

PEARL CULTURE PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PYI PHYO TUN INTERNATIONAL CO., LTD.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
FOR
PEARL CULTURE DEVELOPMENT PROJECT



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Report Review Form

Report Title: Environmental Impact Assessment (EIA) Report

For Pearl Culture Development Project for Pyin Sa Bu Island

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Summary : EIA Report

This document presents the Environmental Impact
Assessment (EIA) report as required for Pyin Sa Bu
Island pearl culture development project.

Approved by:



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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Contents

Contents	i
List of Tables	xiii
List of Figures	xv
List of Abbreviation	xviii
Chapter (1) EXECUTIVE SUMMARY	1
အခန်း (၁) အစီရင်ခံစာအကျဉ်းချုပ်	11
Chapter (2) INTRODUCTION	26
Chapter (3) IDENTIFICATION OF THE PROJECT PROPONENT AND THE EIA EXPERTS	27
3.1 SHARE AND SHAREHOLDERS LIST	27
3.2 ORGANIZATION CHARTS of Pyin Sa Bu Island Pearl Farm for Pyi Phyo Tun International Co., Ltd.	28
3.3 STUDY TEAM FOR ENVIRONMENTAL AND SOCIAL EXPERTS	29
Chapter (4) POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK	32
4.1 POLICY AND LEGAL FRAMEWORK	32
4.2 RELEVANT LEGISLATION	33
4.2.1 ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURES (2015)	33
4.2.2 NATIONAL ENVIRONMENTAL QUALITY EMISSION GUIDELINES (2015)	35
4.2.3 ENVIRONMENTAL CONSERVATION RULES (2014)	36
4.2.4 ENVIRONMENTAL CONSERVATION LAW (2012)	36
4.2.5 NATURAL DISASTER MANAGEMENT LAW (2013)	38
4.2.6 PESTICIDE LAW (2016)	39
4.2.7 THE CONSERVATION OF WATER RESOURCES AND RIVERS LAW (2006)	39
4.2.8 THE NATIONAL ENVIRONMENTAL POLICY LAW (1994)	40
4.2.9 FOREST LAW (1992)	40
4.2.10 THE UNDERGROUND WATER ACT (1930)	40
4.2.11 MYANMAR PEARL LAW (1995)	40
4.2.12 THE LAW AMENDING THE MYANMAR PEARL LAW (2014)	41
4.2.13 EMPLOYMENT AND SKILL DEVELOPMENT LAW (2013)	41
4.2.14 THE MYANMAR INVESTMENT LAW (2016)	42



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

4.2.15	NATIONAL LAND USE POLICY (2016)	43
4.2.16	LABOR ORGANIZATION LAW (2011).....	43
4.2.17	SOCIAL SECURITY LAW (2012).....	44
4.2.18	THE PRIVATE INDUSTRIAL ENTERPRISE LAW (1990)	44
4.2.19	VACANT, FALLOW AND VIRGIN LAND MANAGEMENT LAW (2012) 44	
4.2.20	FARM LAND LAW (2012)	44
4.2.21	Protection of Biodiversity and Protected Area Law (2018).....	45
4.3	APPLICATION OF INTERNATIONAL GUIDELINES	45
4.3.1	IFC ENVIRONMENTAL, HEALTH AND SAFETY (EHS) GUIDELINES (2007) 45	
4.3.2	IFC GUIDELINES ON WATER AND SANITATION, (2007)	46
4.3.3	IFC GUIDELINES ON WASTE MANAGEMENT FACILITIES (2007)	46
4.3.4	IFC GUIDELINES FOR AQUACULTURE (2007)	46
Chapter (5)	PROJECT DESCRIPTION AND ALTERNATIVE SELECTION.....	47
5.1	PROJECT DESCRIPTION AND LOCATION	47
5.2	PROPOSED PROJECT DEVELOPMENT	47
5.3	PROPOSED PEARL CULTURE PROCESS	48
5.3.1	SPECIES DESCRIPTION	49
5.3.2	PEARL CULTURE PROCESS	49
5.4	INVESTMENT PLAN	56
5.5	DESCRIPTION OF BUILDINGS, ASSOCIATED INFRASTRUCTURES AND TEMPORARY SITE LAYOUT PLAN.....	57
5.5.1	MASTER PLAN	59
5.5.2	MANPOWER REQUIREMENT.....	62
5.5.3	UTILITY OF MACHINERY AND EQUIPMENT	64
5.6	RESOURCE CONSUMPTION	65
5.6.1	ELECTRICITY AND FUEL CONSUMPTION	66
5.6.2	WATER CONSUMPTION AND AVAILABILITY	66
5.7	PRODUCTION OF WASTES (Solid, Liquid and Gas)	67
5.7.1	SOLID WASTE	67
5.7.2	LIQUID WASTE.....	68
5.7.3	GAS EMISSION.....	69
5.8	PROJECT ALTERNATIVE	70



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

5.8.1	ALTERNATIVE 1: NO ACTION ALTERNATIVE	70
5.8.2	ALTERNATIVE 2: PROJECT Pyi Phy Tun Pearl Culture Process IN PRE- SELECTED LOCATION	70
Chapter (6)	DESCRIPTION OF THE SURROUNDING ENVIRONMENT	72
6.1	SCOPE OF THE STUDY AREA	72
6.2	OBJECTIVES AND METHODOLOGY	73
6.3	Existing Condition of the Proposed Project Environment	73
6.3.1	LAND USE	73
6.3.2	Kyun Su Township	73
6.4	Environmental Quality Analysis	74
6.4.1	Ambient Air Quality	74
6.4.2	Ambient Noise	74
6.4.3	Water Quality	75
6.5	Monitoring and Sampling Locations	77
6.6	ENVIRONMENTAL QUALITY MONITORING	79
6.6.1	Ambient Air Quality	79
6.6.2	Ambient Noise	82
6.6.3	Wind Speed and Direction	85
6.6.4	Water Quality	86
6.6.5	Odor Concentration Level	88
6.7	Biodiversity	89
6.7.1	Introduction of Biodiversity	89
6.7.2	Objective of the survey	91
6.7.3	Methodology for Biodiversity Survey	91
6.7.4	Results of the Biodiversity Survey	93
6.7.4.1	Terrestrial Fauna	93
6.7.4.2	Flora	98
6.7.4.3	Phytoplankton	102
6.7.4.4	Zooplankton	120
6.7.4.5	Benthos	125
6.7.4.6	Mollusks and Gastropods	131
6.7.4.7	Coral reef	133
6.7.4.8	Fishes	144



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

6.8	CLIMATE CHANGE	153
6.9	REGIONAL GEOLOGY	153
6.9.1	Mergui Group.....	155
6.9.2	Moulmein Limestone	155
6.9.3	Continental Red-beds.....	155
6.9.4	Tertiary Strata	155
6.9.5	Quaternary Deposits.....	156
6.9.6	Igneous Rocks	156
6.9.7	Economic Geology.....	156
6.9.8	STRUCTURAL GEOLOGY	156
6.10	SOCIO- ECONOMIC COMPONENTS	157
6.10.1	Health Status	159
6.10.2	Methodology for Socio-Economic Study	159
6.10.3	Data Collection and Observation in the Field.....	160
6.10.4	Methodology for Determination of Sample Size	161
6.10.4.1	Demographic Aspects	161
6.11	Socio-economic Characteristics	165
6.11.1	Opinion of the Respondents.....	174
Chapter (7)	IMPACT ASSESSMENT AND MITIGATION MEASURES	176
7.1	Introduction	176
7.1.1	Methodology	176
7.2	Terrestrial Ecology	176
7.3	Marine Ecology	176
7.4	WATER QUALITY	176
7.5	AMBIENT AIR QUALITY	177
7.6	NOISE	177
7.7	SENSITIVITY OF RECEPTORS.....	177
7.8	Potential Significant Impacts	179
7.8.1	Potential Significant Impacts on Construction Phase	179
7.8.1.1	Visual Impact.....	179
7.8.1.2	Ambient Air Quality	179
7.8.1.3	Noise and Vibration.....	179
7.8.1.4	Impact on Soil and Soil Erosion	180



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

7.8.1.5	Impact on Water.....	180
7.8.1.6	Loss of Terrestrial Habitats and Biodiversity	180
7.8.1.7	Solid Wastes	180
7.8.1.8	Liquid Wastes	181
7.8.1.9	Hazardous Wastes.....	181
7.8.1.10	Fire Hazards	181
7.8.1.11	Occupational Health and Safety	181
7.8.1.12	Replanting and Landscaping.....	181
7.8.1.13	Employment	182
7.8.2	Potential Significant Impacts on Operation Phase.....	182
7.8.2.1	Introduction of Alien, Selectively or Genetically Engineered Species	182
7.8.2.2	Visual Impact.....	182
7.8.2.3	Ambient Air Quality	182
7.8.2.4	Noise and Vibration.....	182
7.8.2.5	Impact on Soil and Soil Erosion	182
7.8.2.6	Impact on water quality	183
7.8.2.7	Loss of Terrestrial Habitats and Biodiversity	183
7.8.2.8	Anchoring	183
7.8.2.9	Solid Waste	183
7.8.2.10	Liquid Waste.....	184
7.8.2.11	Hazardous Waste	184
7.8.2.12	Fire Hazard	184
7.8.2.13	Occupational Health and Safety	184
7.8.2.14	Employments	184
7.8.3	Potential Significant Impacts on Decommission Phase.....	185
7.8.3.1	Visual Impact.....	185
7.8.3.2	Ambient Air Quality	185
7.8.3.3	Noise and Vibration.....	185
7.8.3.4	Impact on Soil and Soil Erosion	185
7.8.3.5	Impact on water quality	185
7.8.3.6	Loss of Terrestrial Habitats and Biodiversity	185
7.8.3.7	Solid Waste	185



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

7.8.3.8	Liquid Waste.....	185
7.8.3.9	Hazardous Waste	186
7.8.3.10	Fire Hazards	186
7.8.3.11	Occupational Health and Safety	186
7.8.3.12	Replanting and Landscaping.....	186
7.8.3.13	Employments	186
7.9	Mitigation Adverse Impacts of the Proposed Project.....	192
7.9.1	Mitigation Measures during Construction Phase	192
7.9.1.1	Mitigation Measures on Visual Impact.....	192
7.9.1.2	Mitigation Measures on Ambient Air Quality	192
7.9.1.3	Mitigation Measures on Noise and Vibration.....	192
7.9.1.4	Mitigation Measures of Impact on Soil and Soil Erosion.....	192
7.9.1.5	Mitigation Measures of Impact on Water Quality	193
7.9.1.6	Mitigation Measures of Impact on Loss of Terrestrial Habitats and Biodiversity	193
7.9.1.7	Mitigation Measures of Waste Generation	193
7.9.1.8	Mitigation Measures on Fire Hazards.....	194
7.9.1.9	Mitigation Measures on Occupational Health and Safety	194
7.9.1.10	Mitigation Measures on Replanting and Landscaping	194
7.9.2	Mitigation Measures during Operation Phase.....	194
7.9.2.1	Mitigation Measures of Introduction of Alien, Selectively or Genetically Engineered Species.....	194
7.9.2.2	Mitigation Measures of Visual Impact	194
7.9.2.3	Mitigation Measures on Ambient Air Quality	195
7.9.2.4	Mitigation Measures on Noise and Vibration.....	195
7.9.2.5	Mitigation Measures of Impact on Soil and Soil Erosion.....	195
7.9.2.6	Mitigation Measures of Impact on Water Quality	195
7.9.2.7	Mitigation Measures on Loss of Terrestrial Habitats and Biodiversity	195
7.9.2.8	Mitigation Measures on Anchoring	195
7.9.2.9	Mitigation Measures on Solid Waste.....	196
7.9.2.10	Mitigation Measure on Liquid Waste	196
7.9.2.11	Mitigation Measure on Fire Hazards	196
7.9.2.12	Mitigation Measures on Occupational Health and Safety	196



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

7.9.3	Mitigation Measures during Decommissioning Phase	197
7.9.3.1	Mitigation Measures on Ambient Air Quality	197
7.9.3.2	Mitigation Measures on Noise and Vibration.....	197
7.9.3.3	Mitigation Measures on Soil and Soil Erosion	197
7.9.3.4	Mitigation Measures on Water Quality	197
7.9.3.5	Mitigation Measures on Loss of Terrestrial Habitats and Biodiversity 197	
7.9.3.6	Mitigation Measures on Waste Generation	198
7.9.3.7	Mitigation Measures on Fire Hazards.....	198
7.9.3.8	Mitigation Measures on Occupational Health and Safety	198
7.10	Methodology of Marine Biodiversity Environment	198
7.10.1	Potential Significant Impact on Marine biological Environment	199
7.10.2	Mitigation measure on marine biological environment of Proposed project area 201	
7.11	Cumulative Impact Assessment.....	202
Chapter (8)	ENVIRONMENTAL MANAGEMENT PLAN	203
8.1	Environmental Management Plan	203
8.1.1	OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN	203
8.1.2	RESPONSIBILITIES OF THE EMP	203
8.2	ENVIRONMENTAL MONITORING PLAN	223
8.2.1	MONITORING PARAMETERS	223
8.2.2	ENVIRONMENTAL MONITORING REPORTS.....	223
8.3	BIODIVERSITY MANAGEMENT PLAN.....	228
8.4	Biodiversity Monitoring Plan.....	231
8.5	Waste Management Plan.....	234
8.5.1	Waste Management Plan for Pearl Oyster Breeding and Pearl Production Operation Process	236
8.5.2	Waste Management Plan for staff house and kitchen.....	237
8.6	Occupational Health and Safety Plan	238
8.7	Community Health and Safety Plan	238
8.8	Emergency Preparedness and Response Procedures.....	239
8.8.1	Natural Hazardous	239
8.8.1.1	CYCLONES	239
8.8.1.2	STROM SURGE.....	240



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

8.8.1.3	Tsunami	240
8.8.2	Natural Hazards Response Plan	241
8.8.3	Fire Prevention, Preparedness and Response.....	241
8.8.4	Landslide Prevention, Preparedness and Response	244
8.8.5	Oil Spill Response Plan	246
8.8.5.1	OIL SPILL RESPONSE CRITERIA.....	246
8.8.5.2	STEPS FOR OIL SPILL RESPONSE.....	246
8.8.6	Corporate Social Responsibility (CSR) Plan	247
8.8.7	Community Grievance Redress Mechanism.....	247
Chapter (9)	PUBLIC CONSULTATION AND DISCLOSURE	249
9.1	Necessity of Stakeholders Meeting	249
9.2	Define Public Consultation	249
9.3	Public Consultation Process	249
9.3.1	Agenda:.....	250
9.3.2	Public Consultation's Meeting Minute of Pearl Culture Project	251
9.3.3	Recommendation from Attendees.....	256
9.4	Disclosing of Environmental Impact Assessment (EIA) for Pearl Culture Development Project.....	256
Chapter (10)	CONCLUSIONS AND RECOMMENDATIONS.....	257
10.1	Conclusion	257
10.2	Recommendations for Future Works	258
Reference		259
Appendix (1)	Commitment Letter to follow legal frameworks	260
Appendix (2)	Commitment Letter to follow Commitments and Mitigation Measures	261
Appendix (3)	Commitment Letter by Third Party	262
Appendix (4)	Islands in Taninthari Region.....	263
Appendix (5)	Surface Water Result	264
Appendix (6)	Surface Water Result (Continued).....	265
Appendix (7)	Laboratory Result of Wastewater (Point – 1)	266
Appendix (8)	Laboratory Result of Wastewater (Point – 1) (Continued).....	267
Appendix (9)	Laboratory Result of Wastewater (Point – 1) (Continued).....	268
Appendix (10)	Laboratory Result of Wastewater (Point – 1) (Continued).....	269



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (11)	Laboratory Result of Wastewater (Point –2)	270
Appendix (12)	Laboratory Result of Wastewater (Point –2) (Continued).....	271
Appendix (13)	Laboratory Result of Wastewater (Point –2) (Continued).....	272
Appendix (14)	Laboratory Result of Wastewater (Point –2) (Continued).....	273
Appendix (15)	Public Consultation’s Invitation Card.....	274
Appendix (16)	Newspaper Announcement (The Mirror)	275
Appendix (17)	Newspaper Announcement (Myanmar Alin).....	276
Appendix (18)	Public Consultation’s Presentation about Pearl Culture Project.....	277
Appendix (19)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	278
Appendix (20)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	279
Appendix (21)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	280
Appendix (22)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	281
Appendix (23)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	282
Appendix (24)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	283
Appendix (25)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	284
Appendix (26)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	285
Appendix (27)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	286
Appendix (28)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	287
Appendix (29)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	288
Appendix (30)	Public Consultation’s Presentation about Pearl Culture Project (Continued)	289
Appendix (31)	Public Consultation’s Presentation about Environmental Impact Assessment	290
Appendix (32)	Public Consultation about Environmental Impact Assessment (Continued)	291



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (33) (Continued)	Public 292	Consultation about Environmental Impact Assessment
Appendix (34) (Continued)	Public 293	Consultation about Environmental Impact Assessment
Appendix (35) (Continued)	Public 294	Consultation about Environmental Impact Assessment
Appendix (36) (Continued)	Public 295	Consultation about Environmental Impact Assessment
Appendix (37) (Continued)	Public 296	Consultation about Environmental Impact Assessment
Appendix (38) (Continued)	Public 297	Consultation about Environmental Impact Assessment
Appendix (39) (Continued)	Public 298	Consultation about Environmental Impact Assessment
Appendix (40) (Continued)	Public 299	Consultation about Environmental Impact Assessment
Appendix (41) (Continued)	Public 300	Consultation about Environmental Impact Assessment
Appendix (42) (Continued)	Public 301	Consultation about Environmental Impact Assessment
Appendix (43) (Continued)	Public 302	Consultation about Environmental Impact Assessment
Appendix (44) (Continued)	Public 303	Consultation about Environmental Impact Assessment
Appendix (45) (Continued)	Public 304	Consultation about Environmental Impact Assessment
Appendix (46) (Continued)	Public 305	Consultation about Environmental Impact Assessment
Appendix (47) (Continued)	Public 306	Consultation about Environmental Impact Assessment
Appendix (48) (Continued)	Public 307	Consultation about Environmental Impact Assessment
Appendix (49) (Continued)	Public 308	Consultation about Environmental Impact Assessment
Appendix (50) (Continued)	Public 309	Consultation about Environmental Impact Assessment



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (51) Public Consultation about Environmental Impact Assessment (Continued)	310
Appendix (52) Public Consultation about Environmental Impact Assessment (Continued)	311
Appendix (53) Public Consultation about Environmental Impact Assessment (Continued)	312
Appendix (54) Public Consultation about Environmental Impact Assessment (Continued)	313
Appendix (55) Public Consultation about Environmental Impact Assessment (Continued)	314
Appendix (56) Public Consultation about Environmental Impact Assessment (Continued)	315
Appendix (57) Public Consultation about Environmental Impact Assessment (Continued)	316
Appendix (58) Attendance List Record	317
Appendix (59) Attendance List Record (Continued)	318
Appendix (60) Attendance List Record (Continued)	319
Appendix (61) Attendance List Record (Continued)	320
Appendix (62) Attendance List Record (Continued)	321
Appendix (63) Attendance List Record (Continued)	322
Appendix (64) Attendance List Record (Continued)	323
Appendix (65) Attendance List Record (Continued)	324
Appendix (66) Attendance List Record (Continued)	325
Appendix (67) Attendance List Record (Continued)	326
Appendix (68) Attendance List Record (Continued)	327
Appendix (69) Attendance List Record (Continued)	328
Appendix (70) Attendance List Record (Continued)	329
Appendix (71) Attendance List Record (Continued)	330
Appendix (72) Attendance List Record (Continued)	331
Appendix (73) Attendance List Record (Continued)	332
Appendix (74) Attendance List Record (Continued)	333
Appendix (75) Attendance List Record (Continued)	334
Appendix (76) Attendance List Record (Continued)	335
Appendix (77) Attendance List Record (Continued)	336
Appendix (78) Attendance List Record (Continued)	337



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (79)	Attendance List Record (Continued)	338
Appendix (80)	Attendance List Record (Continued)	339
Appendix (81)	Attendance List Record (Continued)	340
Appendix (82)	Recommendation Letter of Attendees from Public Consultation	341
Appendix (83)	Recommendation Letter of Attendees from Public Consultation (Continued)	342
Appendix (84)	Recommendation Letter of Attendees from Public Consultation (Continued)	343
Appendix (85)	Recommendation Letter of Attendees from Public Consultation (Continued)	344
Appendix (86)	Recommendation Letter of Attendees from Public Consultation (Continued)	345
Appendix (87)	Recommendation Letter of Attendees from Public Consultation (Continued)	346



List of Tables

Table 3-1 Share and Shareholder List.....	27
Table 3-2 Environmental Impact Assessment Team	29
Table 5-1 Description for Long Lines	55
Table 5-2 Annual Amount of Pearl Oyster Raising.....	55
Table 5-3 Amount of seeded pearl oyster (February, 2019).....	56
Table 5-4 Lists of Shells Oyster.....	56
Table 5-5 Investment Plan	56
Table 5-6 Imported Machine and Equipment	57
Table 5-7 Detail information of Master Plan Buildings	60
Table 5-8 Master Plan Building	60
Table 5-9 Manpower Requirement	62
Table 5-10 Current Manpowers Information	63
Table 5-11 Employment Statement	64
Table 5-12 Lists of machinery and equipment	64
Table 5-13 Time shift of operating generator	66
Table 5-14 Quantity of CO2 Emissions from the Generator	69
Table 5-15 EBRD Standard of CO2 Emission	70
Table 6-1 Rain Fall Data and Temperature of Kyun Su Township	73
Table 6-2 Ambient Air Quality	74
Table 6-3 Noise Level Monitoring	75
Table 6-4 Equipment used to measure ambient air and noise measurement	75
Table 6-5 Environmental Quality Parameters for Surface Water Quality	76
Table 6-6 Environmental Quality Parameters for Waste Water Quality	76
Table 6-7 Equipment for water sampling	76
Table 6-8 Locations of Environmental Quality sampling points.....	78
Table 6-9 Air pollutants emission results (Pyi Phyto Tun Co., Ltd) (source 13 th to 14 th March 2019)	80
Table 6-10 Air Emission Levels (Standard)	81
Table 6-11 Observed Values of Noise Level Measurement (source) at Pyi Phyto Tun Co., Ltd	82
Table 6-12 Observed Values of Noise Level Measurement (near the kitchen and dining hall) at Pyi Phyto Tun Co., Ltd	83
Table 6-13 Observed Ambient Noise level Results from Selected Points.....	84
Table 6-14 National Environmental Quality (Emission) Guidelines Values for Noise Level	85
Table 6-15 Pyi Phyto Tun Co., Ltd (Waste Water Results).....	87
Table 6-16 Pyi Phyto Tun Co., Ltd (Surface Water Results)	88
Table 6-17 The location of each biodiversity for marine surveyed sites	91
Table 6-18 List of recorded terrestrial fauna by surveying.....	95
Table 6-19 List of recorded terrestrial fauna by interviewing local people.....	96
Table 6-20 List of Recorded Plant Species from the Proposed Project Area	98
Table 6-21 Lists of Flora Species found in the Proposed Project Area	100



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 6-22 Species occurrence and classified list of phytoplankton from the proposed project area.....	105
Table 6-23 Species occurrence and classified list of zooplankton	121
Table 6-24 Species occurrence and classified list of benthos	127
Table 6-25 Classified list Mollusca and Arthropoda	129
Table 6-26 Species occurrence of Gastropods, Bivalves, Chiton and Barnacles	131
Table 6-27 Classified list of coral reefs with common name and IUCN red list level	135
Table 6-28 Species occurrence of coral from the surveyed area	138
Table 6-29 Classified list of fishes with IUCN red list status.....	145
Table 6-30 Geological Succession of the Project Site	154
Table 6-31 Total Area of Kyun Su Township	157
Table 6-32 Ethnic Group in Kyun Su Township	158
Table 6-33 University/ Colleagues of Kyun Su Township.....	158
Table 6-34 School Information of Kyun Su Township	158
Table 6-35 Illiterate Status of Kyun Su Township	159
Table 6-36 Hospital Lists in Kyun Su Township.....	159
Table 6-37 Gender and Age Interval	162
Table 6-38 Enough income in Family	168
Table 6-39 Reason for Changes.....	169
Table 6-40 Toilet Type	171
Table 6-41 Facing of Natural Disaster.....	173
Table 7-1 Impact Assessment	187
Table 7-2 Impact magnitude for biological component.....	199
Table 7-3 Impact Significant for biological component.....	199
Table 7-4 Impact probability for biological component	200
Table 7-5 Impact duration for biological component	200
Table 8-1 Responsible Persons for HSE and Biodiversity Team	205
Table 8-2 Environmental Management Plan	208
Table 8-3 Environmental Monitoring Plan.....	223
Table 8-4 Budget allocation for Environmental Monitoring Plan	227
Table 8-5 Biodiversity Management Plan	229
Table 8-6 Biodiversity Monitoring Plan.....	231
Table 8-7 Cost Estimation for Biodiversity Monitoring Plan.....	234
Table 8-8 Type of Wastes and Sources.....	235
Table 8-9 OHSE plan.....	238
Table 8-10 Corporate Social Responsibility Plan	247



List of Figures

Figure 3-1 Organization Chart of Pearl Farm	28
Figure 5-1 Location of the proposed project.....	47
Figure 5-2 Transported the collected spats to Pyin Sa Bu Island	50
Figure 5-3 Spat Collectors	50
Figure 5-4 Young Oysters.....	50
Figure 5-5 Spat Collectors in Russel Nets	50
Figure 5-6 Long Lines in Pyin Sa Bu Island.....	51
Figure 5-7 Pocket Panels	51
Figure 5-8 Oysters in the 8 pocket panel	51
Figure 5-9 Pocket Panel Storage.....	51
Figure 5-10 Cleaning triangle nets using high pressure cleaner	52
Figure 5-11 Floating House	52
Figure 5-12 Cleaning oysters in the pocket panels using high pressure cleaner	52
Figure 5-13 Barnacles and seaweed off cleaning by using knife on floating house	52
Figure 5-14 Cutting the tissue.....	53
Figure 5-15 Seeding the nucleus into adult oyster	53
Figure 5-16 X ray Checking	53
Figure 5-17 X ray Checking	53
Figure 5-18 Process flow chart for Pearl Culturing	54
Figure 5-19 Location of Long Line Map	55
Figure 5-20 Project Layout Plan	57
Figure 5-21 Clinic	58
Figure 5-22 Ladies Hostel.....	58
Figure 5-23 Staff Canteen.....	58
Figure 5-24 Men Hostel	58
Figure 5-25 Row House	58
Figure 5-26 Workshop	58
Figure 5-27 Jetty	59
Figure 5-28 Office.....	59
Figure 5-29 Kitchen	59
Figure 5-30 Thetha Shop	59
Figure 5-31 Pocket Cleaning House	59
Figure 5-32 Ware House	59
Figure 5-33 Generator Storage House	66
Figure 5-34 Oil Storage House	66
Figure 5-35 Natural Spring Water	67
Figure 5-36 Water Storage Tank.....	67
Figure 5-37 Water Storage Tank.....	67
Figure 5-38 Water Storage Tank.....	67
Figure 5-39 Shells of pearl oyster.....	68
Figure 5-40 Domestic Waste	68



Figure 5-41 Domestic liquid waste	69
Figure 5-42 Traditional Toilet	69
Figure 5-43 Floating ball & Oyster Pocket cleaning	69
Figure 5-44 Floating House	69
Figure 6-1 Scope of the study area	72
Figure 6-2 Air Quality and Noise Monitoring Locations of Pyi Phyto Tun Co., Ltd.....	77
Figure 6-3 Waste Water Quality Sampling Locations of Pyi Phyto Tun Co., Ltd	78
Figure 6-4 Surface Water Quality Sampling Locations of Pyi Phyto Tun Co., Ltd	78
Figure 6-5 Fluctuation of Air Pollutants during diel cycle (source) (13 th to 14 th March 2019)	81
Figure 6-6 PM Monitoring Results (source) (13th to 14th March 2019)	81
Figure 6-7 Noise Level (source) at Pyi Phyto Tun Co., Ltd	83
Figure 6-8 Noise Level near the kitchen at Pyi Phyto Tun Co., Ltd.....	84
Figure 6-9 Wind Speed and Wind Direction (Blowing From) at Pyi Phyto Tun Co., Ltd (13 th to 14 th March 2019).....	86
Figure 6-10 Wind Class Frequency Distribution at Pyi Phyto Tun Co., Ltd (13th to 14th March 2019).....	86
Figure 6-11 Surface Water Sample.....	89
Figure 6-12 Wastewater point 1 sample	89
Figure 6-13 Air Quality Monitoring	89
Figure 6-14 Noise Quality Measurement	89
Figure 6-15 Wastewater point 2 sample	89
Figure 6-16 Phytoplankton	114
Figure 6-17 Phytoplankton	115
Figure 6-18 Phytoplankton	117
Figure 6-19 Quantitative analysis of Centric diatoms	118
Figure 6-20 Quantitative analysis of Pennate diatoms	118
Figure 6-21 Quantitative analysis of dinoflagellates	118
Figure 6-22 Quantitative analysis of blue green algae.....	119
Figure 6-23 Station-wise fluctuations of phytoplankton	119
Figure 6-24 Comparing in percentage of total cell densities among different stations	119
Figure 6-25 Zooplankton	123
Figure 6-26 Zooplankton	124
Figure 6-27 Estimated cell densities of zooplankton from four stations	125
Figure 6-28 Comparing in total cell densities of zooplankton from different stations	125
Figure 6-29 Marine benthic macroinvertebrates.....	128
Figure 6-30 Mollusks and Gastropods	132
Figure 6-31 Mollusks and Gastropods	133
Figure 6-32 Photographs of Coral reefs.....	141
Figure 6-33 Photographs of Coral reefs.....	142
Figure 6-34 Photographs of Coral reefs.....	143
Figure 6-35 Photographs of Fishes	148
Figure 6-36 Photographs of Fishes	149



Figure 6-37 Photographs of fishes	151
Figure 6-38 Photographs of fishes, ray and squid.....	151
Figure 6-39 Photographs of crabs and lobsters.....	151
Figure 6-40 Analysis of IUCN red listed species of both fishes and coral reefs	152
Figure 6-41 Distribution of Projected Climate Change-related Disaster Risks (UNDP 2011)	153
Figure 6-42 Geological Map of the project Site	154
Figure 6-43 Seismic Zone Map of Myanmar (Revised by Dr. Maung Thein, U Thint	157
Figure 6-44 Villages in Kyun Su Township and 5km scope of Project Site	160
Figure 6-45 Address of Interviewee	161
Figure 6-46 Township of Interviewee.....	162
Figure 6-47 Respondent's Gender and Age.....	163
Figure 6-48 Percentage of the Ethnicity of Interviewee	164
Figure 6-49 Educational Status of Interviewee.....	164
Figure 6-50 Job Position of Interviewee	165
Figure 6-51 Number of Family Member	166
Figure 6-52 Main Occupation Status of Family	166
Figure 6-53 Service Year in Pearl Farm	167
Figure 6-54 Average income per year	168
Figure 6-55 Comparisom of Income Change in Last Five Year.....	168
Figure 6-56 Staff Housing	169
Figure 6-57 Source of drinking Water and Domestic Water for respondents	170
Figure 6-58 Sources of electricity	170
Figure 6-59 Wastewater Discharging	171
Figure 6-60 Trash Disposal.....	171
Figure 6-61 Health Status	172
Figure 6-62 Transportation	173
Figure 6-63 Type of Natural Disaster	173
Figure 6-64 Project Involved in local development Program	174
Figure 6-65 Socio-economic Survey	175
Figure 8-1 Waste Management Plan for Pearl Oyster Breeding and Pearl Production Opeartion Process	236
Figure 8-2 Waste Management Plan for Staff House and Kitchen.....	237
Figure 8-3 Pyin Sa Bu Island Topography, High-sea level above.....	241
Figure 8-4 Components of a Fire Extinguisher.....	242
Figure 8-5 Types of Fire Extinguishers	243
Figure 8-6 Examples of low-cost retaining walls	245
Figure 8-7 Tree roots help holding the different soil layers together and hinder landslide ...	245
Figure 8-8 Steps of Grievance Redress Mechanism of Pyi Phyto Tun International Co., Ltd.	248



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

List of Abbreviation

Full Name	Acronym
Environmental Impact Assessment	EIA
Environmental Management Plan	EMP
Environmental Monitoring Plan	EMOP
ton per day	t/d
Myanmar Investment Commission	MIC
Environmental Conservation Department	ECD
Ministry of Natural Resources and Environmental Conservation	MONREC
Particulate Matter under 10 micrometers diameter	PM ₁₀
Particulate Matter under 2.5 micrometers diameter	PM _{2.5}
Nitrogen dioxide	NO ₂
Sulphur dioxide	SO ₂
Ozone	O ₃
Percent	%
feet	ft
kilo volt ampere	kVA
gallons	gals
kilogram	kg
microgram per meter cubed	µg/m ³
Degree celsius	°C
National Environmental Quality (Emission) Guideline	NEQG
kilometer	km
milligram per liter	mg/l
Parts per million	ppm
decibels	dB
Colony Forming Units per 100 milliliter	CFU/100ml
Health and Safety Executive	HSE
Food and Agriculture Organization	FAO
World Health Organization	WHO



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Full Name	Acronym
International Finance Corporation	IFC
International Union for Conservation of Nature	IUCN
Least Concern	LC
Vulnerable	VU
Near Threatened	NT
Data Deficient	DD
Not Evaluated	NE
Residence or Migrant	R M



Chapter (1) EXECUTIVE SUMMARY

This report is Environmental Impact Assessment (EIA) for Pearl Culture Development Project by Pyi Phyto Tun International Co., Ltd. which is conducted by E Guard Environmental Services. The specific objectives of this study are to:

1. identify the major impacts that may arise from the activities of the proposed project on natural environment and socio-economic environment of the project area,
2. describe the mitigation measures to minimize these impacts,
3. prepare and implement Environmental Management Plan for the project and
4. make sure that EIA is developed sufficiently and soundly for the proposed project.
5. support Corporate Social Responsibility Plan (CSR Plan), which plays an essential part for the improvement of the social welfare of community as well as development of the region.

The proposed project is aimed pearl oyster breeding and pearl production for selling and trading. The proposed project is based at the Pyin Sa Bu Kyun, also known as Bentinck island, which is located at Tanintharyi Region, Myeik District, Kyun Su Township, Yay Kan Taung Village Tract, latitude 11°47'49.49"N, 11°51'37.41"N and longitude 98°00'4.94"E, 98°03'04.27"E. The project site is 15.94 miles (25.65 km) far away from the Pandaung Kyun, also known as Letsok-aw Island and 57.55 miles (92.62 km) far away from the Myeik Township. (*See details in Chapter 2-Introduction*)

Pyi Phyto Tun International Co., Ltd is a 100% local investor of this project. The company already have got permission from Myanmar Investment Commission and also has an agreement with Myanmar Pearl Enterprise to establish a pearl culture development at Pyin Sa Bu island. The proposed project investment is in initial 15 years duration. There are two stages in the proposed pearl culture development that (i) Development Stage and (ii) Pearl Culturing Stage. The selling and trading plan will be 50% for export and 50% local.

Pyi Phyto Tun International Co., Ltd has planned to implement the project to

- ❖ supply competitive and quality pearl to the local market and foreign market
- ❖ help rebuild the economy and social lives of the communities in the operational area
- ❖ help reduce rural-urban migration through employment opportunities and to make communities more attractive to youths and the unemployed.

Detailed information of the proposed organization is as follows:

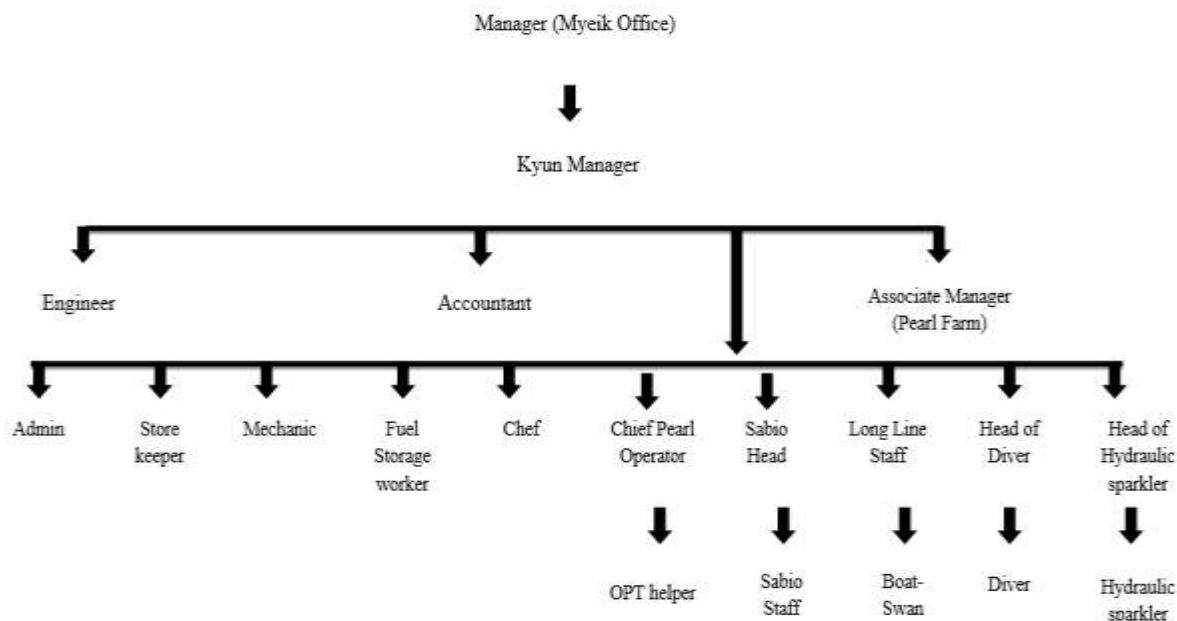
Name of Company:	PYI PHYTO TUN INTERNATIONAL Co., Ltd
Proponent:	Dr. Aung Lwin (@) Ah Khwe
Designation:	Chairman
Business Type:	Pearl Culture Process
Company Address:	No.15, 11 th Street, Lanmadaw Township, Yangon, Myanmar



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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(See details in Chapter 3- Project Proponent)

Laws and regulations related to Sawmill and authorized institution is currently practiced in Myanmar and also described detail in **Chapter 4: Policy, Legal and Administrative Framework**.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

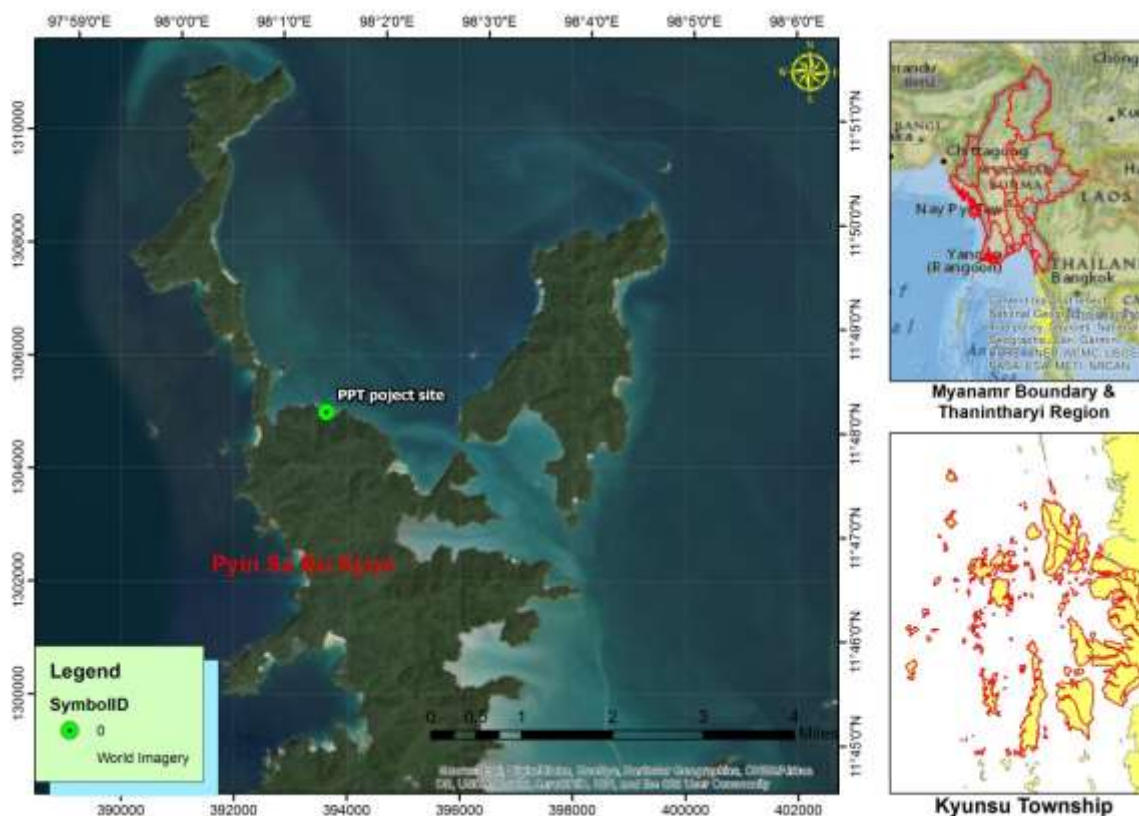
Laws and Regulations	Year
Environmental Impact Assessment Procedure	2015
National Environment Quality (Emission) Guidelines	2015
Environmental Conservation Rules	2014
Environmental Conservation Law	2012
Natural Disaster Management Law	2013
Pesticide Law	2016
The Conservation of Water Resources and Rivers Law	2006
Multi Different Kind of Biological Life and Environmental Protection Law	2018
The National Environmental Policy Law	1994
Forest Law	1992
The Underground Water Act	1930
Myanmar Pearl Law	1995
The Law Amending the Myanmar Pearl Law	2014
Employment and Skill Development Law	2013
The Myanmar Investment Law	2016
National Land Use Policy	2016
Labour Organization Law	2011
Labour Organization Rules	2012
Social Security Law	2012
The Private Industrial Enterprise Law	1990
Vacant, Fallow and Virgin Land Management Law	2012
Farm Land Law	2012
Protection of Biodiversity and Protected Area Law	2018
Application of International Guidelines	
IFC Environmental, Health and Safety (EHS) Guidelines	2007
IFC Guidelines on Water and Sanitation	2007
IFC Guidelines on Waste Management Facilities	2007
IFC Guidelines for Aquaculture	2007

The island is thickly wooded and 19274.2 acres (7799.99 ha) in extent. 8,646.4 acres (3,499.07 ha) will be used for the pearl culture development. The selling and trading plan will be 50% for export and 50% for local. The project life cycle is 15 years and the past 3 years were experimental pearl culture process. The project site and facilities are temporary



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

during the 3 years experimental production period which ends up in 2019. The experimental production period has passed and project is recognized feasible by the officials from Myanmar Pearl Enterprise. The project facilities will be upgraded as planned in the project proposal and construction period will be started in October, 2019.



Proposed Project Location

Pearl cultivation involved planting a nucleus in wild oysters. While some seek to jump-start the natural process by implanting a tiny piece of pearl mantle inside the oyster, others use beads designed to create a larger pearl in the shortest period of time and help to control its shape. Along the way, Japanese scientists identified strains of oysters with the best pearl-bearing qualities and focused on using them to produce pearls of high lustre and clear, uniform colour. PPT use the Japanese method in the process.

Pearl culture process at PPT and similar industries follows the process below -

- ❖ Spats collection
- ❖ Transport the collected spats to Pyin Sa Bu Island
- ❖ Transported collectors hanging at the long line for resting
- ❖ 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 110-120 days, transfer to (3.0) Bu Net
- ❖ Cleaning biofouling and boring organisms from oyster larvae, 3 times a month



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

- ❖ After 180 days transfer to (8) pocket bag
- ❖ When aged 1 year old, check the size and weight to choose for operated oyster
- ❖ Seeding the oyster
- ❖ Within 3-6 months, perform x-rays checking
- ❖ After 1 and half year, pearl harvesting

Total investment will be Ks 5000.00 million. The detail investment plan for office furniture and operational equipment are shown in below table. The Pyi Phyto Tun International Co., Ltd. has an agreement with Myanmar Pearl Enterprise to establish a pearl culture development.

During operation, the management of the process will be operated on one shift during day time starting from 7:00 AM to 5:00 PM including breakfast and lunch time with a total of 90 staffs. The project proponent has been arranged breakfast, lunch and dinner for staffs.

The pearl culture operation would require 1,000 gallons of water per day and 365,000 gallons of water per year and electricity need of the proposed project is 40,150 kw/h per year.

General domestic wastes are also generated from the staffs. Estimated solid waste generation rate will be 0.4kg per person per day. Since there are total 90 staffs in the project site, total solid waste amount produced per day is 36kg and 1080kg of waste will be generated per month. *(See details in Chapter 5: Project Description and Alternatives).*

Primary data and secondary data collections are very important. Primary data collections like environmental quality measurements play an important role for conducting this EIA.

Water quality sampling locations consist of 1 surface water location (SWQ: at Natural Stream) where people live in the project area use portable water. 2 waste water locations (WWQ1: at the discharge point of cleaning house, WWQ2: at the discharge point of kitchen and dining hall) which were the mainly discharge sources of the existing project area. Waste water in point 1 has high in Total Suspended Solids and BOD because water sampling was undertaken at Panel Cleaning House. Waste water in point 2 has high in Total Suspended Solids, Total Nitrogen, Total Phosphorus, Oil and Grease, Chemical Oxygen Demand and Biochemical Oxygen Demand above the water quality standards. Total Suspended Solids, Oil and Grease, Total Nitrogen and Total Phosphorus are high in waste water because water sampling was undertaken at the discharge point where the kitchen waste were collected. Not only Biochemical Oxygen Demand but also Chemical Oxygen Demand were high in waste water because the contents of Total Suspended Solids were also high in the waste water quality. Turbidity as well as aluminium were high in surface water because water sampling was conducted in the natural stream.

Air quality was monitored at the selected 1 location near (source) that can get the results of the existing ambient air quality. The survey team from E Guard sampled on site collection of environmental quality baseline data on 13th March to 14th March, 2019. The observed values are compared with National Emissions Quality (NEQ) Guidelines, WHO Guideline, National



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Ambient Air Quality Standards (NAAQS) and American Conference of Governmental Industrial Hygienists (ACGIH). The secondary data for surrounding proposed environment such as weather, rainfalls, socio-economic and land use data has been used from the General Administrative Department.

Terrestrial Flora, Fauna and marine biodiversity are also surveyed on 13th March to 14th March, 2019. The transect method was used to survey the terrestrial fauna, Point- Transect Method was used to survey Flora. Phytoplankton samples were collected from four stations. To obtain qualitative data of phytoplankton and zooplankton, surface water column was hauled for 15 minutes with standard plankton net (#25µm). A total of 7 stations were established for the collection of benthos data and mollusks as well as gastropods. Sample collection was carried out randomly for each invertebrate data. Random collection method was used along the edge of the reefs to assess the diversity of Coral Reef. For the crustaceans and fishes, data were obtained directly collected from the landing sites and interviewing to some local fisherman and fisher folks. 23 species of fauna, 48 species of Flora, 87 species of Phytoplankton, 27 species of zooplankton, 8 species of macro benthic organism, 8 species of gastropods, 4 species of bivalves, 1 species of chiton and 2 species of barnacles, 54 species of coral 22 species of finfish, 1 stingray, 1 squid, 2 crabs and 1 lobster are recorded in Pyin Sa Bu Island. (*See details in Chapter 6: Description of The Surrounding Environment*).

Possible impacts, such as impacts on environmental resources, ecological resources, human and waste disposal due to production processes are identified and their significance is assessed by using impact assessment methodology. Potential impacts are differentiated into three main phases, viz., **Construction phase, Operation phase and Decommissioning phase.**

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.

SIGNIFICANCE OF IMPACTS



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The approach to the assessment of significance has taken into account the sensitivity of the receiving environment and the magnitude of change. Table 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

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.

DEVELOPMENT PHASES

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 project as well as any impacts resulting from other temporary works such as working areas and compounds.

Operational impacts are those long-term impacts that will occur as a result of the development of the pearl culture project facility. (e.g. oyster cleaning, panel cleaning, generators, disturbance the natural habitats of the biodiversity).

Decommissioning Phase: includes demolishing of all facilities, longlines, buildings of the project. And then, any existing non-hazardous wastes and hazardous materials/ wastes used in the decommissioning process would be properly handled and disposed of in accordance with governing authority requirements.

IMPACT TYPES



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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.

(See detail in Chapter 7. Impact Assessment and Mitigation Measures)

The environmental management practices, procedures and responsibilities are defined to get full compliance with the existing environmental policy, laws, rules and regulations of the Republic of the Union of Myanmar. There are 11 main sections in this Environmental Management Plan (EMP):

- 1) Environmental Management Plan
- 2) Environmental Monitoring Plan
- 3) Biodiversity Management Plan
- 4) Biodiversity Monitoring Plan
- 5) Waste Management Plan
- 6) Occupational Health and Safety Plan
- 7) Community Health and Safety Plan
- 8) Emergency Preparedness and Response Procedures
- 9) Corporate Social Responsibility (CSR) Plan
- 10) Community Grievance Redress Mechanism

Moreover, cost estimation for EMP and EMOP, Responsibilities of the EMP are also described. The **Environmental Management Plan (EMP)** identifies potential environmental impacts, source of impacts, how to mitigate these impacts and residual impacts after mitigation and responsible persons for three phases.

The **Environmental Monitoring Plan (EMOP)** identifies parameters, frequency and responsible persons to monitor for air and water quality and noise level for three phases.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The **Biodiversity Management Plan** identifies which activity must to perform, who has the responsibilities for Terrestrial Fauna and flora and Marine environment.

The **Biodiversity Monitoring Plan** identifies parameters, location, frequency and responsible persons to monitor for Biodiversity environment.

The **Waste Management Plan** describes types of wastes and sources from pearl culture development project and to manage all type of wastes from the activities of the proposed project.

The **Occupational Health and Safety Plan** includes responsible teams and activities to be performed for safety.

The **Community Health and Safety Plan** is intended to improve environment conditions which affect the surrounding communities.

The **Emergency Preparedness and Response Procedures** identifies how to overcome emergency cases and effectively.

The **Community Grievance Redress Mechanism (GRM)** identifies the steps to solve complaints related with the proposed project. This EMP has, in brief, systematically explored all possible positive and negative environmental impacts of the proposed project and identified mitigation and monitoring measures on negative impacts which can occur in three phases.

The **Corporate Social Responsibility (CSR) Plan** aims to secure social well-being of the employees and their family members, better community living and transparent and friendly relationship with neighboring communities. *(See details in CHAPTER 8: Environmental Management Plan (EMP))*

It is important to disclose the information about the project during the preparation of EIA report and the opinion of all stakeholders should be considered in the preparation of the EIA report. So, public consultation meeting for the proposed project was held on 28th July, 2019 at Basic Education High School (Pa Htet) with total attendees of 205. *(See detail in Chapter 9: Public Consultation)*

In conclusion, this project can create job opportunities for local people in all phases. All of the impacts during three phases can be minimized by using mitigation measures and implementing Environmental Management Plan (EMP). Environmental Monitoring Plan (EMOP) must need to implement for monitoring the environmental quality of the proposed project. Finally, the proponent should follow the comments and suggestions that will be given by ECD after reviewing this EIA report. Once EIA will be approved by concerned authorities, effective implementation of EMP by the project proponent is essential to reduce impacts. The proponent should abide by environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar. *(See details in Chapter 10).*



အခန်း (၁) အစီရင်ခံစာအကျဉ်းချုပ်

ပြည်ဖိုးထွန်းအပြည်ပြည်ဆိုင်ရာ ကုမ္ပဏီလီမိတက် မှတ်ကောင်သားဖောက်ခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာကို အီးဂတ်ပတ်ဝန်းကျင်ဝန်ဆောင်မှု ကုမ္ပဏီလီမိတက်သို့ အလုပ်အပ်နှံခဲ့ပါသည်။ ဤလေ့လာဆန်းစစ်ခြင်း၏ အဓိကရည်ရွယ်ချက်မှာ -

- ✚ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားပတ်ဝန်းကျင်တို့အပေါ် စီမံကိန်းဆောင်ရွက်ချက်များကြောင့် ထိခိုက်မှုများကိုလေ့လာရန်၊
- ✚ ထိခိုက်မှုများကို လျော့ချနိုင်ရန် လျော့နည်းစေမည့် နည်းလမ်းများကို ဖော်ပြရန်၊
- ✚ စီမံကိန်းအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို ပြင်ဆင်ရန်နှင့် အကောင်အထည်ဖော်ရန်၊
- ✚ စီမံကိန်းအတွက် လုံလောက်တိကျသော ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ဆောင်မှုရှိစေရန်၊
- ✚ ဒေသခံများ၏ လူမှုနေမှုအဆင့်အတန်း တိုးတက်ရန်နှင့် ဖွံ့ဖြိုးတိုးတက်မှုများအတွက် မရှိမဖြစ်အရေးပါသော လူမှုစီးပွားတာဝန်ယူမှု အစီအစဉ်အား အကောင်အထည်ဖော် ဆောင်ရွက်ရန်တို့ဖြစ်ပါသည်။

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီအရင်ခံစာ၏ ရည်ရွယ်ချက်မှာ မှတ်ကောင်သားဖောက်မွေးမြူခြင်း၊ ပုလဲထုတ်လုပ် ရောင်းချခြင်း ဖြစ်သည်။ စီမံကိန်းဆောင်ရွက်မည့် ပြင်စာကျွန်းခေါ် ဘန်းတစ်ကျွန်းသည် တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ် ၊ ရေကန်တောင် ကျေးရွာအုပ်စု၊ မြောက်လတ္တီကျု ၁၁ နာရီ ၄၇ မိနစ် ၄၉.၄၉ စက္ကန့်၊ ၁၁ ဒီဂရီ ၅၁ မိနစ် ၃၇.၄၁ စက္ကန့်၊ အရှေ့လောင်ဂျီကျု ၉၈ ဒီဂရီ ၀၀ မိနစ် ၄.၄၉ စက္ကန့်၊ ၉၈ ဒီဂရီ ၀၃ မိနစ် ၀၄.၂၇ စက္ကန့် တွင်တည်ရှိပြီး ပတောင်းကျွန်း (သို့မဟုတ်) လက်ဆုပ်အော်ကျွန်းနှင့် (၁၅.၉၄ မိုင်)၊ (၅.၆၅ ကီလိုမီတာ) အကွာ၊ မြိတ်မြို့နယ် မှ (၅၇.၅၅ မိုင်)၊ (၉၂.၆၅ ကီလိုမီတာ) အကွာအဝေးတွင် တည်ရှိသည်။ (အသေးစိတ်ကို အခန်း ၂ တွင်ကြည့်ရှုပါရန်)

ပြည်ဖိုးထွန်းအပြည်ပြည်ဆိုင်ရာ ကုမ္ပဏီလီမိတက်သည် ၁၀၀% နိုင်ငံသားရင်းနှီးမြှုပ်နှံမှု ကုမ္ပဏီဖြစ်ပြီး ၎င်းကုမ္ပဏီသည် မြန်မာ့ရင်းနှီးမြှုပ်နှံမှုကော်မရှင်၏ ခွင့်ပြုချက်ရရှိပြီးသားဖြစ်သည့်အပြင် ပြင်စာကျွန်းတွင် ပုလဲမွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းအတွက် မြန်မာ့ပုလဲကုမ္ပဏီနှင့် သဘောတူညီချက်ရရှိပြီးဖြစ်သည်။ စီမံကိန်းအတွက် ကနဦးရင်းနှီးမြှုပ်နှံမှုမှာ (၁၅ နှစ်) အတွင်းဖြစ်သည်။ အဆိုပါ ပုလဲမွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းစီမံကိန်းတွင် တိုးတက်ဖွံ့ဖြိုးမှုအဆင့်နှင့် ပုလဲမွေးမြူထုတ်လုပ်မှုအဆင့်ဟူ၍ အဆင့် (၂) ဆင့်ပါရှိပါသည်။ ထုတ်လုပ်ရရှိသော ပုလဲများ၏ (၅၀ရာခိုင်နှုန်း) အားပြည်တွင်း၌ ရောင်းချမည်ဖြစ်ပြီးကျန် (၅၀ရာခိုင်နှုန်း) အားပြည်ပသို့တင်ပို့မည်ဖြစ်သည်။

ပြည်ဖိုးထွန်းအပြည်ပြည်ဆိုင်ရာ ကုမ္ပဏီလီမိတက်သည် စီမံကိန်းဖြစ်မြောက်ရန် အောက်ပါအချက်အလက်များအတိုင်း လုပ်ဆောင်မည်ဖြစ်ပါသည်။

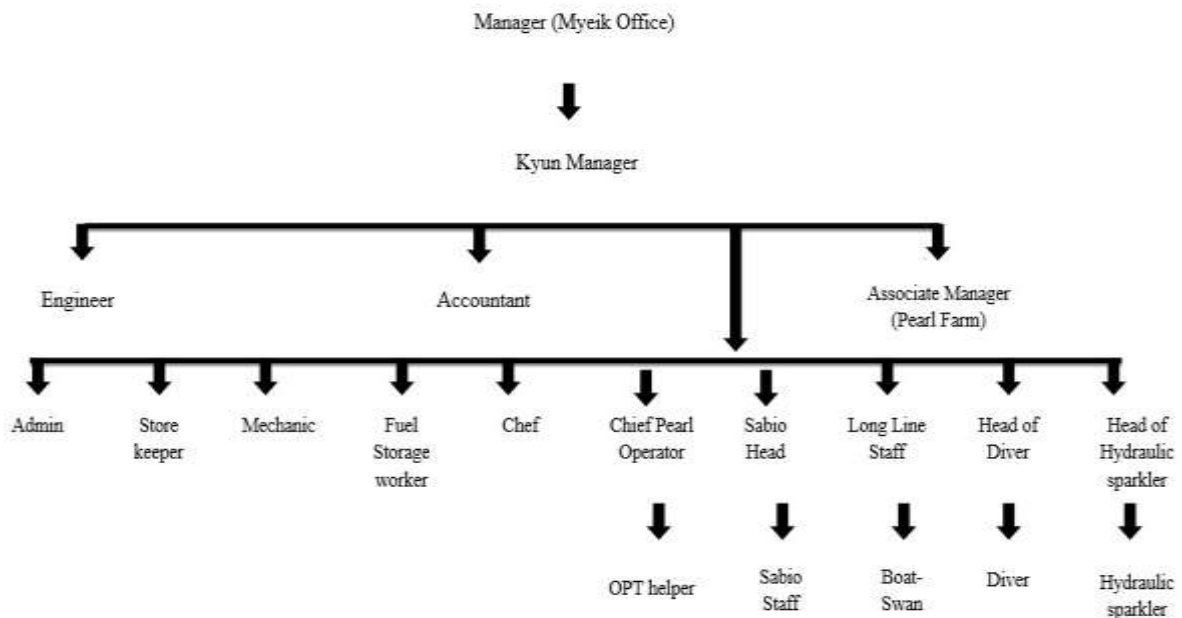


ENVIRONMENTAL IMPACT ASSESSMENT REPORT

- ✚ ပြည်တွင်းနှင့်ပြည်ပ ဈေးကွက်များသို့ အရည်အသွေးကောင်းသောပုလဲများ ရောင်းချရန်၊
- ✚ ထုတ်လုပ်မှုဧရိယာတွင် အဖွဲ့အစည်း၏ လူမှုဆက်ဆံရေးနှင့် စီးပွားရေးကိုပြန်လည်ထူထောင်ရာတွင် ကူညီရန်၊
- ✚ အလုပ်လက်မဲ့များနှင့် လူငယ်များအား အလုပ်အခွင့်အရေးများ ပေးခြင်းအားဖြင့် ကျေးလက်-မြို့ပြပြောင်းရွှေ့နေထိုင်မှုကို လျှော့ခြင်းတွင် ကူညီရန်၊

အဖွဲ့အစည်း၏ အသေးစိတ် အချက်အလက်များမှာ အောက်ပါအတိုင်းဖြစ်သည် -

ကုမ္ပဏီ၏ အမည်	ပြည့်ဖြိုးထွန်းအပြည်ပြည်ဆိုင်ရာ ကုမ္ပဏီလီမိတက်
ထောက်ခံသူအမည်	ဒေါက်တာအောင်လွင် (@) အပ်ဇွေ
ရာထူး	ဥက္ကဋ္ဌ
လုပ်ငန်း အမျိုးအစား	မှတ်ကောင်သားဖောက်ခြင်းနှင့် ပုလဲဖော်ယူခြင်း လုပ်ငန်း
ကုမ္ပဏီလိပ်စာ	အမှတ် (၁၅)၊ ၁၁လမ်း၊လမ်းမတော် မြို့နယ်၊ ရန်ကုန်မြို့၊ မြန်မာ။
ဖုန်းနံပါတ်	၉၅(၁)၂၃၀၀၄၆၊၂၃၀၀၄၇၆
အီးမေးလ်	manageppt@yangon.net.mm , pptamp.headoffice@ppt.com.mm , hsuthirinwe@pptamp.co





ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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(အသေးစိတ်ကို အခန်း ၃ တွင်ကြည့်ရှုပါရန်)

ပြည်ထောင်စုသမ္မတ မြန်မာနိုင်ငံ၏ သစ်စက်နှင့်သက်ဆိုင်သော စည်းမျဉ်းစည်းကမ်းများ၊ နည်းဥပဒေများကို အခန်း(၄) (မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းဆိုင်ရာ မူဘောင်)များတွင် အသေးစိတ်ဖော်ပြထားပါသည်။

(အသေးစိတ်ကို အခန်း ၄ တွင်ကြည့်ရှုပါရန်)

ဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ	ခုနှစ်
ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း	၂၀၁၅
အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး(ထုတ်လွှတ်မှု)လမ်းညွှန်ချက်များ	၂၀၁၅
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ	၂၀၁၄
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ	၂၀၁၂
သဘာဝဘေးအန္တရာယ်ဆိုင်ရာစီမံခန့်ခွဲမှုဥပဒေ	၂၀၁၃
ပိုးသတ်ဆေးဥပဒေ	၂၀၁၆
ရေအရင်းအမြစ်နှင့်မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ	၂၀၀၆
အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာမူဝါဒ	၁၉၉၄
သစ်တောဥပဒေ	၁၉၉၂
မြေအောက်ရေအက်ဥပဒေ	၁၉၃၀
မြန်မာ့ပုလဲလုပ်ငန်းဥပဒေ	၁၉၉၅
မြန်မာ့ပုလဲလုပ်ငန်းဥပဒေကိုပြင်ဆင်သည့်ဥပဒေ	၂၀၁၄
အလုပ်အကိုင်နှင့်ကျွမ်းကျင်မှုဖွံ့ဖြိုးတိုးတက်ရေးဥပဒေ	၂၀၁၃
မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုဥပဒေ	၂၀၁၆

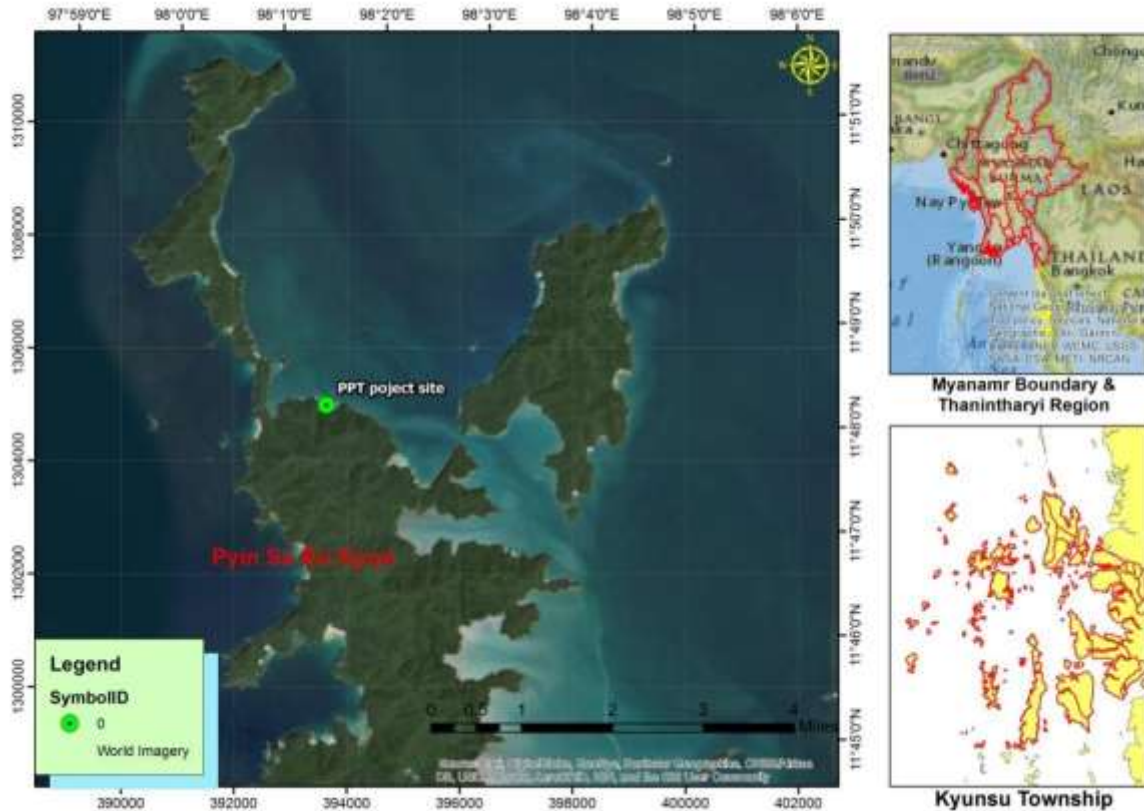


အမျိုးသားမြေအသုံးချမှုမူဝါဒ	၂၀၁၆
အလုပ်သမားအဖွဲ့အစည်းဥပဒေ	၂၀၁၁
အလုပ်သမားအဖွဲ့အစည်းနည်းဥပဒေ	၂၀၁၂
လူမှုဖူလုံရေးဥပဒေ	၂၀၁၂
ပုဂ္ဂလိကစက်မှုလုပ်ငန်းဥပဒေ	၁၉၉၀
မြေလွတ်၊ မြေလပ်နှင့် မြေရိုင်းများစီမံခန့်ခွဲမှုဥပဒေ	၂၀၁၂
လယ်ယာမြေဥပဒေ	၂၀၁၂
ဇီဝမျိုးစုံမျိုးကွဲနှင့်သဘာဝနယ်မြေများထိန်းသိမ်းရေးဥပဒေ	၂၀၁၈
Application of International Guidelines	
IFC Environmental, Health and Safety (EHS) Guidelines	၂၀၀၇
IFC Guidelines on Water and Sanitation	၂၀၀၇
IFC Guidelines on Waste Management Facilities	၂၀၀၇
IFC Guidelines for Aquaculture	၂၀၀၇

စီမံကိန်းတည်ရှိရာကျွန်းသည် သစ်တောထူထပ်၍ (၁၉၂၇၄.၂ ဧက)၊ (၇၇၉၉.၉၉ ဟတ်တာ) ကျယ်ဝန်းပါသည်။ ဧရိယာ၏ (၈၆၄၆.၄ ဧက)၊ (၃၄၉၉.၀၇ ဟတ်တာ) သည် ပုလဲမွေးမြူရေးလုပ်ငန်းအတွက် အသုံးပြုရန်ဖြစ်သည်။ ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်း၏ ထုတ်လုပ်မှု (၅၀) ရာခိုင်နှုန်းကို ပြည်တွင်းတွင်ရောင်းချမည်ဖြစ်ပြီး ကျန် (၅၀) ရာခိုင်နှုန်းအား ပြည်ပသို့တင်ပို့ရောင်းချမည်ဖြစ်ပါသည်။ စီမံကိန်းဆောင်ရွက်ရန်ကာလမှာ (၁၅ နှစ်) ကြာမည်ဖြစ်ပြီး လွန်ခဲ့သော (၃ နှစ်) မှာ မုတ်ကောင်သားဖောက်ခြင်းနှင့် ပုလဲမွေးမြူ ထုတ်လုပ်ရေး လုပ်ငန်းအားစမ်းသပ်လုပ်ငန်းကာလဖြစ်ပါသည်။ (၂၀၁၉ ခုနှစ်)တွင် ပြီးဆုံးမည့် စမ်းသပ်ကာလ (၃ နှစ်) အတွင်းတွင် စီမံကိန်းအတွက် အသုံးပြုသည့် ပစ္စည်းကိရိယာများသည် ယာယီအတွက်သာ အသုံးပြုခြင်းဖြစ်သည်။ စမ်းသပ်ထုတ်လုပ်သည့်ကာလ ပြီးဆုံးသည့်အချိန်တွင် မြန်မာ့ပုလဲမွေးမြူရေးလုပ်ငန်းမှ တရားဝင်ပုလဲမွေးမြူထုတ်လုပ်သည့် လုပ်ငန်းအဖြစ် အသိအမှတ်ပြုမည်ဖြစ်သည်။ စီမံကိန်းအဆိုပြုချက်တွင် စီစဉ်ဖော်ပြထားသည့်အတိုင်း စီမံကိန်းတွင်အသုံးပြုမည့် ပစ္စည်းကိရိယာများကို အဆင့်မြင့်တင်မည်ဖြစ်ပြီး (၂၀၁၉) ခုနှစ်၊ အောက်တိုဘာလတွင် စီမံကိန်း၏လုပ်ငန်းတည်ဆောက်ခြင်းကာလကို စတင်မည်ဖြစ်သည်။ မုတ်ကောင်သားဖောက်ခြင်းနှင့် ပုလဲမွေးမြူ ထုတ်လုပ်ခြင်းတွင် virgin oyster များအတွင်း ဝတ်ဆံထည့်သွင်း မွေးမြူခြင်းတို့ပါဝင်သည်။



ENVIRONMENTAL IMPACT ASSESSMENT REPORT



မုတ်ကောင်သားဖောက်ခြင်းနှင့် ပုလဲဖော်ယူခြင်းတွင် ဝတ်ဆံသွင်းခြင်းမှာ အဓိကပါဝင်ပါသည်။ မုတ်ကောင်အတွင်း တစ်ရူးစထည့်ခြင်း၊ အချိန်တိုအတွင်း ပုလဲလုံးကြီးစေရန် ဒီဇိုင်းဖော်ထားသည့် ဝတ်ဆံသွင်းခြင်း ပြုလုပ်ခြင်းဖြင့် သဘာဝနည်းထက်ပိုမြန်သည်ကို တွေ့ရှိခဲ့ပါသည်။ ထိုနည်းတူစွာ ဂျပန်နိုင်ငံမှသိပ္ပံပညာရှင်များသည် အကောင်းဆုံး အရည်အသွေးနှင့် ပုလဲမွေးမြူရေး လုပ်ငန်းစဉ်အား ဖော်ထုတ်ရန်ကြိုးပမ်းခဲ့ကြပြီး အရည်အသွေးနှင့်ပြည့်စုံသော အရောင်ညီသော ပုလဲများအား ထုတ်လုပ်ရန် အဓိက ထားခဲ့ကြသည်။ ပြည်ဖျိုးထွန်းကုမ္ပဏီ၏ ပုလဲမွေးမြူထုတ်လုပ်ရေး လုပ်ငန်းစဉ်များသည် ဂျပန်နည်းပညာများကို အသုံးပြု၍ထုတ်လုပ်သည်။

ပြည်ဖျိုးထွန်းကုမ္ပဏီနှင့် အခြားလုပ်ငန်းတူကုမ္ပဏီများတွင် မုတ်ကောင်သားဖောက်ခြင်းနှင့် ပုလဲမွေးမြူထုတ်လုပ်ခြင်းလုပ်ငန်းများ၌ပါဝင်သောလုပ်ငန်းစဉ်များကို အောက်တွင်ဖော်ပြထားပါသည်။

- ✚ မုတ်ကောင်သားလောင်းများစုဆောင်းခြင်း၊
- ✚ စုဆောင်းထားသောမုတ်ကောင်သားလောင်းများပါသည့် collector များကို ပြင်စတုကျွန်းသို့ ပို့ဆောင်ခြင်း၊
- ✚ ပို့ဆောင်ထားသောမုတ်ကောင်သားလောင်း collector များကို circle net အိတ်တွင်ထည့်သွင်းကာ long line တစ်လျှောက်ချိတ်ဆွဲမွေးမြူရပါသည်။



- ✚ ရက် (၃၀) ခန့်မွေးမြူပြီးနောက် collectorမှ မုတ်ကောင်သားလောင်းများကိုရွေးယူပြီး (2.0Bu)ခြင်းများသို့ပြောင်းထည့်၍ ပြန်လည်ချိတ်ဆွဲ မွေးမြူရပါသည်။
- ✚ မုတ်ကောင်သားလောင်းများ၏အနေအထားကို စစ်ဆေးရပါသည်။
- ✚ ရက်ပေါင်း (၁၁၀-၁၂၀) ခန့်ကြာပြီးနောက် (3.0Bu) ခြင်းများတွင် ပြောင်းထည့်၍ ပြန်လည်ချိတ်ဆွဲမွေးမြူရပါသည်။
- ✚ မုတ်ကောင်သားလောင်းများအား အန္တယ်ရာယ်ပေးနိုင်သည့် ခက်ရင်း၊ ငါးနှင့် အခြားပိုးမွှားကို ရှင်းထုတ်ရန် တစ်လကို (၃) ကြိမ်ခန့် ရေပန်းထိုး သန့်ရှင်းရေးပြုလုပ်ပေးရပါသည်။
- ✚ မုတ်ကောင်များရေချမွေးမြူပြီး ရက်ပေါင်း (၁၈၀) ခန့်အကြာတွင် 8 pocket bag သို့ ပြောင်းထည့်၍ မွေးမြူရပါသည်။
- ✚ မွေးမြူပြီးတစ်နှစ်ခန့် ကြာပြီးနောက် အရွယ်ရောက်မုတ်ကောင်အဖြစ် ရွေးချယ်ရန် အရွယ်အစားနှင့်အလေးချိန်များကို စစ်ဆေးရပါသည်။
- ✚ မုတ်ကောင်များအတွင်းသို့ ခွဲစိတ်ဝတ်ဆံသွင်းခြင်း၊
- ✚ ဝတ်ဆံသွင်းထားသည့်မုတ်ကောင်များအား ဝတ်ဆံသွင်းပြီး (၃လ မှ ၆လ) အတွင်းတွင် ဝတ်ဆံသွင်းမုတ်ကောင်များအား X-ray Machine ဖြင့် ဝတ်ဆံမြဲမြဲစစ်ဆေးခြင်း၊
- ✚ ပုလဲပိုက်ထားသည့် မုတ်ကောင်များကို ဝတ်ဆံသွင်းကားလ (၁နှစ်) နှင့် (၆လ) ပြည့်မြောက်သော် ၎င်းဝတ်ဆံမြဲမုတ်ကောင်များကို မြန်မာ့ပုလဲထုတ်လုပ်ရေးနှင့် ရောင်းဝယ်ရေးလုပ်ငန်းမှ တာဝန်ယူကြီးကြပ်ကာ ပုလဲဖော်ထုတ်ကြပါသည်။

ရင်းနှီးမြှုပ်နှံထားရှိမှု ပမာဏမှာ မြန်မာကျပ်ငွေသန်းပေါင်း (၅၀၀၀ကျပ်) ကုန်ကျမည်ဖြစ်သည်။ လုပ်ငန်းဆိုင်ရာ ပရိဘောဂနှင့်ထုတ်လုပ်မှု ဆိုင်ရာပစ္စည်းများအတွက် အသေးစိတ်ရင်းနှီးမြှုပ်နှံမှု အစီအစဉ်ကို အောက်တွင်ဖော်ပြထားပါသည်။ ပြည်ဖိုးထွန်းအပြည်ပြည်ဆိုင်ရာ ကုမ္ပဏီလီမိတက်သည် မုတ်ကောင်သားဖောက်ခြင်းနှင့် ပုလဲမွေးမြူရေးလုပ်ငန်းအတွက် မြန်မာ့ပုလဲလုပ်ငန်းနှင့် သဘောတူညီချက်ရရှိထားပါသည်။ ထုတ်လုပ်မှုကာလအတွင်း ဝန်ထမ်း (၉၀ဦး)နှင့် မနတ်စာနှင့် နေ့လည်စာ စားချိန်အပါအဝင် အလုပ်အချိန်ကို နံနက် ၇နာရီ မှ ညနေ ၅နာရီ အထိ တစ်ရက်အတွင်း တစ်ချိန်တွင် တစ်လှည့်စီ လည်ပတ်မည်ဖြစ်သည်။ စီမံကိန်းအဆိုပြုသူမှ မနတ်စာ၊ နေ့လည်စာနှင့် ညစာများကိုလည်း ဝန်းထမ်းများအတွက် စီစဉ်ပေးထားပါသည်။ ပုလဲမွေးမြူထုတ်လုပ်ရန် တစ်နေ့လျှင် ရေဂါလံ (၁၀၀၀) နှင့် တစ်နှစ်လျှင် ရေဂါလံ (၃၆၅၀၀၀) လိုအပ်မည်ဖြစ်ပြီး အဆိုပြုထားသော စီမံကိန်းအတွက် တစ်နှစ်လျှင် (၄၀၁၅၀ k/h) လျှပ်စစ်ဓာတ်အားလိုအပ်ပါသည်။

စွန့်ပစ်ပစ္စည်းများ (ပလတ်စတစ်၊ ရေသန့်ဘူးခွံများ) သည်လုပ်သားများ၏ အသုံးပြုမှုမှ ထွက်ပေါ်လာခြင်းဖြစ်သည်။ လုပ်သားတစ်ဦးသည် တစ်နေ့လျှင် (၀.၄ ကီလိုဂရမ်) ခန့် အမှိုက်စွန့်ပစ်နေသည်ဟု ခန့်မှန်းရရှိသည်။ စီမံကိန်းတွင်အလုပ်လုပ်ကိုင်နေသော လုပ်သား (၉၀ဦး)



ရှိသောကြောင့် စွန့်ပစ်ပစ္စည်း(ပလတ်စတစ်၊ ရေသန့်ဘူးခွံ)များသည် တစ်ရက်လျှင်(၃၆ ကီလိုဂရမ်)၊ တစ်လလျှင် (၁၀၈၀ ကီလိုဂရမ်) ခန့်ရှိလာနိုင်သည်။ (အသေးစိတ်ကို အခန်း ၅ တွင်ကြည့်ရှုပါရန်)

မူလပတ်ဝန်းကျင်အခြေအနေများကို ကွင်းဆင်းလေ့လာခြင်းနှင့် ယခင်ရှိပြီးသားပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်များ၊ ဒေသဆိုင်ရာအချက်အလက်များကို ထပ်ဆင့်ရယူခြင်း စသည့် အချက်အလက်များ ကောက်ယူခြင်းသည် အရေးကြီးပါသည်။ ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးတိုင်းတာချက်ကဲ့သို့သော ပထမအကြိမ်ကောက်ယူရသည့် အချက်အလက်များသည် ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများအား လေ့လာဆန်းစစ်ခြင်းများပြုလုပ်ရန် အရေးပါသော အခန်းကဏ္ဍ တစ်ခုဖြစ်ပါသည်။

ရေအရည်အသွေးနမူနာရယူသောနေရာများတွင် (၁) စီမံကိန်းဧရိယာအတွင်းရှိ လူများနေထိုင်အသုံးပြုသော မြေပေါ်ရေတည်ရှိရာနေရာ (SWQ: at Natural Stream) ၊ (၂) စီမံကိန်းတည်ရှိရာ ဧရိယာ၏ ရေအရင်းအမြစ်မှ စွန့်ထုတ်လိုက်သော စွန့်ပစ်ရေများ (WWQ1: မုတ်ကောင်ခြင်းသန့်ရှင်းရုံမှ စွန့်ပစ်ရေ၊ WWQ2: မီးဖိုချောင်နှင့် ထမင်းစားဆောင်မှ ထွက်ပေါ်လာသော စွန့်ပစ်ရေများ) လေထုအရည်အသွေးကို လက်ရှိပတ်ဝန်းကျင်အရည် အသွေးရလဒ်များ ရရှိနိုင်သည့် အနီးအနားရှိ (အရင်းအမြစ်) တစ်နေရာ၌ တိုင်းတာခဲ့ပါသည်။ (၂၀၁၉) ခုနှစ်၊ မတ်လ (၁၃ရက်) မှ (၁၄ရက်)တွင် အီးဂတ်ကုမ္ပဏီမှ စစ်တမ်းကောက်ယူသော အဖွဲ့သည် သဘာဝပတ်ဝန်းကျင် အရည်အသွေးအချက်အလက်များ စုဆောင်းမှုကို နမူနာယူခဲ့သည်။ လေ့လာတွေ့ရှိရသော တန်ဖိုးများကို အမျိုးသားထုတ်လုပ်မှုအရည်အသွေး (NEQ) လမ်းညွှန်ချက်များ၊ WHO လမ်းညွှန်များ၊ National Ambient Air Quality Standards (NAAQS)၊ American Conference of Governmental Industrial Hygienists (ACGIH) တို့နှင့်နှိုင်းယှဉ်ထားသည်။ ရေအရည်အသွေးတိုင်းတာမှုတွင် စွန့်ပစ်ရေ အမှတ် (၁) တွင် Total suspended solids and BOD များသည် သတ်မှတ်ထားသည့် စွန့်ပစ်ရေတန်ဖိုးထက်ကျော်လွန်နေပါသည်။ စွန့်ပစ်ရေ အမှတ် (၂) တွင် Total suspended solids, Total Nitrogen, Total phosphorus, Oil and Grease, COD and BOD များသည် သတ်မှတ်ထားသည့် စွန့်ပစ်ရေတန်ဖိုးထက်ကျော်လွန်နေပါသည်။ Total suspended solids, Oil and Grease, Total Nitrogen and Total phosphorus များသည် သတ်မှတ်တန်ဖိုးထက်များနေခြင်းမှာ ၎င်းစွန့်ပစ်ရေသည် မီးဖိုချောင်မှ ထွက်ရှိလာသည့် စွန့်ထုတ်ရေများဖြစ်ပါသည်။ ထိုမျှသာမက BOD and COD များသည်လည်း သတ်မှတ်တန်ဖိုးထက်များနေခြင်းမှာ ၎င်းစွန့်ပစ်ရေထဲတွင် Total suspended solids ပါဝင်မှုများနေခြင်းကြောင့်ဖြစ်ပါသည်။ မြေပေါ်ရေအရည်အသွေးတွင်လည်း Turbidity and aluminium တန်ဖိုးသည်လည်း သတ်မှတ်တန်ဖိုးထက် အနည်းငယ်များနေပါသည်။ လေအရည်အသွေးတိုင်းတာမှုတွင် NO₂, PM₁₀, PM_{2.5}, SO₂, CO₂ and CO များသည် သတ်မှတ်ထားသည့် စံချိန်စံညွှန်းအတွင်းရှိနေပါသည်။ ဆူညံသံတိုင်းတာမှုတွင် ဆူညံသံအရည်အသွေးသည်လည်း သတ်မှတ်ထားသည့် စံချိန်စံညွှန်းအတွင်းရှိနေပါသည်။ အဆိုပြုထားသောပတ်ဝန်းကျင်အတွက် ထပ်ဆင့်ရယူထားသော



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

သတင်းအချက်အလက်များသည် (ရာသီဥတု၊ မိုးရေချိန်များ၊ လူမှုစီးပွားရေးနှင့် မြေအသုံးချမှု) အချက်အလက်များကို အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနမှ ရယူအသုံးပြုထားသည်။

၂၀၁၉ ခုနှစ်၊ မတ်လ ၁၃ ရက်မှ ၁၄ ရက်အထိ မြေပြင်အပင်များ၊ သတ္တဝါများနှင့် အဏ္ဏဝါဇီဝမျိုးကွဲများကို စစ်တမ်းကောက်ယူခဲ့သည်။ ကုန်းနေသတ္တဝါများကိုလေ့လာရန် Transect method ကိုအသုံးပြု လေ့လာခဲ့သည်။ ဒေသပေါက်အပင်များကို လေ့လာရန် point-transect method ကို အသုံးပြုလေ့လာခဲ့ပြီး Phytoplankton နမူနာများကို station (၄) ခုမှ ရယူစုဆောင်းခဲ့သည်။ Phytoplankton နှင့် zooplankton တို့၏ အရည်အသွေးဆိုင်ရာ အချက်အလက်များကို ရရှိရန်အတွက် ရေမျက်နှာပြင်တွင် standard plankton net(#25μm)နှင့် ၁၅မိနစ်ခန့်ကြာ ဆွဲယူခဲ့ပြီး နမူနာအဖြစ် စုဆောင်းခဲ့ပါသည်။ Benthos အချက်အလက်နှင့် mollusks နှင့် gastropods များအတွက် စုစုပေါင်းနေရာ (၇)ခုတွင် ကောက်ယူခဲ့ပါသည်။ ကောက်ယူစုဆောင်းထားသော နမူနာများမှ ပင်မအချက်အလက်တစ်ခုစီအတွက် ကျပ်စုဆောင်းခြင်းနည်းလမ်းကို အသုံးပြု၍ သန္တာကျောက်တန်းအစွန်းတစ်လျှောက်တွင် Coral Reef ၏မတူညီကွဲပြားမှုများကို တိုင်းတာခဲ့သည်။ ရေနေအခွံမာသတ္တဝါများနှင့် ငါးများအတွက် အချက်အလက်များကို စီမံကိန်းမြေနေရာမှ တိုက်ရိုက်ကောက်ယူခဲ့ပြီး ဒေသခံတံငါသည်များ၊ ငါးဖမ်းသူများနှင့်တွေ့ဆုံမေးမြန်းခြင်းများပြုလုပ်ခဲ့သည်။ သတ္တဝါမျိုးစိတ်(၂၃) မျိုး၊ ဒေသပေါက်ပင်(၄၈) မျိုး၊ Phytoplankton (၈၇) မျိုး၊ zooplankton မျိုးစိတ်(၂၇) မျိုး၊ macrobenthic သက်ရှိ (၈) မျိုး၊ gastropods (၈) မျိုး၊ bivalves (၄) မျိုး၊ chiton (၁) မျိုးနှင့် barnacles (၂) မျိုး၊ သန္တာငါးမျိုးစိတ် (၂၂) မျိုး၊ stingray (၁) မျိုး၊ ကင်းမွန် မျိုးစိတ် (၁)မျိုး၊ ဂဏန်း မျိုးစိတ် (၂)မျိုး နှင့် ကျောက်ပုစွန် (၁) မျိုးတို့ကို ပြင်စောကျွန်းတွင် လေ့လာတွေ့ရှိခဲ့ပါသည်။ (အသေးစိတ်ကို အခန်း ၆ တွင်ကြည့်ရှုပါရန်)

ထုတ်လုပ်မှုဖြစ်စဉ်များကြောင့် သဘာဝပတ်ဝန်းကျင်အရင်းအမြစ်များ၊ ဂေဟစနစ်အရင်းအမြစ်များ၊ လူနှင့်စွန့်ပစ်ပစ္စည်းများစသည့်ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများကိုဖော်ထုတ်ပြီး သက်ရောက်မှုကို အကဲဖြတ်နည်းစနစ်များအသုံးပြု၍ ၎င်းတို့၏အရေးပါမှုကိုအကဲဖြတ်သည်။ အလားအလာရှိသော သက်ရောက်မှုများကို အဆင့် (၃) ဆင့် ခွဲခြားသတ်မှတ်ထားသည်။ စီမံကိန်း တည်ဆောက်ခြင်းအဆင့်၊ စီမံကိန်းဆောင်ရွက်ခြင်း အဆင့်နှင့် စီမံကိန်းဖျက်သိမ်းခြင်းအဆင့်တို့ဖြစ်သည်။

ခေါင်းစဉ်တစ်ခုချင်းစီအတွက် အခြေခံအခြေအနေများ၏ ထိခိုက်လွယ်မှုအား စီမံကိန်းဧရိယာအနီးရှိ ပတ်ဝန်းကျင်လက္ခဏာ (သို့မဟုတ်) ဖွံ့ဖြိုး တိုးတက်မှုကြောင့် အကျိုး သက်ရောက်နိုင်သည့်သူများ၏ အာရုံခံစားမှုအရဆုံးဖြစ်သည်။

တုံ့ပြန်နိုင်စွမ်း	အဓိပ္ပာယ်ဖွင့်ဆိုချက်
အလွန်မြင့်	လက်ခံသူသည် ၎င်း၏လက်ရှိ အခြေခံဝိသေသ လက္ခဏာများအားလိုက်လျော ပြောင်းလဲလိုက်ရခြင်းမှ လွဲ၍ ပြောင်းလဲမှုများကို လုံးဝလက်ခံနိုင်ခြင်း၊



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

	(သို့မဟုတ်) ဖြစ်ပေါ်လာသော အခြေအနေကို တောင့်မခံနိုင်ခြင်း၊ ဂေဟဗေဒဆိုင်ရာတန်ဖိုးမြင့်မားခြင်း၊ (သို့မဟုတ်) နိုင်ငံတကာစံနှုန်းအရ အရေးကြီးခြင်း။
မြင့်	လက်ခံသူသည် ၎င်း၏လက်ရှိ အခြေခံဝိသေသ လက္ခဏာများအား လိုက်လျောပြောင်းလဲရသော်လည်း ပြောင်းလဲမှုများကို အနည်းငယ်လက်ခံနိုင်ခြင်း၊ (သို့မဟုတ်) ဂေဟဗေဒဆိုင်ရာ တန်ဖိုးမြင့်မားခြင်း၊ (သို့မဟုတ်) နိုင်ငံတကာစံနှုန်းအရ အရေးကြီးခြင်း။
အလယ်အလတ်	လက်ခံသူသည် ၎င်း၏လက်ရှိ သိသာထင်ရှားသောဝိသေသ လက္ခဏာများအား လိုက်လျောပြောင်းလဲရသော်လည်း ပြောင်းလဲမှုများကို အလယ်အလတ် လက်ခံနိုင်ခြင်း၊ (သို့မဟုတ်) ဂေဟဗေဒဆိုင်ရာ တန်ဖိုးရှိခြင်း၊ (သို့မဟုတ်) နိုင်ငံတကာစံနှုန်းအရ အရေးကြီးခြင်း။
နိမ့်	လက်ခံသူသည် ၎င်း၏လက်ရှိဝိသေသ လက္ခဏာများအား လိုက်လျောပြောင်းလဲရသော်လည်း ပြောင်းလဲမှုများ လက်ခံနိုင်ခြင်း၊ (သို့မဟုတ်) ဂေဟဗေဒဆိုင်ရာ တန်ဖိုးနည်းခြင်း၊ (သို့မဟုတ်) ဒေသန္တရ စံနှုန်းအရ အရေးကြီးခြင်း။
မရှိသလောက်နိမ့်	လက်ခံသူသည် ပြောင်းလဲမှုအပေါ် ခံနိုင်ရည်မြင့်မားခြင်း၊ (သို့မဟုတ်) ဂေဟဗေဒဆိုင်ရာ တန်ဖိုးနည်းခြင်း။

သိသာထင်ရှားသော သက်ရောက်မှုများ

သိသာထင်ရှားသော သက်ရောက်မှုများကို အကဲဖြတ်ရာ၌ လက်ခံရသော ဝန်းကျင်၏လက်ခံနိုင်စွမ်းနှင့် သက်ရောက်သောပမာဏ အပေါ်မူတည်၍ ဆန်းစစ်အကဲဖြတ်ပါသည်။ အောက်ပါဇယားတွင် သိသာထင်ရှားသော သက်ရောက်မှုများကို မည်သို့ သတ်မှတ်သည်ကို ဖော်ပြထားပါသည်။ သို့သော် ထိုသတ်မှတ်ချက်များမှာ ယေဘုယျနည်းဖြစ်ပြီး ခိုင်မာသော ကိန်းဂဏန်းဆိုင်ရာအချက်အလက်များ အဖြစ်မသတ်မှတ်နိုင်ပေ။

သက်ရောက် သောပမာဏ	တုံ့ပြန်နိုင်စွမ်း				
	အလွန်မြင့်	မြင့်	အလယ်အလတ်	နိမ့်	အလွန်နိမ့်
ပြင်း	အဓိက	အဓိက	အလယ်အလတ်	အလယ်အလတ်	အနည်းငယ်
သင့်	အဓိက	အလယ်အလတ်	အလယ်အလတ်	အနည်းငယ်	လျစ်လျူရှုရ
နိမ့်	အလယ်အလတ်	အလယ်အလတ်	အနည်းငယ်	လျစ်လျူရှုရ	လျစ်လျူရှုရ



အလွန်နိမ့်	အနည်းငယ်	အနည်းငယ်	လျစ်လျူရှုရ	လျစ်လျူရှုရ	လျစ်လျူရှုရ
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အဆိုပြုစီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသော သက်ရောက်မှုများကို သတ်မှတ်ရာ၌ အောက်ပါ အတိုင်းအတာ (၄) ခုဖြင့် သတ်မှတ်နိုင်ပါသည်။

- ✚ အဓိကဆိုးကျိုးသက်ရောက်မှု
- ✚ အလယ်အလတ်ဆိုးကျိုးသက်ရောက်မှု
- ✚ အနည်းငယ်ဆိုးကျိုးသက်ရောက်မှု
- ✚ လျစ်လျူရှုရသောဆိုးကျိုးသက်ရောက်မှု

အနည်းငယ်ဆိုးကျိုးသက်ရောက်မှုနှင့် လျစ်လျူရှုရသောဆိုးကျိုးသက်ရောက်မှု တို့ကို သိသာထင်ရှားသော ထိခိုက်မှုမရှိဟုသတ်မှတ်နိုင်ပြီး အလယ်အလတ်သက်ရောက်မှုနှင့် အဓိကဆိုးကျိုးသက်ရောက်မှု တို့ကို သိသာထင်ရှားသော ထိခိုက်မှုရှိဟု သတ်မှတ်နိုင်ပါသည်။ ဤအဆင့်တွင် အကဲဖြတ်မှုအရေအတွက် သက်သာစေရန် မှတ်ထားသင့်ပြီး ကြွင်းကျန်နေသော သက်ရောက်မှုဟု ယူဆရသော သက်ရောက်မှု အားလုံးသည် အဆိုပြုထားသော တိုင်းတာမှုဖြစ်စဉ်တွင် အောက်ပါ ဖြည့်စွက်ချက်များ ကျန်ရှိနေပါသည်။

စီမံကိန်းလုပ်ငန်းအဆင့်ဆင့်

အဆိုပြုစီမံကိန်း၏ ဖွံ့ဖြိုးမှုအဆင့်အပေါ် အခြေခံ၍အလားအလာရှိသော သက်ရောက်မှုများကို တည်ဆောက်ရေးဆိုင်ရာ သက်ရောက်မှုများနှင့် လုပ်ငန်းလည်ပတ်မှုဆိုင်ရာ သက်ရောက်မှုများဟူ၍ အမျိုးအစား(၂)ခု ကွဲထွက်သွားသည်။

တည်ဆောက်ရေးဆိုင်ရာသက်ရောက်မှုများသည် တည်ဆောက်ရေးအဆင့်တွင်သာ ဖြစ်ပေါ်သည့် ကာလတို သက်ရောက်မှုများဖြစ်သည်။ စီမံကိန်းဆောင်ရွက်ရာ ဧရိယာနှင့် မြေနေရာအကျယ်အဝန်း ကဲ့သို့သော အလုပ်အပေါ်တွင် ယာယီသက်ရောက်မှုများရှိနိုင်သည်။

လုပ်ငန်းလည်ပတ်မှုဆိုင်ရာသက်ရောက်မှုများသည် အထောက်အပံ့ပစ္စည်းများ၊ အခြေခံအဆောက်အအုံနှင့် သက်ဆိုင်သော (ဥပမာ - မုတ်ကောင်များ ဆေးခြင်း၊ မုတ်ခြင်းများ ဆေးခြင်း၊ မီးစက်များမောင်းနှင်ခြင်း၊ ဇီဝဆိုင်ရာမျိုးကွဲများရှိသည့်နေရာတွင် ဆူပူမှုဖြစ်ခြင်း) ကဲ့သို့ တိုးတက်ဖွံ့ဖြိုးစေမည့်ရလဒ်ရှိသည့် ရေရှည် သက်ရောက်မှုများဖြစ်သည်။

လုပ်ငန်းပိတ်သိမ်းမှုဆိုင်ရာသက်ရောက်မှုများသည် စီမံကိန်းအဆောက်အအုံများ ဖျတ်သိမ်းခြင်း၊ longline များ၊ ထောက်အပံ့ပစ္စည်းများအားလုံးကို ဖျတ်သိမ်းခြင်းတို့ပါဝင်သည်။ ထို့နောက်အန္တရာယ်ရှိနိုင်သော စွန့်ပစ်ပစ္စည်းများနှင့် အန္တရာယ်မရှိနိုင်သောစွန့်ပစ်ပစ္စည်းများကို သက်ဆိုင်ရာတာဝန်ရှိသူများ အကူအညီဖြင့် စနစ်တကျကိုင်တွယ်ဖယ်ရှားပေးခြင်းတို့ဖြစ်ပါသည်။

**အကျိုးသက်ရောက်နိုင်သည့်ပုံစံများ**

ထုတ်လုပ်မှုနှင့်ဖွဲ့စည်းတည်ဆောက်မှုဆိုင်ရာလုပ်ငန်းများနှင့် ဆက်စပ်နေသည့် အခြားသက်ရောက်နိုင်သော ပုံစံများကိုအောက်တွင် ဆွေးနွေးတင်ပြထားပါသည်။

ကောင်းကျိုး (သို့မဟုတ်) ဆိုးကျိုးများ

ဆိုးကျိုးတစ်ခုအပေါ်စဉ်းစားဆုံးဖြတ်နိုင်သည့် အရည်အချင်းရှိခြင်းသည် သက်ရောက်မှုကောင်းတစ်ခု ဖြစ်သည်။

စီမံကိန်းအတွက်ကောင်းကျိုးရလဒ်များဖြစ်ပေါ်စေရန် ပြည်တွင်းနှင့် အပြည်ပြည်ဆိုင်ရာမူဝါဒများကို အင်တိုက်အားတိုက်တောင်းဆိုတင်ပြကြသည်။

ကြာချိန်

အရင်းအမြစ်များပြန်လည်အစားထိုးခြင်း (သို့) ပြန်လည်ကောင်းမွန်လာစေရန် အချိန်သည် နောက်ဆုံးဦးစားပေးအရာဖြစ်ပါသည်။ ကိစ္စတစ်ခုပြီးမြောက်ရန်ကြာချိန်သည် ၎င်းကိစ္စဖြစ်ပွားရာ သက်ရောက်မှုဖြစ်သည့် ကြာချိန်ပေါ်မူတည်၍ကွဲပြားသည်။ ဥပမာ - ငှက်များသားလောင်း ပေါက်ချိန်ကာလအတွင်းတွင် ဖွဲ့စည်းတည်ဆောက်ပုံဆိုင်ရာ ကာလတိုဆောင်ရွက်ချက်များဖြစ်ပေါ်ပြီး ထိုရာသီဥတုတွင် မျိုးမအောင်သောကြောင့်ပြန်လည်မွေးမြူရန် ကာလရှည်ဖြည့်စွက်မှုများကိုလိုအပ်သည်။

ပြန်လည်ပြုပြင်နိုင်စွမ်း

ဤလမ်းညွှန်ချက်၏ ရည်ရွယ်ချက်မှာ ပြန်လည်ပြုပြင်နိုင်စွမ်းမရှိသည့် (အမြဲတမ်း) သက်ရောက်မှုသည် အချိန်ကာလတစ်ခုအတွင်း ပြန်လည်ကုစားရန်မဖြစ်နိုင်ပါ (သို့မဟုတ်) ထိုအရာကို ပြန်လည်ပြုပြင်ရန် ကျိုးကြောင်းဆီလျော်သော အခွင့်အလမ်းများ မရှိနိုင်ပါ။ ပြန်လည်ပြုပြင်နိုင်စွမ်း (ယာယီ) သက်ရောက်မှုတစ်ခုမှာ အလိုအလျောက်ပြန်လည်ပြုပြင်နိုင်ခြင်း (သို့မဟုတ်) ထိရောက်သော လျော့ပါးရေးကို ပြုလုပ်နိုင်သလို ကတိကဝတ်များဖြင့် တွန်းအားပေးလုပ်ဆောင်ရမည်ဖြစ်ပါသည်။

ဆက်စပ်သက်ရောက်မှုများနှင့် ပေါင်းစပ်သက်ရောက်မှုများသည် အဓိကအရင်းအမြစ်များ (သို့မဟုတ်) လက်ခံသူများ တစ်ခုနှင့်တစ်ခုဆက်စပ်နေမှုများကို အစီရင်ခံစာ၏ အဓိက အပိုင်းတွင်ဖော်ပြထားပါသည်။

(အသေးစိတ်ကို အခန်း (၇) တွင်ကြည့်ရှုရန်)

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ၊ လေ့ကျင့်မှုများ၊ တာဝန်ဝတ္တရားများကို တည်ဆဲ သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာမူဝါဒနှင့် ပြည်ထောင်စုသမ္မတ မြန်မာနိုင်ငံတော်၏ စည်းမျဉ်းစည်းကမ်းများအား အပြည့်အဝလိုက်နာရန် သတ်မှတ်ထားသည်။ ဤပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP) တွင် အဓိကအပိုင်း (၁၁) ခုရှိပါသည်။



- ၁) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်
- ၂) ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုခြင်းအစီအစဉ်
- ၃) ဇီဝမျိုးစုံမျိုးကွဲများ စီမံခန့်ခွဲမှု အစီအစဉ်
- ၄) ဇီဝမျိုးစုံမျိုးကွဲများ စောင့်ကြပ်ကြည့်ရှုခြင်းအစီအစဉ်
- ၅) စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲမှု အစီအစဉ်
- ၆) လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအစီအစဉ်
- ၇) လူမှုကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအစီအစဉ်
- ၈) အရေးပေါ်ကြိုတင်ပြင်ဆင်ခြင်း တုံ့ပြန်မှုအစီအစဉ်
- ၉) လူမှုရေးဆိုင်ရာ တာဝန်ယူဆောင်ရွက်မှုအစီအစဉ်
- ၁၀) မကျေလည်မှုများဖြေရှင်းပေးမည့်အစီအစဉ်

ထို့အပြင် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်နှင့် ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်၏ ခန့်မှန်းကုန်ကျစရိတ်နှင့် တာဝန်ယူဆောင်ရွက်ရန်တာဝန်ရှိသူများကို ဖော်ပြခဲ့သည်။

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် - ဆိုသည်မှာ လုပ်ငန်းကာလ (၃) ခုလုံးတွင် အလားအလာရှိသည့်ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုများ၊ ထိခိုက်မှုအရင်းအမြစ်များ၊ သက်ရောက်မှုများအား မည်သို့လျော့ချရမည်၊ လျော့ချမှုမှကျန်ရှိနေသည့် သက်ရောက်မှုများနှင့် တာဝန်ရှိသူများပါဝင်သည့် အစီအစဉ်ဖြစ်ပါသည်။

ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုခြင်းအစီအစဉ်တွင် လုပ်ငန်းကာလ (၃) ခုလုံးအတွက် လေ့လာအသေး၊ ရေအရည်အသွေးနှင့် ဆူညံသံအဆင့်တို့အတွက် အတိုင်းအတာများ၊ ကြိမ်နှုန်းများဖြင့်တိုင်းတာခြင်းကို တာဝန်ယူဆောင်ရွက်မည့်သူများ ကိုဖော်ပြထားသည်။

ဇီဝမျိုးစုံမျိုးကွဲများစီမံခန့်ခွဲမှုအစီအစဉ် - ဆိုသည်မှာ ဒေသမျိုးရင်းပင်များ၊ ရေအောက်ပေါက်ပင်များ နှင့် တာဝန်ယူဆောင်ရွက်မည့်သူများမှ လုပ်ဆောင်ရမည့်အစီအစဉ်ဖြစ်ပါသည်။

ဇီဝမျိုးစုံမျိုးကွဲများစောင့်ကြပ်ကြည့်ရှုခြင်းအစီအစဉ်တွင် တာဝန်ရှိသူမှ ပတ်ဝန်းကျင်ဇီဝမျိုးစုံမျိုးကွဲများ စောင့်ကြပ်ကြည့်ရှုထိန်းသိမ်းခြင်း၊ တိုင်းတာခြင်း၊ နေရာသတ်မှတ်ခြင်းနှင့် အကြိမ်အရေအတွက် တို့ပါဝင်ပါသည်။



စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ်တွင် မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲထုတ်လုပ်ခြင်းစီမံကိန်းမှ ထွက်ရှိလာသော စွန့်ပစ်ပစ္စည်းအမျိုးအစားများနှင့် စီမံကိန်းမှလုပ်ဆောင်မည့် စွန့်ပစ်ပစ္စည်းအမျိုးအစားအားလုံးအတွက် ထိန်းသိမ်းမည့်အစီအစဉ်များပါဝင်ပါသည်။

လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအစီအစဉ်တွင် တာဝန်ရှိသူများမှ ဘေးအန္တရာယ်ကင်းရှင်းရေးအတွက် ဆောင်ရွက်ချက်တို့ပါဝင်ပါသည်။

လူမှုကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအစီအစဉ်သည် လူနေမှုအဆင့်အတန်းတိုးတက်လာစေရန် ရည်ရွယ်ပါသည်။

အရေးပေါ်ကြိုတင်ပြင်ဆင်ခြင်းတုံ့ပြန်မှုလုပ်ထုံးလုပ်နည်းများတွင် အရေးပေါ်အခြေအနေဖြစ်ပေါ်လာပါက ထိရောက်စွာဆောင်ရွက်ခြင်းတို့ပါဝင်ပါသည်။

လူမှုရေးဆိုင်ရာတာဝန်ယူဆောင်ရွက်မှုအစီအစဉ်တွင် အလုပ်သမားများနှင့် မိသားစုဝင်များ၏လူနေမှုအဆင့်အတန်းတိုးတက်လာစေရန်နှင့် ရပ်ရွာဒေသခံပြည်သူတို့၏ လူနေမှုအဆင့်အတန်းမြှင့်တိုးတက်လာစေရန် ရည်ရွယ်ပါသည်။

မကျေလည်မှုများဖြေရှင်းပေးမည့်အစီအစဉ်တွင် အဆိုပြုစီမံကိန်းနှင့် ဆက်စပ်နေသောမကျေနပ်ချက်များကို ဖြေရှင်းပေးမည့် အဆင့်များပါဝင်ပါသည်။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်တွင် အတိုချုပ်အနေဖြင့် လုပ်ငန်းကာလ (၃) ခုလုံးတွင် ဖြစ်ပွားနိုင်သည့် အဆိုပြုစီမံကိန်း၏ ပတ်ဝန်းကျင်အပေါ်ကောင်းကျိုးနှင့် ဆိုးကျိုးတို့ကိုစနစ်တကျဖော်ထုတ်ခြင်းနှင့် ဆိုးကျိုးသက်ရောက်မှုများကို လျှော့ချခြင်းနှင့် စောင့်ကြပ်ကြည့်ရှုခြင်းတို့ပါဝင်ပါသည်။ (အသေးစိတ်ကို အခန်း ၈ တွင်ကြည့်ရှုပါရန်)

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာရေးသားချိန်အတွင်း စီမံကိန်းနှင့်ပတ်သတ်သော သတင်းအချက်အလက်များအား ဖော်ထုတ်နိုင်ရန်နှင့် စီမံကိန်းနှင့်ပတ်သတ်သောသူများ၏ သဘာထားထင်မြင်ချက်မှာလည်း အရေးကြီးပါသည်။ စီမံကိန်းအတွက် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းကို (၂၀၁၉) ခုနှစ် ဇူလိုင်လ(၂၈) ရက်တွင် အခြေခံပညာအထက်တန်းကျောင်း (ပဒက်) တွင်ပြုလုပ်ခဲ့ပြီး စုစုပေါင်းတက်ရောက်သူဦးရေမှာ (၂၀၅) ဦး ဖြစ်ပါသည်။ (အသေးစိတ်ကို အခန်း ၉ တွင်ကြည့်ရှုပါရန်)

အချုပ်ဆိုရသော် စီမံကိန်းသည် ဒေသခံပြည်သူများအတွက် လုပ်ငန်းစဉ်တိုင်းတွင် အလုပ်အကိုင် အခွင့်အလမ်းများ ရရှိနိုင်ပါသည်။ လုပ်ငန်းကာလ (၃) ခုလုံး၏ ထိခိုက်မှုများကို အနည်းဆုံးဖြစ်စေရန် ပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်း အစီအစဉ်အတိုင်း အကောင်အထည်ဖော်ဆောင်ရွက်ရမည်ဖြစ်ပါသည်။ အဆိုပြုစီမံကိန်း၏ ပတ်ဝန်းကျင်အရည်အသွေးကို စောင့်ကြည့်ထိန်းသိမ်းရန် ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြပ်ကြည့်ရှုခြင်းအစီအစဉ် အကောင်အထည်ဖော် ဆောင်ရွက်ရန်လိုအပ်ပါသည်။





ENVIRONMENTAL IMPACT ASSESSMENT REPORT

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာကို ဝန်ကြီးဌာနမှ စစ်ဆေးသုံးသပ်ပြီးနောက်တွင် အစီရင်ခံစာတင်ပြသူသည် ဝန်ကြီးဌာန၏ သုံးသပ်မှုများနှင့် အကြံပြုချက်များကို လိုက်နာဆောင်ရွက်ရမည်။

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာအား ဝန်ကြီးဌာနမှ အတည်ပြုလက်ခံပြီးပါက အစီရင်ခံစာတင်ပြသူသည် ထိခိုက်မှုများအား ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲခြင်းအစီအစဉ်အတိုင်း ထိရောက်စွာ အကောင်အထည်ဖော်ဆောင်ရွက်ရမည်ဖြစ်ပါသည်။ အစီရင်ခံစာတင်ပြသူသည် ပြည်ထောင်စုသမ္မတ မြန်မာနိုင်ငံ၏ ပတ်ဝန်းကျင်ဆိုင်ရာ မူဝါဒများ ဥပဒေ စည်းမျဉ်းစည်းကမ်းများ ညွှန်ကြားချက်များ အတိုင်းလိုက်နာဆောင်ရွက်ရမည်ဖြစ်ပါသည်။ (အသေးစိတ်ကို အခန်း ၁၀ တွင်ကြည့်ရှုပါရန်)



Chapter (2) INTRODUCTION

This report is the Environmental Impact Assessment (EIA) report for Pearl Culture Project, proposed by Pyi Phyto Tun International Co., Ltd. The proposed project is aimed pearl oyster breeding and pearl production for selling and trading. The proposed project is based at the Pyin Sa Bu Kyun, also known as Bentinck island, which is located at Tanintharyi Region, Myeik District, Kyun Su Township, Yay Kan Taung Village Tract, latitude 11°47'49.49"N, 11°51'37.41"N and longitude 98°00'4.94"E, 98°03'04.27"E. The project site is 15.94 miles (25.65 km) far away from the Pandaung Kyun, also known as Letsok-aw island and 57.55 miles (92.62 km) far away from the Myeik Township.

According to the Environmental Conservation Law (2012), it is the requirement of every development project in the country to submit an Environmental Management Plan (EMP) or Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) to MONREC depending on the criteria for specific kind of economic activity, was enacted in the Environmental Impact Assessment Procedure (2015). ECD, screened this proposed project as it requires to prepare EIA report to meet the environmental assessment requirements of the Environmental Policy, Environmental Conservation Law and other environmental related rules and procedures. Therefore, Pyi Phyto Tun International Co., Ltd., here in after PPT or the project proponent, made consultations with E Guard Environmental Services Co., Ltd. for conducting the environmental impact assessment studies.

The specific objectives of this study are to

- ❖ identify the major impacts that may arise from the activities of the proposed project on natural environment and socio-economic environment of the project area,
- ❖ describe the mitigation measures to minimize these impacts,
- ❖ prepare and implement Environmental Management Plan for the project and
- ❖ make sure that EIA is developed sufficiently and soundly for the proposed project.
- ❖ support Corporate Social Responsibility Plan (CSR Plan), which plays an essential part for the improvement of the social welfare of community as well as development of the region.



Chapter (3) IDENTIFICATION OF THE PROJECT

PROPONENT AND THE EIA EXPERTS

Pyi Phyto Tun International Co., Ltd is a 100% local investor of this project. The company already have got permission from Myanmar Investment Commission and also has an agreement with Myanmar Pearl Enterprise to establish a pearl culture development at Pyin Sa Bu island. The proposed project investment is in initial 15 years in duration. There are two stages in the proposed pearl culture development that (i) Development Stage and (ii) Pearl Culturing Stage. The selling and trading plan will be 50% for export and 50% local.

Pyi Phyto Tun International Co., Ltd has planned to implement the project to

- ❖ supply competitive and quality pearl to the local market and foreign market
- ❖ help rebuild the economy and social lives of the communities in the operational area
- ❖ help reduce rural-urban migration through employment opportunities and to make communities more attractive to youths and the unemployed.

Detailed information of the proposed organization is as follows:

Name of Company:	PYI PHYTO TUN INTERNATIONAL Co., Ltd
Proponent:	Dr. Aung Lwin (@) Ah Khwe
Designation:	Chairman
Business Type:	Pearl Culture Process
Company Address:	No.15, 11 th Street, Lanmadaw Township, Yangon, Myanmar
Telephone number:	95 (1) 2300460, 2300476
E mail:	manageppt@yangon.net.mm , pptamp.headoffice@ppt.com.mm , hsuthirinwe@pptamp.co

3.1 SHARE AND SHAREHOLDERS LIST

Table 3-1 Share and Shareholder List

No.	Name	NRC No.	Designation	Address
1.	Dr. Aung Lwin (@) Ah Khwe	12/AhLaNa (Naing) 033879	Chairman	No.15. 11 th Street, Lanmadaw Township, Yangon.
2.	U Hla Than	6/MaAhYa (Naing) 057303	Managing Director	No. Myit Ngwe Yat, Myeik Township, Thanintharyi Division.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3.	Daw Thet Sandar	12/DaGaNa (Naing) 023444	Director	No.15. 11 th Street, Lanmadaw Township, Yangon.
4.	Daw Tin War	6/MaAhYa (Naing) 056432	Director	Tatpyin Yat, Myeik Township, Thanintharyi Division.
5.	Daw Myint Myint Kyu	6/MaAhYa (Naing) 011598	Director	Tatpyin Yat, Myeik Township, Thanintharyi Division.
6.	Daw Khin Than Yi	6/MaAhYa (Naing) 027115	Director	Tatpyin Yat, Myeik Township, Thanintharyi Division.
7.	U Myat Ko Ko	6/MaMaNa (Naing) 144704	Director	No.12, Bo Ba Htoo Street, Myint Nge (5) Ward, Myeik Myo, Myeik Township, Thanintaryi Region.
8.	Daw Myat Thiri Khaing	12/LaMaTa (Naing) 035236	Director	No.15. 11 th Street, Ward No. (5), Lanmadaw Township, Yangon.
9.	Daw Hsu Thiri Nwe	12/LaMaTa (Naing) 033421	Director	No.15. 11 th Street, Ward No. (5), Lanmadaw Township, Yangon.

3.2 ORGANIZATION CHARTS of Pyin Sa Bu Island Pearl Farm for Pyi Phyo Tun International Co., Ltd

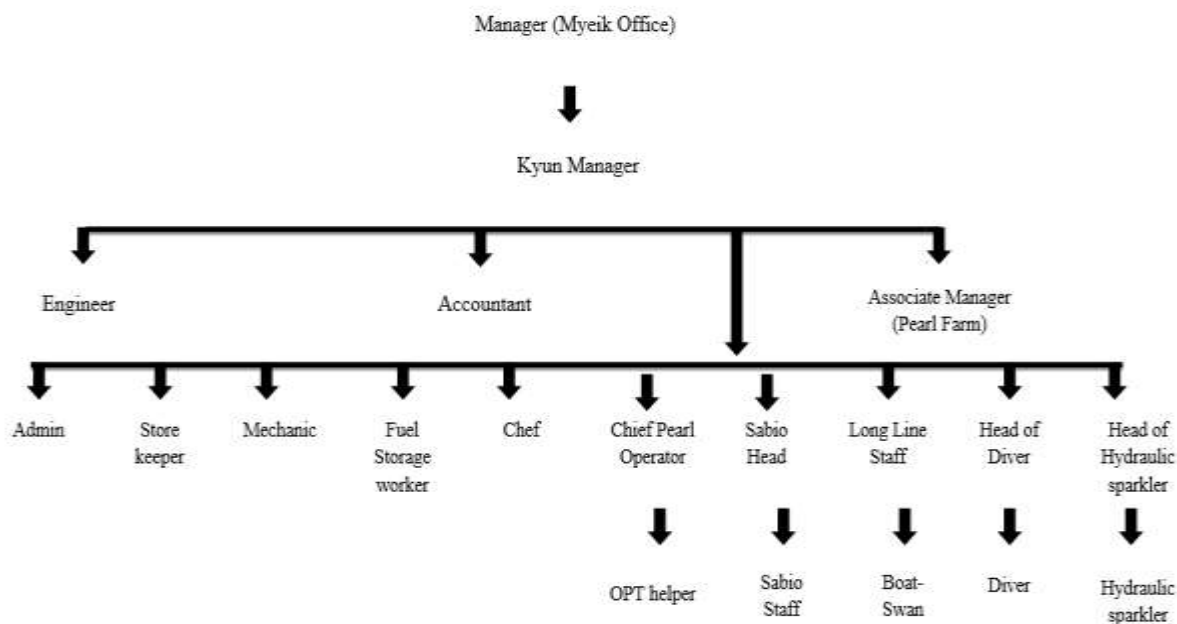


Figure 3-1 Organization Chart of Pearl Farm

**3.3 STUDY TEAM FOR ENVIRONMENTAL AND SOCIAL EXPERTS****Table 3-2 Environmental Impact Assessment Team**

No	Name	Responsibility	Address
1.	U Soe Min (ECD Reg. No.00067) (Consultant/ Director)	Overall responsibility for EIA report review, checking and Impact Analysis and Identification	usoemin@eguardservices.com Ph.no: +95 (9) 797005160
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8.	U Aung Ko Ko Kyaw (Project Assistant)	Responsibility for Surveying Baseline data of Terrestrial Biodiversity	aungkokokyaw@eguardservice.com Ph.no: +95 (9) 797005184
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10.	Dr. Aung Aung Htaik (Assistant Lecturer)	Responsibility for marine environmental management and monitoring of marine biodiversity	ms.aungmyohsan.ms@gmail.com Ph.no: +95 (9) 258612785
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12.	Dr. Naung Naung Oo (Assistant Lecturer)	Responsibility for Surveying and Reporting of Marine Biodiversity (Marine Invertebrates)	ms.aungmyohsan.ms@gmail.com Ph.no: +95 (9) 258612785



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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U Soe Min (Environmental Engineering Consultant)

U Soe Min is a civil, water resources and environmental engineer by training. He holds Bachelor of Civil Engineering from (RIT), Yangon and Master of Environmental Engineering from (AIT), Bangkok, Thailand. He had worked for ADB and WB as a National Consultant for environmental safeguard capacity building program. He has been working as a National Environmental Consultant for infrastructure projects funded by ADB and JICA in Myanmar. He involves in several EIA projects representing E Guard as a team leader, an environmental specialist and a civil engineer.

U Si Thu Min Naing (Project Associate)

U Si Thu Min Naing is working as project assistant in E-Guard Environmental Services Co., Ltd. He obtained his Bachelor degree in Mining Engineering from Technological University Mandalay (TUM) in 2014. He is currently assisting in preparing environmental reports, public consultations and information gathering process. His contribution on the preparation of EIA for this project is as associate to the team leader to complete the EIA report.

Hnin Yee Mon Mon (Project Associate)

Daw Hnin Yee Mon Mon is a Project Associate who received Bachelor of Civil Engineering from Meiktila Technological University in February 2017. She has more than two years experience in conduction stakeholder engagement and public consultation, site visit at E Guard Environmental Services. Her contribution on the preparation of EIA for this project are associating to the team leader to prepare this EIA report, conducting socio-economic survey and doing analysis of social conditions and opinions of the respondents.

U Naing Zaw Win (Environmental Specialist)

Naing Zaw Win is a Project Associate, who received his Bachelor Degree in Forestry from the University of Forestry in 2015. He has more than two years experiences on environmental site survey and socio-economic surveys. In addition, he has to cooperate with clients for conducting stakeholder's engagement and public consultations. He is responsible for stakeholder engagement and public consultation meeting for the preparation of Environmental Reports.



U Aung Ko Ko Kyaw (Project Assistant)

U Aung Ko Ko Kyaw is a project assistant who received his Bachelor Degree of science from University of Forestry in 2016. He also obtained the “Post Graduated Diploma in GIS and RS” from the University of Yangon in November, 2018. He has the experiences of forest plantation management, agroforestry and community development. He can create and analysis a map using GIS and RS concepts. He also participates in the activities of socio – economic survey, biodiversity survey and public consultation.

Daw Shwe Sin Chue Lae (Environmental Quality Project Assistant)

Daw Shwe Sin Chue Lae is a Project Assistant who holds a Bachelor Degree in Engineering specializing in Electronic Engineering from Government Technological University, Myingyan. She has experience in meeting with client for discussing environmental quality (EQ) monitoring parameters and collecting project information about survey points. In addition, she also has experience in environmental field like writing environmental quality (EQ) report.

Dr. Aung Myo Hsan (Marine Biologists)

Dr. Aung Myo Hsan work as an Assistant Lecturer of Department of Marine Science, at Mawlamyine University. His team has involved in doing marine biodiversity and assessment in this report.

Htet Shwe Sin Aung (Environmental Specialist, Fauna)

Daw Htet Shwe Sin Aung is a project associate, who received Bachelor of Science in Zoology from Dagon University in 2014. She also received Master of Science in Zoology from Yangon University in 2017. She has experience in laboratory analysis, conducting socio-economic surveys and biodiversity assessment.

Hay Marn Hnin (Environmental Specialist, Flora)

Daw Hay Marn Hnin work as a Project Associate at eGuard Environmental Services Company. She got a Master of Science Degree in Botany from the Patheingyi University in 2017. She has experience in conducting socio-economic surveys and biodiversity assessment for EIA projects.



Chapter (4) POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

4.1 POLICY AND LEGAL FRAMEWORK

The section reviews the relevant policies, legislations and institutional framework of Myanmar and International guidelines relevant in the context of environmental and socio-economic aspect of the project. The activities carried out under the project are subject to these legal requirements.

The following are the legislations relevant to this Pearl Culture Project;

Laws and Regulations	Year
Environmental Impact Assessment Procedure	2015
National Environment Quality (Emission) Guidelines	2015
Environmental Conservation Rules	2014
Environmental Conservation Law	2012
Natural Disaster Management Law	2013
Pesticide Law	2016
The Conservation of Water Resources and Rivers Law	2006
The National Environmental Policy Law	1994
Forest Law	1992
The Underground Water Act	1930
Myanmar Pearl Law	1995
The Law Amending the Myanmar Pearl Law	2014
Employment and Skill Development Law	2013
The Myanmar Investment Law	2016
National Land Use Policy	2016
Labour Organization Law	2011
Labour Organization Rules	2012
Social Security Law	2012
The Private Industrial Enterprise Law	1990
Vacant, Fallow and Virgin Land Management Law	2012
Farm Land Law	2012
Protection of Biodiversity and Protected Area Law	2018



Application of International Guidelines	
IFC Environmental, Health and Safety (EHS) Guidelines	2007
IFC Guidelines on Water and Sanitation	2007
IFC Guidelines on Waste Management Facilities	2007
IFC Guidelines for Aquaculture	2007

4.2 RELEVANT LEGISLATION

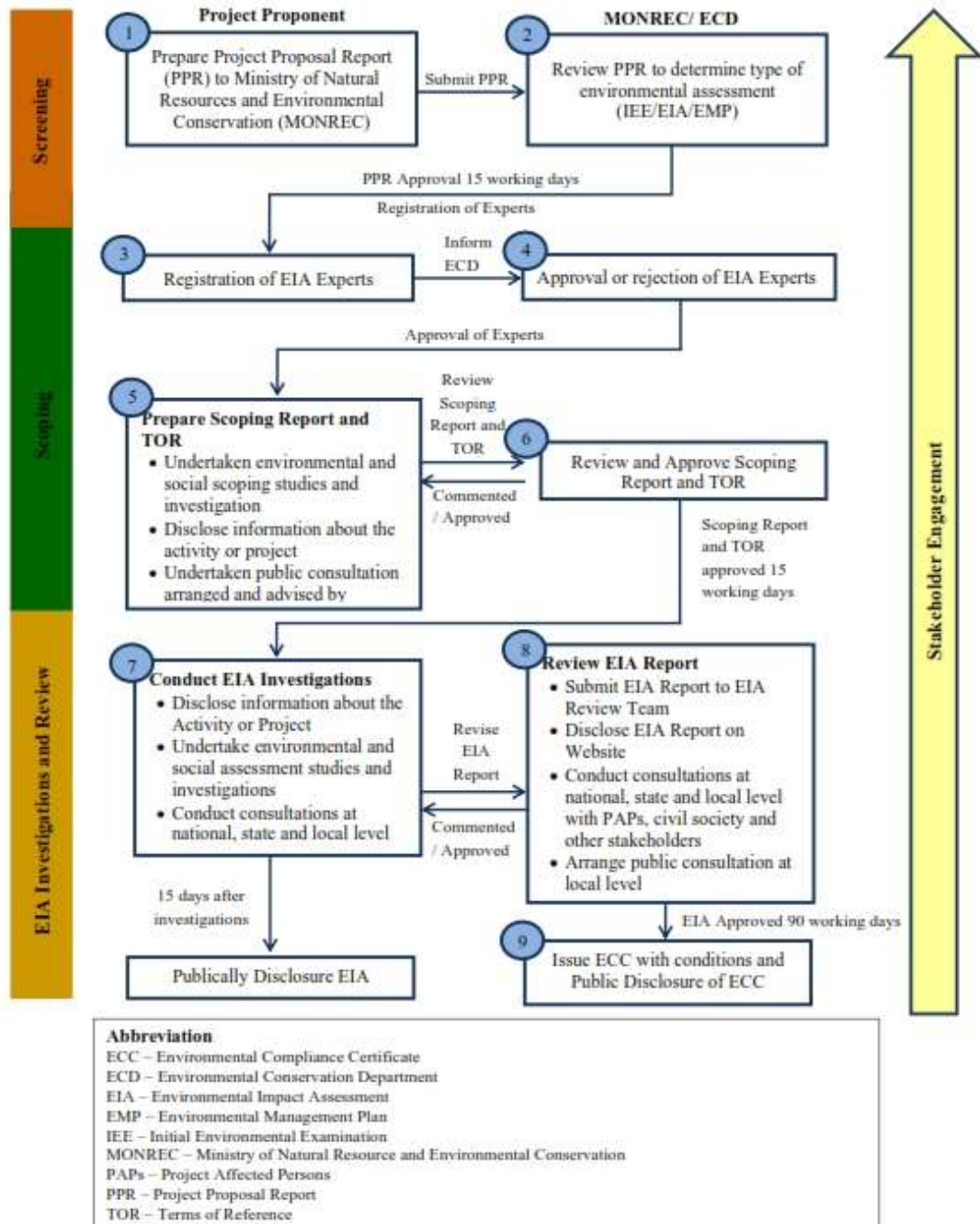
The EIA report will be prepared based on the Myanmar Environmental Impact Assessment Procedure (2015) and International best practice and guidelines.

4.2.1 ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURES (2015)

(1) Outline of the Procedures

The objectives of the EIA procedures are to provide a common framework for EIA reporting and to ensure that EIA reporting is in line with legal requirements, good practices and professional standards. Concrete steps to be followed in conducting and accessing EIA are stipulated in the EIA procedures.

- (a) All development projects in Myanmar are subject to an environmental screening process through which project will be judged to determine if they require any environmental review and, if so, at which level (i.e. IEE or EIA)
- (b) EIA includes an environmental management plan and a social impact assessment report.
- (c) Describe the environmental and social baseline data of the study area as well as the changes that will occur during and after project implementation
- (d) Public participation is essential for the Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA), with an inclusion of an Environmental Management Plan (EMP).
- (e) Analyze project alternatives and define measures that will minimize negative environmental, social and health impacts and maximize benefits to affected communities;
- (f) Propose environmental, social and health management and monitoring plans to ensure that the requests from the government and the communities of the project proponent are implemented.
- (g) EIA Review committee is formed to give recommendations to the Minister of MONREC from an environmental point of view on whether to approve the EIA report or not. The Minister makes the final decision based on this recommendation.
- (h) Members of the EIA Review Committee will be selected by the Minister of MONREC and will include persons from the industry, academia, and civil society, as well as government officials.
- (i) Involuntary resettlement is carried out under the responsibility of a Respective Regional Government and hence will not be included in the EIA Procedures.



All projects subject to EIA procedure have to comply with and refer to applicable national guidelines/ standards or international standards adopted by the Ministry. In addition, a project proponent shall be responsible for the monitoring of their compliance with general and



applicable industry- specific guidelines as specified in the EMP and ECC (Environmental Compliance Certificate).

In addition, the Project Proponent is responsible to monitor the environmental quality based on the developed EMP as specified in the following sections.

Section 12:

As specified in the EIA Procedure, projects shall engage in continuous, proactive and comprehensive self- monitoring of the project and comply with applicable guidelines and standards. For purposes of these Guidelines, projects shall be responsible for the monitoring of their compliance with general and applicable industry- specific Guidelines as specified in the EMP and ECC.

Section 13:

Air emissions, noise, odor, and liquid/ effluent discharges will be sampled and measured at points of compliance as specified in the project EMP and ECC.

4.2.2 NATIONAL ENVIRONMENTAL QUALITY EMISSION GUIDELINES (2015)

The Ministry may, with the approval of the Union Government and the Committee, stipulate the following environmental quality standards:

- a) suitable surface water quality standards in the usage in rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs and other inland water sources of the public;
- b) Water quality standards for coastal and estuarine areas;
- c) Underground water quality standards;
- d) Atmospheric quality standards;
- e) Noise and vibration standards;
- f) Emissions standards;
- g) Effluent standards;
- h) Solid wastes standards;
- i) Other environmental quality standards stipulated by the Union Government.

The Ministry shall, under the guidance of the Committee, maintain a comprehensive monitoring system and implement by itself or in co- ordination with relevant Government departments and organizations in the following matters:

- a) The use of agro-chemicals which cause to impact on the environment significantly;
- b) Transport, storage, use, treatment and disposal of pollutants and Hazardous substances in industries;
 - Disposal of wastes which come out from exploration, production and treatment of minerals, industrial mineral raw materials and gems;
 - Carrying out waste disposal and sanitation works;
 - Carrying out development and constructions;
 - Carrying out other necessary matters relating to environmental pollution.



4.2.3 ENVIRONMENTAL CONSERVATION RULES (2014)

Environmental Conservation Rules provide a platform to bridge the Environmental Conservation Law with more specific and practical rules and guidelines including EIA Procedures and environmental quality standards, the rules stipulate that the Ministry of Environmental Conservation and Forestry will adopt and carry out the environmental impact assessment system which includes determination of categories of plans, business or activity that requires Environmental Impact Assessment (EIA). The system will also stipulate the categories which are required to conduct the Initial Environmental Examination (IEE). Environmental Conservation Rules also provide a platform for developing Environmental Quality Standards.

Here the principle rules for EIA review and approval are specified as follows.

Rules 58:

The Ministry shall form the Environmental Impact Assessment Report Review Body with the experts from the relevant Government departments, Government organizations.

Rules 60:

The Ministry may assign duty to the Department to scrutinize the report of environmental impact assessment prepared and submitted by a third person or organization relating to environmental impact assessment and report through the Environmental Impact Assessment Report Review Body.

Rules 61:

The Ministry may approve and reply on the environmental impact assessment report or environmental management plan with the approval of the Committee.

4.2.4 ENVIRONMENTAL CONSERVATION LAW (2012)

The principle law governing environmental management in Myanmar is the Environmental Conservation Law, which was issued in March, 2012 (The Pyidaungsu Hluttaw Law No.9/20/2130rh). The law stipulates that government bodies are in charge of environmental conservation as well as their relevant roles and responsibilities. It touches on water, noise, vibration and solid waste qualities but does not provide specific standards to be met.

It also mentions that any new development project must perform a system of Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) in order to find out whether or not a project or activity to be undertaken by any government department, organization or person may cause a significant impact on the environment or not. In the context of project development, it is important to note that the law adopts the notion of 'Polluter Pays Principle' as it implies that the project proponents are responsible for covering all environmental and social costs generated by the project.

The law serves as the basic for founding of Environmental Conservation Department (ECD) under the Ministry of Natural Resources and Environmental Conservation (MONREC), both



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

of which will be explained later. Following the Environmental Conservation Law are two legal instruments: Environmental Conservation Rules (2014) and EIA Procedures (2015).

The main objectives of Environmental Conservation Law related to this Project are abstracted from Section 3 as follows.

- (a) To enable to emerge a healthy and clean environment and to enable to conserve natural and cultural heritage for the benefit of present and future generations;
- (b) To reclaim ecosystems as may be possible which are starting to generate and disappear;
- (c) To enable to manage and implement for decrease and loss of natural resources and for enabling the sustainable use beneficially;

As the important reference, the following sections are excerpted: Section 7 for provisions of duties and powers of MONREC, Section 10 for Environmental Quality Standards, Section 13 for monitoring as well as Section 14 and Section for polluter's responsible.

Section 7: Provisions of Duties and Powers relating to the Environmental Conservation of the Ministry

- (a) To specify categories and classes of hazardous wastes generated from the production and use of chemicals or other hazardous substances in carrying out industry, agriculture, mineral production, sanitation and other activities;
- (b) To prescribe categories of hazardous substances that may affect significantly at present or in the long run on the environment;
- (c) To promote and carry out the establishment of necessary factories and stations for the treatment of solid wastes, effluents and emissions which contain toxic and hazardous substances;
- (j) To prescribe the terms and conditions relating to effluent treatment in industrial estates and other necessary places and buildings and emissions of machines, vehicles and mechanisms;
- (m) To lay down and carry out a system of EIA and SIA as to whether or not a project or activity to be undertaken by any Government department, organization or person may cause a significant impact on the environment;
- (o) To manage to cause the polluter to compensate for environmental impact, cause to contribute fund by the organizations which obtain benefit from the natural environmental service system, cause to contribute a part of the benefit from the businesses which explore, trade and use the natural resources in environmental conservation works.

Section 10: Environmental Quality Standards

The Ministry may, with the approval of the Union Government and the Committee, stipulate the following environmental quality standards:



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

- (a) Suitable surface water quality standards in the usage in rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs and other inland water sources of the public;
- (b) Water quality standards for coastal and estuarine areas;
- (c) Underground water quality standards;
- (d) Atmospheric quality standards;
- (e) Noise and vibration standards;
- (f) Emissions standards;
- (g) Effluent standards;
- (h) Solid wastes standards;
- (i) Other environmental quality standards stipulated by the Union Government.

Section 13: Monitoring

The Ministry shall, under the guidance of the Committee, maintain a comprehensive monitoring system and implement by itself or in co- ordination with relevant Government departments and organizations in the following matters:

- (a) The use of agro- chemicals which cause to impact on the environment significantly;
- (b) Transport, storage, use, treatment and disposal of pollutants and hazardous substances in industries;
- (c) Disposal of wastes come out from exploration, production and treatment of minerals, industrial mineral raw materials and gems;
- (d) Carrying out waste disposal and sanitation works;
- (e) Carrying out development and constructions;
- (f) Carrying out other necessary matters relating to environmental pollution.

Section 14:

A person causing a point source of pollution shall treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards.

Section 15:

The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on- site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmental sound methods.

4.2.5 NATURAL DISASTER MANAGEMENT LAW (2013)

The Pyidaungsu Hluttaw hereby enacts this Law in 31st July, 2013.

The objectives of this Law are as follows:

- a) To implement natural disaster management programs systematically and expeditiously in order to reduce disaster risks;
- b) To form the National Committee and Local Bodies in order to implement natural disaster management programs systematically and expeditiously;



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

- c) To coordinate with national and international government departments and organizations, social organizations, other non-government organizations or international organizations and regional organizations in carrying out natural disaster management activities;
- d) To conserve and restore the environment affected by natural disasters;
- e) To provide health, education, social and livelihood programs in order to bring about better living conditions for victims.

Section 6, article 16:

Preventive measures to be carried out in the area where is likely to strike natural disaster before the natural disaster include the following:

- a) Building cyclone shelters and life-saving hillock-sanctuaries in the area where is not easy to evacuate;
- b) Constructing embankments along the coast and the flooded area;
- c) Preservation of mangroves along the coast and planting fast-growing trees;
- d) Taking preventive measures according to the type of natural disaster;
- e) Performing other duties assigned by this law in respect of the preventive measures.

4.2.6 PESTICIDE LAW (2016)

- The project proponent has to comply with the instruction for use of pesticide,
- The project proponent has to comply with pesticide safety guidelines published by the Ministry of Agriculture, Livestock and Irrigation (Department of Agriculture) from time to time,
- The project proponent has to keep pesticides in close proximity to foodstuffs,
- The project proponent has to comply with the methods of disposal and destruction of the used empty container and packaging materials of the pesticide in accord with the directive of the department under sub-sections of section-26 of said law.
- The project proponent hasn't use the pesticide or active ingredient to catch or kill any creatures under section-33 of said law.
- The project proponent using the pesticide shall not affect the environment or anyone by violating any conditions of the user of pesticide under section-35 of said law

4.2.7 THE CONSERVATION OF WATER RESOURCES AND RIVERS LAW (2006)

The State Peace and Development Council Law enacted this law by Law No. 8/ 2006 on the date of 2nd October, 2006. This law covers for all water sources above and underground within boundaries of rivers, creeks, banks and water fronts. Under this law, Ministry of Transport has power to direct for carrying out waterways conservation work, to notify the land boundary as waterfront boundary for bank protection, river-creek improvement and to navigate the vessels in the rivers and creeks with the objectives of:

- a) To conserve and protect the water resources and rivers system for beneficial utilization by the public;



- b) To smooth and safety waterways navigation along rivers and creeks;
- c) To contribute to the development of State economy through improving water resources and river system;
- d) To protect environmental impact.

4.2.8 THE NATIONAL ENVIRONMENTAL POLICY LAW (1994)

To achieve harmony and balance between socio-economic, natural resources and environment through the integration of environmental considerations into the development process enhancing the quality of the life of all its citizens.

4.2.9 FOREST LAW (1992)

The State Law and Order Restoration Council was promulgated the Forest Law in 1992. This law was formulated by focusing on the balanced approach towards conservation and development issues implicit in the concept of sustainable forestry. It decentralizes the management and opens up opportunities for increased private sector involvement in timber trade. Highlighting environmental and biodiversity conservation, the law encourages community forestry and people's participation in forest management to meet the basic needs of the rural people, but prescribes severe punishments for forest offences. In addition, the MOF has promulgated the Forest Rules in 1995.

4.2.10 THE UNDERGROUND WATER ACT (1930)

According to Act the President of the Union may, by notification, direct and shall apply only to the tubes, exceeding a depth to be prescribed the President of the Union and may prescribe different depths for different local areas.

Accordingly, “underground water” means water obtained from below the surface of the ground by the sinking of tubes. It is also stated that no person shall sink a tube for the purpose of obtaining underground water except under and in accordance with the terms of a license granted by the water officer, an officer by notification prescribed on his behalf.

4.2.11 MYANMAR PEARL LAW (1995)

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 under section-3 of said law.



4.2.12 THE LAW AMENDING THE MYANMAR PEARL LAW (2014)

Purpose; to implement the policy of the Government relating to pearl production and marketing, to encourage and supervise the development of pearl production and to protect and conserve water area of oyster fishing grounds from destruction and oysters from extinction

- The project proponent has to apply the rules, procedures, orders and directives issued under Myanmar Pearl Law regarding the following matters under sub-section (e) of section-8 of said law
 - (1) appointing staff and workers, putting to work, determining the age, wage, salary and other fees;
 - (2) determining working days and hours on and under the water regarding pearl production;
 - (3) managing and performing to be safe and to protect from an accident in the pearl production;
 - (4) drawing and implementing the projects for the welfare, health, sanitation and disciplinary measures of the staff and workers from the pearl production;
 - (5) managing and performing not to be detriment to the activities of environmental preservation due to pearl production;
 - (6) informing and reporting on the accidents and, death and bodily injuries due to such accidents in the pearl production;
 - (7) accepting the inspection of Chief Inspector and Inspectors.
- The project proponent has to abide by the conditions contained in the permit under sub-section (b) of section-8 of said law.

4.2.13 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. This law focuses as followings;

- 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.

4.2.14 THE MYANMAR INVESTMENT LAW (2016)

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

- The project proponent has to appoint the nationalities in the various levels of administrative, technical and expert work by the arrangement to develop their expertise, in line with the sub-section (b) of section 51 of said law.
- The project proponent has to appoint the nationalities only in normal work without expertise, in line with the sub-section (c) of section 51 of said law.
- The project proponent has to appoint either foreigner or nationality with the appointment agreement in accord with the law, in line with the sub-section (d) of section 51 of said law.
- The project proponent has to comply with the international best practices, existing laws, rules and procedures to not damage, pollute, and injure to environment, cultural heritage and social, in line with the sub-section (g) of section 65 of said law.
- The project proponent has to close the project after paying the compensation to the employees in accord with the existing laws if violates the appointment agreement or terminate, transfer or suspend the investment or reduce the number of employees , in line with the sub-section (i) of section 65 of said law.
- The project proponent has to pay the wages or salary to the employees in accord with the laws, rules, order and procedures in the suspension period, in line with the sub-section (j) of section 65 of said law.
- The project proponent has to pay the compensation or injured fees to the respected employees or their inheritors if injury in or loss of part of body or death caused by work, in line with the sub-section (k) of section 65 of said law.
- The project proponent has to stipulate the foreign employees to respect the culture and custom and abide by the existing laws, rules, orders, directives, in line with the sub-section (l) of section 65 of said law..



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

- The project proponent has to abide by labour laws, in line with the sub-section (m) of section 65 of said law.
- The project proponent has to pay the compensation, to the injured person for damages if damage to environment or socio-economy is occurred by misuse of project, in line with the sub-section (o) of section 65 of said law.
- The project proponent has to allow to inspect in anywhere of project if Myanmar Investment Commission inform to inspect the project, in line with the sub-section (p) of section 65 of said law.
- The project proponent has to obtain the permission of MIC before EIA process and report back this process to Myanmar Investment Commission, in line with the sub-section (q) of section 65 of said law.
- The project proponent has to insure the prescribed insurance by rules, under section 73 of said law.

4.2.15 NATIONAL LAND USE POLICY (2016)

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

4.2.16 LABOR ORGANIZATION LAW (2011)

The Pyidaungsu Hluttaw hereby enacts this Law in 11th October, 2011, in accord with section 24 of the Constitution of the Republic of the Union of Myanmar, to protect the rights of the workers, to have good relations among the workers or between the employer and the worker, and to enable to form and carry out the labor organizations systematically and independently.

In Section (7) in this Law stated the duties of the employer.

According to Article (29), the employer shall recognize the labor organizations of his trade as the organizations representing the workers.



According to Article (30), the employer shall allow the worker who is assigned any duty on the recommendation of the relevant executive committee to perform such duty not exceeding two days per month unless they have agreed otherwise. Such period shall be deemed as if he is performing the original duty of his work.

4.2.17 SOCIAL SECURITY LAW (2012)

The Pyidaungsu Hluttaw hereby enacts this law in 31th August, 2012.

In Article (53) stated about the occupational safety of workers. The employers and workers shall co-ordinate with the Social Security Board or insurance agency in respect of keeping plans for safety and health in order to prevent employment injury, contracting disease and decease owing to occupation and in addition to safety and educational work of the workers and accident at the establishment.

4.2.18 THE PRIVATE INDUSTRIAL ENTERPRISE LAW (1990)

The State Law and Order Restoration Council enacted this law by Law No.22/90 on 26th November, 1990. According to this law, all private industrial enterprises shall avoid or reduce the use of polluting technology. The Supervisory Body supervises and inspects the enterprise to ensure the following:

- No health threats from the industrial enterprise to the nearby residence;
- No fire threats or hazards;
- No source of nuisance or pollution originating from the enterprise;
- No occupational hazard to the workers and
- Compliance with the existing law.

4.2.19 VACANT, FALLOW AND VIRGIN LAND MANAGEMENT LAW (2012)

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

- The project proponent will ensure to get permitted areas for the project land by the Central Administrative Body on Vacant, Virgin and Fallow Land, under sub-section (d) of section 10 of said law.
- The project proponent will promise to return the land if any antique object is found in the project area, under sub-section (a) of section 19 of said law.
- The project proponent will promise to return the land if any resource is found in the project, under sub-section (d) of section 19 of said law.

4.2.20 FARM LAND LAW (2012)

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

- The project owner has to abide by the decision of relevant Ministry with the coordination with the Central Administrative Body of the Farmland for paying



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

the compensation if it is needed acquisition farm land, under section 26 of said law.

- The project proponent has to obtain the permission of the Central Administrative Body of Farmland for the land use change from paddy field land to other land use under sub-section (a) of section 30.
- The project proponent has to obtain the permission of the Yangon Region Government with the recommendation of Yangon Region Administrative Body of Farmland for the land use change from farm land other than paddy field land to other land use under sub-section (b) of section 30.

4.2.21 Protection of Biodiversity and Protected Area Law (2018)

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

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

4.3 APPLICATION OF INTERNATIONAL GUIDELINES

Specifically, the Environmental Impact Assessment for this project will follow not only the national regulations such as the Environmental Conservation Law, Environmental Conservation Rules and relevant regulations of the Government of the Republic of the Union of Myanmar but also International Guidelines such as WHO standards, IFC Environmental Health and Safety Guidelines for environmental and social considerations.

4.3.1 IFC ENVIRONMENTAL, HEALTH AND SAFETY (EHS) GUIDELINES (2007)

The World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). 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. The General EHS Guideline contains information on crosscutting Environmental, Health, and Safety issues potentially applicable to all industry sectors. It should be used together with the relevant



industry sector guideline(s). When host country (Myanmar) regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent.

4.3.2 IFC GUIDELINES ON WATER AND SANITATION, (2007)

The EHS Guidelines for Water and Sanitation include information relevant to the operation and maintenance of potable water treatment and distribution systems, and collection of sewage in centralized systems (such as piped sewer collection networks) or decentralized systems (such as septic tanks subsequently serviced by pump trucks) and treatment of collected sewage at centralized facilities.

4.3.3 IFC GUIDELINES ON WASTE MANAGEMENT FACILITIES (2007)

The EHS Guidelines for Waste Management cover facilities or projects dedicated to the management of municipal solid waste and industrial waste, including waste collection and transport; waste receipt, unloading, processing, and storage; landfill disposal; physico-chemical and biological treatment; and incineration projects. Industry-specific waste management activities applicable, for example, to medical waste, municipal sewage, cement kilns, and others are covered in the relevant industry-sector EHS Guidelines, as is the minimization and reuse of waste at the source.

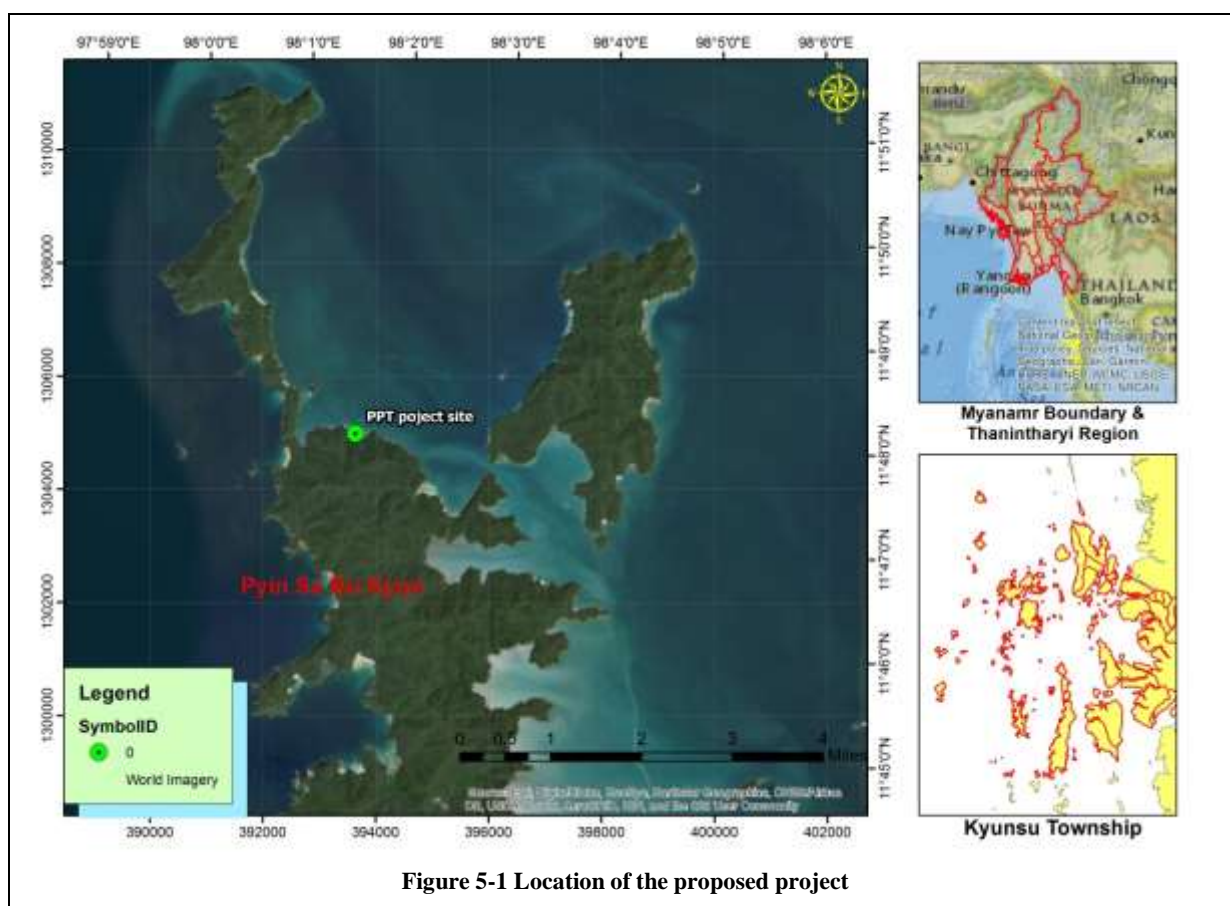
4.3.4 IFC GUIDELINES FOR AQUACULTURE (2007)

The EHS Guidelines for Aquaculture provide information relevant to semi-intensive and intensive/super-intensive, commercial aquaculture production of the main aquatic species, including crustaceans, mollusks, seaweeds and finfish, located in developing countries in temperate and tropical regions.

Chapter (5) PROJECT DESCRIPTION AND ALTERNATIVE SELECTION

5.1 PROJECT DESCRIPTION AND LOCATION

The proposed project is based at the Pyin Sa Bu Kyun, also known as Bentinck island, which is located at latitude 11°47'49.49"N, 11°51'37.41"N and longitude 98°00'4.94"E, 98°03'04.27"E, southwestern part of the Myeik Archipelago. The Island is a horse shoe shape forming a good breeding ground for pearl oyster. The island is thickly wooded and 19274.2 acres (7799.99 ha) in extent. 8,646.4 acres (3,499.07 ha) will be used for the pearl culture development. The selling and trading plan will be 50% for export and 50% for local. The project life cycle is 15 years and the past 3 years were experimental pearl culture process. The project site and facilities are temporary during the 3 years experimental production period which ends up in 2019. The experimental production period has passed and project is recognized feasible by the officials from Myanmar Pearl Enterprise. The project facilities will be upgraded as planned in the project proposal and construction period will be started in October, 2019.



5.2 PROPOSED PROJECT DEVELOPMENT

Pyi Phyto Tun International Co., Ltd has already received a permit from Myanmar Investment Commission and also has an agreement with Myanmar Pearl Enterprise to



establish a pearl culture development at Pyin Sa Bu island. After the experimental production period and project is recognized feasible by the Myanmar Pearl Enterprise, the project facilities will be upgraded as planned in the project proposal. The initial observation period for the development took 12 months and the construction phase will take 3 years. There are two stages in the proposed pearl culture development that (i) Development Stage and (ii) Pearl Culturing Stage.

5.3 PROPOSED PEARL CULTURE PROCESS

Pearl cultivation involved planting a nucleus in wild oysters. While some seek to jump-start the natural process by implanting a tiny piece of pearl mantle inside the oyster, others use beads designed to create a larger pearl in the shortest period of time and help to control its shape. Along the way, Japanese scientists identified strains of oysters with the best pearl-bearing qualities and focused on using them to produce pearls of high lustre and clear, uniform colour. PPT use the Japanese method in the process.

Culturing Process -

Technicians open the live pearl oysters then gently surgically implant a small shell bead along with a tiny piece of mantle tissue. This bead is the nucleus around which the oyster secretes layer after layer of nacre, the substance that forms the pearl. This step of the culturing process requires tremendous skill and precision. The oysters will only allow their shells to be pried open 2 to 3 centimetres or they will reject the nucleus. Experienced technicians use exacting tools to make the tiny incisions.

The nucleated oysters are quickly returned to the sea, housed in individual mesh pockets that are suspended from floating rafts. The oysters feed and grow in sheltered bays rich in natural nutrients. As time passes, the oysters secrete lustrous layers of nacre around the implanted bead. In winter, the oysters are moved to warmer waters. Pearl technicians monitor water temperatures and feeding conditions daily at various water depths and move the oysters to take advantage of the best growing conditions.

Periodically, the pearl-bearing oysters are lifted from the sea for cleaning and health care. Seaweed, barnacles and other growths are removed from their shells and they are treated with compounds to prevent parasites from injuring the tender flesh of the oysters. These precious oysters are meticulously protected from every conceivable threat to ensure the finest resulting pearls. However, typhoons, red tides of plankton and predators all take their toll before the pearls are ready to be harvested. Once the oysters are brought back to shore, the pearl farmers take inventory of the long-anticipated harvest. Of the millions of oysters nucleated every year, only a tiny fraction of them produce high grade pearls. On average, about half of the nucleated oysters do not even survive to bear pearls. Less than five percent of the survivors yield pearls of the ideal shape, lustre, and colour to be considered fine quality. The few pearls that make the cut are then cleaned, soaked and sorted.

Harvesting -



The newest crop of pearls go through a series of gentle treatments to prepare them for jewellery. The pearls are first soaked for several days in a mild cleaning solution, under intense fluorescent light, to remove any deposits and odours they may have accumulated during their days in the ocean. The pearls are then bathed in a wooden vat of finely crushed walnut shells. The natural oils from the shells provide a soft, gentle polish without harming the integrity of the pearl's surface. After they receive their luscious spa treatments, these pearls are painstakingly matched.

5.3.1 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).

5.3.2 PEARL CULTURE PROCESS

Pearl culture process at PPT and similar industries follows the process below -

- ❖ Spats collection
- ❖ Transport the collected spats to Pyin Sa Bu Island
- ❖ Transported collectors hanging at the long line for resting
- ❖ 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 110-120 days, transfer to (3.0) Bu Net
- ❖ Cleaning biofouling and boring organisms from oyster larvae, 3 times a month
- ❖ After 180 days transfer to (8) pocket bag
- ❖ When aged 1 year old, check the size and weight to choose for operated oyster
- ❖ Seeding the oyster
- ❖ Within 3-6 months, perform x-rays checking
- ❖ After 1 and half year, pearl harvesting

Hatchery Breeding Hall is in Myanmar Pearl Farm and after 30 days of spats from the hatchery breeding hall, these spats are collected to transfer Pyin Sa Bu Island. Spat

collectors are placed in the Russel Nets (Circle Nets) and hanged at the long lines for resting.



Figure 5-2 Transported the collected spats to Pyin Sa Bu Island



Figure 5-3 Spat Collectors

Figure 5-4 Young Oysters



Figure 5-5 Spat Collectors in Russel Nets

After resting for 30 days, choose oyster larvae from the collectors and transfer to (2.0) Bu Net and hung in long lines and each net has 25 spats in this stage. And then, 60 days later, oysters are changed into 3.0 BU Triangle nets. In this stage, only 10 spats are placed in a net. When they are bigger after 180 days, they are transferred to the bigger nets (8 pocket panel) and hung in the long lines from sea water. After 60-90 days in 10 pocket panels, the sizes of the oyster spats are bigger and they are changed into 8 pocket panels, 6 pocket panels respectively and grow in sea water by suspending in long lines at appropriate depths.



Figure 5-6 Long Lines in Pyin Sa Bu Island



Figure 5-7 Pocket Panels



Figure 5-8 Oysters in the 8 pocket panel



Figure 5-9 Pocket Panel Storage

Oysters must be cleaned of biofouling and boring organisms that grow on their shells. Every oyster is cleaned 3 times a month using high pressure hydraulic sprayer on boat and knife to get all the barnacles and seaweed off on the floating house and cleaning house. Cleaning keeps the pearl oysters healthy and in good condition. In this process, sea water near the cleaning boat and floating house may occur in temporary turbid color. There may be low impact on sea water since cleaning the pearl oysters is used only sea water. After cleaning the pearl oysters, they are replaced to their respective nets and hanged in long lines and then suspended in sea water. Panels and nets are also cleaned to reuse.



Figure 5-10 Cleaning triangle nets using high pressure cleaner



Figure 5-11 Floating House



Figure 5-12 Cleaning oysters in the pocket panels using high pressure cleaner



Figure 5-13 Barnacles and seaweed off cleaning by using knife on floating house

When aged of the oysters are 1 year old, check the size and weight to choose for operated oyster. The healthy oysters are gathered from the long lines and prepared for

implantation (seeding). After seeding a pearl nucleus inside the pearl sac of each oyster shell by a grafting technician in the operation hall, these oysters are then hung in long lines and suspended in sea water. 3 months later after seeding, seeded pearl oysters have to be checked by X ray whether the nucleus is effective or vomit. Effective oysters are harvested two years later after seeding. Vomit oysters need to be recreated and seeded the nucleus again after 3 months to 6 months.



Figure 5-14 Cutting the tissue



Figure 5-15 Seeding the nucleus into adult oyster



Figure 5-16 X ray Checking



Figure 5-17 X ray Checking

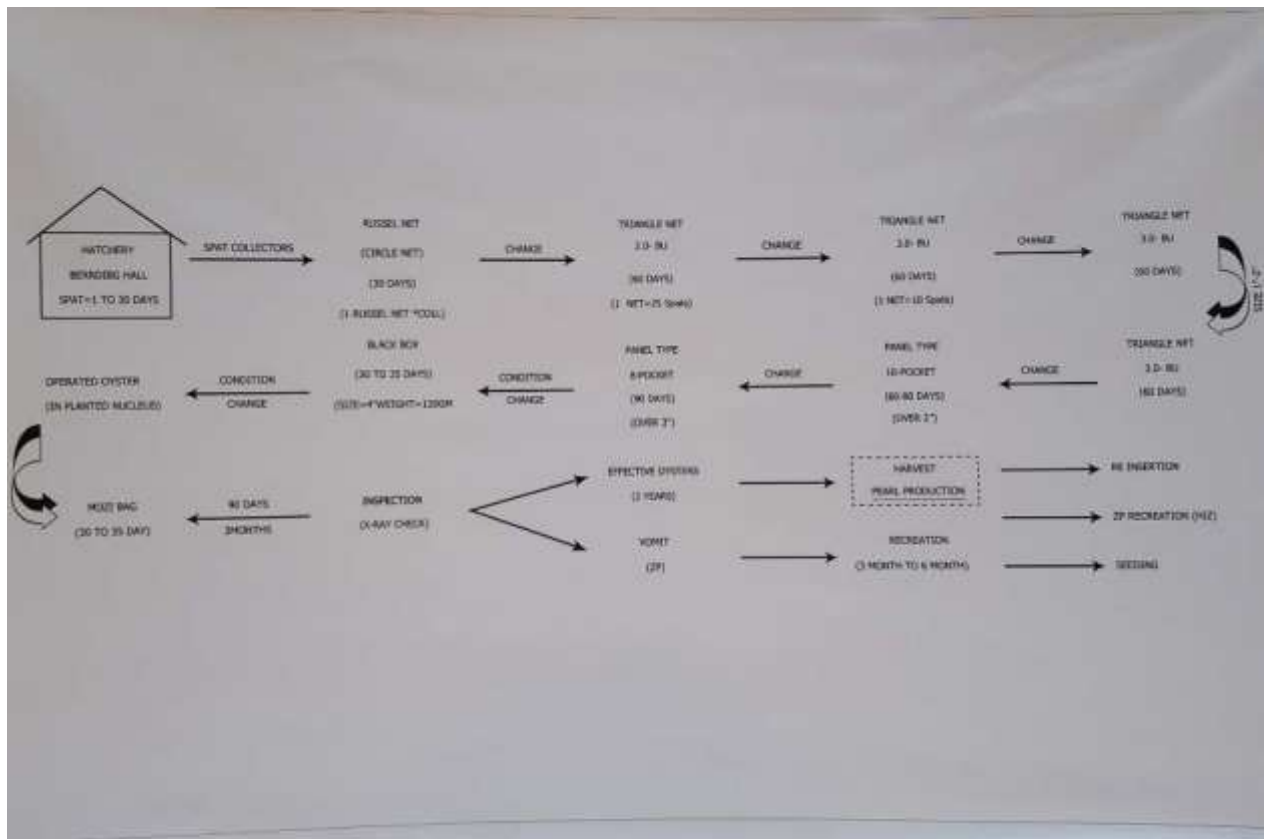


Figure 5-18 Process flow chart for Pearl Culturing

Description for Long Line

For the process of oyster breeding and pearl culturing, oysters are hung in long lines and leave in sea water. The distance between each long line is at least 7 feet. The total numbers of long lines and type of placements for the proposed project of Pyi Phy Tun Co., Ltd are shown in the following **Table (5.1)** and **Figure (5.19)**.

Table 5-1 Description for Long Lines

No	Type of Long Lines	Numbers of Long Lines
1.	10 Line Group -19 Group	190
2.	Single Long Line	85
Total		275

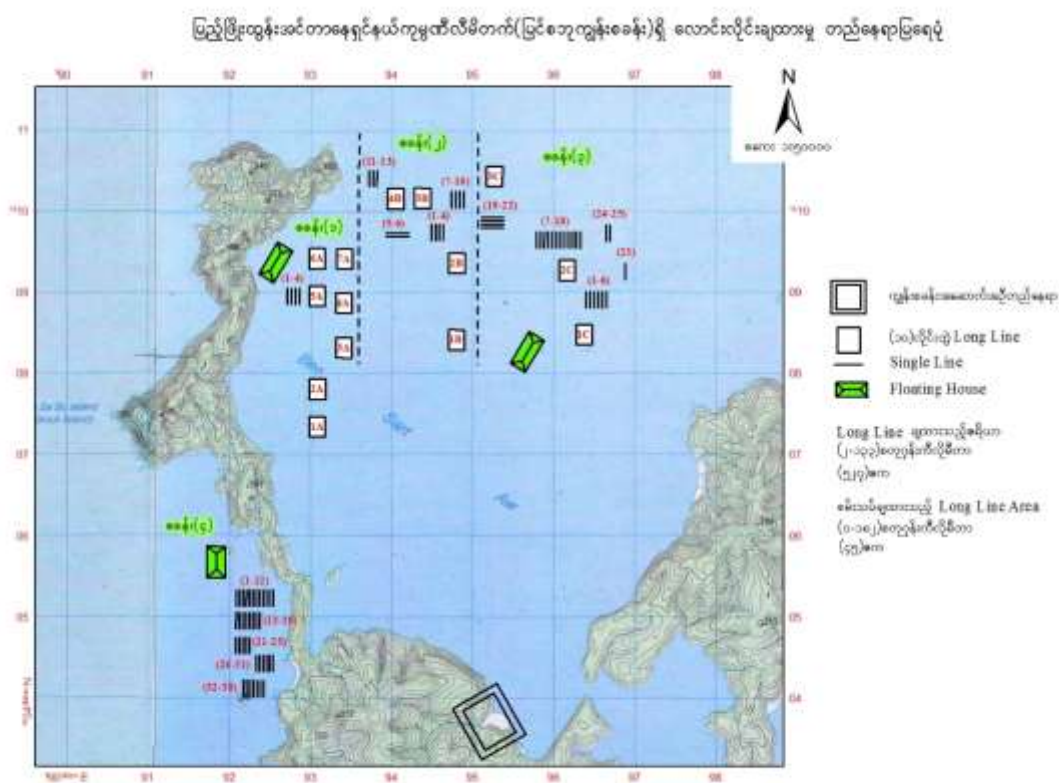


Figure 5-19 Location of Long Line Map

Annual Amount of Pearl Oyster Raising

Table 5-2 Annual Amount of Pearl Oyster Raising

No	Type of Oyster	Number of Oyster
1.	2018 spat oyster	89545
2.	2019 spat oyster	321400

**Amount of seeded pearl oyster (February, 2019)****Table 5-3 Amount of seeded pearl oyster (February, 2019)**

No.	Description	Effective Number of Oyster
1.	Seeding oyster (2018, 6 months)	21658
2.	Reseeding oyster	552
3.	Effective oyster	7952
4.	Adult oyster (B-17)	1596
5.	Vomit nucleus oyster	59
6.	Seeding oyster (2019)	25844

Lists of Shells oyster**Table 5-4 Lists of Shells Oyster**

No.	Description	Total numbers of shells	Shells weight (Lb)
1.	Shells	19292	3858.4
2.	Shells (Saibo)	10768	215.60

5.4 INVESTMENT PLAN

Total investment will be Ks 5000.00 million. The detail investment plan for office furniture and operational equipment are shown in below table. The Pyi Phyto Tun International Co., Ltd. has an agreement with Myanmar Pearl Enterprise to establish a pearl culture development. According to the employment statement mentioned in the proposal, total manpower to be used for the industry is 165 staffs. In addition, the company attached fire protection plan, pollution control plan and safety and social security plan in its proposal.

Table 5-5 Investment Plan

Investment Type	Kyats	USD	Total Investment (Kyats, In Million)
Cash	4,703.00	-	4,703.00
Equipment	128.4	0.04	176.4
Buildings	107.5	-	107.5
Office assets and Materials	13.1	-	13.1
Total	4,952.00	0.04	5000.00

Table 5-6 Imported Machine and Equipment

Import Investment	Kyats in Millions	USD
Machine, Equipment	48.0	0.04
Total	48.0	0.04

5.5 DESCRIPTION OF BUILDINGS, ASSOCIATED INFRASTRUCTURES AND TEMPORARY SITE LAYOUT PLAN

Pearl culture operates within an area of approximately 8646.4 acres on the island. The temporary camp site includes three staff dormitories, one water storage tanks, warehouse, work shop, clinic, generator storage house, pocket cleaning house, office, staff canteen etc. The project will be using 3 generators during the operation period. A3 kVA generator will be used for camp lighting, a 10-kVA generator will be used for OPT and another 10 kVA will be used for pocket cleaning operation. The layout plan of the proposed project site is shown in **Figure 5.20**.

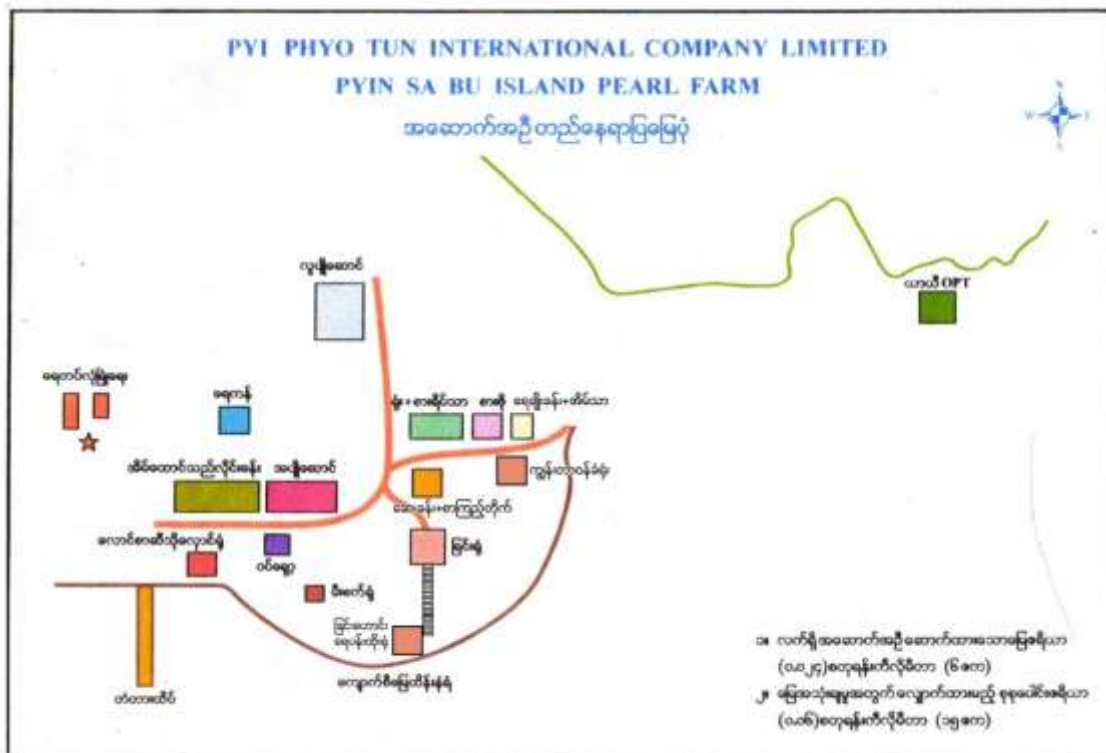


Figure 5-20 Project Layout Plan



Figure 5-21 Clinic



Figure 5-22 Ladies Hostel



Figure 5-23 Staff Canteen



Figure 5-24 Men Hostel



Figure 5-25 Row House



Figure 5-26 Workshop



Figure 5-27 Jetty



Figure 5-28 Office



Figure 5-29 Kitchen



Figure 5-30 Thetha Shop



Figure 5-31 Pocket Cleaning House



Figure 5-32 Ware House

5.5.1 MASTER PLAN

The project site will be built as planned in the Master Plan and the construction period will commence in October, 2019. The detail information of project proponents master plan building is shown in following;



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 5-7 Detail information of Master Plan Buildings

No.	Category	Quantity
1.	Office	1
2.	Operation Room	1
3.	Laboratory	1
4.	Office Quarter	1
5.	Guest House	1
6.	Staff Quarter (4) Units	6
7.	Staff Canteen	1
8.	Clinic	1
9.	Store House	1
10.	Generator House	1
11.	Workshop	1
12.	Thetha Shop	1
13.	Convention	1
14.	Security Barrack	1
15.	Kitchen House	1
16.	Bridge	2

Table 5-8 Master Plan Building



Master Layout Plan



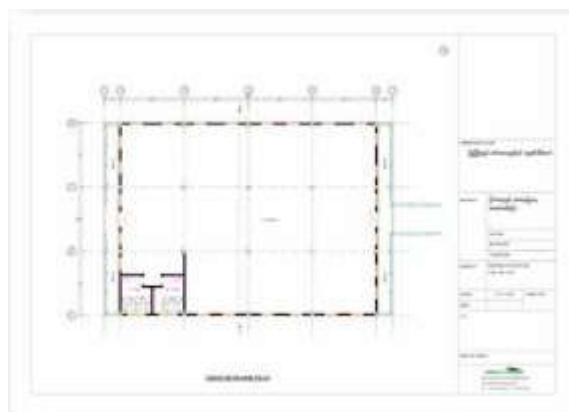
Bachelor Hall



ENVIRONMENTAL IMPACT ASSESSMENT REPORT



Laboratory



Ground Floor Plan of Laboratory



Officer House



Ground Floor Plan of Officer House



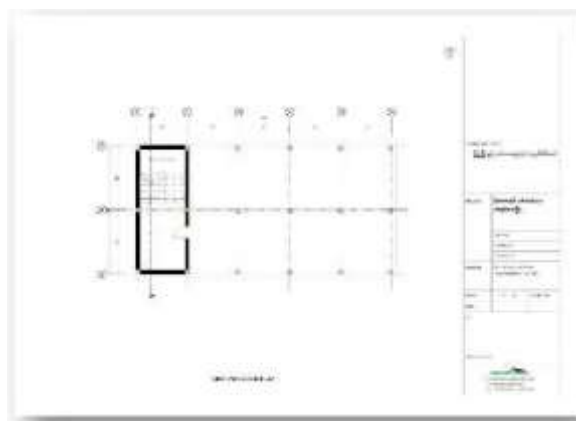
VIP House



Ground Floor Plan of VIP House



Cyclone Shelter



Ground Floor Plan of Cyclone Shelter



Dining Hall



Kitchen and Bahroom

5.5.2 MANPOWER REQUIREMENT

The requirement of manpower during operation in the project is shown in **Table 5.9**.

Table 5-9 Manpower Requirement

No.	Designation	No of Employee
1.	Manager	3
2.	Assistant Manager	2
3.	Accountant	5
4.	Pearl Operator	5
5.	Assistant Operator	5
6.	Admin Staff	7
7.	Supervisor	5
8.	Sabio Staff	5
9.	OPT Helper	5
10.	Boat- Swan	2



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

11.	Driver	10
12.	Mechanic	3
13.	Boat- driver	7
14.	General Labor	100
15.	Store Keeper	1
	Total	165

According to the updated information, total 90 staff and workers are working for the proposed project currently although there are stated as 165 workers requirement for manpower in scoping report. During operation, the management of the process will be operated on one shift during day time starting from 7:00 AM to 5:00 PM including breakfast and lunch time. The project proponent has been arranged breakfast, lunch and dinner for staffs. The following tables are updated numbers of manpower and employment statement. 80% of the employees are local people near from Kyun Su Townships and Myeik.

Table 5-10 Current Manpowers Information

No.	Designation	No of Employee
1.	Manager (Myeik Office)	1
2.	Kyun Manager	1
3.	Associate Kyun Manager	2
4.	Accountant (Myeik Office)	1
5.	Engineer	1
6.	Pearl Chief Operator	1
7.	Head of Diver	1
8.	Long Line Staff	1
9.	Head of Hydraulic Sparkler	1
10.	Sabio Head	1
11.	OPT Helper	6
12.	Saibo Staff	52
13.	Boat- Swan	3
14.	Driver	2
15.	Hydraulic sparkler	6
16.	Admin Staff	6
17.	Mechanic	1



No.	Designation	No of Employee
18.	Fuel Storage worker	1
19.	Chef	1
20.	Store Keeper	1
21.	Health Assistant	1
	Total	90

Employment Statement

Table 5-11 Employment Statement

No.	Region	Number of employees
1.	Thae Chaung Village, Kyun Su Township	13
2.	Tan Maw Village, Kyun Su Township	1
3.	Nga Man Chaung Htaung Village, Kyun Su Township	2
4.	Kyue Kha Yan Village, Kyun Su Township	4
5.	Nyaung Bee Village, Kyun Su Township	3
6.	Ya Htaung Village, Kyun Su Township	3
7.	Sa Shan Thit Village, Kyun Su Township	1
8.	Near Myeik Township	34
9.	Yangon, Bago, Magwe, Ayeyarwaddy, and Rakhine	29
	Total	90

5.5.3 UTILITY OF MACHINERY AND EQUIPMENT

During the operation phase, required machines are to be purchased locally. The proposed project site has also utilized cleaning boat, generator and etc. for pearl culture production operation. Detailed machines and equipment are shown in **Table 5.12**.

Table 5-12 Lists of machinery and equipment

No.	Particular	Quantity
1.	X-Ray Checker Machine	1
2.	Transportation Vessel	1



No.	Particular	Quantity
3.	Fishing Boat (PPT)	4
4.	Fiber Boat	9
5.	Cycle	1
6.	Pro Box	1
7.	Generator-36 KVA	1
8.	Generator-4DR.5	2
9.	Diesel Engine Model (R.175)	1
10.	Water Pump	2
11.	5/6 HP Chinese Machine	8
12.	7.5 KW Dinamo	2
13.	190 A (Emei) 11 HP	2
14.	185 (Emei) 10 HP	5
15.	Pressure Pump	4
16.	Pressure Pump Machine	11
17.	2.0 Bu Triangle Net	4384
18.	3.0 Bu Triangle Net	10668
19.	6 Pocket Panel	1998
20.	8 Pocket Panel	1782
21.	Russel Net	300
22.	Floating ball	8426
23.	Concrete Stone	676
24.	24 mm rope	478
25.	16 mm rope	285
26.	8 mm rope	480
27.	5 mm rope	135

5.6 RESOURCE CONSUMPTION

There may only low usage in energy consumption and water consumption by the proposed project because this pearl culture process will implement as environmentally friendly system. For the annual electricity requirement, will use generators. Annual water requirement being on island will be relying on artesian wells and then oyster cleaning process water usage is sea water. Generators will provide auxiliary and backup power. Operations



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

plans will minimize power usage. Air Conditioning will be used in limited areas and to achieve limited temperature levels.

5.6.1 ELECTRICITY AND FUEL CONSUMPTION

The electricity need of the proposed project is 40,150 kw/h per year. The proposed pearl culture project is located at the isolated island and the electricity supply will be available by generator. The annual fuel consumption will be 29,520 gallons for diesel, 14,400 gallons for petrol and 600 gallons for oil and lubricant and engine oil and 300 gallons for oil and lubricant (compressor oil).

Table 5-13 Time shift of operating generator

No.	Time interval of operating generator	Time
1.	5:00 AM to 9:00 AM	Morning
2.	12:00 PM to 2:00 PM	Afternoon
3.	4:00 PM to 9:00 PM	Night



Figure 5-33 Generator Storage House



Figure 5-34 Oil Storage House

5.6.2 WATER CONSUMPTION AND AVAILABILITY

Approximately, the pearl culture operation would require 1,000 gallons of water per day and 365,000 gallons of water per year. Spring water is the only available source for the development. The nearest spring water source is located approximately 200m away from the proposed project site.



Figure 5-35 Natural Spring Water



Figure 5-36 Water Storage Tank



Figure 5-37 Water Storage Tank



Figure 5-38 Water Storage Tank

5.7 PRODUCTION OF WASTES (Solid, Liquid and Gas)

5.7.1 SOLID WASTE

The majority of waste generated from the pearl production process are the biofouls, used nets and shells of pearl oyster. General domestic wastes are also generated from the staffs. Estimated solid waste generation rate will be 0.4kg per person per day. Since there are total 90 staffs in the project site, total solid waste amount produced per day is 36kg and 1080kg of waste will be generated per month. These domestic solid wastes will be destroyed by fire in the waste dump that is 30ft away from the staff housings. The waste dump is located at latitude 11°48'14.12"N and longitude 98°01'21.29"E.



Figure 5-39 Shells of pearl oyster



Figure 5-40 Domestic Waste

5.7.2 LIQUID WASTE

Liquid wastes are generated where pumped water jets are used in cleaning of oysters. Domestic wastewater is generated from staff quarters, kitchens and bathing tanks. Oyster cleaning is the process of cleaning oysters with brine along the long line, floating ball and pocket which repair, cleaning and pocket exchange in floating house. Since the produced liquid used in oyster cleaning is just the brine, they are discharged back into the ocean. It is non-hazardous liquid waste. Since per head wastewater discharge rate being is 60gals per person, total amount of water discharged from the project is 5400 gals for a total of 90 staffs. Approximately 70% of this water is domestic wastewater, which is 3780 gals, will be discharged into septic tank. Remaining 30% of produced water (1620 gals) are discharged outside the project site. They flow into the near project area.



Figure 5-41 Domestic liquid waste



Figure 5-42 Traditional Toilet



Figure 5-43 Floating ball & Oyster Pocket cleaning



Figure 5-44 Floating House

5.7.3 GAS EMISSION

There are generators used in the cleaning processes produce Carbon-dioxide emission. In the project area, two generators will be used for electricity source for operation and staffs on the island. Diesel consumptions of those generators is about 100 gallons per day. Total amount of CO₂ emissions from the generator can be calculated as shown in below **Table 5.14**.

Table 5-14 Quantity of CO₂ Emissions from the Generator

Description	Metric Tons of CO ₂ emission factor	Resource Consumption per day	Kilo Tons of CO ₂ e/ per day	Kilo Tons of CO ₂ e per Month	Kilo Tons of CO ₂ e per year
Diesel (Generator)	0.010	100 gallons	0.001	0.03	0.36

Source: World Resources Institute GHG Calculation for Stationary and Mobile Sources (2006)

Average amount of CO₂ emission from the generators is calculated 0.36 kilo tons CO₂e per year. According to EBRD Greenhouse Assessment Methodology, minimum CO₂ emission from the operation of facilities is <20 ktons CO₂e per year. The amount of GHG



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

emissions is low when considered on the EBRD standard of CO₂ emission and there will be only a minor impact for the surrounding area.

In order to find out the air pollution due to GHG emissions, EBRD has developed a standard that will assess CO₂ emissions due to operation of project sectors. (See CO₂ Emission standards in below Table.

Table 5-15 EBRD Standard of CO₂ Emission

Category	Range
Negligible	No GHG assessment necessary
Low	< 20kt/y CO ₂ - equivalence (CO ₂ -e)
Medium – Low	20 – 100 kt CO ₂ - equivalence (CO ₂ -e)
Medium- high	100 kt- 1 Mt CO ₂ - equivalence (CO ₂ -e)
High	> 1 Mt CO ₂ - e

5.8 PROJECT ALTERNATIVE

This section considers the selected alternative to ‘no project alternative’. There were no other alternatives site locations considered for the project because all three locations for the project site had been identified by the MONREC and permit had been given to the project proponent to develop this pre-selected pearl culture process location sites.

5.8.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE

The following positive impacts are anticipated by choosing this alternative:

- Pyin Sa Bu island’s land will have no impact (even minimal) from any construction activities on the island (no pressure or destruction caused by constructions on the ground)
- No light pollution, emissions, noise and any other (even minimal) impacts on the island’s environment will be expected so natural resources and biodiversity will be impacted by the activities of the project
- No additional human presence (staff) will be expected
- There will be less traffic movement around the island

In the meantime, the following negative impacts are anticipated:

- In the absence of government security patrol due to the isolated location of the island, illegal consumption of resources will continue in the absence of any project-related security measures (e.g. on-going illegal hunting)
- Job opportunity (need for up to 165 local personnel)
- No export income will be made

5.8.2 ALTERNATIVE 2: PROJECT Pyi Phyo Tun Pearl Culture Process IN PRE-SELECTED LOCATION

The project proponent, Pyi Phyo Tun International Co., Ltd, had already received permission from MONREC to establish the oyster raising and pearl production process at



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Pyin Sa Bu Island. The pearl culture process development will be implemented with Build, Operate and then the construction period will start in October, 2019.

The proposed pearl culture project is designed as an environmentally minimal-impact self-sufficient project which pays attention to the natural setting of the island in its architectural design, meets its energy needs with renewable energy sources and uses environmentally sensitive materials and sustainable construction techniques and has a sustainable approach to water, wastewater and sewage. Thus, it is expected to bring positive impacts and to the development of Myanmar pearl project in Country. Archipelago while at the same time having negligible impact on land, natural resources and biodiversity of the surrounding environment. Below is the description of the proposed project in pre-selected location. Below is the detailed description of the physical and biological as well as social conditions of the surrounding environment which help to assess the potential environmental and social risks of the proposed project.

Chapter (6) DESCRIPTION OF THE SURROUNDING ENVIRONMENT

In the EIA study, it is necessary to establish the baseline condition for environmental and social status of proposed project area and its surrounding area. Based on the collected information, the environmental impact assessment is carried out to determine whether the proposed project's environmental and social these impacts positively or negatively affected surrounding environment. This chapter describes bio-physical environmental and socio-economic condition of the study area based on the available secondary information and primary information collected from field survey visit.

6.1 SCOPE OF THE STUDY AREA

Considering both environmental and social impacts of the proposed project's nature and location, the EIA study area for it was roughly set within 5 km radius of the center of the proposed project area. Other environmental and social features located further away from the center of the project have also been described where relevant to the EIA.

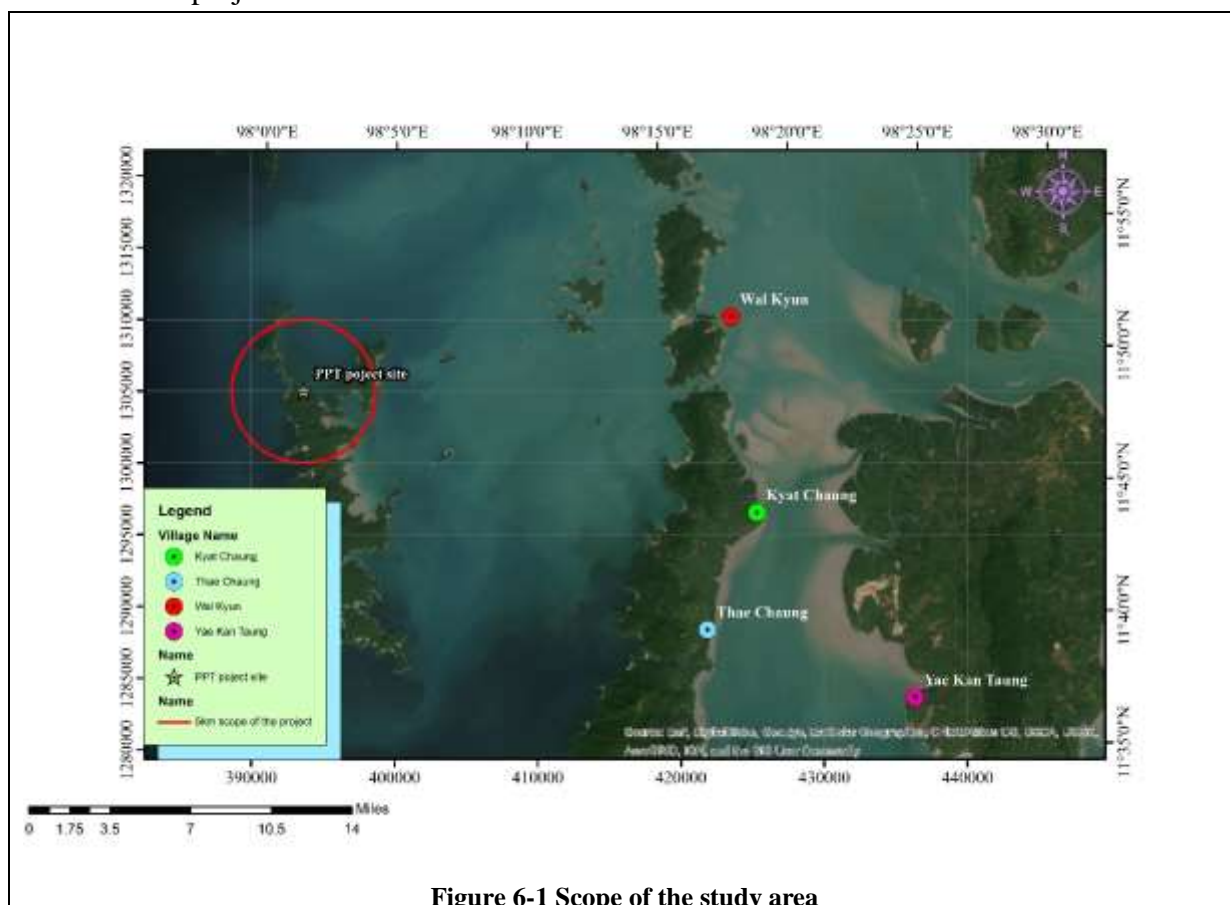


Figure 6-1 Scope of the study area



6.2 OBJECTIVES AND METHODOLOGY

The objectives of the baseline review and data collection is to describe the baseline environmental and social components of the Project Area which may potentially be affected by the Project activities; and from the Project to the environmental and social components.

Project Area; to provide baseline data before the construction of the the Project begins which may be used for future monitoring of the Project impacts by comparing the baseline data with data obtained from future monitoring during the implementation of after completion of the project.

6.3 Existing Condition of the Proposed Project Environment

Pyin Sa Bu Island locate in the Mergui Archipelago, Tanintharyi Region, Myanmar. Pyin Sa Bu Island has a very irregular indented shape. The island is thickly wooded and farming project area is in the north of the island.

6.3.1 LAND USE

According to the township and site visit, the proposed project is located at inhabited island and there is no current land use as commercially or regionally observed.

6.3.2 Kyun Su Township

(a) Climate

Kyun Su Township has tropical monsoon climate and the highest temperature is 32 °C and the lowest temperature is 14 °C. According to the township data of Kyun Su Township, annual rainfall data and temperature are the following.

Table 6-1 Rain Fall Data and Temperature of Kyun Su Township

No.	Year	Rain fall		Temperature	
		Raining Day	Total Rainfall (in)	Summer °C	Winter °C
				Highest	Lowest
1.	2014	139	221.71	32	14
2.	2015	138	159.17	32	14
3.	2016	153	199.76	40	29
4.	2017	7	6.58	40	-

(b) Topography

Kyun Su Township is composed of small islands which are surrounding by sea water. Kyun Su Township is commonly hilly and flat land area are rare on the most island.

(c) Hydrology



Most islands of Kyun Su Township are located above the sea level of 460 feet. Water resource is normally received from the natural spring water and wells.

6.4 Environmental Quality Analysis

OBJECTIVES

The objective of the assessment is:

- To review the existing baseline air quality status of in the vicinity of the proposed project.

METHODOLOGY

Baseline environmental parameters and sampling locations were defined according to the objectives for environmental impact assessment. Locations for sampling and analysis of water quality, ambient air quality and noise level of the project site were identified by environmental specialist on site before doing measurement.

6.4.1 Ambient Air Quality

Air quality parameters were monitored with adequate device named Environmental Perimeter Air Station (EPAS). The Portable Haz Scanner EPAS is easily deployed as an ambient air quality monitor to measure pollutants including nitrogen dioxide, sulfur dioxide, carbon monoxide, carbon dioxide, particulates matter. The EPAS provides direct readings in real time with data logging capabilities. Each EPAS is manufactured according to the customer's sensor specifications. Although individual systems may have different numbers of sensors attached, the software is self-configuring and determines which sensors are connected at any given time.

The results were compared with **National Environmental Quality Guidelines (NEQG)**, **American Conference of Governmental Industrial Hygienists (ACGIH)** and **World Health Organization (WHO)**.

Table 6-2 Ambient Air Quality

Ambient Air Quality (1 location)	
Gas Emission	CO, CO ₂ , SO ₂ , NO ₂
Dust Emission	PM ₁₀ , PM _{2.5}

6.4.2 Ambient Noise

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



ENVIRONMENTAL IMPACT ASSESSMENT REPORT



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

Table 6-3 Noise Level Monitoring

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

Equipment used to measure ambient air and noise are shown below Table 6-4

Table 6-4 Equipment used to measure ambient air and noise measurement

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

6.4.3 Water Quality

Water samples were collected on site with appropriate sampling equipment and procedures. Physical parameters such as Dissolved Oxygen (DO), Conductivity, Salinity, Total Dissolved Solids, pH, Temperature and Turbidity of surface water were measured on site by portable



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

multi parameter water quality meter. The sampling team has pre-arranged with the labs in Yangon for analysis and logistic arrangement made to reach the preserved samples with unique IDs to the designated labs within 48hrs.

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

The following laboratories were used for analysis of water and parameter shown in Table 6-5.

1. SGS Minerals and Environmental Services, No. 79D, Bo Chain Street, 6-1/2Miles, Hlaing Township, Yangon. Tel; 01 654 795, 654 796
2. ISO Lab, No-18, Lanthit Road, Insein Township, Yangon. Tel; 01 540 955, 732251575
3. REM-UAE (United Analyst and Engineering Consultant Co., Ltd), 3 Soi Udomsuk 41, Sukhumvit Road, Bangchak, Phrakhanong, Bangkok 10260. Tel; 799 855 808

Table 6-5 Environmental Quality Parameters for Surface Water Quality

Surface Water Parameters (1 location)	
Physical Parameter	Temperature, Salinity, Turbidity
Chemical Parameter	pH, Salinity, Dissolved Oxygen (DO), Nitrate, Phosphate, Hardness, Chloride
Heavy Metal	Iron, Copper, Manganese (Mn), Zinc, Aluminium, Potassium

Table 6-6 Environmental Quality Parameters for Waste Water Quality

Waste Water Parameters (2 locations)	
Physical Parameter	Total Suspended Solid, Turbidity, Temperature,
Chemical Parameter	pH, Total Nitrogen, Total Phosphorus, Oil and grease, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD)
Bio	Total Coliform Bacteria

On-site water quality measurements, water samplings are conducted using the following equipment as shown in figure Table 6-7.

Table 6-7 Equipment for water sampling

<p>HORIBA U-50, Multiparameter Water Quality Meter</p> <p>Multiple sensors allow for the measurement of 11 parameters simultaneously. (pH, pH(mv), ORP, DO, Salinity, TDS, Seawater Specific Gravity, Temperature, Turbidity, Water depth)</p> <p>Patented auto-calibration features provide hassle free calibration of pH, dissolved oxygen, conductivity and turbidity.</p> <p>Ultra-sensitive Turbidity Sensors (Models U-50)</p> <p>Precision has been improved over conventional</p>	
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instruments.
Improved stability of the dissolved oxygen sensor has been achieved with a new 3 electrode design for fast response and polarographic sensor for ease of maintenance.
pH and ORP electrodes can be replaced individually to reduce replacement costs.



6.5 Monitoring and Sampling Locations

Sampling locations were confirmed by environmental specialist on site before doing the sampling. Water quality sampling locations consist of 1 surface water location (SWQ: at Natural Stream) where people live in the project area use portable water. 2 waste water locations (WWQ1: at the discharge point of cleaning house, WWQ2: at the discharge point of kitchen and dining hall) which were the mainly discharge sources of the existing project area. Air quality was monitored at the selected 1 location near (source) that can get the results of the existing ambient air quality.

Air quality and noise monitoring locations were identified as shown in **Figure 6-2**. And waste water and surface water sampling locations were conducted as shown in Figure 6-3 and Figure 6-4.



Figure 6-2 Air Quality and Noise Monitoring Locations of Pyi Phyto Tun Co., Ltd



Figure 6-3 Waste Water Quality Sampling Locations of Pyi Phyto Tun Co., Ltd



Figure 6-4 Surface Water Quality Sampling Locations of Pyi Phyto Tun Co., Ltd

Table 6-8 Locations of Environmental Quality sampling points

No.	Points	Coordinate	Locations
Ambient Air Quality and Noise Monitoring Locations			
1.	AQ and Noise-1	Lat: - 11°48'11.98"N Long: - 98° 1'27.45"E	At source of Pyi Phyto Tun Co., Ltd
2.	Noise-2	Lat: - 11°48'13.01"N Long: - 98° 1'22.31"E	Near the kitchen and dining hall of Pyi Phyto Tun Co., Ltd (receptor)
Surface Water and Waste Water Quality Monitoring Locations			
1.	SWQ	Lat: - 11°48'2.01"N Long: - 98° 1'30.22"E	At the natural stream



No.	Points	Coordinate	Locations
2.	WWQ-1	Lat: - 11°48'15.96"N Long: - 98° 1'23.65"E	At the discharge point of the cleaning house
3.	WWQ-2	Lat: - 11°48'14.01"N Long: - 98° 1'21.64"E	At the discharge point of the kitchen and dining hall

6.6 ENVIRONMENTAL QUALITY MONITORING

6.6.1 Ambient Air Quality

The air quality monitoring was done at selected locations during 13th to 14th March 2019. During this survey, these parameters were measured with adequate devices named Environmental Perimeter Air Station (EPAS) viz; Particulate Matters (PM₁₀ and PM_{2.5}) and gases CO₂, CO, SO₂, NO₂ via 24-hour basis. The results and guidelines of all emission pollutants are shown in table.

Particulate matters (PM 10 and PM 2.5) results are with in guideline values as shown in table. Atmospheric particulate matters such as PM₁₀ and PM_{2.5} have their ability to reach the deepest part of lungs and so affect respiratory process. In this air quality survey of the project site, the surveyed results of these particulate matters gathered from EPAS. The results with one-hour interval are shown in the following table.

Sulfur Dioxide (SO₂) is generated from combustion of fuels such as oil and coal, and as by-product from some chemical production or wastewater treatment processes. On-road and off-road vehicles are also emission source of SO₂. SO₂ irritates the respiratory tract, injures lung tissues and reduces visibility and level of sunlight. The emission can be controlled by implementation of manufacturer recommended engine maintenance programs, good driving practices, installing and maintaining emissions control devices, and implementing a regular vehicle maintenance and repair program.

Nitrogen Oxides (NO_x) in the ambient air consist of nitric oxide (NO), nitrogen dioxide (NO₂) and nitrous oxide (N₂O). NO₂ is formed by chemical reaction of NO and ozone. The main sources of NO₂ are combustion of fuel and on-road and off-road vehicles. NO₂ decreases lung function and resistance to infection. The gas emission can be monitored by combustion modification, flue gas recirculation, water/ steam injection and the same measures for SO₂ reduction.

Likewise, **Carbon Monoxide (CO) and Carbon dioxide (CO₂)** have the same emission sources and mitigation measures for SO₂ and NO₂. They are poisonous gas and cause damage to the respiratory organ. Guidelines 2013, adopted threshold limit values of CO₂ is 5,000 ppm for 8-hour, time-weighted average. Thus, it can be concluded that the existing CO₂ level is acceptable for human health.

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



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 6-9 Air pollutants emission results (Pyi Phyto Tun Co., Ltd) (source 13th to 14th March 2019)

Pyi Phyto Tun Co., Ltd Project (13.4.2019)							
Date	Time	CO₂ (ppm)	PM 10 µg/m³	PM 2.5 µg/m³	CO (ppb)	NO₂ (ppb)	SO₂ (ppb)
12.3.2019	18:00-18:55	202.92	44.33	20.92	0.00	48	1
12.3.2019	19:00-19:55	220.00	42.92	18.50	0.00	52.25	1.00
12.3.2019	20:00-20:55	291.67	11.25	3.75	0.00	55.42	1.00
12.3.2019	21:00-21:55	281.75	16.00	7.42	0.00	57.00	1.92
12.3.2019	22:00-22:55	236.58	35.00	19.00	0.00	58.42	0.00
12.3.2019	23:00-23:55	249.58	31.67	9.08	0.00	60.92	0.00
13.3.2019	0:00-0:55	229.58	23.75	10.92	0.00	62.08	0.00
13.3.2019	1:00-1:55	194.67	21.42	9.33	0.00	62.42	0.00
13.3.2019	2:00-2:55	203.08	16.67	12.25	0.00	60.00	0.00
13.3.2019	3:00-3:55	167.00	16.33	9.83	0.00	57.67	0.00
13.3.2019	4:00-4:55	155.08	13.17	5.25	0.00	57.25	0.00
13.3.2019	5:00-5:55	167.00	15.17	4.83	0.00	60.00	0.00
13.3.2019	6:00-6:55	139.67	27.92	9.83	0.00	55.58	0.00
13.3.2019	7:00-7:55	160.25	10.67	4.00	0.00	49.00	0.25
13.3.2019	8:00-8:55	166.75	18.25	7.58	0.00	8.67	2.50
13.3.2019	9:00-9:55	195.50	12.33	7.00	0.00	5.67	0.00
13.3.2019	10:00-10:55	192.00	12.25	6.33	0.00	13.75	0.00
13.3.2019	11:00-11:55	199.58	14.92	8.00	0.00	11.75	1.83
13.3.2019	12:00-12:55	189.00	22.33	5.00	0.00	2.00	3.00
13.3.2019	13:00-13:55	178.92	23.42	11.08	0.00	2.00	2.40
13.3.2019	14:00-14:55	177.00	22.08	8.42	0.00	2.00	0.00
13.3.2019	15:00-15:55	168.75	6.08	2.92	0.00	2.00	0.00
13.3.2019	16:00-16:55	141.33	11.42	4.83	0.00	3.25	2.10
13.3.2019	17:00-17:55	134.75	10.58	5.58	0.00	14.58	4.40
Average		193.43	20.00	8.82	0.00	35.90	0.89
1 hour Minimum		134.75	6.08	2.92	0.00	2.00	0.00
1 hour Maximum		291.67	44.33	20.92	0.00	62.42	4.40
Guideline for 24 hour		5000 ppm	50 ug/m3	25 ug/m3	35 ppm	200 ug/m3	20 ug/m3

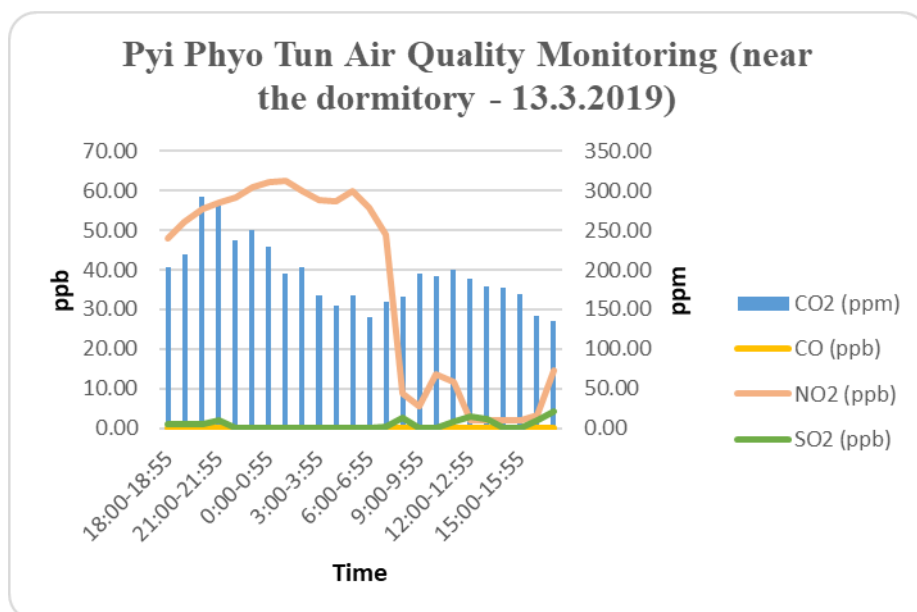


Figure 6-5 Fluctuation of Air Pollutants during diel cycle (source) (13th to 14th March 2019)

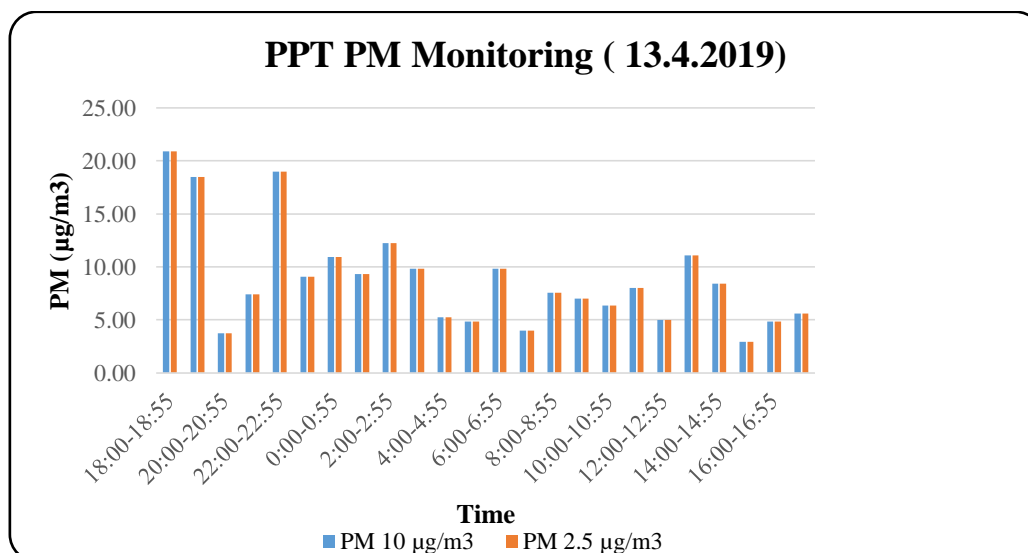


Figure 6-6 PM Monitoring Results (source) (13th to 14th March 2019)

Table 6-10 Air Emission Levels (Standard)

No.	Parameter	Maximum Concentration	Observed Values	Unit	Average Period	Source
1.	NO ₂	200	117.39	µg/m ³	1 hour	NEQG
2.	PM ₁₀	50	20	µg/m ³	24 hour	NEQG
3.	PM _{2.5}	25	8.82	µg/m ³	24 hour	NEQG
4.	SO ₂	20	2.33	µg/m ³	24 hour	NEQG
5.	CO ₂	5000	193.43	ppm	24 hour	ACGIH
6.	CO	35	0	ppm	1 hour	NAAQS

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



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

As per above tables, it can be seen that all parameters measured are within the National Environmental Quality (Emission) Guideline (NEQG), National Ambient Air Quality Standards (NAAQS) and American Conference of Governmental Industrial Hygienists (ACGIH) guidelines except PM₁₀ and PM_{2.5}. It was a result of temperature inversion. Temperature inversion is a condition in which atmospheric temperature increases with altitude, unlike the normal situation in which atmospheric temperature decreases with height. Because of this effect, pollutants released in the lower layer of atmosphere, ie near ground, gets accumulated instead of dispersing vertically.

6.6.2 Ambient Noise

Ambient noise level for the proposed project was measured with Digital Sound Level Meter at the project site. The noise level measurement is conducted at Pyi Phyto Tun Co., Ltd points: the first point of noise monitoring is nearly the air monitoring point and the second point of noise monitoring is near the kitchen and dining hall on 13th to 14th March 2019. Measuring period is 24 hours continuously. The observed values are described in Table 6-11 to Table 6-12 and the following figures are noise level measurement at the proposed project.

Table 6-11 Observed Values of Noise Level Measurement (source) at Pyi Phyto Tun Co., Ltd

No.	Date	Time	Observed Mean Value	Weight	Day/Night	Average
1	14.3.2019	7:00:13-7:59:13	51.46	A	Day	54.46
2	14.3.2019	8:00:13-8:59:13	51.04	A	Day	
3	14.3.2019	9:00:13-9:59:13	45.38	A	Day	
4	14.3.2019	10:00:13-10:59:13	59.68	A	Day	
5	14.3.2019	11:00:13-11:59:13	57.71	A	Day	
6	14.3.2019	12:00:13-12:59:13	50.94	A	Day	
7	14.3.2019	13:00:13-13:59:13	58.88	A	Day	
8	14.3.2019	14:00:13-14:59:13	58.69	A	Day	
9	14.3.2019	15:00:13-15:59:13	50.82	A	Day	
10	14.3.2019	16:00:13-16:59:13	57.51	A	Day	
11	14.3.2019	17:00:13-17:59:13	57.11	A	Day	
12	13.3.2019	18:00:13-18:59:13	57.88	A	Day	
13	13.3.2019	19:00:13-19:59:13	59.53	A	Day	
14	13.3.2019	20:00:13-20:59:13	41.09	A	Day	
15	13.3.2019	21:00:13-21:59:13	59.16	A	Day	
16	13.3.2019	22:00:13-22:59:13	50.62	A	Night	43.97
17	13.3.2019	23:00:13-23:59:13	50.86	A	Night	
18	13.3.2019	0:00:13-0:59:13	45.03	A	Night	
19	13.3.2019	1:00:13-1:59:13	31.03	A	Night	
20	13.3.2019	2:00:13-2:59:13	45.97	A	Night	

No.	Date	Time	Observed Mean Value	Weight	Day/Night	Average
21	13.3.2019	3:00:13-3:59:13	55.12	A	Night	
22	13.3.2019	4:00:13-4:59:13	40.58	A	Night	
23	13.3.2019	5:00:13-5:59:13	32.99	A	Night	
24	13.3.2019	6:00:13-6:59:13	43.52	A	Night	
Average			50.52			

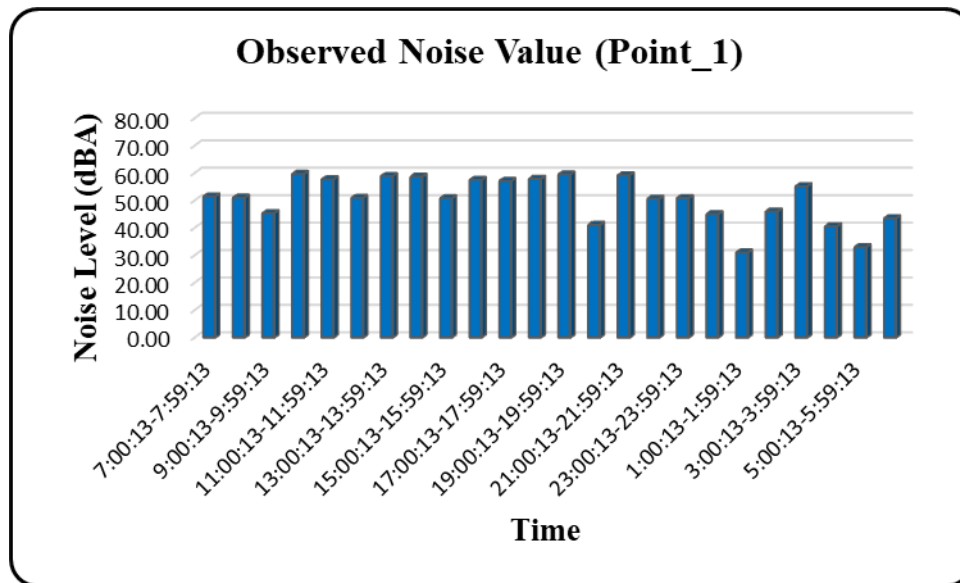


Figure 6-7 Noise Level (source) at Pyi Phy Tun Co., Ltd

Table 6-12 Observed Values of Noise Level Measurement (near the kitchen and dining hall) at Pyi Phy Tun Co., Ltd

No.	Date	Time	Observed Mean Value	Weight	Day/Night	Average
1	14.3.2019	7:00:13-7:59:13	41.53	A	Day	51.11
2	14.3.2019	8:00:13-8:59:13	43.54	A	Day	
3	14.3.2019	9:00:13-9:59:13	42.27	A	Day	
4	14.3.2019	10:00:13-10:59:13	43.47	A	Day	
5	14.3.2019	11:00:13-11:59:13	54.38	A	Day	
6	14.3.2019	12:00:13-12:59:13	51.00	A	Day	
7	14.3.2019	13:00:13-13:59:13	52.81	A	Day	
8	14.3.2019	14:00:13-14:59:13	42.84	A	Day	
9	14.3.2019	15:00:13-15:59:13	43.28	A	Day	
10	14.3.2019	16:00:13-16:59:13	56.46	A	Day	

No.	Date	Time	Observed Mean Value	Weight	Day/Night	Average
11	14.3.2019	17:00:13-17:59:13	56.37	A	Day	
12	13.3.2019	18:00:13-18:59:13	60.56	A	Day	
13	13.3.2019	19:00:13-19:59:13	59.85	A	Day	
14	13.3.2019	20:00:13-20:59:13	60.20	A	Day	
15	13.3.2019	21:00:13-21:59:13	58.16	A	Day	
16	13.3.2019	22:00:13-22:59:13	58.39	A	Night	44.17
17	13.3.2019	23:00:13-23:59:13	39.44	A	Night	
18	13.3.2019	0:00:13-0:59:13	47.18	A	Night	
19	13.3.2019	1:00:13-1:59:13	34.59	A	Night	
20	13.3.2019	2:00:13-2:59:13	42.27	A	Night	
21	13.3.2019	3:00:13-3:59:13	46.78	A	Night	
22	13.3.2019	4:00:13-4:59:13	47.16	A	Night	
23	13.3.2019	5:00:13-5:59:13	45.30	A	Night	
24	13.3.2019	6:00:13-6:59:13	36.44	A	Night	
Average			49.76			

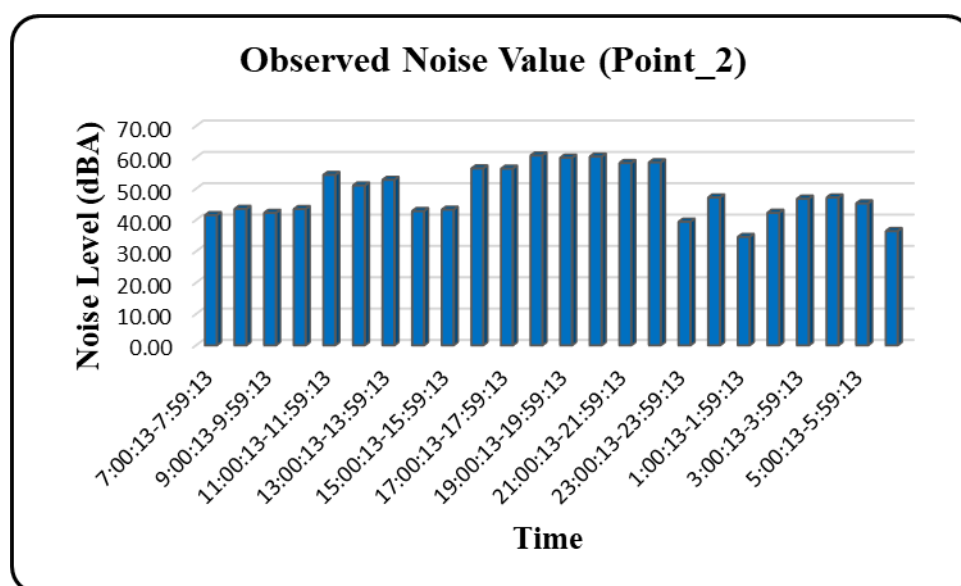


Figure 6-8 Noise Level near the kitchen at Pyi Phyto Tun Co., Ltd

Table 6-13 Observed Ambient Noise level Results from Selected Points

Point	Pyi Phyto Tun International Co., Ltd	
	Day Time	Night Time
Pyi Phyto Tun Co., Ltd (source)	54.46	43.97



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Pyi Phyto Tun Co., Ltd (receptor)	51.11	44.17
Guideline Values for Residential	55	45
Guideline Values for Industrial	70	70

The observed values are compared with the National Environmental Quality (Emission) Guidelines as shown in Table 6-13, which indicates the separate level for residential and industrial points.

Table 6-14 National Environmental Quality (Emission) Guidelines Values for Noise Level

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

The observed values of the proposed project for daytime at Pyi Phyto Tun Co., Ltd near the (source) and (receptor) are 54.46 dB (A) and 51.11 dB (A). The observed values of the proposed project for night time at Pyi Phyto Tun Co., Ltd (source) and (receptor) are 43.97 dB (A) and 44.17 dB (A). The observed daytime value and night time value for Pyi Phyto Tun Co., Ltd are lower than the guideline value 55 dB (A) and 45 dB (A).

6.6.3 Wind Speed and Direction

The following figures describe the wind speed and wind direction of the proposed project site (Pyi Phyto Tun Co., Ltd source) on 13th to 14th March 2019. According to the data, the wind direction is following Figure 6-9 to **Error! Reference source not found.** According to the figures, the wind speed (0.5-2.10) m/s is blowing from south west and south east. And the most significant wind speed (5.7-8.8) m/s is blowing from south.



Figure 6-9 Wind Speed and Wind Direction (Blowing From) at Pyi Phyo Tun Co., Ltd. (13th to 14th March 2019)

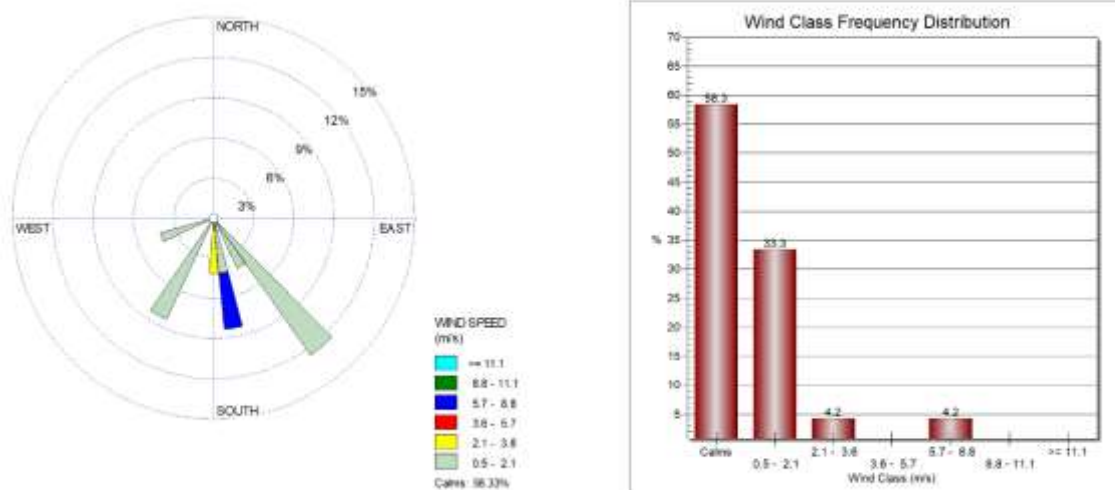


Figure 6-10 Wind Class Frequency Distribution at Pyi Phyo Tun Co., Ltd (13th to 14th March 2019)

6.6.4 Water Quality

Currently Myanmar does not have surface water quality standards for major rivers and its tributaries, natural and man-made streams or lakes, ground water, or reservoir water. For waste water standards of the project site, Environmental conservation department describes in the National Environmental Quality (Emission) Guidelines. The parameters of surface water are available to compare with the contents of the WHO standards for surface. The comparison of the measured water quality results and the standards of NEQ (E) G and WHO are conducted in Table 6-15 below.

Baseline quality of the waste water and surface water quality were recorded by on site sampling and measurement, and laboratory analysis at three selected locations systematically.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The field surveys for environmental quality monitoring and sampling were done during 15th March 2019.

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

Waste water in point 1 has high in Total Suspended Solids and BOD because water sampling was undertaken at Panel Cleaning House. Waste water in point 2 has high in Total Suspended Solids, Total Nitrogen, Total Phosphorus, Oil and Grease, Chemical Oxygen Demand and Biochemical Oxygen Demand above the water quality standards. Total Suspended Solids, Oil and Grease, Total Nitrogen and Total Phosphorus are high in waste water because water sampling was undertaken at the discharge point where the kitchen waste were collected. Not only Biochemical Oxygen Demand but also Chemical Oxygen Demand were high in waste water because the contents of Total Suspended Solids were also high in the waste water quality. Turbidity as well as aluminium were high in surface water because water sampling was conducted in the natural stream.

Table 6-15 Pyi Phyto Tun Co., Ltd (Waste Water Results)

Waste Water - 1	Waste Water - 2	Unit	Result of Waste Water-1	Result of Waste Water-2	National Emission Guideline
pH	pH	-	7.3	6.8	6-9
Total Suspended Solids	Total Suspended Solids	mg/l	1093	187	50
Total Nitrogen	Total Nitrogen	mg/l	<1	12.88	10
Total Phosphorus	Total Phosphorus	mg/l	<0.01	2.44	2
Oil and Grease	Oil and Grease	mg/l	<5	28	10
Turbidity	Turbidity	NTU	352	199	-
Temperature	Temperature	°C	25	25	<25 ^b
Chemical Oxygen Demand (COD)	Chemical Oxygen Demand (COD)	mg/l	128	256	250
Biochemical Oxygen Demand (BOD)	Biochemical Oxygen Demand (BOD)	mg/l	60	110	50
Total Coliform Count	Total Coliform Count	CFU/100ml	40	30	400
Color (True)	Color (True)	TCU	200	110	-



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 6-16 Pyi Phyto Tun Co., Ltd (Surface Water Results)

Surface Water	Unit	Result	Health based guideline by the WHO	National drinking water quality standards. 2014. Ministry of Health, Myanmar. (draft)
pH (Lab analysis)		7.3	-	6.5-8.5
pH (On Site)		7.9		
Temperature (Lab Analysis)	°C	25	-	-
Temperature (On Site)	°C	27		
Salinity (Lab Analysis)	ppt	0.1	-	-
Salinity (On Site)	ppt	0.4		
Dissolved Oxygen (Lab Analysis)	mg/l	7.4	-	-
Dissolved Oxygen (On Site)	mg/l	8		
Turbidity (Lab analysis)	NTU	38	-	5
Turbidity (On Site)	NTU	41		
Nitrate	mg/l	0.9	50 mg/l total nitrogen	50
Phosphate	mg/l	Nil	-	-
Hardness	mg/l	6	-	500
Chloride	mg/l	7	250	250
Iron	mg/l	0.48	-	1
Copper	mg/l	Nil	2	2
Manganese	mg/l	0.02	0.5	0.4
Zinc	mg/l	Nil	3	3
Aluminum	mg/l	0.214	0.2	0.2
Potassium	mg/l	0.55	-	-

6.6.5 Odor Concentration Level

Odor is an environmental component that can contribute to its changes. Odor pollution is an indicator of environmental change that impact health and human well-being. Odor affects human beings in a number of ways. Strong, unpleasant or offensive smells can interfere with a person's enjoyment of life especially if they are frequent and / or persistent. The odor concentration monitoring was done at selected locations during 13th to 14th March 2019.



Figure 6-11 Surface Water Sample



Figure 6-12 Wastewater point 1 sample



Figure 6-13 Air Quality Monitoring



Figure 6-14 Noise Quality Measurement



Figure 6-15 Wastewater point 2 sample

6.7 Biodiversity

6.7.1 Introduction of Biodiversity

What is biodiversity? “The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.” It is the variety of life on earth at all levels, from genes to worldwide populations of the same species; from communities of species sharing the same small area of habitat to worldwide ecosystems.



Why biodiversity is important? Biodiversity supports many lives and livelihoods. It does this by providing essential services such as;

A source of harvestable goods including food, medicines and building materials.

Essential for regulation of natural processes and the earth's life support systems, e.g., carbon sequestration, soil formation, and purification of water.

Essential for pollination of commercially valuable crops and biological control of pests and diseases.

A source of spiritual and religious enrichment and well-being.

Biodiversity Impact Assessment (BIA) is a new technique which helps existing techniques achieve the Convention on Biological Diversity (CBD). Human impacts have been shown to profoundly modify genetic and species diversity (Palumbi 2001). The main direct impacts are caused by overexploitation and habitat loss, while indirect effects may result from cascading interactions in the food web (e.g. removing competitors and predators from the system) and the effects of environmental change. Dulvy *et al.* (2003) reviewing local, regional and global marine extinction, identified "exploitation" and "habitat loss" as being respectively responsible for 55 and 37 % of 133 reported extinctions. Other important impacts on biodiversity are the effects of species transfer and introduction, which may result in biological invasions.

The proposed project area is located at the Pyin Sa Bu Kyun, also known as Bentinck Island, Kyun Su Township, Myeik District, Tanintharyi Region. The main objective of present study is to provide a comprehensive evaluation of a pearl culture development in terms of predicted environmental impacts, mitigation strategies needed and potential alternatives to the proposed development and related legislation.



6.7.2 Objective of the survey

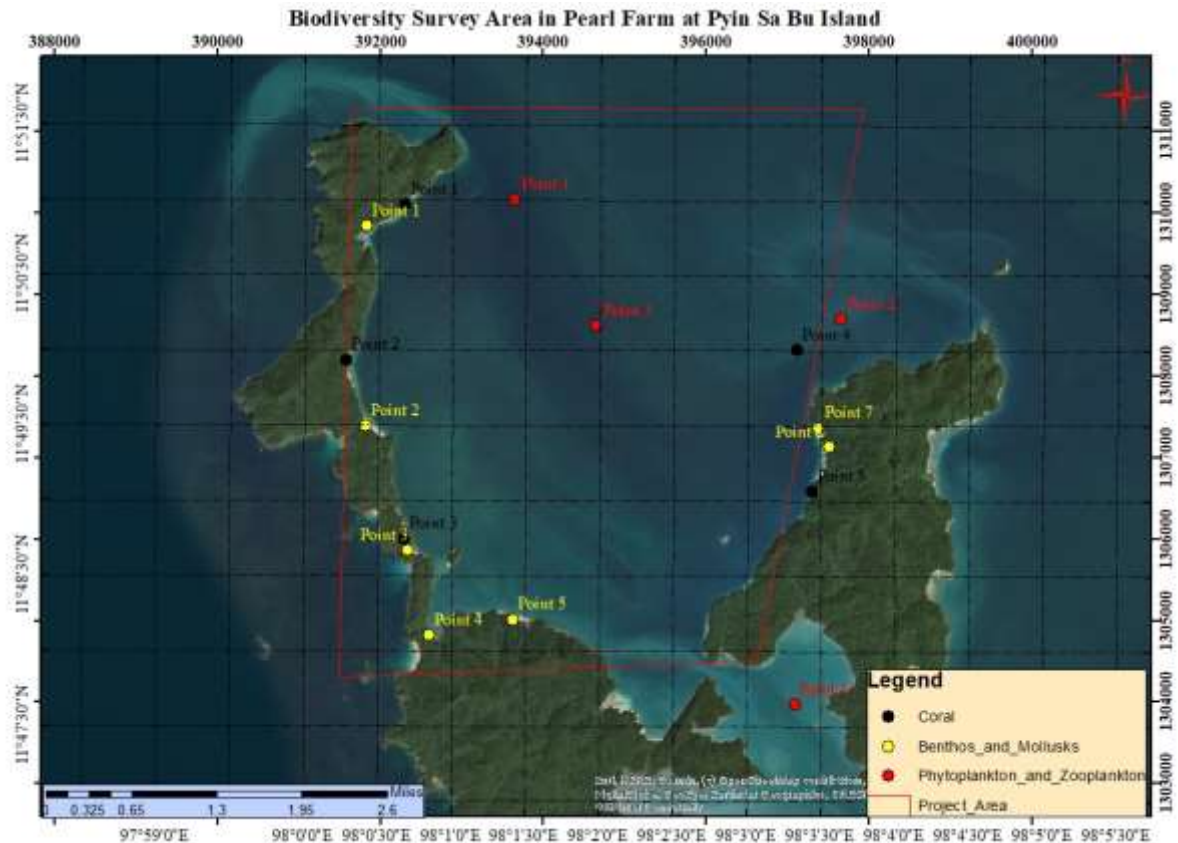
The objectives of the survey are to record and identify the flora and fauna species of the Pyin Sa Bu Island. Besides, to make ensure that there is protected or IUCN red list species does exist or not.

6.7.3 Methodology for Biodiversity Survey

Site descriptions: The study area located in Bee Sart Aw (northern bay) of Pyin Sa Bu (Bentinck) Island, Myeik Archipelago. The bay is widely opened at the northern part whereas the southern part has small channel. Therefore, diurnal exchange of waterway system occurred during high and low tides. In this area, the major ecosystems are coral reefs, mangrove, sandy beach and rocky shores. The survey sites were described in Table 6-17. The survey was carried out during 13th March 2019 to 15th March 2019.

Table 6-17 The location of each biodiversity for marine surveyed sites

Category	Station	Latitude and Longitude
Phytoplankton and Zooplankton	1	11° 50.999'N, 98° 1.441'E
	2	11° 50.193'N, 98° 3.629'E
	3	11° 50.145'N, 98° 2.000'E
	4	11° 47.649'N, 98° 3.325'E
Benthos and Marine Invertebrates	1	11° 50.816'N, 98° 0.449'E
	2	11° 49.475'N, 98° 0.475'E
	3	11° 48.659'N, 98° 0.768'E
	4	11° 48.109'N, 98° 0.917'E
	5	11° 48.205'N, 98° 1.479'E
	6	11° 49.349'N, 98° 3.539'E
	7	11° 49.470'N, 98° 3.477'E
Coral	1	11° 50.957'N, 98° 0.691'E
	2	11° 49.909'N, 98° 0.328'E
	3	11° 48.729'N, 98° 0.737'E
	4	11° 48.868'N, 98° 3.333'E
	5	11° 49.049'N, 98° 3.425'E



Terrestrial fauna: The transect method was used to survey the terrestrial fauna. The interview with local people also did for this activity.

The FUJIFILM camera, the binocular, GPS and field guides were used to do the survey.

The following activities were performed during the survey;

- Recording the plants and animals by taking photos
- Recording the way points by using GPS
- Interview with local villagers

Flora: Walk-through-surveys (Point-Transect Method) were conducted across the survey areas and all plant species observed were recorded by using a handheld GPS device, field notes, camera for taking photographs and interviewing with local people. During the survey, different plant features, habitat and vegetation units present at the site were identified and mapped in the field.

Plankton: Phytoplankton samples were collected from four stations **Table 6-17**. To obtain qualitative data of phytoplankton and zooplankton, surface water column was hauled for 15 minutes with standard plankton net (#25µm). Moreover, 100 liters of surface water column was collected with a bucket as for the quantitative analysis and filtered with a standard plankton net. Samples were fixed with 5 % formaldehyde solution (Thronsen 2010). Cells counting followed the methods of LeGresley and McDermott 2010 and Guillard 2003. Sedgewick-Rafter counting chamber was used for cell enumeration under compound microscope (Nikon Eclipse E200) using 10X objective. The entire chamber was screened and



30 % of sub-samples from each station were counted and expressed as cells per liter. The concentration factor (CF) is calculated by the following equation:

$$CF = A/B \text{ (Murielle-LeGresley and Georgina McDermott, 2010 and Sournia, 1978)}$$

Where, **A** = 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.

$$F = (400/\text{number of squares counted}) * 1,000$$

Benthos and Mollusks: A total of 7 stations were established for the collection of benthos data and mollusks as well as gastropods **Table 6-17**. Sample collection was carried out by randomly for each invertebrate data. At each site, 20x20 cm quadrat was placed and the substrate and dug to a depth of a few centimeters. For the data precision there are at least 5-10 quadrats were established in each station. Obtained sediment samples were placed on the sieve (0.5 mm mash size) and wash with seawater and collected by using forceps and preserved with 5% formaldehyde solution for further studies. Identification was conducted by using compound microscope. Mollusks and gastropods samples were photographed and fixed with 10% formaldehyde solution for the further studies.

Coral reef: Random collection method was used along the edge of the reefs to assess the diversity of 5 their ecosystem **Table 6-17**. The position of each reef surveyed was taken using a GPS. At each survey site, the observer moves slowly along the edge of the reefs and record with digital camera (Olympus TG-4) and some pieces of samples were also collected and bring back to laboratory for identification.

Crustaceans and fishes: For the crustaceans and fishes, data were obtained by directly collected from the landing sites and interviewing to some local fisherman and fisher folks. Samples were photographed for further identification and ranking for IUCN red listed species.

6.7.4 Results of the Biodiversity Survey

6.7.4.1 Terrestrial Fauna

The islands of Myeik region have rich biodiversity. According to the secondary data, those islands have hundreds of fauna species. There are total 23 species of fauna were recorded during the survey at the project area. These faunas were described in



Table 6-18.

Table 6-18 List of recorded terrestrial fauna by surveying


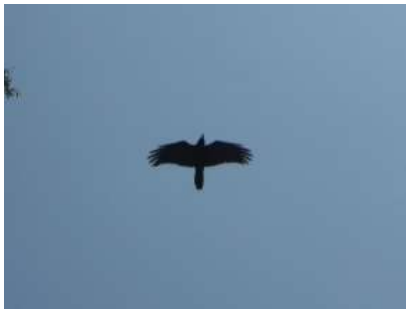


1		Common name	Brahmany Kite
		Scientific name	<i>Haliastur indus</i>
		Habitats	Sri Lanka, Nepal, India, Pakistan, Bangladesh, and southeast Asia and as far south as New South Wales, Australia
		IUCN Red list categories	LC (Least Concern)
2		Common name	Large-Billed Crow
		Scientific name	<i>Corvus macrorhynchos</i>
		Habitats	Occurs in woodland, parks and gardens, cultivated regions with at least some trees
		IUCN Red list categories	LC (Least Concern)
3		Common name	Forest Lizard
		Scientific name	<i>Calotes</i> sp.
		Habitats	Cambodia, China, India, Laos, Myanmar, Thailand, & Vietnam. And possibly found in Bangladesh, adjacent to Mizoram province of India
		IUCN Red list categories	LC (Least Concern)
4		Common name	Colubrid snake
		Scientific name	<i>Chrysopelea ornata</i>
		Habitats	Found in both South and Southeast Asia
		IUCN Red list categories	NE (Not Evaluate)

Table 6-19 List of recorded terrestrial fauna by interviewing local people

1	Common name	Squirrel
	Scientific name	<i>Callosciurus</i> sp.
	Habitats	Widely found in Myanmar, India, China, Bangladesh and Nepal
	IUCN Red list categories	LC (Least Concern)
2	Common name	Long-tailed Macaque
	Scientific name	<i>Macaca fascicularis</i>
	Habitats	Primary forest, Secondary forest, riverine and coastal forest
	IUCN Red list categories	LC (Least Concern)
3	Common name	Capped Langur
	Scientific name	<i>Trachypithecus pileatus</i>
	Habitats	Northern, Southern and Western part of Myanmar
	IUCN Red list categories	EN (Endangered)
4	Common name	Black Kite
	Scientific name	<i>Elanus caeruleus</i>
	Habitats	Open land and semi-deserts in sub-Saharan Africa and tropical Asia
	IUCN Red list categories	LC (Least Concern)
5	Common name	Sunbird
	Scientific name	<i>Dicaeum</i> sp.
	Habitats	Africa, Asia and Australasia
	IUCN Red list categories	LC (Least Concern)
6	Common name	Oriental pied hornbill
	Scientific name	<i>Anthracoceros albirostris</i>
	Habitats	Indian Subcontinent and Southeast Asia, ranging across Bangladesh, Bhutan, Brunei, Cambodia, Eastern and Northern India, Indonesia, Laos, North peninsular Malaysia, Myanmar, Nepal, Singapore, Thailand, Tibet, Vietnam and the Sunda shelf islands
	IUCN Red list categories	LC (Least Concern)
7	Common name	Great Egret



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

	Scientific name	<i>Casmerodius albus</i>
	Habitats	Asia, Africa, the Americas, and southern Europe
	IUCN Red list categories	LC (Least Concern)
8	Common name	Spotted Owlet
	Scientific name	<i>Athene brama</i>
	Habitats	Tropical Asia from mainland India to Southeast Asia
	IUCN Red list categories	LC (Least Concern)
9	Common name	Rock monitor
	Scientific name	<i>Varanus albigularis</i>
	Habitats	Dry habitats, including steppes, prairies, and savannahs, but is absent from desert interiors, rainforests, and thick scrub forests
	IUCN Red list categories	NE (Not Evaluate)
10	Common name	Jungle Cat
	Scientific name	<i>Felis chaus</i>
	Habitats	Native to the Middle East, South and Southeast Asia and southern China. It inhabits foremost wetlands like swamps, littoral and riparian areas with dense vegetation
	IUCN Red list categories	LC (Least Concern)
11	Common name	Eurasian Wild Pig
	Scientific name	<i>Sus scrofa</i>
	Habitats	India, Nepal, Burma, western Thailand and Sri Lanka
	IUCN Red list categories	LC (Least Concern)
12	Common name	Boa
	Scientific name	<i>Boa constrictor</i>
	Habitats	Jungle, rainforests, dry tropical, woodland
	IUCN Red list categories	LC (Least Concern)
13	Common name	Python

	Scientific name	<i>Python molurus</i>
	Habitats	Asia, Africa, Oceania, Australia
	IUCN Red list categories	VU (Vulnerable)
14	Common name	Banded Krait
	Scientific name	<i>Bungarus fasciatus</i>
	Habitats	Forest, agricultural and coastal areas
	IUCN Red list categories	LC (Least Concern)
15	Common name	King Cobra
	Scientific name	<i>Ophiophagus hannah</i>
	Habitats	Rainforest of India, Southdren China, Southdren Asia
	IUCN Red list categories	VU (Vulnerable)

6.7.4.2 Flora

A total of (48) flora species belonging to (28) families were recorded within the study area, comprising (32) trees, (6) small trees, (5) shrubs, (3) herbs and (2) climbers. All the recorded flora species were common species. The listed and recorded plant species were checked with the International Union for Conservation of Nature (IUCN) Red List of threatened species. According to conservation status of IUCN, two Endangered Species (EN) species, four Vulnerable (VU) species, three Near Threatened (NT) species and five Least Concern (LC) species were existing in the project area.

According to the results of Flora Survey, recorded plant species have been mentioned with the following table, Table 6-20.

Table 6-20 List of Recorded Plant Species from the Proposed Project Area

No.	Scientific Name	IUCN Red List Category	Common Name	Family	Habit
1	<i>Abarema bigemina</i>	VU	Danyin	Mimosaceae	Tree
2	<i>Acacia mangium</i>	NE	Mangium	Fabaceae	Tree
3	<i>Alocasia brisbanensis</i>	NE	Pain	Araceae	Herb
4	<i>Anacardium occidentale</i>	NE	Thiho Thayet	Anacardiaceae	Tree
5	<i>Artocarpus chaplasha</i>	NE	Taung Peinne	Moraceae	Tree
6	<i>Bouea burmanica</i>	NE	Ma Yan	Anacardiaceae	Tree



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

No.	Scientific Name	IUCN Red List Category	Common Name	Family	Habit
7	<i>Bridelia retusa</i>	NE	Seik Che	Phyllanthaceae	Tree
8	<i>Calamus guruba</i>	NE	Kyein Ni	Arecaceae	Shrub
9	<i>Calophyllum amoenum</i>	NE	Tharaphy	Hypericaceae	Tree
10	<i>Careya arborea</i>	NE	Bent Bway	Lecythidaceae	Tree
11	<i>Chromolaena odorata</i>	NE	Bi Zat	Asteraceae	Shrub
12	<i>Cocos nucifera</i>	NE	Ohm	Arecaceae	Tree
13	<i>Combretum acuminatum</i>	NE	Nabu Nwe	Combretaceae	Climber
14	<i>Costus speciosus</i>	NE	Falan Taung Hway	Costaceae	Herb
15	<i>Dalbergia fusca</i>	NT	Yinsat	Fabaceae	Tree
16	<i>Desmos chinensis</i>	NE	Sintswe	Annonaceae	Shurb
17	<i>Dialium indum</i>	NE	Taung Khaye	Caesalpiniaceae	Tree
18	<i>Dillenia pentagyna</i>	NE	Zin Byun	Dilleniaceae	Tree
19	<i>Dipterocarpus alatus</i>	VU	Kanyin Phyu	Dipterocarpaceae	Tree
20	<i>Dipterocarpus tuberculatus</i>	NT	In	Dipterocarpaceae	Tree
21	<i>Ficus glabella</i>	NE	Nyaung	Moraceae	Tree
22	<i>Ficus glomerata</i>	NE	Ye Thaphan	Moraceae	Tree
23	<i>Haplophragma adenophyllum</i>	NE	Phet Than	Bignoniaceae	Tree
24	<i>Heritiera fomes</i>	EN	Kanazo	Sterculiaceae	Tree
25	<i>Hopea odorata</i>	VU	Thingan	Dipterocarpaceae	Tree
26	<i>Leea edgeworthii</i>	NE	Nagarmout	Leeaceae	Shurb
27	<i>Livistona speciosa</i>	NE	Taw Htang	Arecaceae	Tree
28	<i>Mangifera sylvatica</i>	LC	Thaw Thayet	Anacardiaceae	Tree
29	<i>Mesua ferrea</i>	NE	Gangaw	Hypericaceae	Tree
30	<i>Morinda angustifolia</i>	NE	Yeyo	Rubiaceae	Small Tree
31	<i>Musa itinerans</i>	NE	Taw Ngapyaw	Musaceae	Herb
32	<i>Myrsine semiserrata</i>	NE	Kazaw	Myrsinaceae	Shurb
33	<i>Nypa fruticans</i>	LC	Dani	Arecaceae	Small Tree
34	<i>Oroxylum indicum</i>	NE	Kyung Shar	Bignoniaceae	Tree
35	<i>Oxystelma esculentum</i>	LC	Kauk Yo Nwe	Asclepiadaceae	Climber
36	<i>Palaquium obovatum</i>	LC	Pinlepyin	Sapotaceae	Tree
37	<i>Phoenix paludosa</i>	NT	Thin Boun	Arecaceae	Small Tree
38	<i>Pinanga gracilis</i>	NE	Taw Kun	Arecaceae	Tree
39	<i>Samadera indica</i>	NE	Katay	Simaroubaceae	Small Tree
41	<i>Shorea farinosa</i>	EN	U Ban	Dipterocarpaceae	Tree

No.	Scientific Name	IUCN Red List Category	Common Name	Family	Habit
42	<i>Sterculia urens</i>	NE	Shaw	Sterculiaceae	Tree
43	<i>Swietenia macrophylla</i>	VU	Mahawgani	Meliaceae	Tree
44	<i>Syzygium cumini</i>	NE	Thapyay	Myrtaceae	Tree
45	<i>Talipariti macrophyllum</i>	NE	Taung Petwun	Malvaceae	Small Tree
46	<i>Tamarindus indica</i>	LC	Magyi	Caesalpiniaceae	Tree
47	<i>Wendlandia glabrata</i>	NE	Thit Phyu	Rubiaceae	Small Tree
48	<i>Xylia xylocarpa</i>	NE	Pyin Kadoe	Mimosaceae	Tree

Endangered (EN), Nearly Threatened (NT), Vulnerable (VU), Least Concerned (LC), Data Deficient (D), Not Evaluated (NE), Missing (M)

According to the recorded data, species observed during the flora survey were referenced to the IUCN Red List documentation. Ecologically successful species such as *Dipterocarpus tuberculatus*, *Dipterocarpus alatus*, *Heritiera fomes* and *Swietenia macrophylla*, while IUCN listed species, were also observed. Another important tree species in and around the proposed project area are mentioned above.

Table 6-21 Lists of Flora Species found in the Proposed Project Area



Syzygium cumini



Shorea farinosa



Mangifera sylvatica



Palaquium obovatum



Calophyllum amoenum



Ficus glomerata



Pinanga gracilis



Calamus guruba



Alocasia brisbanensis



Chromolaena odorata

6.7.4.3 Phytoplankton

A total of 87 species of phytoplankton were recorded from the Bee Sart Aw and adjacent water (**Table 6.22** and **Figures 6.15** to **6.17**). Among them, 56 species of Centric diatom, 10 species of Pennate, 20 species of Dinoflagellate and 1 species of Cyanophyta. The species occurrence of phytoplankton was not too fluctuated because 46 species were detected in Station 1, 53 species in Station 2, 48 species in Station 3 and 58 species in Station 4 respectively.

Quantitative analysis of Centric diatom; Hemiaulaceae 30200-79600 Cell L⁻¹ and Rhizosoleniaceae 1060-84800 Cell L⁻¹ shows the highest number of cell density at each



Station. The cell densities of those two Family were higher because they are change forming species so counting was done by screening of every single cells. Likewise, cell density of Chaetocerotaceae was also higher in Stations 3 and 4 (**Figure 6.18**).

Quantitative analysis of Pennate diatom; among the three Family, Bellercheaceae was the highest abundance of cell density (25200-74400 Cell L⁻¹) at the all stations which is also the due to the effect of situation mentioned above (**Figure 6.19**).

Quantitative analysis of dinoflagellate and Cyanophyta; Ceratiaceae (400-2100 Cell L⁻¹) and Protoperidiniaceae (400-1800 Cell L⁻¹) were the predominated groups in every station (**Figure 6.20**). In the present study, only one species of Cyanophyta (*Trichodesmium erythraeum*) was observed, the cell density of this species was highest (4200 Cell L⁻¹) in Station 2 (**Figure 6.21**).

Among the four stations, the highest percent of cell density 40% occurred in Station 3 (Centric; 369200 Cell L⁻¹, Pennate; 75600 Cell L⁻¹) whereas the lowest percent 13% detected in Station 1 (Centric; 109600 Cell L⁻¹, Pennate; 32600 Cell L⁻¹) (Figure 10). However, the number of dinoflagellates were higher at Station 2 (3900 Cell L⁻¹) and lowest at Station 4 (800 Cell L⁻¹). Furthermore, the highest numbers of blue green algae were found in Station 2 (2600 Cell L⁻¹). On the other hand, the lowest number occurred at Station 1 (4200 Cell L⁻¹).

Diatoms are a key component of aquatic ecosystems and constitute a fundamental link between primary and secondary production. Many microorganisms feed on diatoms and in this way, they are integrated into aquatic food webs. Understanding phytoplankton biodiversity in our oceans is essential for the following reasons. Firstly, 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. Secondly, phytoplankton are responsible for some 46% of the planetary photosynthesis. This process is resulted the reduction of carbon dioxide. Moreover, dinoflagellates produced dimethyl sulfoniopropionate which is converted to dimethyl sulphide a volatile compound that is important in cloud formation over the ocean (Burkill and Reid, 2011).

The studies of qualitative and quantitative provides a solid foundation for the research needed for the conservation of marine life. There is no way to accurately identify the source population cause of a bloom after it has begun, until historical data are available. They can be used frequently as bioindicators, and if they are not investigated live, they may be perceived simply as “glass boxes” used to give information about water quality (Taylor *et al.*, 2007). Harmful algal bloom (HAB) is generally must occurred in unusually high cells concentration which also called “**blooms**” or “**red tide**”. However, an exact definition of “**blooms**” is not meaningful in this context because some species e.g. *Alexandrium spp.* and *Dinophysis spp.*, caused toxicity in shellfish are reached at only a few hundred cells per liter while for other species, e.g. raphidophytes, caused the same condition when cell density at millions of cell per liter. Such occurrences caused water discoloration (Larsen and Nguyen, 2004). In India, water discoloration or red tides caused due to a bloom of *Coscinodiscus asteromphalus* var. *centralis* was observed in 2006 with the cell count of *Coscinodiscus* 7x10⁶ Cell L⁻¹.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

In the present proposed project area, the cell densities of phytoplankton were normal conditions because the highest cell density is 9.8×10^3 Cell L⁻¹ (Chaetocerotaceae). Although the densities of cell were low, the following species can cause harmful to human and other organisms such as **Human potentially toxic species** - *Dinophysis caudata* Diarrhetic Shellfish Poisoning (DSP) and *Pseudo-nitzschia* spp Amnesic Shellfish Poisoning (ASP); **Potentially fish- killing species** - *Ceratium fusus* Fish-killing, *C. furca* Paralytic shellfish poisoning (PSP), bloom forming as well as **Potentially bloom-forming species** - *Skeletonema costatum* and Small *Chaetoceros* spp. However, the cell density would be higher in the future, so the special care of waste water treatment system should carry out to control the level of nutrient inputs to the adjacent marine ecosystem. The physical processes such as mixing of water masses, light intensity, temperature, turbulence, salinity and nutrients are recognized as controlling community structure of phytoplankton (Achary *et al.*, 2010).



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 6-22 Species occurrence and classified list of phytoplankton from the proposed project area

Phylum	Class	Sub-Class	Order	Family	S/N	Genus and Species	Station			
							1	2	3	4
Bacillariophyta	Bacillariophyceae		Melosirales	Melosiraceae	1	<i>Hyalodiscus stelliger</i> Baily	-	+	-	-
	Coscinodiscophyceae (Centric diatoms) Round and Crawford 1995	Thalassiosiraphycidae Round and Crawford 1995	Thalassiosirales Glezer and Makarova 1986	Thalassiosiraceae Lebour 1930	2	<i>Thalassiosira angustelineata</i>	-	+	-	-
					3	<i>Thalassiosira oestrupii</i> var. <i>venrickae</i> Fryxell and Hasle	+	+	+	+
				Lauderiaceae (Schütt) Lemmermann 1900	4	<i>Lauderia annulata</i> Cleve	+	+	+	+
				Skeletonemataceae Lebour 1930 emend. Round et al. 1990	5	<i>Skeletonema costatum</i> (Greville) Cleve	-	-	+	+
		Coscinodiscophycidae Round and Crawford 1995	Melosirales Crawford 1995	Stephanopyxidaceae Nikolaev	6	<i>Stephanopyxis palmeriana</i> (Greville) Grunow	+	+	+	+
			Coscinodiscales Round and Crawford 1995	Coscinodiscaceae Kützing 1844	7	<i>Coscinodiscus asteromphalus</i> Ehrenberg	-	+	-	-
					8	<i>Coscinodiscus centralis</i> Ehreberg	-	+	-	+



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Sub-Class	Order	Family	S/N	Genus and Species	Station			
							1	2	3	4
Bacillariophyta	Coscinodiscophyceae (Centric diatoms) Round and Crawford 1995	Coscinodiscophycidae Round and Crawford 1995	Coscinodiscales Round and Crawford 1995	Coscinodiscaceae Kützing 1844	9	<i>Coscinodiscus radiatus</i> Ehrenberg	+	-	-	-
					10	<i>Coscinodiscus wailesii</i> Grab and Angst	-	+	+	-
					11	<i>Palmeria hardmaniana</i> Greville	+	+	+	+
			Asterolamprales Round and Crawford 1995	Asterolampraceae H.L. Smith 1872	12	<i>Asteromphalus hookeri</i> Ehrenberg	-	-	+	-
		Biddulphiophycidae Round and Crawford 1995	Triceratiales Round and Crawford 1995	Triceratiaceae (Schütt) Lemmermann 1899	13	<i>Odontella sinensis</i> (Greville) Grunow	+	+	+	+
			Hemiaulales Round and Crawford 1995	Hemiaulaceae Heiberg 1863	14	<i>Cerataulina dentata</i> Hasle	+	-	+	+
					15	<i>Climacodium frauenfeldianum</i> Grunow	-	+	-	-
					16	<i>Eucampia cornuta</i>	+	-	+	+
					17	<i>Eucampia zodiacus</i> Ehreberg	+	+	+	+
					18	<i>Hemiaulus sinensis</i> Greville	+	+	+	+



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Sub-Class	Order	Family	S/N	Genus and Species	Station			
							1	2	3	4
Bacillariophyta				Belleracheaceae Crawford 1995	19	<i>Bellerachea horologicalis</i> Von Stosch	-	+	+	+
	Coscinodiscophyceae (Centric diatoms) Round and Crawford 1995	Biddulphiophycidae Round and Crawford 1995	Hemiaulales Round and Crawford 1995	Belleracheaceae Crawford 1995	20	<i>Bellerachea malleus</i> (Brightwell) Van Heurck	+	-	-	-
				Streptothecaceae Crawford 1995	21	<i>Helicotheca thamensis</i> (Brightwell) Van Heurck	+	+	-	-
		Lithodesmiophycidae Round and Crawford 1995	Lithodesmiales Round and Crawford 1995	Lithodesmiaceae Round 1995	22	<i>Ditylum brightwelli</i> (West) Grunow	+	-	+	+
					23	<i>Ditylum sole</i>	+	+	+	+
		Rhizosoleniophycidae Round and Crawford 1995	Rhizosoleniales Silva 1962	Rhizosoleniaceae De Toni 1890	24	<i>Rhizosolenia bergonii</i> Pérégallo	-	-	-	+
					25	<i>Rhizosolenia</i> cf. <i>pungens</i> Cleve- Euler	+	-	-	-
					26	<i>Rhizosolenia cochlea</i> Brun	+	+	+	+
					27	<i>Rhizosolenia crassa</i>	-	-	+	-



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Sub-Class	Order	Family	S/N	Genus and Species	Station			
							1	2	3	4
					28	<i>Rhizosolenia formosa</i>	-	-	+	-
Bacillariophyta					29	<i>Rhizosolenia hebetata</i>	-	-	+	-
					30	<i>Rhizosolenia imbricata</i> Brightwell	+	+	+	+
					31	<i>Rhizosolenia polydactyla</i>	-	-	-	+
					32	<i>Rhizosolenia robusta</i> Norman	+	+	-	+
	Coscinodiscophyceae (Centric diatoms) Round and Crawford 1995	Rhizosoleniophycidae Round and Crawford 1995	Rhizosoleniales Silva 1962	Rhizosoleniaceae De Toni 1890	33	<i>Rhizosolenia setigera</i> Brightwell	+	+	+	+
					34	<i>Proboscia alata</i> (Brightwell) sundström	+	+	+	+
					35	<i>Proboscia alata</i> f. <i>indica</i> (H. Péragallo) Ostenfeld	+	+	+	+
					36	<i>Guinardia flaccida</i> (Castracane 1886) H. Peragallo	-	+	-	+
					37	<i>Guinardia striata</i> (stolterfoth) Hasle	+	+	+	+
		Chaetocerotophycidae Round and Crawford 1995	Chaetocerotales Round and Crawford 1995	Chaetocerotaceae Ralfs 1861/H. L. Smith 1872	38	<i>Bacteriastrum</i> cf. <i>elegans</i> Pavillard	-	-	-	+



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Sub-Class	Order	Family	S/N	Genus and Species	Station			
							1	2	3	4
					39	<i>Bacteriastrum delicatulum</i> Cleve	-	+	+	+
Bacillariophyta					40	<i>Bacteriastrum hyalinum</i> Lauder	+	+	-	+
					41	<i>Chaetoceros affinis</i> Lauder	-	+	+	+
					42	<i>Chaetoceros atlanticus</i> Cleve	-	-	+	-
					43	<i>Chaetoceros brevis</i>	+	-	+	-
					44	<i>Chaetoceros coarctatus</i> Lauder	-	-	-	+
	Coscinodiscophyceae (Centric diatoms) Round and Crawford 1995	Chaetocerotophycidae Round and Crawford 1995	Chaetocerotales Round and Crawford 1995	Chaetocerotaceae Ralfs 1861/H. L. Smith 1872	45	<i>Chaetoceros compressus</i> Lauder	-	+	+	-
					46	<i>Chaetoceros costatus</i> Pavillard	+	-	-	-
					47	<i>Chaetoceros curvisetum</i> Cleve	+	-	+	+
					48	<i>Chaetoceros curvisetus</i>	-	+	-	-
					49	<i>Chaetoceros decipiens</i> Cleve	+	-	-	-
					50	<i>Chaetoceros denticulatus</i> Lauder	+	+	-	+
					51	<i>Chaetoceros diversus</i> Cleve	+	-	-	-
					52	<i>Chaetoceros laciniosus</i> schütt	+	+	+	+



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Sub-Class	Order	Family	S/N	Genus and Species	Station			
							1	2	3	4
					53	<i>Chaetoceros laevis</i> Leuduger-Fortmorel	+	+	-	-
Bacillariophyta					54	<i>Chaetoceros lorenzianus</i> Grunow	-	+	+	+
					55	<i>C. pseudocurvisetum</i> Mangin	+	+	+	+
					56	<i>Chaetoceros tortissimum</i> Gran	-	-	+	-
	Fragilariophyceae Round 1995 (Araphid, pennate diatoms)	Fragilariophycidae Round 1995	Thalassionematales Round 1995	Thalassionemataceae Round 1995	57	<i>Thalassionema frauenfeldii</i> (Grunow) Hallegraeff	+	+	+	+
	Fragilariophyceae Round 1995	Fragilariophycidae Round 1995	Thalassionematales Round 1995	Thalassionemataceae Round 1995	58	<i>Thalassionema nitzschioides</i> (Grunow) Mereschkowsky	+	+	+	+
	Bacillariophyceae Haeckel 1878 emend Mann 1995 (Raphid, pennate diatoms)	Bacillariophycidae Mann 1995	sub-order: Naviculineae Hendey 1937	Naviculaceae Kützing 1844	59	<i>Haslea</i> sp. cf. <i>balearica</i> in Witkowski et al., 2000	-	-	+	+
				Pleurosigmaaceae Mereschkowsky 1903	60	<i>Pleurosigma angulatum</i> (Quek) W. Smith	+	+	+	-
					61	<i>Pleurosigma cuspidatum</i> Cleve	-	-	-	+
					62	<i>Pleurosigma normanii</i> Ralfs	-	+	+	+
					63	<i>Pleurosigma</i> cf. <i>elongatum</i> Smith	-	-	-	+



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Sub-Class	Order	Family	S/N	Genus and Species	Station			
							1	2	3	4
			Bacillariales Hendey 1937	Bellerocheaceae Ehregmberg 1831	64	<i>Bacillaria paxillifera</i> (Müller) Hendey	+	+	+	+
Dinophyta					65	<i>Pseudo-nitzschia seriata</i>	+	+	+	+
			Surirellales Mann 1995	Surirellaceae Kützing 1844	66	<i>Surirella fastuosa</i> Ehrenberg	-	-	-	+
	Desmophyceae smith	-	Dinophysiales Lindemann 1928	Dinophysiaceae Stein 1883	67	<i>Dinophysis caudata</i> Saville-Kent 1881	+	-	+	+
					68	<i>Phalacroma rotundata</i> Kofoed and Michener 1911	-	-	-	+
Dinophyta	Desmophyceae smith	-	Gonyaulacales F. J. R. Taylor 1980	Ceratiaceae Lindemann 1928	69	<i>Ceratium breve</i> (Ostenfeld and Schmidt) Schröder 1906	-	+	-	+
					70	<i>Ceratium carriense</i> Gourret 1883	+	-	-	-
					71	<i>Ceratium dens</i> Ostenfeld & Schumidt 1901	-	+	-	-
					72	<i>Ceratium furca</i> (Ehrenberg 1836) Claparède and Lachmann 1859	+	+	+	+
					73	<i>Ceratium fusus</i> (Ehrenberg 1834) Dujardin 1841	+	+	+	+
					74	<i>Ceratium gibberum</i> Gourret 1883	+	+	-	+
					75	<i>Ceratium inflatum</i> (Kofoed)	-	+	-	-



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Sub-Class	Order	Family	S/N	Genus and Species	Station			
							1	2	3	4
						Jørgensen 1920				
Dinophyta					76	<i>Ceratium macroceros</i> (Ehrenberg) Vanhöffen 1897	+	+	-	+
					77	<i>Ceratium trichoceros</i> (Ehrenberg) Kofoid 1908	+	+	+	+
				Cladopyxidaceae Stein 1883	78	<i>Cladopyxis hemibrachiata</i> Balech 1964	-	+	-	-
				Pyrocystaceae (Schütt) Lemmerman 1899	79	<i>Pyrocystis lunula</i> (Schütt) Schütt 1896	-	-	-	+
	Desmophyceae Smith	-	Gonyaulacales F. J. R. Taylor 1980	Pyrophacaceae Lindemann 1928	80	<i>Pyrophacus horologicum</i> Stein 1883	+	+	-	-
			Peridinales Haeckel 1894	Proto-peridiniaceae F. J. R. Taylor	81	<i>Proto-peridinium conicum</i> (Gran) Balech 1974	-	-	-	+
					82	<i>Proto-peridinium depressum</i> (Bailey 1855) Balech	-	+	-	-
					83	<i>Proto-peridinium granii</i> Ostensfeldt 1906	-	+	+	+
					84	<i>Proto-peridinium murrayi</i> Kofoid 1907	-	-	-	+
					85	<i>Proto-peridinium pentagonum</i> Gran 1902	-	-	+	+



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Sub-Class	Order	Family	S/N	Genus and Species	Station			
							1	2	3	4
Cyanophyta (Blue-green algae)				Podolampaceae Lindemann 1928	86	<i>Podolampas spinifer</i> Stein 1883	-	-	-	+
	Cyanophyceaea Schaffner 1909	-	Oscillatoriales Elenkin 1934	Phormidiaceae Anagnostidis et Koma'rek 1988 subfamily: Phormidioideae Anagnostidis et Koma'rek 1988	87	<i>Trichodesmium erythraeum</i> Ehrenberg 1830	+	+	+	+
Total							46	53	48	58





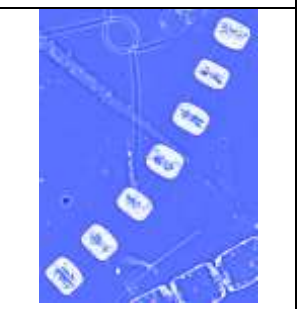


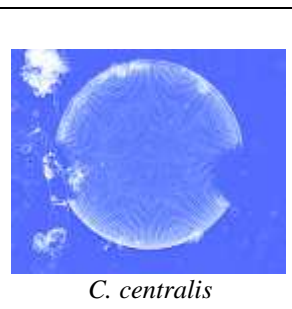


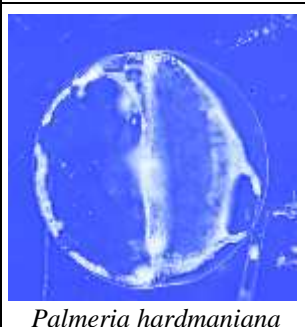

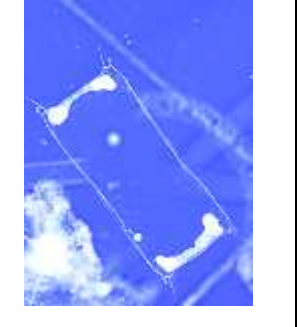
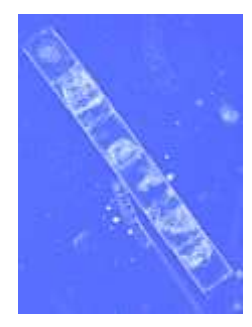
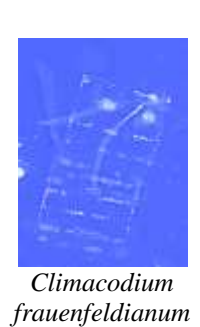



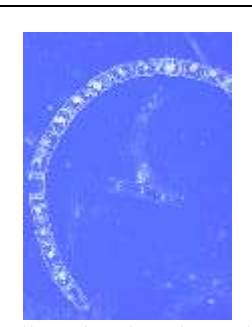
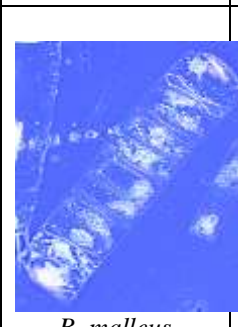


				
<i>Hyalodiscus stelliger</i>	<i>Thalassiosira angustelineata</i>		<i>T. oestrupii</i> var. <i>venrickae</i>	<i>Lauderia annulata</i>
				
<i>Skeletonema costatum</i>	<i>Stephanopyxis palmeriana</i>	<i>Coscinodiscus asteromphalus</i>		<i>C. centralis</i>
				
<i>C. radiatus</i>	<i>Coscinodiscus wailesii</i>	<i>Palmeria hardmaniana</i>	<i>Asteromphalus hookeri</i>	
				
<i>Odontella sinensis</i>	<i>Cerataulina dentata</i>	<i>Climacodium frauenfeldianum</i>	<i>Eucampia cornuta</i>	<i>E. zodiacus</i>
				
<i>Hemiaulus sinensis</i>	<i>Bellerochea horologicalis</i>	<i>B. malleus</i>	<i>Helicotheca thamensis</i>	<i>Ditylum brightwelli</i>

Figure 6-16 Phytoplankton

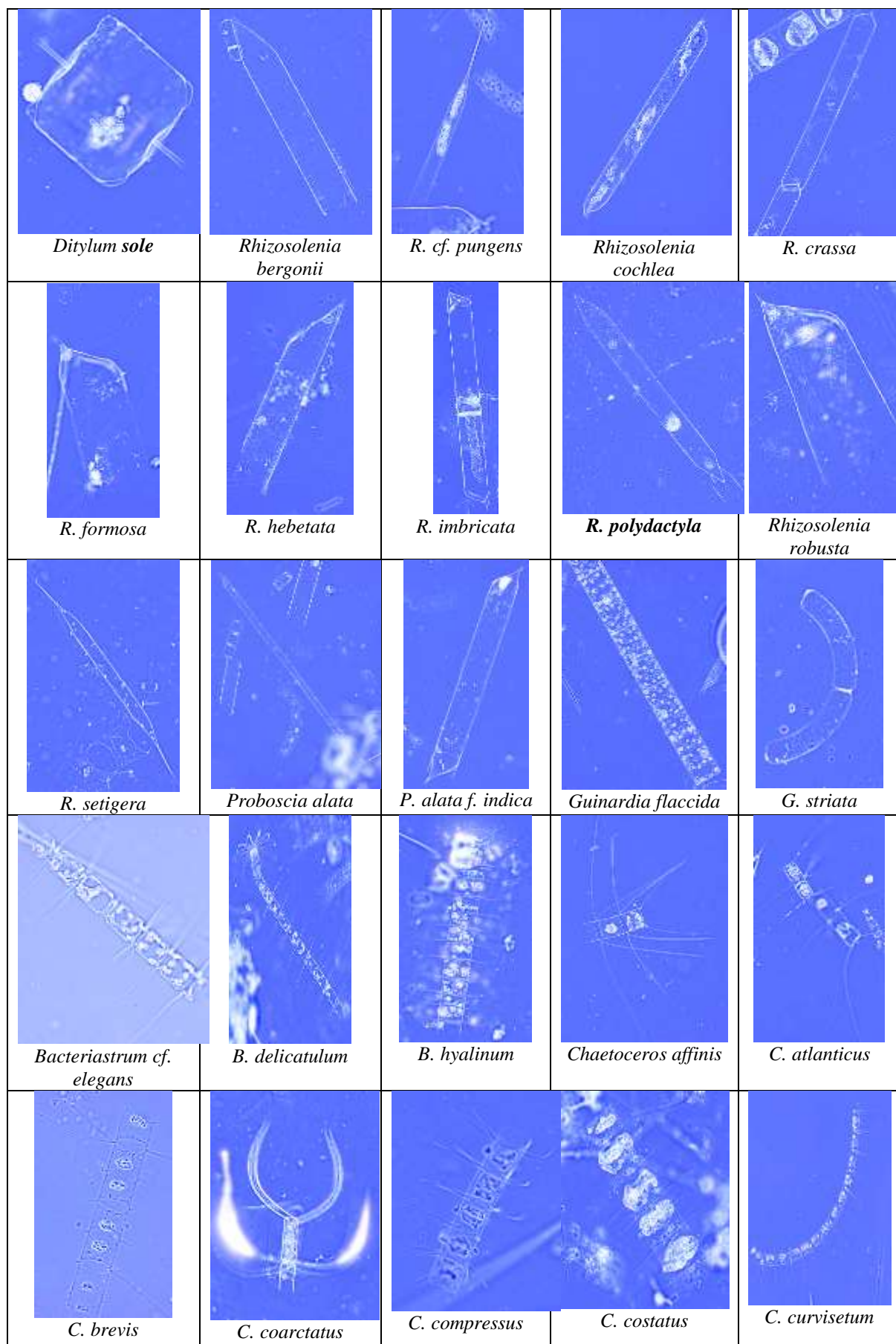
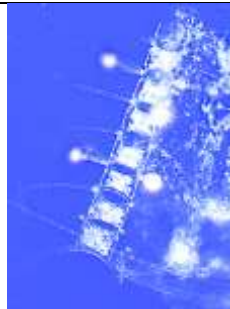
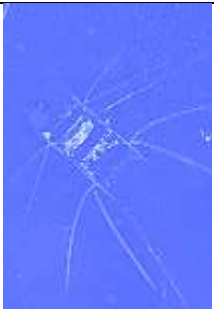
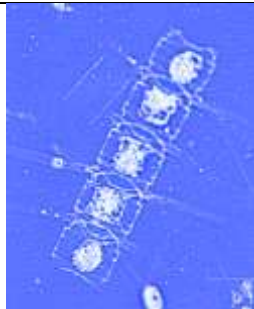

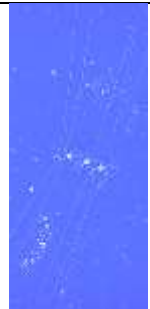
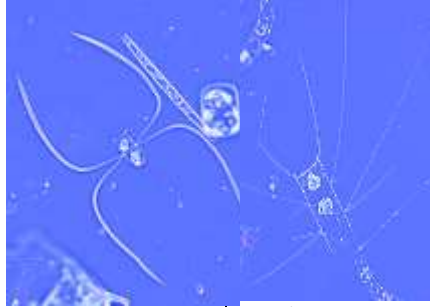
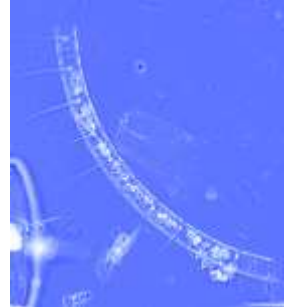









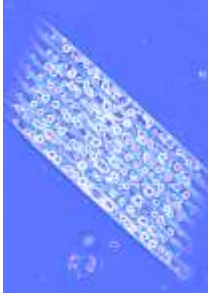


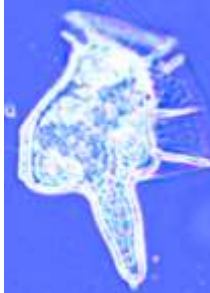


Figure 6-17 Phytoplankton

				
<i>Chaetoceros curvisetus</i>	<i>C. decipiens</i>	<i>C. denticulatus</i>	<i>C. diversus</i>	<i>C. laciniosus</i>
				
<i>C. laevis</i>	<i>C. lorenzianus</i>	<i>C. pseudocurvisetus</i>	<i>C. tortissimum</i>	<i>Thalassionema frauenfeldii</i>
				
<i>T. nitzschioides</i>	<i>Haslea sp. cf. balearica</i>	<i>Pleurosigma angulatum</i>	<i>P. cuspidatum</i>	<i>P. normanii</i>
				
<i>P. cf. elongatum</i>	<i>Bacillaria paxillifera</i>	<i>Pseudo-nitzschia seriata</i>	<i>Surirella fastuosa</i>	<i>Dinophysis caudata</i>

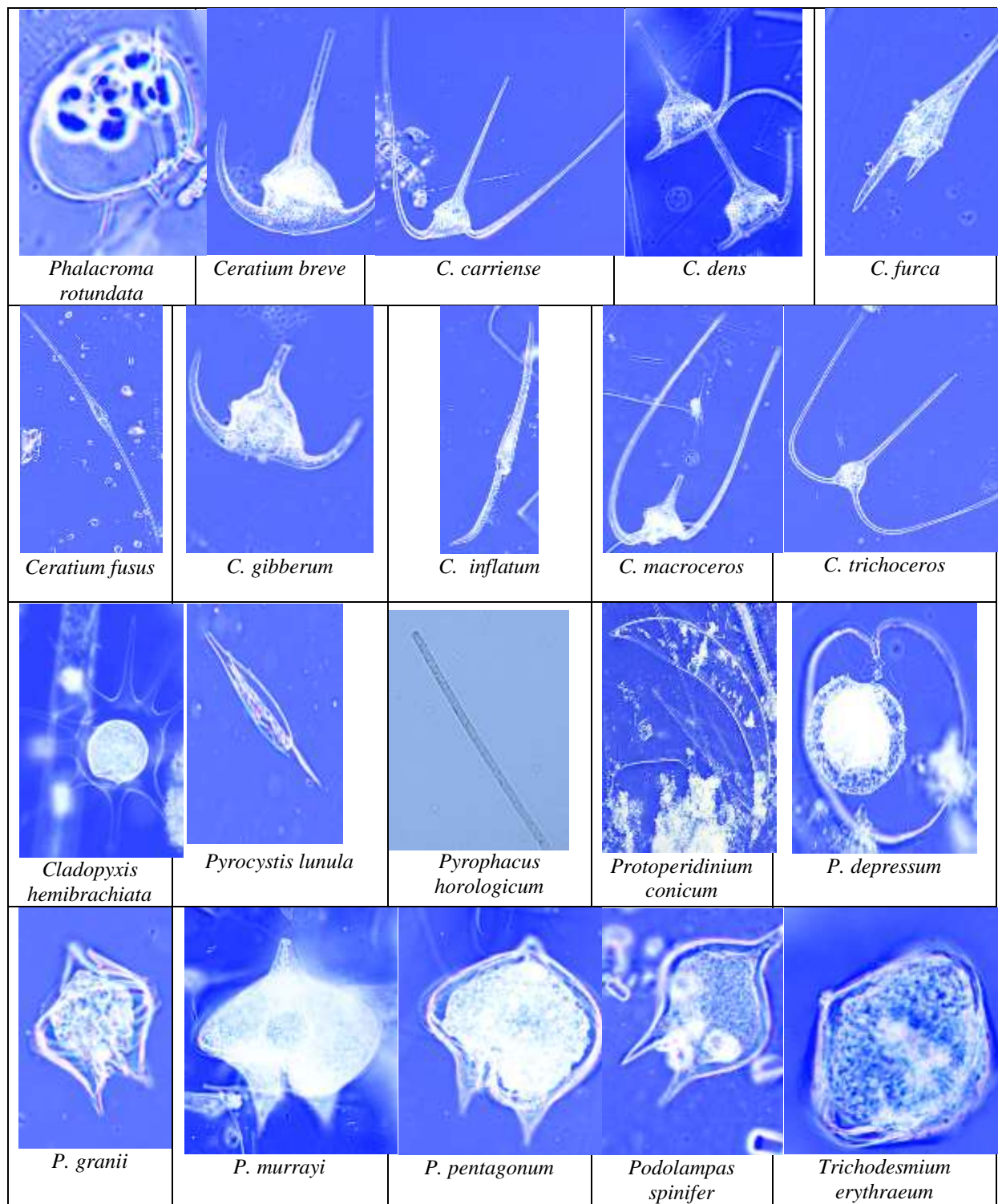


Figure 6-18 Phytoplankton

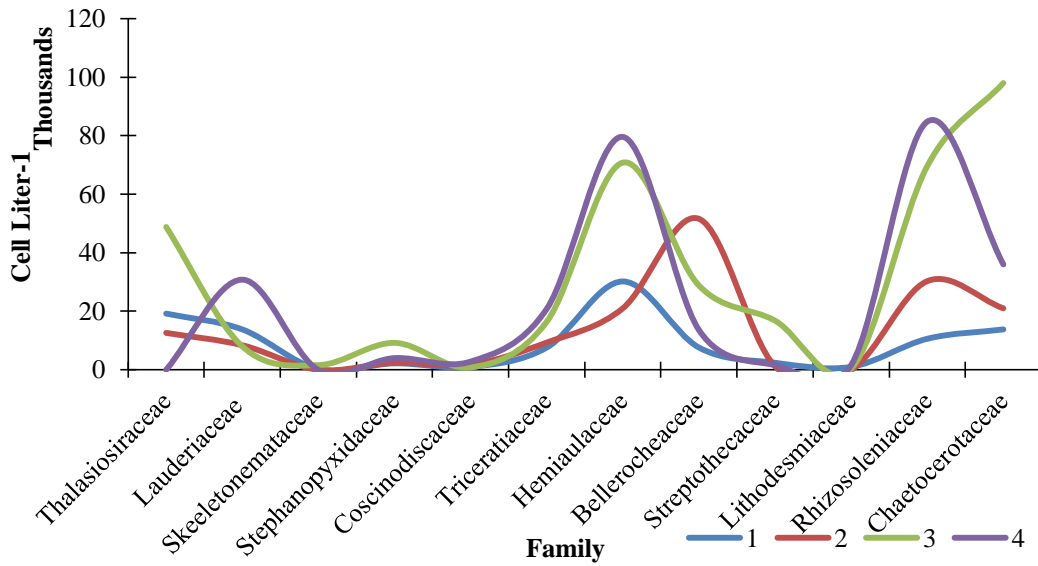


Figure 6-19 Quantitative analysis of Centric diatoms

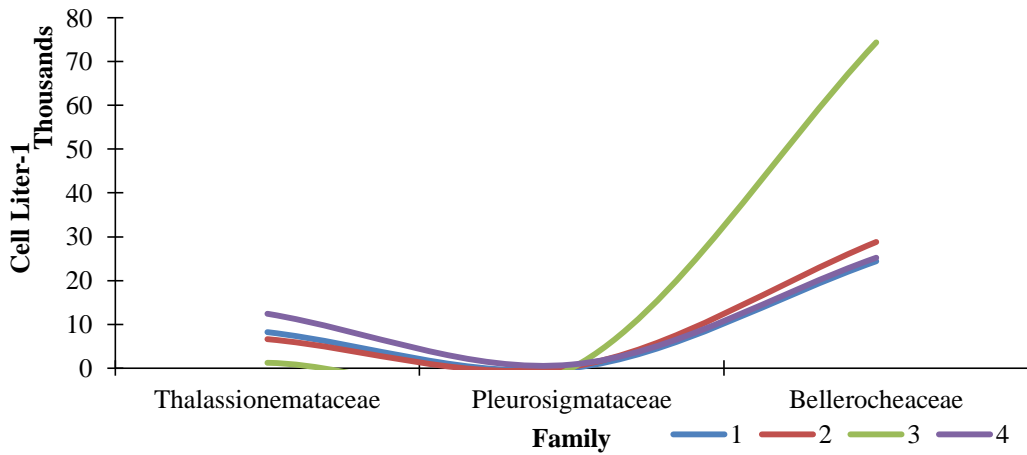


Figure 6-20 Quantitative analysis of Pennate diatoms

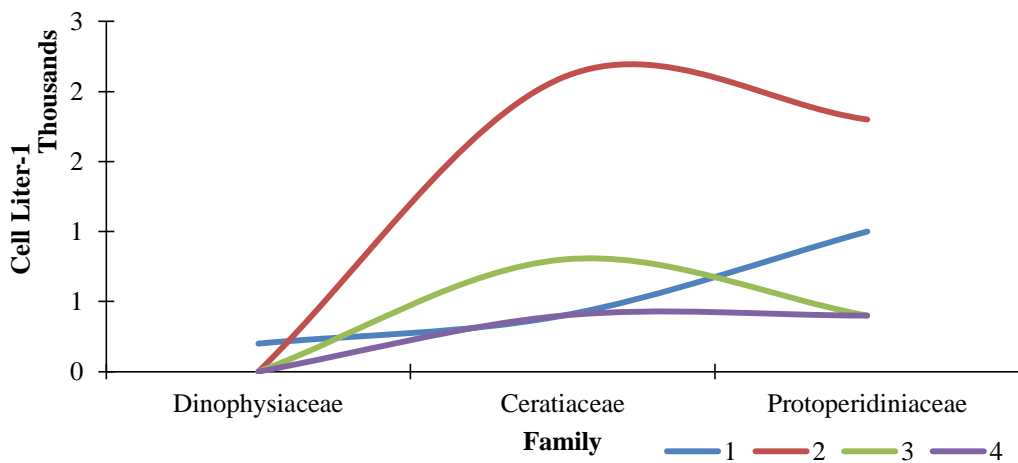


Figure 6-21 Quantitative analysis of dinoflagellates

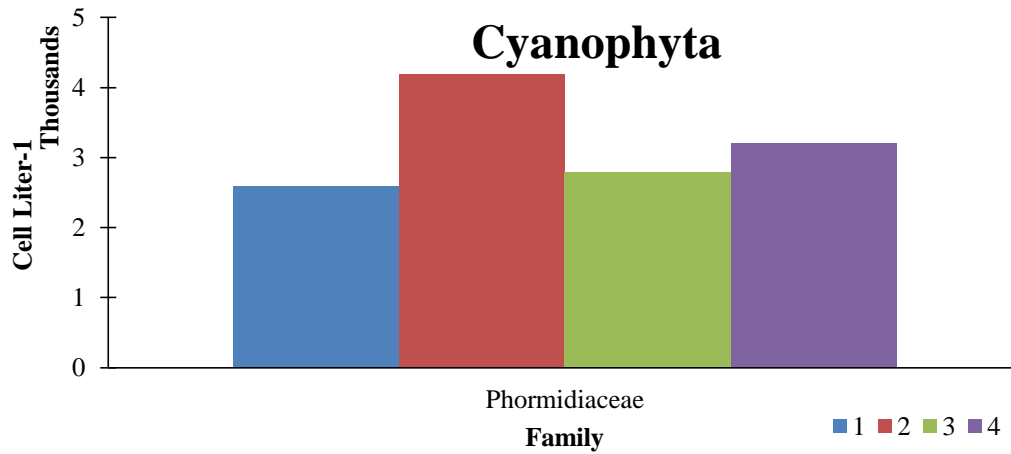


Figure 6-22 Quantitative analysis of blue green algae

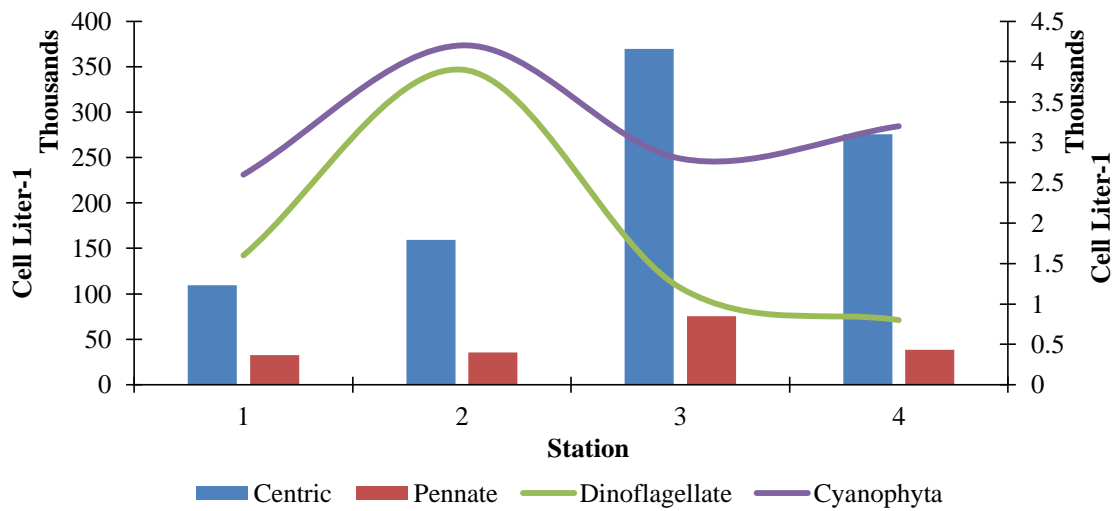


Figure 6-23 Station-wise fluctuations of phytoplankton

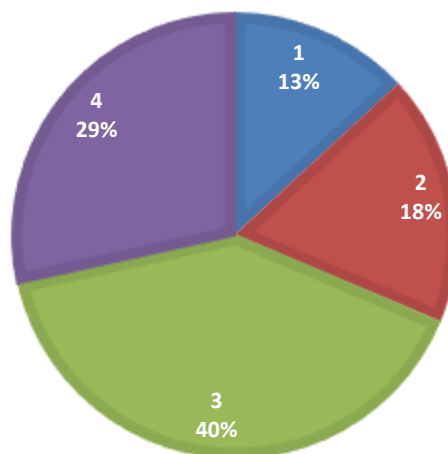


Figure 6-24 Comparing in percentage of total cell densities among different stations



6.7.4.4 Zooplankton

There are 27 species of zooplankton were recorded from the proposed project area. Although their diversities were not too high, they play an important role in aquatic environment to provide food (heterotrophs) for small fishes and other organisms. The less fluctuation in the occurrence of species were also found.

Paracalanus (1300-5300 Cell L⁻¹), later larva of bivalve (1000-3500 Cell L⁻¹) and larvae of *Limacina* sp. (1100-3300 Cell L⁻¹) were detected under the condition of higher cell densities in each station. Moreover, *Corycaeus* (3000 Cell L⁻¹) species was also higher in cell density at Station 3 than the other stations. Among the four stations, the highest cell concentration of zooplankton was recorded in Station 4 (40%) whereas the lowest concentration occurred in Station 1 (10%).



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 6-23 Species occurrence and classified list of zooplankton

Phylum	Class	Order	Family	Genus	S/N	Species	Station			
							1	2	3	4
Cnidaria	Hydrozoa	Siphonophorae	Diphyidae	<i>Lensia</i>	1.	<i>Lensia multicristata</i> Moser, 1925	-	+	-	-
Chaetognatha	Sagittoidea	Aphragmophora	Sagittidae	<i>Sagitta</i>	2.	<i>Sagitta robusta</i> Doncaster, 1902	-	+	-	+
Annelida	Polychaeta				3.	Nectochaete larvae of nereid	+	+	+	+
Arthropoda	Branchiopoda	Onychopoda	Podonidae	<i>Evadne</i>	4.	<i>Evadne</i> sp.	-	-	-	+
	Hexanauplia	Calanoida	Paracalanidae	<i>Acrocalanus</i>	5.	<i>Acrocalanus gibber</i> Giesbrecht, 1888	+	+	+	-
				<i>Bestiolina</i>	6.	<i>Bestiolina similis</i> Sewell, 1914	+	+	+	+
				<i>Paracalanus</i>	7.	<i>Paracalanus aculeatus</i> Giesbrecht, 1888	+	+	+	+
					8.	<i>P. parvus</i> Claus, 1863	+	+	+	+
			Eucalanidae	<i>Pareucalanus</i>	9.	<i>Pareucalanus attenuates</i> Dana, 1849	+	+	+	+
					10.	<i>Pareucalanus</i> sp.	+	+	-	-
			Centropagidae	<i>Centropages</i>	11.	<i>Centropages furcatus</i> Dana, 1849	+	-	+	+
			Acartiidae	<i>Acartia</i>	12.	<i>Acartia spinicauda</i> Giesbrecht, 1889	+	+	+	+
		Cyclopoida	Oithonidae	<i>Oithona</i>	13.	<i>Oithona brevicornis</i> Giesbrecht, 1891	+	-	-	-
					14.	<i>O. simplex</i> Giesbrecht, 1896	+	+	+	+
			Oncaeidae	<i>Oncaea</i>	15.	<i>Oncaea clevei</i> Früchtl, 1923	+	+	+	-



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Order	Family	Genus	S/N	Species	Station			
							1	2	3	4
Arthropoda	Hexanauplia	Cyclopoida	Corycaeidae	<i>Corycaeus</i>	16.	<i>Corycaeus latus</i> Dana, 1849	-	-	-	+
	Malacostraca	Cyclopoida	Corycaeidae	<i>Corycaeus</i>	17.	<i>C. speciosus</i> Dana, 1849	+	+	+	+
		Harpacticoida	Euterpinidae	<i>Euterpina</i>	18.	<i>Euterpina acutifrons</i> Dana, 1847	+	+	+	+
		Amphipoda	Ampithoidae	<i>Ampithoe</i>	19.	<i>Ampithoe</i> sp.	+	-	-	-
			Hyperiididae	<i>Hyperia</i>	20.	<i>Hyperia galba</i> Montagu, 1815	-	+	-	-
		Decapoda	Porcellanidae		21.	Porcellanid zoea	+	+	+	+
					22.	Larvae of <i>Lucifer</i>	+	+	+	+
Arthropoda	Malacostraca	Stomatopoda	Squillidae	<i>Squilla</i>	23.	<i>Squilla alima</i> larva	+	-	-	-
Mollusca	Pelecypoda				24.	Later larva of bivalve	+	+	+	+
Mollusca	Gastropoda	Thecosomata	Limacinidae	<i>Limacina</i>	25.	Larvae of <i>Limacina</i> sp	+	+	+	+
Chordata	Appendicularia	Copelata	Oikopleuridae	<i>Oikopleura</i>	26.	<i>Oikopleura dioica</i>	+	-	+	-
					27.	<i>Oikopleura</i> sp.	+	-	-	+
	Actinopterygii				28.	Fish egg	-	+	+	-
						Total	22	20	18	18

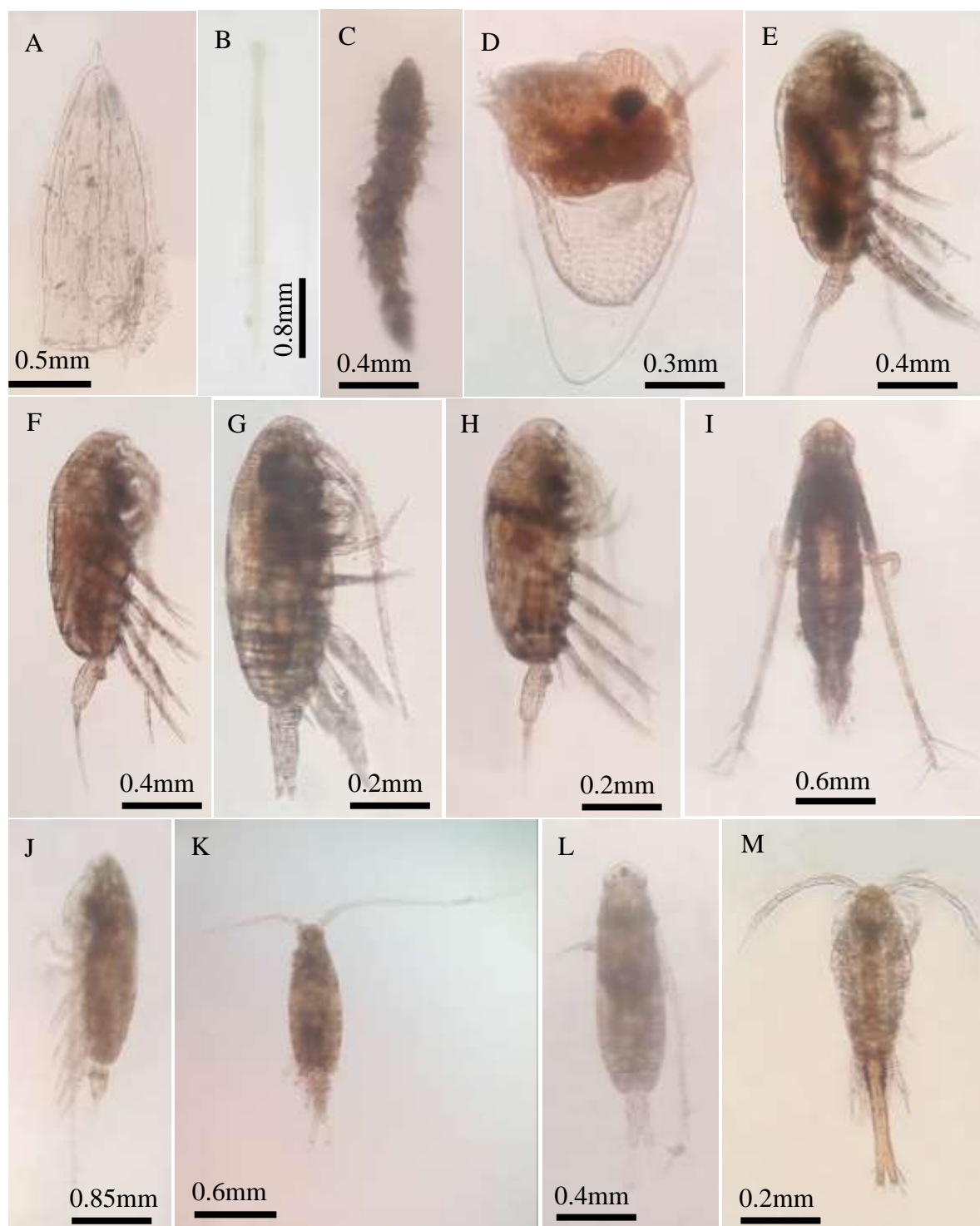


Figure 6-25 Zooplankton

[A) *Lensia multicristata*, B) *Sagitta robusta*, C) Nectochaete larvae of nereid, D) *Evadne* sp., E) *Acrocalanus gibber*, F) *Bestiolina similis*, G) *Paracalanus aculeatus*, H) *P. parvus*, I) *Pareucalanus attenuates*, J) *Pareucalanus* sp., K) *Centropages furcatus*, L) *Acartia spinicauda* and M) *Oithona brevicornis*.]

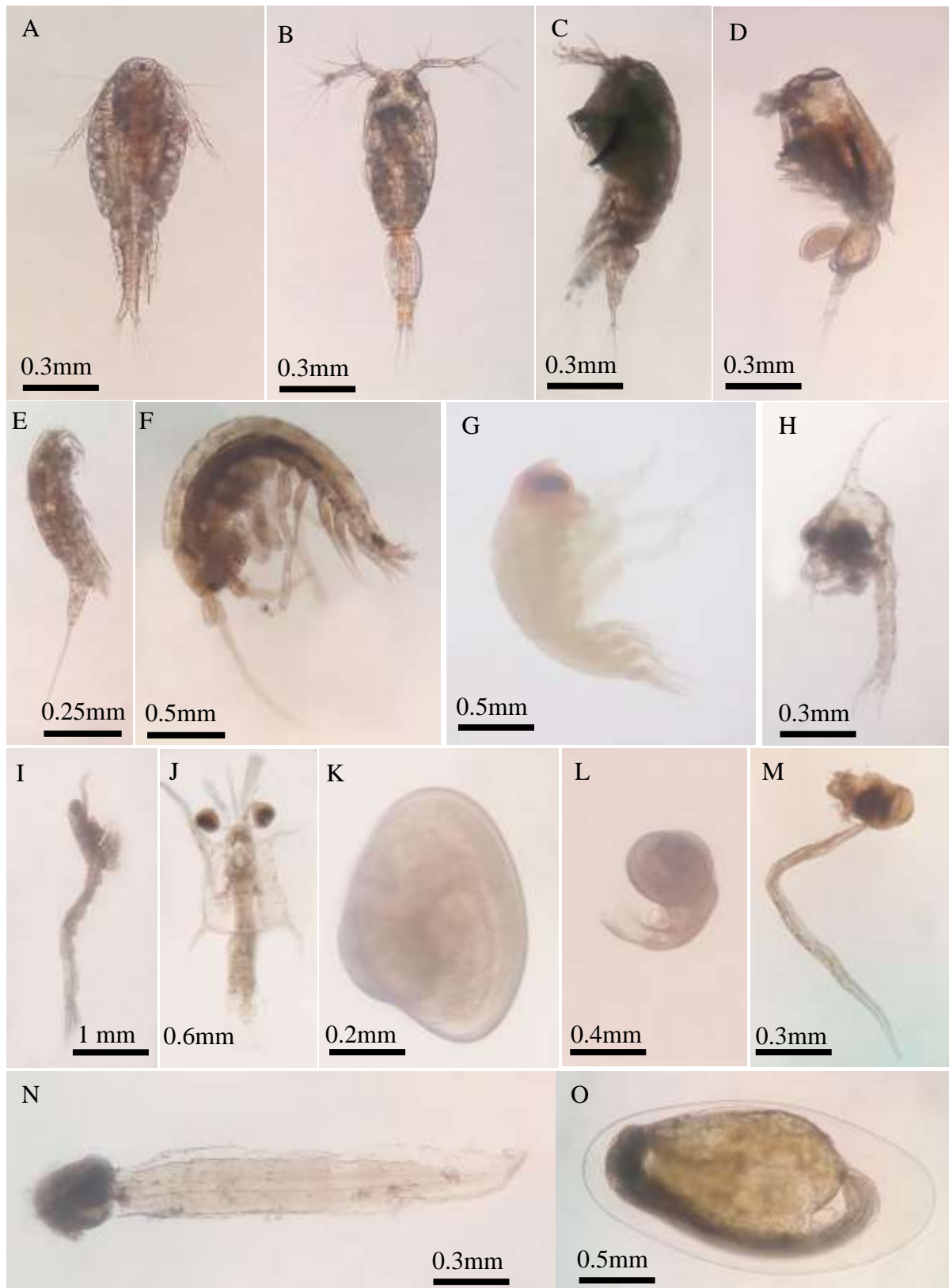


Figure 6-26 Zooplankton

[A) *Oithona simplex*, B) *Oncaea clevei*, C) *Corycaeus latus* , D) *C. speciosus*, E) *Euterpina acutifrons*, F) *Am* sp., G) *Hyperia galba*, H) Porcellanid zoea, I) Larvae of *Lucifer*, J) *Squilla alima* larva, K) Later larvae of biva
Larvae of *Limacina* sp, M) *Oikopleura dioica*, N) *Oikopleura* sp. and O) Fish egg]

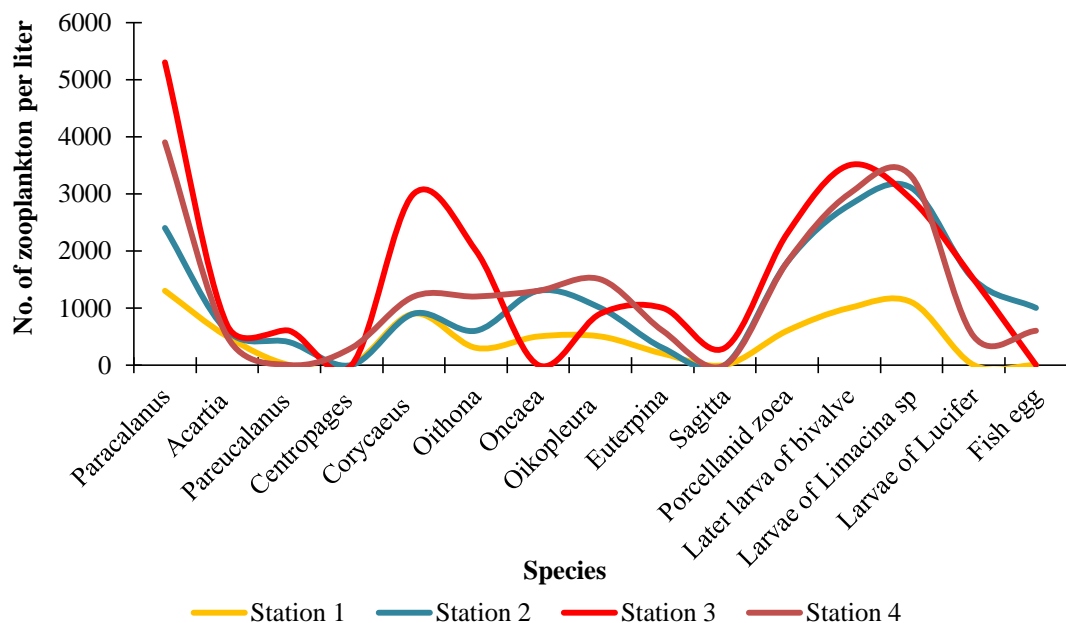


Figure 6-27 Estimated cell densities of zooplankton from four stations

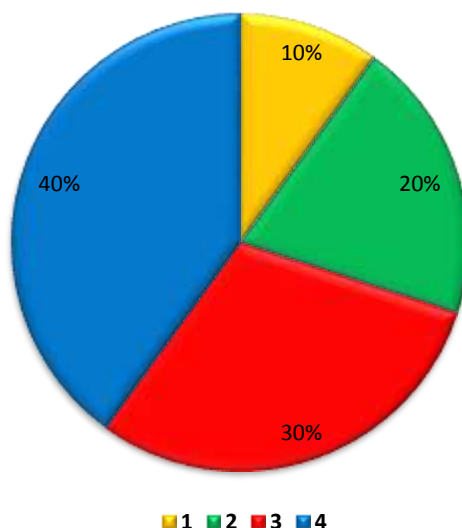


Figure 6-28 Comparing in total cell densities of zooplankton from different stations

6.7.4.5 Benthos

In many coastal areas, soft bottoms are the most common habitat type, such as bottom of the bay and at the base of coral reefs. Soft sediments are a mixture of inorganic particles, organic particles and pore water. Benthic organisms are strongly affected by variation in all these constituents. The size of particles affects the lifestyles of benthic organisms and is often a reflection of current regime. Soft bottom habitats are a key area for secondary producers, such as sea cucumbers, that ingest sediment material and derive their nutrition from some fraction of the material. Soft benthic habitat harbours a high diversity and biomass of plankton (like copepods and polychaetes), which provide food for many reef organisms. The emergent plankton migrate vertically at night into the water column and provide food for



fishes and corals. However, 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).

In the present study, there are only 8 species of macro benthic organism were recorded. Although the occurrence of species diversity was very low because the benthic substrate was unfavorable condition to survive (less soft sediments). Among the seven stations, the highest diversity was recorded in Stations 1 (3 species) and 4 (2 species). These two stations have more soft sediment than the others. Therefore, the operators should carry out their works with care attention around these two stations (especially removing benthic substrates).



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 6-24 Species occurrence and classified list of benthos

Phylum	Class	Order	Family	Genus	S/N	Species	Station						
							1	2	3	4	5	6	7
Annelida	Polycheata	Errantia	Nereidae	<i>Nereis</i>	1	<i>Nereis</i> sp.1	+	-	-	-	-	-	-
					2	<i>Nereis</i> sp.2	-	-	-	+	+	-	-
			Glyceridae	<i>Preinereis</i>	3	<i>Preinereis</i> sp.	-	-	-	-	-	+	-
				<i>Glycera</i>	4	<i>Glycera</i> sp.	-	-	-	-	-	-	+
		Sedentaria	Maldanidae	<i>Euclymene</i>	5	<i>E. annandalei</i>	-	-	-	+	-	-	-
			Phyllodoceidae	<i>Phyllodoce</i>	6	<i>P. novaehollandiae</i>	+	+	+	-	-	-	-
			Orbiniidae	<i>Haploscoloplos</i>	7	<i>Haploscoloplos</i> sp.	+	-	-	-	-	+	+
Sipunculida	Sipunculids		Sipunculidae	<i>Sipunculus</i>	8	<i>Sipunculus</i> sp.	-	-	-	+	+	-	-
						Total	3	1	1	3	2	2	2

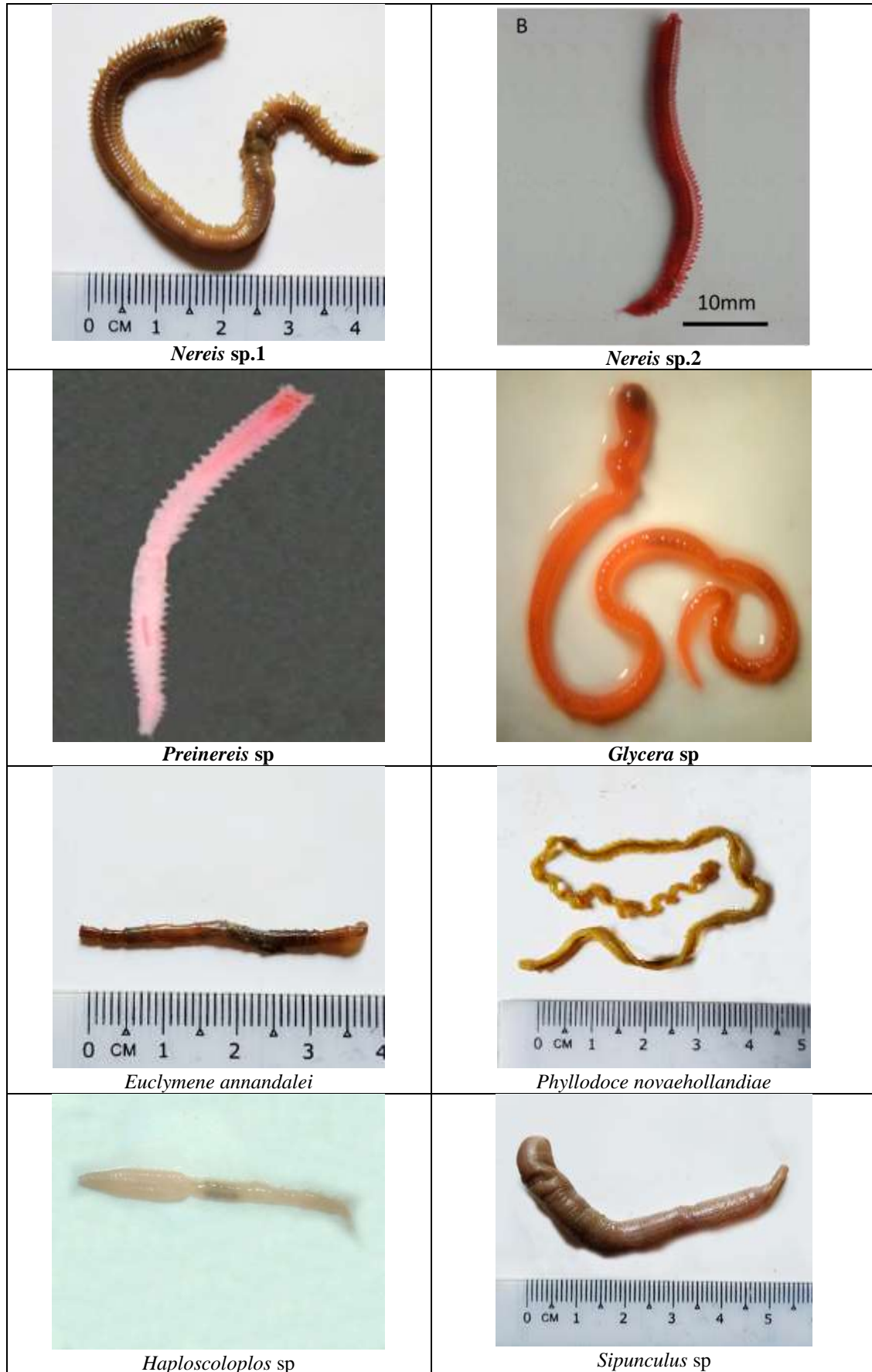


Figure 6-29 Marine benthic macroinvertebrates



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 6-25 Classified list Mollusca and Arthropoda

Phylum	Class	Order	Family	s/n	Scientific name
Mollusca Linnaeus 1758	Gastropoda Cuvier 1795	Mesogastropoda Thiele, 1929	Cerithiidae J. Fleming, 1822	1	<i>Cerithiopsis monachus</i> Bartsch 1881
		Mesogastropoda Thiele, 1929	Strombidae Rafinesque, 1815	2	<i>Strombus marginatus</i> Linnaeus, 1758
		Mesogastropoda Thiele, 1929	Naticidae Guilding, 1834	3	<i>Polinices didyma</i> (Röding, 1798)
		Mesogastropoda Thiele, 1929	Ranellidae (=Cymatiidae) Gray, 1854	4	<i>Cymatium pfeifferianum</i> (Reeve, 1844)
		Neogastropoda Wenz 1938	Muricidae Rafinesque 1815	5	<i>Drupa spinosa</i> (H. Adams & A. Adams 1853)
		Neogastropoda Wenz, 1938	Conidae J. Fleming, 1822	6	<i>Conus coronatus</i> Gmelin, 1791
		Archaeogastropoda Thiele, 1925	Neritidae Rafinesque, 1815	7	<i>Nerita undata</i> Linnaeus, 1758
		Archaeogastropoda Thiele, 1925	Trochidae Rafinesque, 1815	8	<i>Trochus radiatus</i> Gmelin, 1791
Mollusca Linnaeus, 1758	Bivalvia (= Pelecypoda) Linnaeus, 1758	Arcoida Stoliczka, 1871	Arcidae Lamarck, 1809	9	<i>Barbatia foliate</i> (Forsskål in Niebuhr, 1775)



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Order	Family	s/n	Scientific name
		<i>Veneroida</i> H. Adams & A. Adams, 1856	Cardiidae Lamarck, 1809	10	<i>Trachycardium rugosum</i> (Lamarck, 1819)
		Ostreida Fèrussac, 1822	Ostreidae Rafinesque, 1815	11	<i>Pinctada radiata</i> (Leach, 1814)
		Ostreida Fèrussac, 1822	Ostreidae Rafinesque, 1815	12	<i>Saccostrea cucullata</i> (Born, 1778)
	Polyplacophora Gray, 1821	Chitonida Thiele, 1909	Mopaliidae Dall, 1889	13	<i>Mopalia kennerleyi</i> Carpenter, 1864
Arthropoda von Siebold, 1848	Maxillopoda Dahl, 1956	Sessilia Lamarck, 1818	Balanidae Leach, 1817	14	<i>Amphibalanus amphitrite</i> (Darwin, 1854)
				15	<i>Amphibalanus reticulatus</i> (Utinomi, 1967)

Table 6-26 Species occurrence of Gastropods, Bivalves, Chiton and Barnacles

S/N	Species	Station						
		1	2	3	4	5	6	7
Gastropods								
1	<i>Drupa spinosa</i>	+	+	-	-	-	-	+
2	<i>Cerithiopsis monachus</i>	-	-	-	-	-	-	+
3	<i>Nerita undata</i>	-	+	-	-	-	+	-
4	<i>Trochus radiatus</i>	+	+	-	-	-	-	-
5	<i>Conus coronatus</i>	+	+	-	-	-	-	-
6	<i>Strombus marginatus</i>	+	+	-	-	-	-	-
7	<i>Polinices didyma</i>	-	+	-	-	-	-	-
8	<i>Cymatium pfeifferianum</i>	-	+	-	-	-	-	-
Bivalves								
9	<i>Saccostrea cucullata</i>	+	+	+	+	+	+	+
10	<i>Barbatia foliata</i>	-	+	-	-	-	-	-
11	<i>Trachycardium rugosum</i>	-	+	-	-	-	-	-
12	<i>Pinctada radiata</i>	-	-	-	-	+	-	-
Chiton								
13	<i>Mopalia kennerleyi</i>	+	+	+	-	-	+	+
Barnacles								
14	<i>Amphibalanus amphitrite</i>	+	+	+	+	+	+	+
15	<i>A. reticulatus</i>	+	+	+	+	+	+	+
	Total	7	13	4	3	4	5	5

6.7.4.6 Mollusks and Gastropods

There are 8 species of gastropods, 4 species of bivalves, 1 species of chiton and 2 species of barnacles were recorded throughout the study period. One species of bivalve such as *Saccostrea auccullata* and two species of barnacles such as *Amphibalanus amphitrite* and *A. reticulatus* were observed in all stations. However, some species had been collected as a dead shell so they were introduced from the other areas by human consumption.




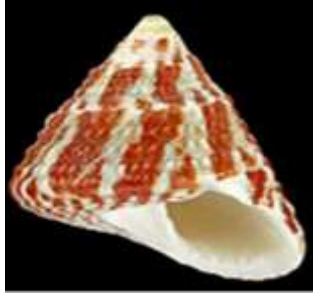




			
<p>Drupa spinosa</p>	<p>Cerithiopsis monachus</p>	<p>Nerita undata</p>	<p>Trochus radiatus</p>
			
<p>Conus coronatus</p>	<p>Strombus marginatus</p>	<p>Polinices didyma</p>	<p>Cymatium pfeifferianum</p>

Figure 6-30 Mollusks and Gastropods

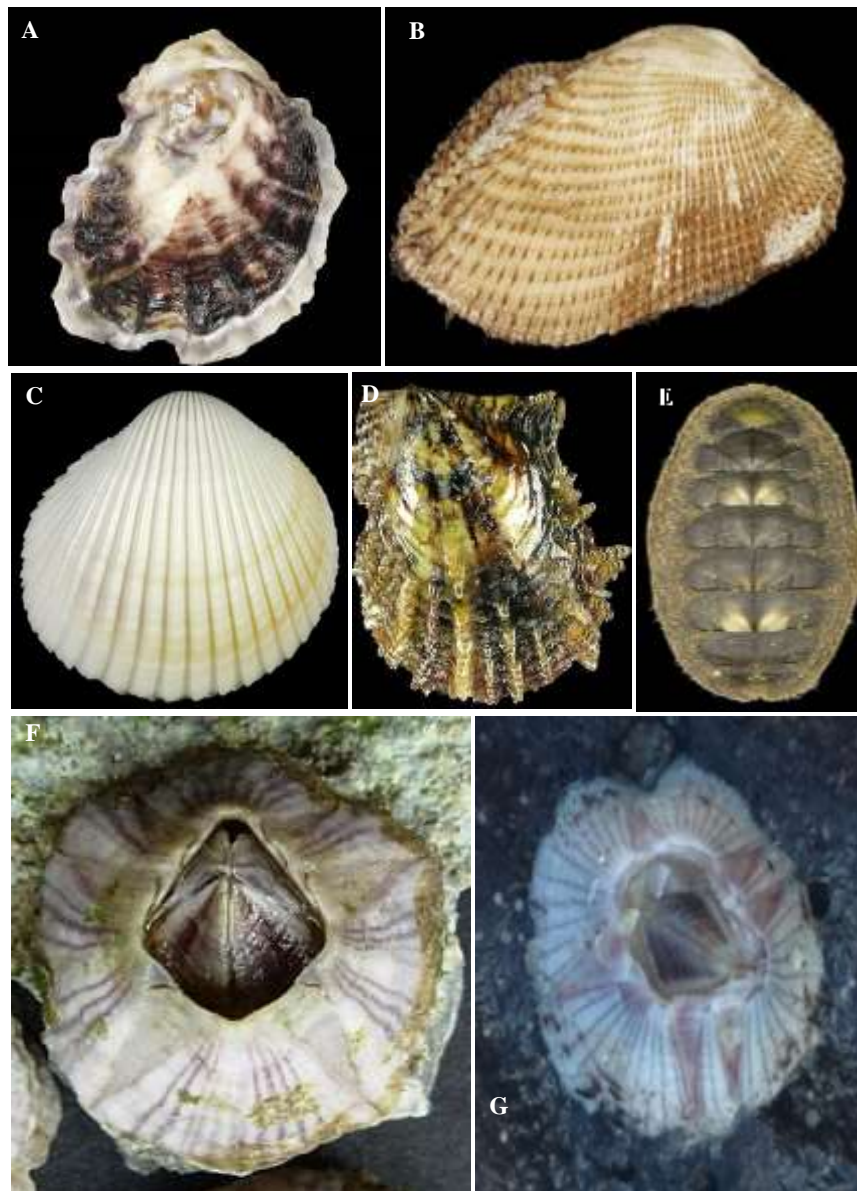


Figure 6-31 Mollusks and Gastropods

A) *Saccostrea cucullata*, B) *Barbatia foliate*, C) *Trachycardium rugosum*, D) *Pinctada radiata*, E) *Mopalia kennerleyi*, F) *Amphibalanus amphitrite*, G) *A. reticulatu*.

6.7.4.7 Coral reef

In the tropics, coral reefs are a conspicuous and important component in the livelihoods of many coastal communities. Coral reefs are amongst the most productive and diverse habitats in tropical oceans. The diversity of organisms on coral reefs is the highest per unit area of any known habitat.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

High diversity of coral occurred in the present study. There are 54 species of coral were recorded from the five sites of the Bay. Station 3 has the higher diversity (30 species) than the others. Most of the species are *Porites* (massive type) coral. This species more dominant along the coastal area of Stations 1, 2 and 3, so this area is somewhat tolerance to some disturbance from boating. On the other hand, branching coral are dominant along the coastal area of Stations 4 and 5. Therefore, boating for transportation should take with very low speed and around those area and strongly prohibited from walking on the coral reefs. There is a risk, even though minimal, that the sediment plume associated with cleaning could have a detrimental impact on the immediate and broader environment.

Besides, some species of coral need to protect from extinction because they are listed by IUCN as red list species *viz.*, 8 species were vulnerable (VU) and 17 species are nearly threatened (NT) of the world. However, this rank is according to the world data but there is no IUCN red list for national level in Myanmar. For instances, one species of seagrass *Halophila beccarii* have been ranked as VU by IUCN but this species occurs abundantly in some coastal area of Myanmar.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 6-27 Classified list of coral reefs with common name and IUCN red list level

Phylum	Class	Order	Family	Genus	Species	IUCN Red List	Common Name
Cnidaria	Anthozoa	Scleractinia	Acroporidae	<i>Acropora</i>	<i>Acropora millepora</i>	NT	Stagehorn coral
					<i>Acropora nobilis</i>	LC	Stagehorn coral
					<i>Acropora verweyi</i>	VU	Stagehorn coral
					<i>Acropora glauca</i>	NT	Stagehorn coral
					<i>Acropora plantaginea</i>	DD	Stagehorn coral
					<i>Acropora digitifera</i>	NT	Stagehorn coral
					<i>Acropora gemmifera</i>	LC	Stagehorn coral
					<i>Acropora grandis</i>	LC	Stagehorn coral
					<i>Acropora monticulosa</i>	NT	Stagehorn coral
					<i>Acropora hoeksemai</i>	VU	Stagehorn coral
					<i>Acropora nasuta</i>	NT	Stagehorn coral
					<i>Acropora verweyi</i>	VU	Stagehorn coral
					<i>Acropora florida</i>	NT	Stagehorn coral
					<i>Acropora formosa</i>	NT	Stagehorn coral
					<i>Acropora nobilis</i>	LC	Stagehorn coral
			Poritidae	<i>Anacropora</i>	<i>Anacropora spumosa</i>	DD	Stagehorn coral
				<i>Montipora</i>	<i>Montipora sp</i>	-	Porous leaf coral
			Poritidae	<i>Porites</i>	<i>Porites compressa</i>	LC	Hump Coral
			Poritidae	<i>Porites</i>	<i>Porites nodifera</i>	LC	Dome Coral



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Order	Family	Genus	Species	IUCN Red List	Common Name
Cnidaria	Anthozoa	Scleractinia			<i>Porites branneri</i>	NT	Blue Crust Coral
					<i>Porites lobata</i>	NT	Lobe Coral
					<i>Porites lutea</i>	LC	Hump Coral
					<i>Porites annae</i>	NT	Nodule Coral
					<i>Porites australiensis</i>	LC	Hump Coral
				<i>Goniopora</i>	<i>Goniopora sp</i>	-	Flowerpot Coral
			Faviidae	<i>Favia</i>	<i>Favia pallida</i>	LC	Brain Coral
					<i>Favia fava</i>	LC	Head Coral
					<i>Favia lacuna</i>	NT	Knob Coral
					<i>Favia matthaii</i>	NT	Knob Coral
			Fungiidae	<i>Fungia</i>	<i>Fungia fungites</i>	NT	Mushroom Coral
					<i>Fungia repanda</i>	LC	Mushroom Coral
				<i>Herpolitha</i>	<i>Herpolitha limax</i>	LC	Striate Boomerang coral
				<i>Ctenactis</i>	<i>Ctenactis echinata</i>	LC	Mushroom Coral
			Merulinidae	<i>Goniastrea</i>	<i>Goniastrea aspera</i>	LC	Lesser Star Coral
					<i>Goniastrea edwardsi</i>	LC	Brain Coral
			Merulinidae	<i>Goniastrea</i>	<i>Goniastrea pectinata</i>	LC	Lesser Star Coral
Cnidaria	Anthozoa	Scleractinia	Merulinidae	<i>Goniastrea</i>	<i>Goniastrea retiformis</i>	LC	Lesser Star Coral
				<i>Favites</i>	<i>Favites spinosa</i>	VU	Moon Coral
					<i>Favites chinensis</i>	NT	Large Star Coral
				<i>Merulina</i>	<i>Merulina ampliata</i>	LC	Crispy Crust Coral



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Order	Family	Genus	Species	IUCN Red List	Common Name
				<i>Petinia</i>	<i>Pectinia lactuca</i>	VU	Lettuce Coral
			Lobophyllidae	<i>Lobophyllia</i>	<i>Lobophyllia hemiprichii</i>	LC	Lobe Brain Coral
				<i>Cynarina</i>	<i>Cynarina lacrymalis</i>	NT	Button Coral
			Agariciidae	<i>Leptoseris</i>	<i>Leptoseris explanata</i>	LC	Rough Plate Coral
				<i>Pavona</i>	<i>Pavona explanulata</i>	LC	Leaf Coral
			Pocilloporidae	<i>Pocillopora</i>	<i>Pocillopora damicornis</i>	LC	Lace Coral
				<i>Stylophora</i>	<i>Stylophora sp</i>	-	Cauliflower Coral
			Dendrophylliidae	<i>Turbinaria</i>	<i>Turbinaria reniformis</i>	VU	Yellow Scroll Coral
			Diploastreidae	<i>Diploastrea</i>	<i>Diploastrea heliopora</i>	NT	Honeycomb Coral
			Mussidae	<i>Isophyllia</i>	<i>Isophyllia sinuosa</i>	LC	Sinuuous Cactus Coral
				<i>Symphyllia</i>	<i>Symphyllia agaricia</i>	LC	Brain Coral
			Montastraeidae	<i>Montastrea</i>	<i>Montastrea magnistellata</i>	NT	Torres Strait Coral
		Actiniaria	Stichodactylidae	<i>Heteractis</i>	<i>Heteractis magnifica</i>	VU	Ritteri anemone
		Helioporacea	Helioporidae	<i>Heliopora</i>	<i>Heliopora coerulea</i>	VU	Blue Coral

Table 6-28 Species occurrence of coral from the surveyed area

S/N	Species	Station				
		1	2	3	4	5
1	<i>Acropora millepora</i>	+	-	-	+	+
2	<i>Acropora nobilis</i>	-	-	-	+	+
3	<i>Acropora verweyi</i>	-	+	-	+	+
4	<i>Acropora glauca</i>	-	-	+	-	-
5	<i>Acropora plantaginea</i>	-	-	+	+	+
6	<i>Acropora digitifera</i>	+	-	-	-	-
7	<i>Acropora gemmifera</i>	+	-	-	-	-
8	<i>Acropora grandis</i>	-	-	+	-	-
9	<i>Acropora monticulosa</i>	+	-	-	-	-
10	<i>Acropora hoeksemai</i>	-	-	+	-	-
11	<i>Acropora nasuta</i>	+	+	+	-	-
12	<i>Acropora verweyi</i>	+	-	-	-	-
13	<i>Acropora florida</i>	-	+	-	-	-
14	<i>Acropora formosa</i>	-	-	-	+	+
15	<i>Acropora nobilis</i>	-	-	-	-	-
16	<i>Anacropora spumosa</i>	-	-	-	+	+
17	<i>Montipora</i> sp.	-	-	+	-	-
18	<i>Porites compressa</i>	-	-	-	+	+
19	<i>Porites nodifera</i>	-	+	-	+	+
20	<i>Porites branneri</i>	+	-	+	+	+
21	<i>Porites lobata</i>	+	+	+	+	+
22	<i>Porites lutea</i>	+	-	+	+	+
23	<i>Porites annae</i>	+	+	-	+	+
24	<i>Porites australiensis</i>	+	+	-	+	+
25	<i>Goniopora</i> sp.	-	-	+	-	-
26	<i>Favia pallida</i>	-	-	+	+	+



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

S/N	Species	Station				
		1	2	3	4	5
27	<i>Favia fava</i>	-	-	+	-	-
28	<i>Favia lacuna</i>	-	-	+	-	-
29	<i>Favia matthaii</i>	-	-	+	-	-
30	<i>Fungia fungites</i>	-	-	-	+	+
31	<i>Fungia repanda</i>	+	-	-	+	+
32	<i>Herpolitha limax</i>	-	-	+	+	+
33	<i>Ctenactis echinata</i>	+	-	-	+	+
34	<i>Goniastrea aspera</i>	-	-	-	+	+
35	<i>Goniastrea edwardsi</i>	-	-	+	-	-
36	<i>Goniastrea pectinata</i>	-	-	+	-	-
37	<i>Goniastrea retiformis</i>	-	-	+	-	-
38	<i>Favites spinosa</i>	-	-	+	-	-
39	<i>Favites chinensis</i>	-	-	+	-	-
40	<i>Merulina ampliata</i>	-	-	-	+	+
41	<i>Pectinia lactuca</i>	-	-	+	-	-
42	<i>Lobophyllia hemiprichii</i>	-	-	+	-	-
43	<i>Cynarina lacrymalis</i>	-	-	-	+	+
44	<i>Leptoseris explanata</i>	-	-	-	+	+
45	<i>Pavona explanulata</i>	-	-	+	+	+
46	<i>Pocillopora damicornis</i>	+	+	+	+	+
47	<i>Stylophora</i> sp.	-	-	+	-	-
48	<i>Turbinaria reniformis</i>	-	-	-	+	+
49	<i>Diploastrea heliopora</i>	-	-	+	-	-
50	<i>Isophyllia sinuosa</i>	-	-	+	-	-
51	<i>Symphyllia agaricia</i>	-	-	+	-	-
52	<i>Montastrea magnistellata</i>	-	-	+	-	-
53	<i>Heteractis magnifica</i>	+	-	-	-	-



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

S/N	Species	Station				
		1	2	3	4	5
54	<i>Heliopora coerulea</i>	+	+	+	-	-
	Total	16	9	30	25	25



Acropora millepora



Acropora verweyi



Acropora nobilis



Acropora grandis



Acropora glauca



Acropora plantaginea



Acropora hoeksemai



Acropora nasuta



Acropora plantaginea



Acropora gemmifera



Acropora digitifera



Acropora florida



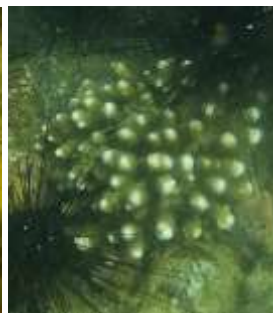
Acropora formosa



Anacropora spumosa



Acropora nasuta



Acropora monticulosa



Acropora millepora



Montipora sp



Turbinaria reniformis



Porites nodifera

Figure 6-32 Photographs of Coral reefs



Ctenactis echinata



Fungia fungites



Fungia repanda



Favia pallida



Herpolitha limax



Leptoseris explanata



Cynarina lacrymalis



Goniastrea aspera



Pocillopora damicornis



Pavona explanulata



Merulina ampliata



Porites compressa



Diploastrea heliopora



Favia favius



Favia lacuna



Favia matthaii



Favites chinensis



Favites spinosa



Heliopora coerulea

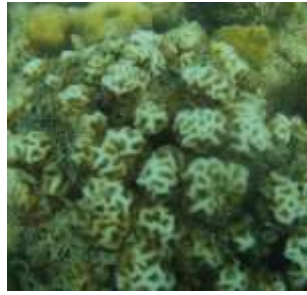


Isophyllia sinuosa

Figure 6-33 Photographs of Coral reefs



Goniastrea edwardsi



Goniastrea pectinata



Petinia lactuca



Lobophyllia hemiprichii



Goniastrea retiformis



Montastrea magnistellata



Porites lobata



Stylophora sp



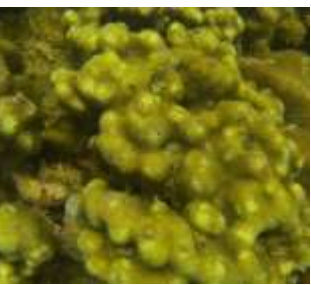
Porites lutea



Goniopora sp



Symphyllia agaricia



Porties branneri



Porites annae



Porites australiensis



Heteractis magnifica

Figure 6-34 Photographs of Coral reefs



6.7.4.8 Fishes

There are 22 species of finfish, 1 stingray, 1 squid, 2 crabs and 1 lobster were recorded. Among them, 15 species were commercially importance species. Moreover, only one species of vulnerable (VU) fish was also found. The fishery data were obtained from the surveyed area and adjacent coastal waters because there are no fishing activities occurred in the current proposed project area. However, the abundance of fishes could attribute to pearl farming because the fish eat organisms encrusted on the shells, but also because small fish can hide between the shells in the oyster cages. There is no record which concerned with seaturtle/nesting sites and marine mammal such as whales, dolphin and porpoise those are protected by law, so someone have to release back to the sea.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 6-29 Classified list of fishes with IUCN red list status

Phylum	Class	Order	Family	S/N	Genus & Species	Common name	Local name	IUCN Red List Status
Chordata	Actinopterygii	Perciformes	Siganidae	1	<i>*Siganus javus</i> (Lineaeus, 1766)	Streaked spinefoot	Nga-yan-shar	NE
				2	<i>*Siganus corallines</i> (Valenciennes, 1835)	Blue-spotted spinefoot	-	NE
			Serranidae	3	<i>*Epinephelus faveatus</i> (Valenciennes, 1828)	Barred-chest grouper	Kyauk-nga	DD
				4	<i>Epinephelus erythrurus</i> (Valenciennes, 1828)	Cloudy grouper	Kyauk-nga-pway-chut	DD
			Lutjanidae	5	<i>*Lutjanus russellii</i> (Bleeker, 1849)	Russell's snapper	Nga-parr-ne	NE
			Terapontidae	6	<i>Terapon theraps</i> Cuvier, 1829	Largescaled terapon	Nga-gone-kyarr	LC
			Blenniidae	7	<i>Petroscirtes breviceps</i> (Valenciennes, 1836)	Striped poison-fang blenny mimic	Nga-khway	NE
			Nemipteridae	8	<i>Scolopsis monogramma</i> (Cuvier, 1830)	Monogrammed monocle bream	-	NE
			Carangidae	9	<i>Atule mate</i> (Curvier, 1833)	Yellowtail scad	Pann-zinn	NE
			Carangidae	10	<i>Scomberoides commersonnianus</i> Lacepede, 1801	Talang queenfish	Nga-let-warr	NE
				11	<i>*Ulna mentalis</i> (Curvier, 1833)	Longrakered travelly	Zar-kyann	NE
				12	<i>Caranx sp.</i>	-	-	-



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Order	Family	S/N	Genus & Species	Common name	Local name	IUCN Red List Status
Chordata	Actinopterygii							
		Perciformes	Haemulidae	13	<i>*Pomadasys argenteus</i> (Forsskal, 1775)	Silver grunt	Nga-gonn	LC
				14	<i>Plectorhinchus vittatus</i> (Linnaeus, 1758)	Indian ocean oriental sweetlips	-	NE
			Odacidae	15	<i>Scarus sp.</i>	-	-	-
		Pleuronectiformes	Psettodidae	16	<i>*Psettodes erumei</i> (Bloch & Schneider, 1801)	Indian halibut	Nga-let-gaik/ Nga Khway	NE
		Beloniformes	Belonidae	17	<i>*Tylosurus crocodilus crocodilus</i> (Peron & Lesueur, 1821)	Hound needlefish	Sa-lon-kyauk	NE
		Anguilliformes	Muraenidae	18	<i>Gymnothorax fimbriatus</i> (Bennett, 1832)	Fimbriated moray	-	NE
			Muraenesocidae	19	<i>*Congresox talabon</i> (Cuvier, 1829)	Yellow pike conger	Nga-hauk	NE
		Siluriformes	Plotosidae	20	<i>*Plotosus canius</i> Hamilton, 1822	Gray eel-catfish	Pin-lel-nga-khu	NE
			Ariidae	21	<i>*Arius maculatus</i> (Thunberg, 1972)	Spotted catfish	Za-lone	NE
		Beryciformes	Holocentridae	22	<i>Myripristis hexagona</i> (Leceppede, 1802)	Doubletooth soldierfish	-	NE



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Phylum	Class	Order	Family	S/N	Genus & Species	Common name	Local name	IUCN Red List Status
Chordata	Elasmobranchii	Myliobatiformes	Dasyatidae	23	<i>*Himantura uarnak</i> (Gmelin, 1789)	Honeycomb stingray	Nga-leik-kyauk	VU
Mollusca	Cephalopoda	Myopsida	Loliginidae	24	<i>*Sepioteuthis lessoniana</i> (Ferussac, 1831)	Bigfin reef squid	Kinn-mon	NE
Crustacea	Malacostraca	Decapoda	Portunidae	25	<i>Charybdis natator</i> (Herbst, 1794)	Ridged swimming crab	Ga-nann	NE
Crustacea	Malacostraca	Decapoda	Portunidae	26	<i>*Portunus pelagicus</i> (Linnaeus, 1758)	Blue swimming crad	Ga-nann	NE
			Palinuridae	27	<i>*Panulirus polyphagas</i> (Herbst, 1793)	Mud spiny lobster	Ba-ghel/ Pa-zun Kyauk-	LC
*= Commercial species, NE=Not Evaluated, LC= Least Concern, DD=Data deficient, VU = Vulnerable								



Siganus javus



Siganus corallines



Epinephelus faveatus



Epinephelus erythrurus



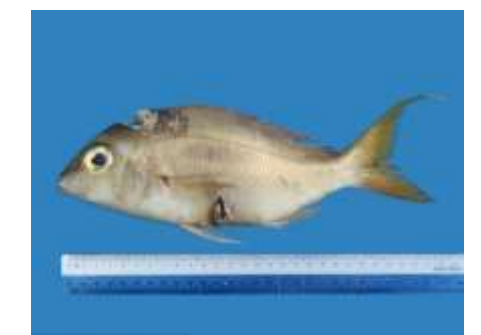
Lutjanus russellii



Terapon theraps

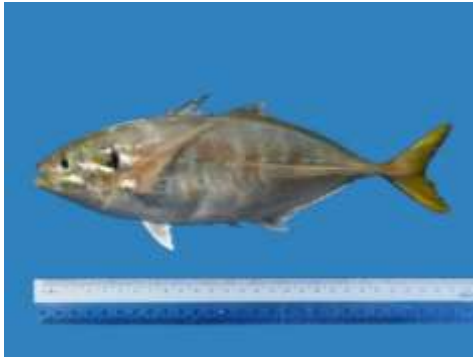


Petrosirtes breviceps

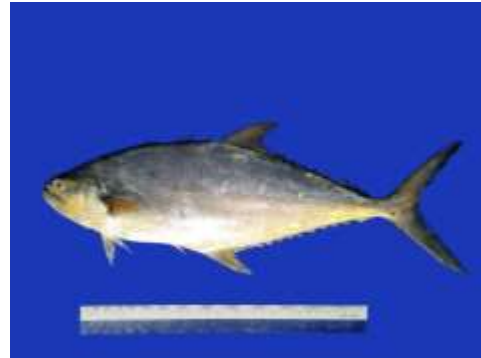


Scolopsis monogramma

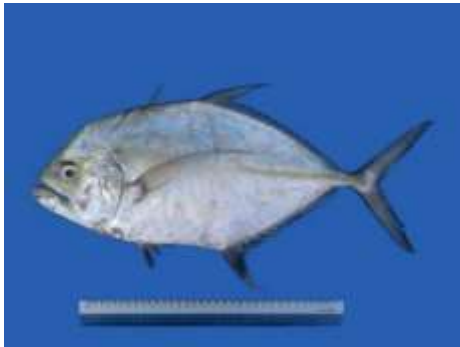
Figure 6-35 Photographs of Fishes



Atule mate



Scomberoides commersonnianus



Ulna mentalis



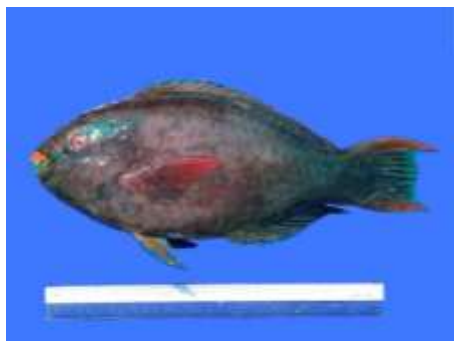
Caranx sp.



Pomadasys argenteus



Plectorhinchus vittatus



Scarus sp.



Psettodes erumei

Figure 6-36 Photographs of Fishes



Tylosurus crocodilus crocodilus



Gymnothorax fimbriatus



Congresox talabon



Plotosus canius



Arius maculatus



Myripristis hexagona



Himantura uarnak



Sepioteuthis lessoniana

Figure 6-37 Photographs of fishes



Charybdis natator



Portunus pelagicus

Figure 6-38 Photographs of fishes, ray and squid



Panulirus polyphagas

Figure 6-39 Photographs of crabs and lobsters

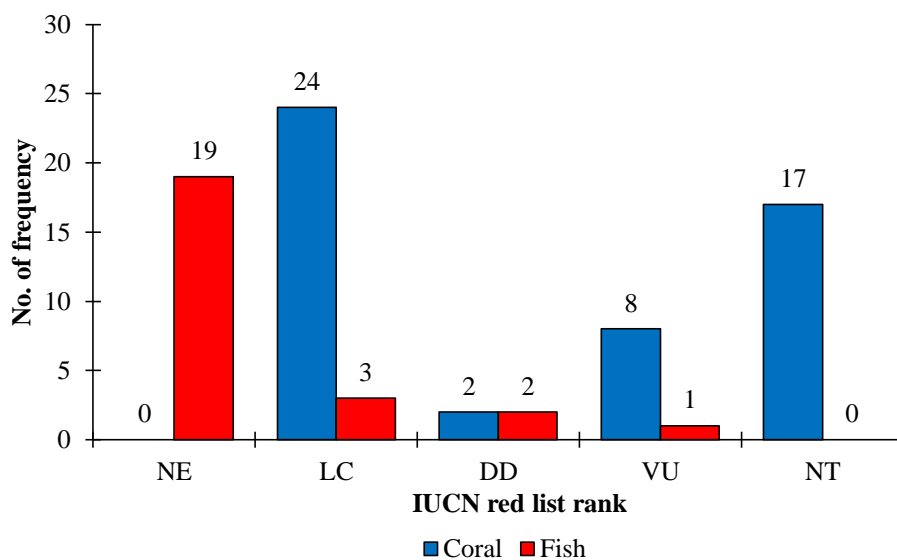


Figure 6-40 Analysis of IUCN red listed species of both fishes and coral reefs

6.8 CLIMATE CHANGE

According to observations, Myanmar has been experiencing weather changes in almost every year over the last two decades manifesting, for example, in the changes in the onset, withdrawal, duration and intensity of monsoon.

The country is expected to be increasingly more prone to the effects of climate change, especially climate conditions resulting from increasing temperatures, changes in the amount of rainfall, possibilities of more extreme climate events and sea level rise along 1930 km of its long coastal area. In fact, Myanmar is considered one of the most vulnerable countries globally in terms of climate change risks of extreme weather, agricultural productivity loss, sea level rise (see the figure 3 showing the UNDP maps with disaster risk projections below):

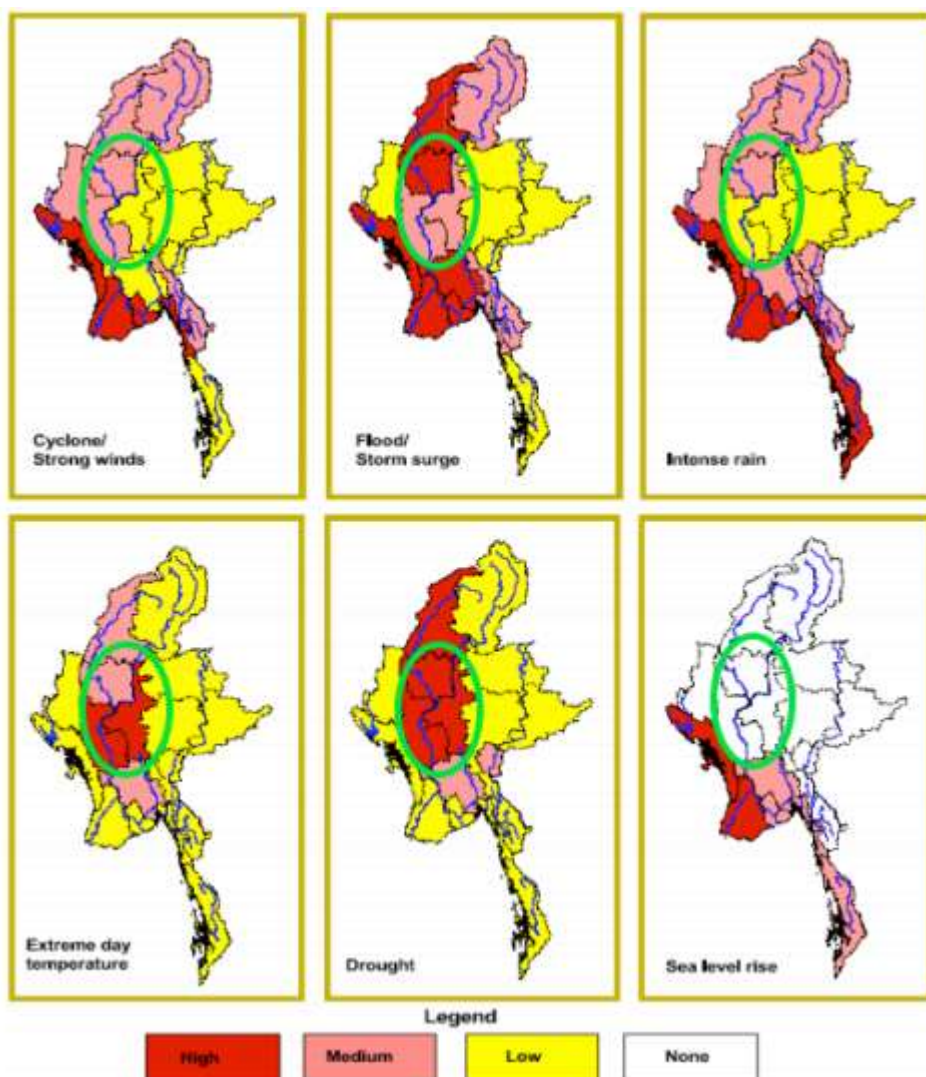


Figure 6-41 Distribution of Projected Climate Change-related Disaster Risks (UNDP 2011)

6.9 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 - 6.41** and **Table 6.30**.

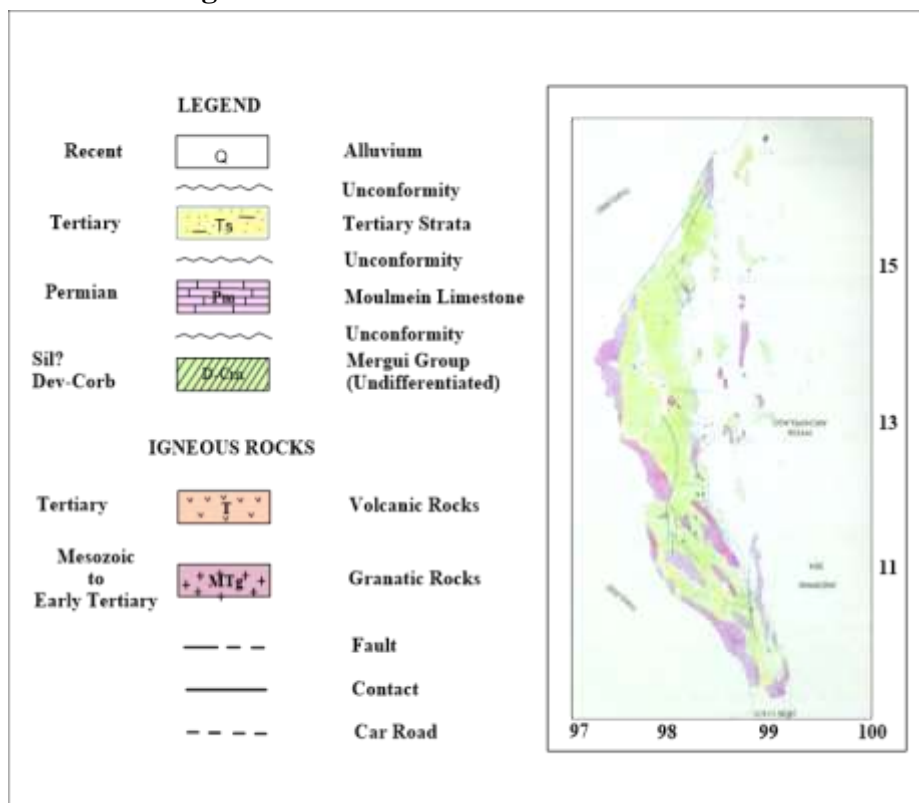


Figure 6-42 Geological Map of the project Site

Geological Succession of the project site

Table 6-30 Geological Succession of the Project Site

AGE	UNIT
QUETERNARY	Alluvium, raised marine terrace, and landslide material



AGE	UNIT
	Unconformity
TERTIARY	Tertiary Strata
	Unconformity
JURASSIC-CRETACEOUS?	Redbeds
	Unconformity
PERMAIN	Moulmein Group
	Unconformity
CARBONIFEROUS-PERMIAN	Mergui Group

Sources: outline geology and economic mineral occurrences of the union of Myanmar by Dr. Win Swe

6.9.1 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.

6.9.2 Moulmein Limestone

Small isolated outliers of massive, fine grained, grey limestone of Late Permian age, referred to as the Moulmein 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.

6.9.3 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.

6.9.4 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.



6.9.5 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 restricted 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.

6.9.6 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.

6.9.7 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, disseminated in tourmaline-muscovite pegmatite 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.

6.9.8 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. The project site is located in a zone of low seismicity zone (I) according to the seismic zone map of Myanmar 2005 (**Figure 6.42**).

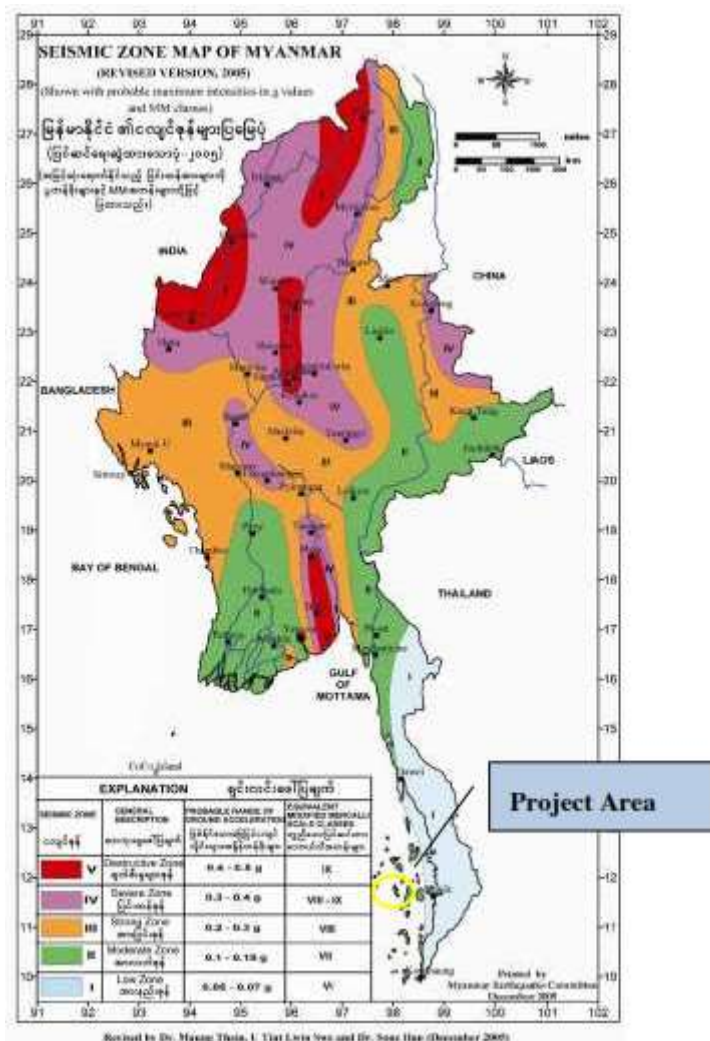


Figure 6-43 Seismic Zone Map of Myanmar (Revised by Dr. Maung Thein, U Thint Lwin Swe and Dr. Sone Han (December 2005)).

6.10 SOCIO- ECONOMIC COMPONENTS

SOCIAL AND CULTURE RESOURCES

DEMOGRAPHIC STRUCTURE

(a) TOPOGRAPHY

Kyunsu Township is located between Latitude 98 01 and 98 55 and Longitude 10 15 and 12 45. Total area is described in the following table.

Table 6-31 Total Area of Kyun Su Township

No.	Township	Town	Area (sq miles)	Town	Area (sq miles)
1.	Kyunsu	1838.48	1838.48	-	-

**(b) BOUNDARY**

Kyunsu Township is bordered by Myeik to the East, Thanintharyi Township, Bote Pyinn Township to the South, Bay of Katpali to the West and Palaw to the North.

(c) SOCIAL ENVIRONMENT

Various ethnic groups are living in Kyunsu Township are as follow.

Table 6-32 Ethnic Group in Kyun Su Township

No.	Ethnic	Population	Township Population	Percentage of Township Population
1.	Kachin	-	175234	-
2.	Kayar	-	175234	-
3.	Kayin	16130	175234	9.20
4.	Chin	2	175234	0.001
5.	Mon	27	175234	0.015
6.	Burma	155201	175234	88.57
7.	Rakhine	20	175234	0.011
8.	Shaan	1	175234	0.00
9.	Salone	656	175234	0.374
10.	Others	3197	175234	1.81
Total		175234	175234	100

(d) EDUCATIONAL STATUS

Educational information of Kyunsu Township as follow.

(a) Universities/ Collages**Table 6-33 University/ Collegues of Kyun Su Township**

No.	Universities/Collages	Location	Area (acre)	No. of Teachers	No. of Students	Ratio of Teachers and Students
No						

(b) Basic Education**(i) High school****Table 6-34 School Information of Kyun Su Township**

No.	School	Location	Area (Acres)	No. of Teachers	No. of Students	Ratio of Teachers and Students
1.	High school- Kyun Su	Kyun Su Township	3.638	38	94	1:24
2.	High school-Sa Khan Thit	Sa Khan Thit Village	3.06	38	1075	1:28
3.	High	Nyaung Bee	15.00	38	978	1:25



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

No.	School	Location	Area (Acres)	No. of Teachers	No. of Students	Ratio of Teachers and Students
	school- Nyaung Bee	Village				
4.	High school- Kat Talu	Kat Talu Village	7.50	33	587	1:17
5.	High school- Pa Htet Village	Pa Htet Village	3.08	42	1108	1:26
6.	High school- Kan Maw Village	Kan Maw Village	10.00	49	1551	1:31
Total				238	6193	1:36

(e) Illiterate

Table 6-35 Illiterate Status of Kyun Su Township

No	Township	Population	Over 15 years	No. of illiterate	Illiterate rate
1.	Kyunsu	175234	70100	70100	100%
Total		175234	70100	70100	100%

6.10.1 Health Status

Information of Health of Kyunsu are as follow.

(i) Hospitals

Table 6-36 Hospital Lists in Kyun Su Township

No.	Hospitals	Public/ Private	No. of Bed
1.	Township Hospitals	Public	25 bedded
2.	Ka Maw Tite Nal Hospitals	Public	16 bedded
3.	Sa Khan thit Tite Nal Hospitals	Public	16 bedded
4.	Maune Hlaw Tite Nal Hospitals	Public	16 bedded
5.	Tar La Pine Tite Nal Hospitals	Public	16 bedded
6.	Yay Kan Pine Tite Nal hospital	Public	16 bedded
Total			105 bedded

The socio-economic study is to assess the information related with the socio-economic condition of the people living in and near the project area. This information is useful for analyzing the potential impacts caused by the project's activities. Based on the impacts, actions will be taken to mitigate or reduce the potential negative impacts.

6.10.2 Methodology for Socio-Economic Study

Primary data was collected through direct observation and survey with questionnaires for socio-economic status as demographic information (age, sex, education, occupation, ethnical group and income, and household assets: housing, livestock holding, land ownership, land use, livelihood zone, natural resource use, infrastructure, public, cultural assets and civilization).

The project area is located at Pyin Sa Bu Island which is no living people and villages except the employees of Pyi Phyo Tun International Co., Ltd. There is no nearest neighbor villages and other projects within 5 km of proposed project. The village Tracts: Wal Kyun, Kyat Chaung, Thae Chaung and Yae Kan Taung which are situated in Kyun Su Township are located at least 20 miles away from the project area. Fishing boat can fish around the Pyin Sa Bu Island but can't enter the area of Pyi Phyo Tun's Project Area. That's why, we did socio economic survey to employees of Pearl Farm who are living in Pyin Sa Bu Island. 70% of local people from Myeik Region employed in Pearl Culture Project and the rest 30% are from Yangon, Bago, Magwe, Ayeyarwaddy and Rakhine. Cause there are no villages and living people at Pyin Sa Bu Island except the employees of Pyi Phyo Tun and some guards from the navy of military, EIA Study Team collected socio-economic conditions from the employees of Pyin Sa Bu Island on March 14, 2019 at pearl culture project area.

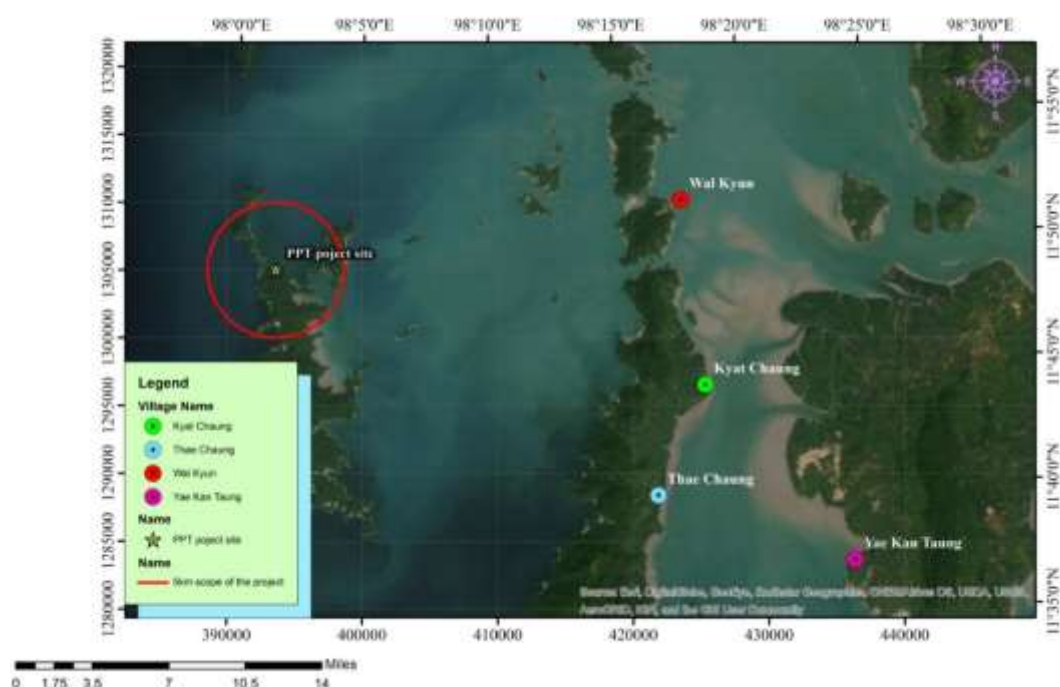


Figure 6-44 Villages in Kyun Su Township and 5km scope of Project Site

6.10.3 Data Collection and Observation in the Field

The EIA team conducted the social survey with stakeholders for participatory facilitation through quantitative and qualitative study, focus group discussions, and other participatory exercise as follows:

- Individual household interview for qualitative study
- In-depth interviews with key informants utilizing review instruments such as open-ended and closed-ended questionnaires for the collection of both qualitative and quantitative data
- Review activities conducted in the field and initial analysis of findings and feedback to key project staffs



- Data analysis (using appropriate methods for data analysis) data entry, data cleaning, data processing, recording, feedback to key project staffs

6.10.4 Methodology for Determination of Sample Size

EIA team selected total 20 employees from 90 of Pearl Farm's employees as samples to study the livelihood and socio-economic conditions of them. Total 20 samples were sized by stratified random sampling method based on their native.

For primary data collection, socio-economic study team selected 20 households to understand the socioeconomic condition of the surrounding environment of project area. The respondents from the sample households were interviewed for their socio-economic status and their opinions for the proposed project.

6.10.4.1 Demographic Aspects

Demography aspects of study area were assessed based on the employee status of Pyi Phyo Tun International Co., Ltd.'s Pearl Farm according to the survey in March 2019. For primary data collection, 20 staffs from Pyin Sa Bu Island were surveyed of their socio-economic condition including the household size, occupational status, income, their health facilities, and source of electricity, weather condition and their opinion on this project.

i) Address of Interviewee

The respondents who are working in Pyin Sa Bu Island for Pearl Culture Project are mostly from Thae Chaung Village, with 15% of the total respondents and most are from Kyun Su Township. 45% from Kyun Su Township, 25% from Myeik Township and 30% of others from Dawei, Pwint Phyu, Myauk U, Pathein and Bago region responded the socio-economic conditions on Pyin Sa Bu Island respectively.

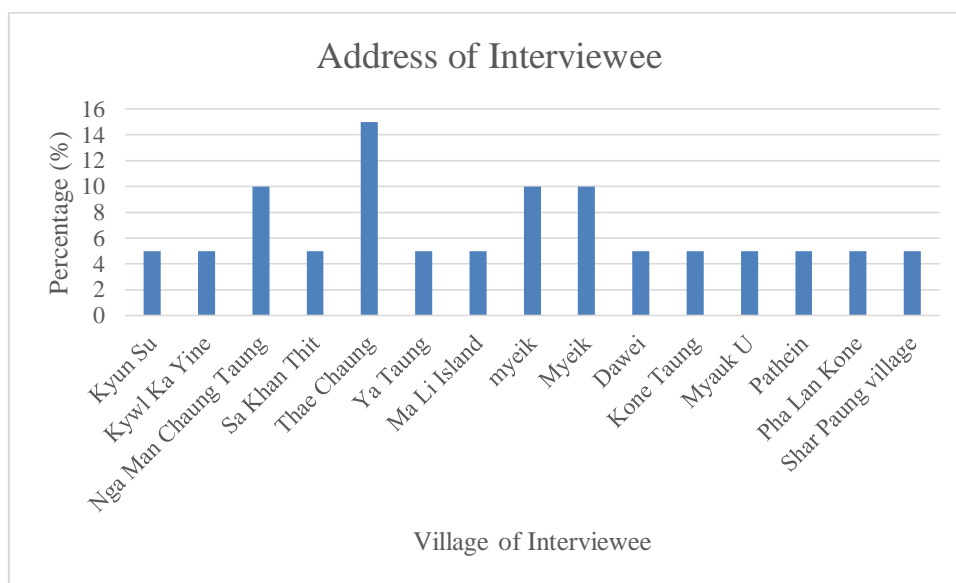


Figure 6-45 Address of Interviewee

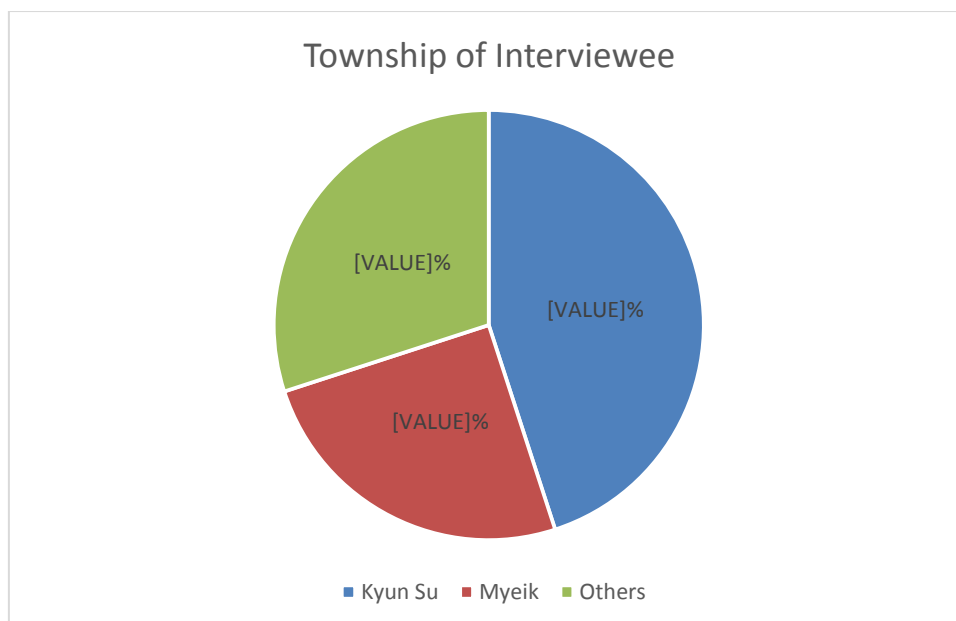


Figure 6-46 Township of Interviewee

ii) Gender and Age

90 employees: 63 of Male and 27 of Female are working in Pyin Sa Bu Island for Pearl Culture Development Project of Pyi Phyto Tun International Co., Ltd. The social survey results of project site show that 20 sample of employees were interviewed and, in that sample, 12 of the Male and 8 of the Female responded to the surveyors for socio-economic survey. Most of the respondents are 15% of Male and 30% of Female which are in the range of 18-25 years age interval. The following Table (6.37) and Figure (6.46) show the distribution of respondents by Genders and Age Group which are 60% of respondents by Male and 40% of respondents by Female.

Table 6-37 Gender and Age Interval

Age of Interviewee		Gender of Interviewee		Total
		Male	Female	
Age Interval	18-25	3	6	9
		15%	30%	45%
	25-30	4	1	5
		20%	5%	25%
	30-35	2	0	2
		10%	0%	10%
	35-40	0	1	1
		0%	5%	5%
	40-45	1	0	1
		5%	0%	5%
	45-50	1	0	1
		5%	0%	5%



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Age of Interviewee	Gender of Interviewee		Total
	Male	Female	
50-55	1	0	1
	5%	0%	5%
Total	12	8	20
	60%	40%	100%

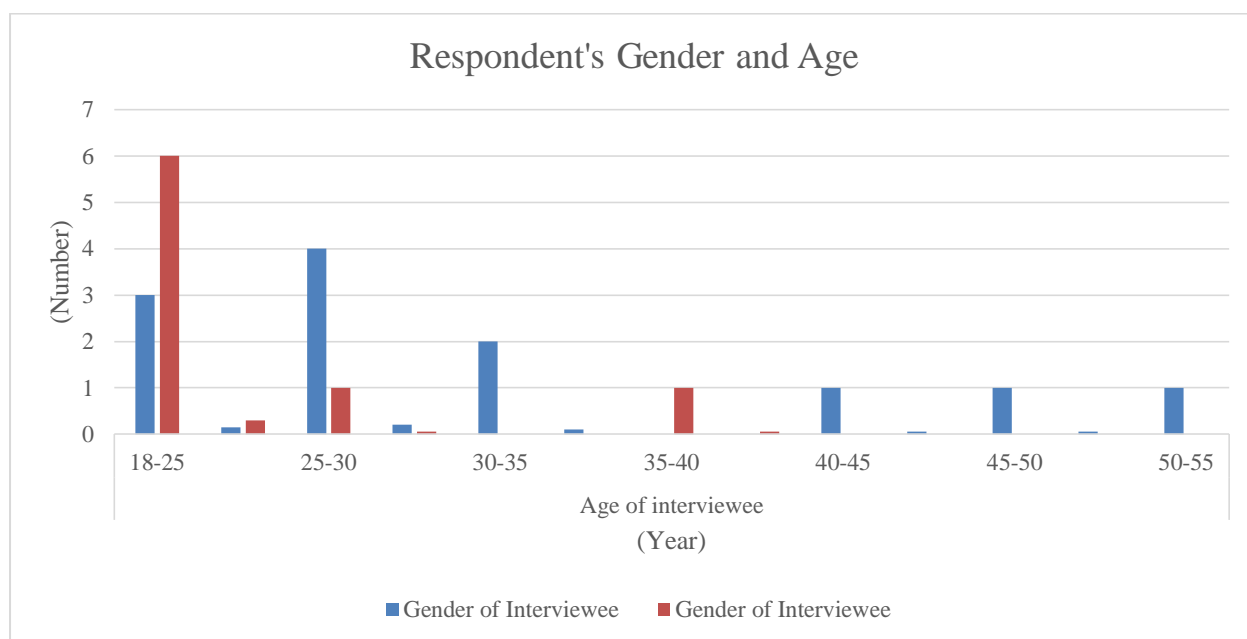


Figure 6-47 Respondent's Gender and Age

iii) Ethnic group

The respondents who are working in the project site are mostly Burma with 90% of respondents and all of the sample respondents are Buddhism. The detail ethnic group who are working in Pyin Sa Bu Island are shown in Figure (6.47).

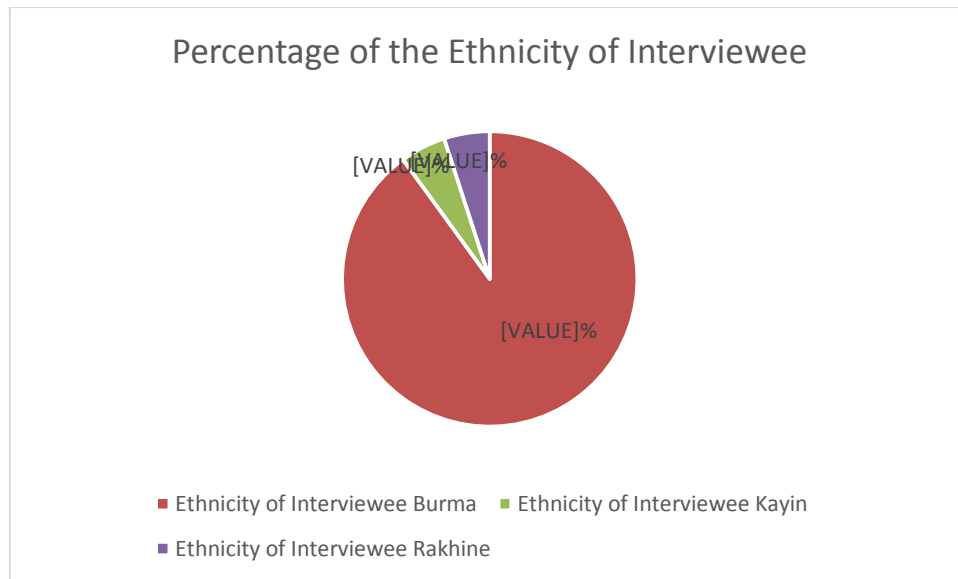


Figure 6-48 Percentage of the Ethnicity of Interviewee

iv) Educational Status

As the result of the data, 40% of the respondent dropped out from school after studying Middle school. About 20% and 10% of the respondent had quit from school after higher education and primary education respectively. 25% of the respondent are graduated and there are some respondents about 5% who have colleague level educational status and still attending colleague with distance education. The educational status of the respondent in the sample status is shown in Figure (6.48).

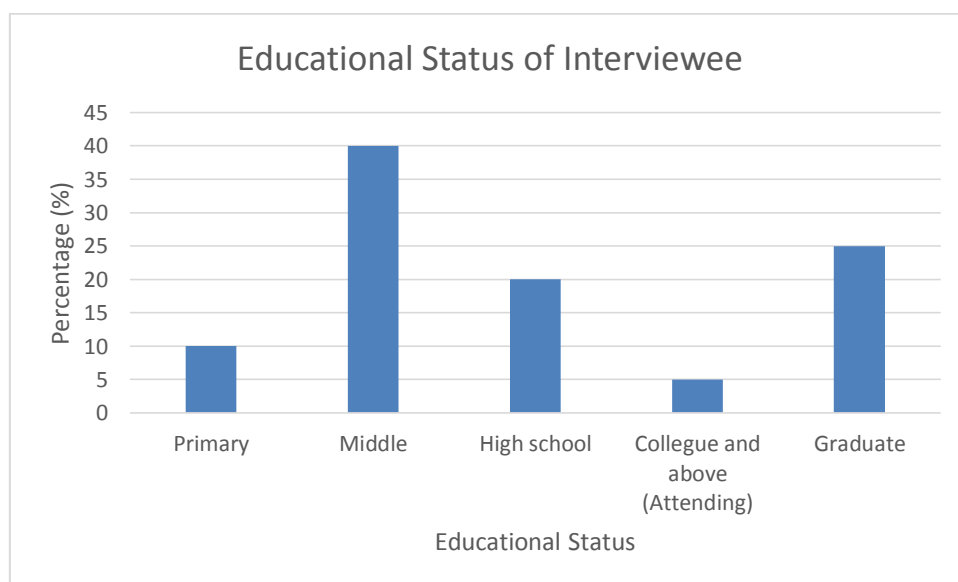


Figure 6-49 Educational Status of Interviewee

v) Occupation: Job Title of Interviewee

The inhabitants who live in Pyin Sa Bu Island are the employees of Pyi Phyo Tun International Co., Ltd. Most of the respondents are operation staff of Pearl Culture Project



with 50% of total respondents. 20% of the respondents are General Workers and Saibo respectively. The details are shown in the following Figures (6.49).

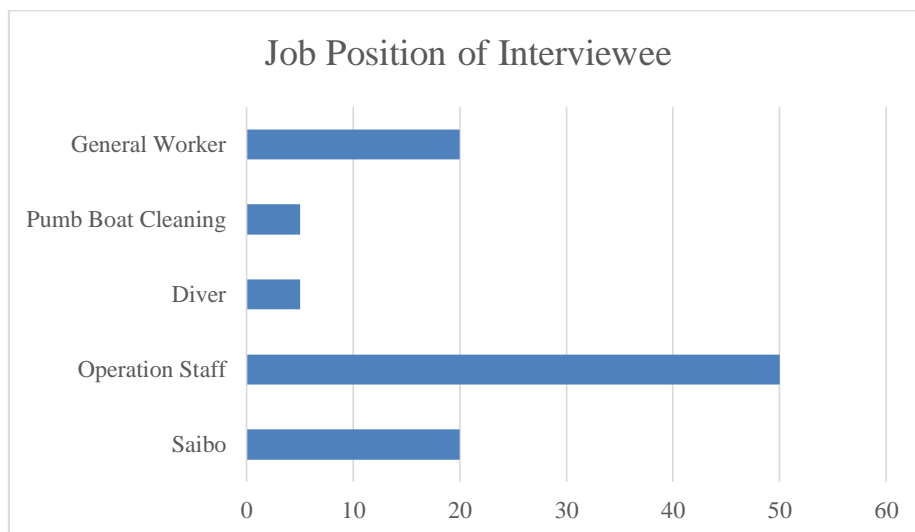


Figure 6-50 Job Position of Interviewee

6.11 Socio-economic Characteristics

Infrastructure services are basic service and act as support for socio-economic development. Therefore, infrastructure facilities play an important role in fostering economic growth and enhancing public welfare. Socio-economic infrastructure including education, health, other community facilities of family member of respondents were studied by questioning about their household size, type of household, daily income, and livelihood.

i) Family Member Status

According to the result of sample data, most of the respondents have family members of 3. The respondents and their family member do not live together and only the respondents live in Pyin Sa Bu Island for pearl project. The details family member status are shown in Figure (6.50).

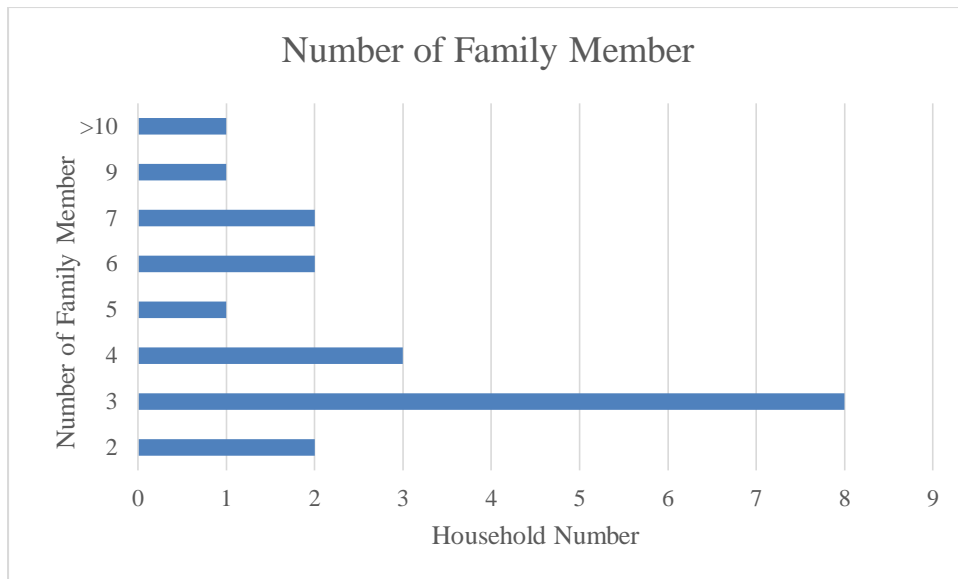


Figure 6-51 Number of Family Member

ii) Occupational status of households

Based on the type of main occupational status of the households, majority income sources are Company Job and shops. Main Occupation of Family is the company Staff of Pyi Phyto Tun International Co., Ltd. with the percentage of 85% and the rest 15% are Shop Owner.

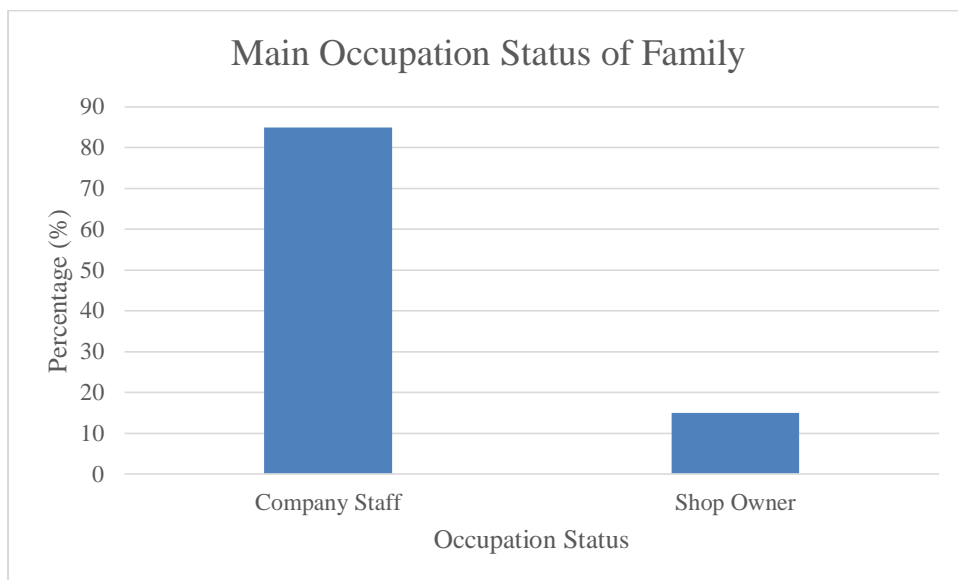


Figure 6-52 Main Occupation Status of Family

iii) Service Year in Pearl Farm

80% of the most of the respondents are working in the pearl farm in Pyin Sa Bu Island with the service year between 1 to 3 year and 15% of the respondents have less than 1 year of



experiences in pearl farm. A few respondents have been working in pearl farm with the experience of 3 to 5 year. The detail service year in Pearl Farm can be seen in Figure (6.52).

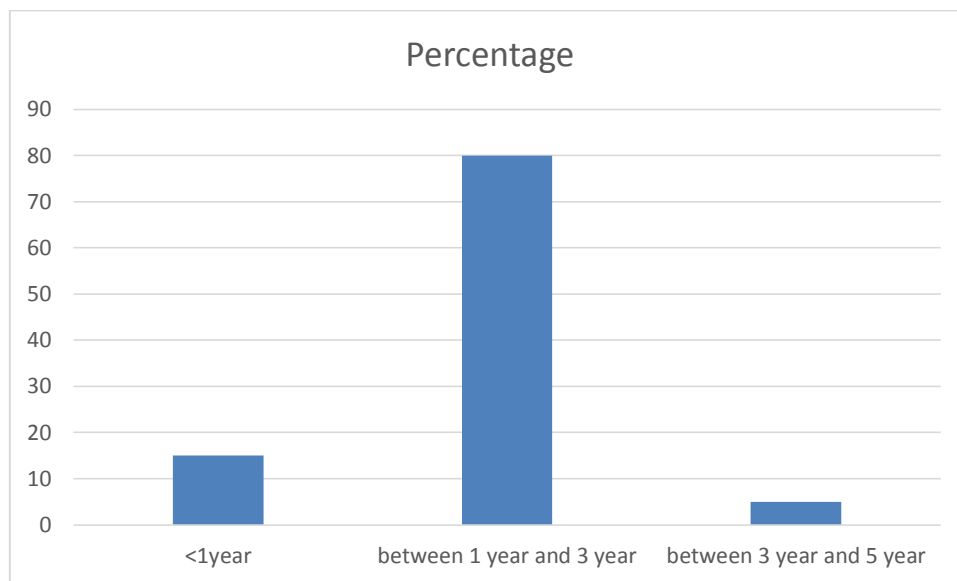


Figure 6-53 Service Year in Pearl Farm

iv) Income Status

As the result of socio-economic data, 85% of respondents have yearly income of within the range of 1,000,000-1499999 kyats. 10% of respondents gain the income of 1500000-1999999 kyats per year. The following Figure (6.53) describes the percentage of the average income per year of Family.

95% of the respondents respond that they have enough income for family and the 5% of respondents who have the big family members respond that they don't have enough income per year. As the comparison the current income with last five year, 85% of respondents obviously change in their income with better status. The detail income change status are shown in Figure (6.54).

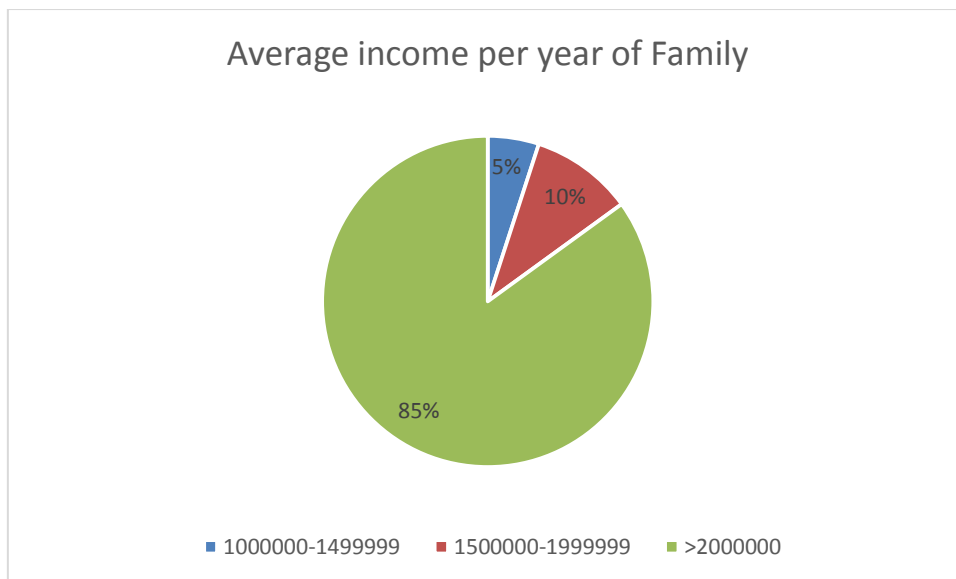


Figure 6-54 Average income per year

Table 6-38 Enough income in Family

Enough income for family	Percent (%)
Yes	95
No	5

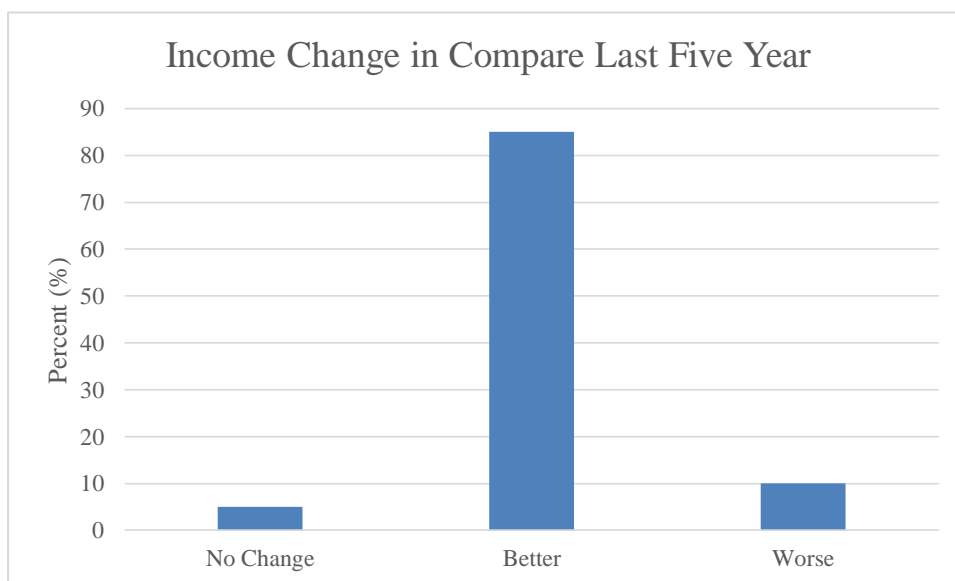


Figure 6-55 Comparisom of Income Change in Last Five Year

v) Reason for Income Change

According to the survey data, 45% of respondents did not give answer the reason of income changes. 30% of the respondents and the most rest of respondents are better in their income status because they get job opportunity. 5% of respondents who had answer the main occupation of family is shop owner respond that their income status is worse



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

because they are not good in selling. The detail reason for income changes can be seen in the following Table (6.39).

Table 6-39 Reason for Changes

Reason for Changes	Percent (%)
No Answer	45
all got job	30
Cause dad is dead	5
For Job Offer	5
for job opportunity	5
Getting job	5
not good in selling	5

vi) Type of Accommodation

According to the gathered information, pearl farm of Pyin Sa Bu Island provide staff housing to respondents and the structures of accommodation are built with wooden and the roof is zinc.

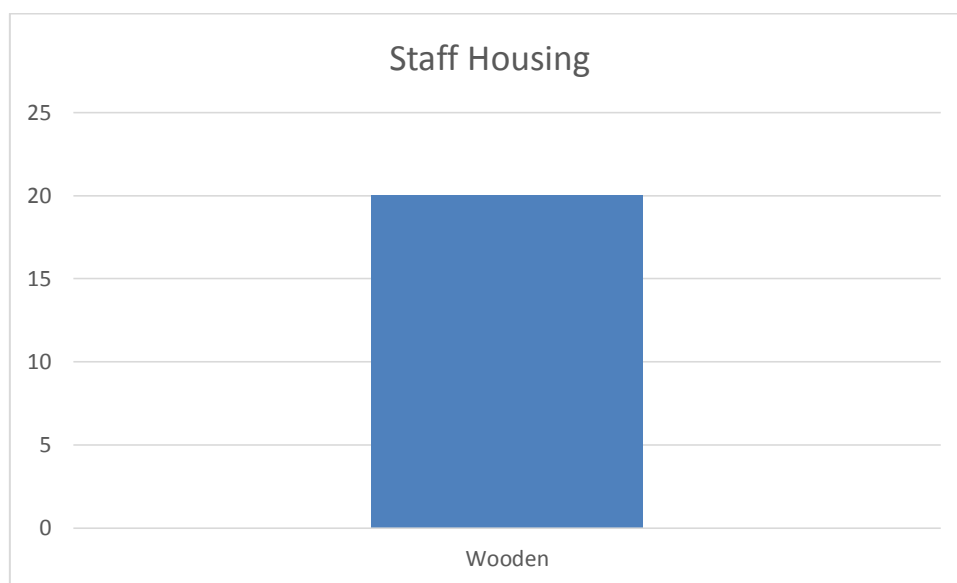


Figure 6-56 Staff Housing

vii) Water Requirement and Consumption

According to the collect data, source of water for Domestic Usage and Drinking can get from Spring water and Well. Most of the respondents' drink spring water with the 90% of total respondents and the rest are satisfied for drinking water from well.



The main source of water consumption for domestic usage in Pyi Phyto Tun's Pearl Farm is spring water. Spring water is conveyed with pipe and store it with tanks in Pearl Farm and used that water for Domestic usage.

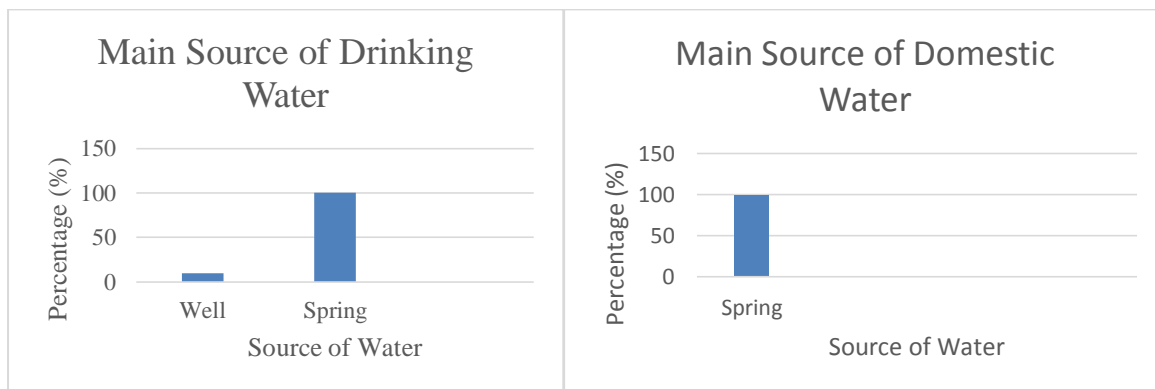


Figure 6-57 Source of drinking Water and Domestic Water for respondents

viii) Sources of Electricity

According to the respondent's data, source of electricity for usage is from company supply. Pyi Phyto Tun International Co., Ltd. provide electricity for light and other usage in pearl Farm with Generator and Sola.

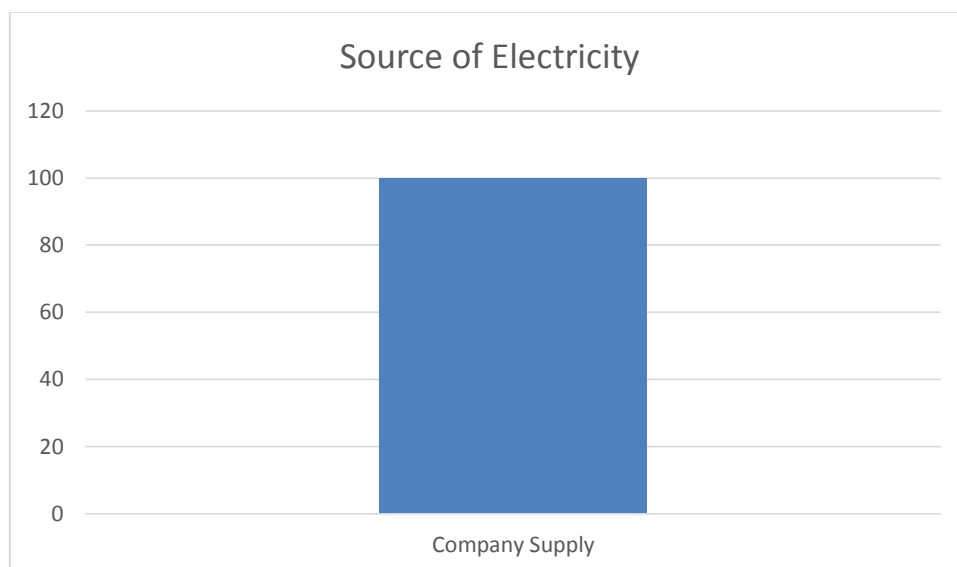


Figure 6-58 Sources of electricity

ix) Toilet Type

The respondents from Pyin Sa Bu Island use the traditional toilet. Some staff housings are attached with the toilet and some staff housing place the toilets the designated place. Although there has been using the toilet system, there has not have septic tank and treatment for sewage.

Table 6-40 Toilet Type

Toilet Type	Frequency
Traditional Toilet	20

x) Wastewater Discharging

Most of the respondents respond that they are discharging the wastewater to the ground directly. And 25% of respondents discharge the wastewater from the drainage and the rest 5% respond that wastewater is discharged to the sea directly.

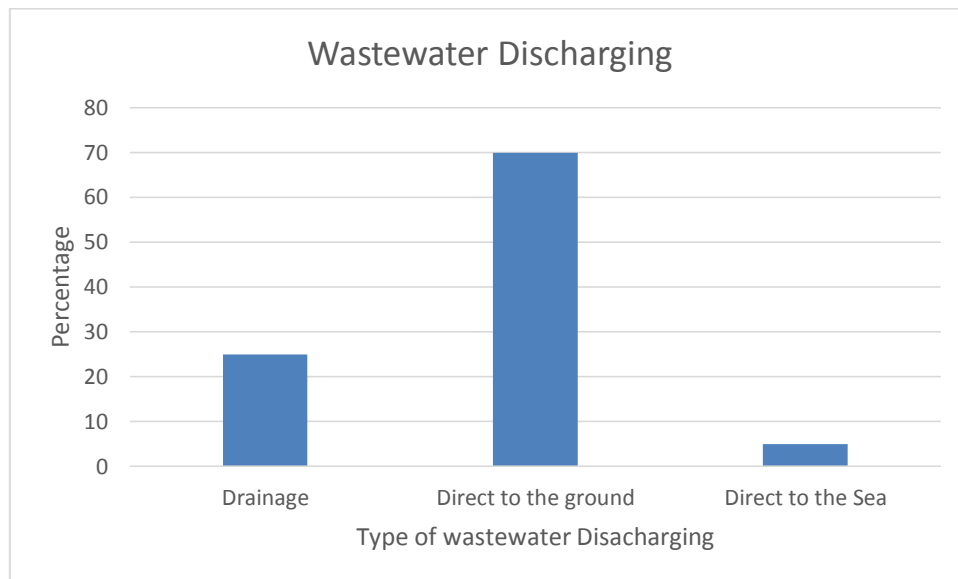


Figure 6-59 Wastewater Discharging

xi) Type of Trash Disposal

90% of the respondents dispose the trash by burning and a few 10% of the respondents dispose the trash by burying.

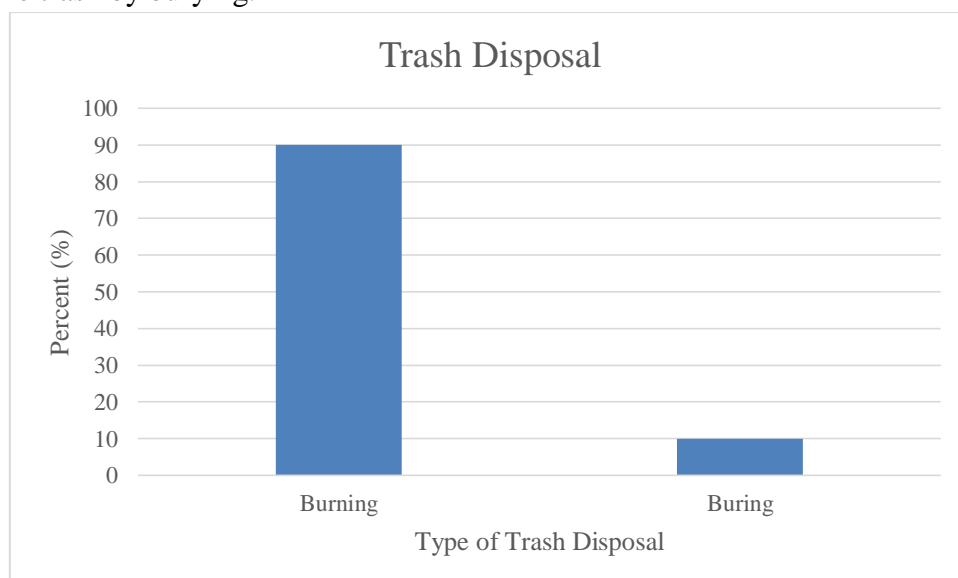


Figure 6-60 Trash Disposal

xii) Health Care Facilities and Health Condition

Regarding the health condition of the sample collected data, the most common disease occurred in the Pyin Sa Bu Island is Flu. But 35% of respondents are healthy. There is a clinic and health facilitator in Pyin Sa Bu Island, and normal disease can be treated in that clinic.

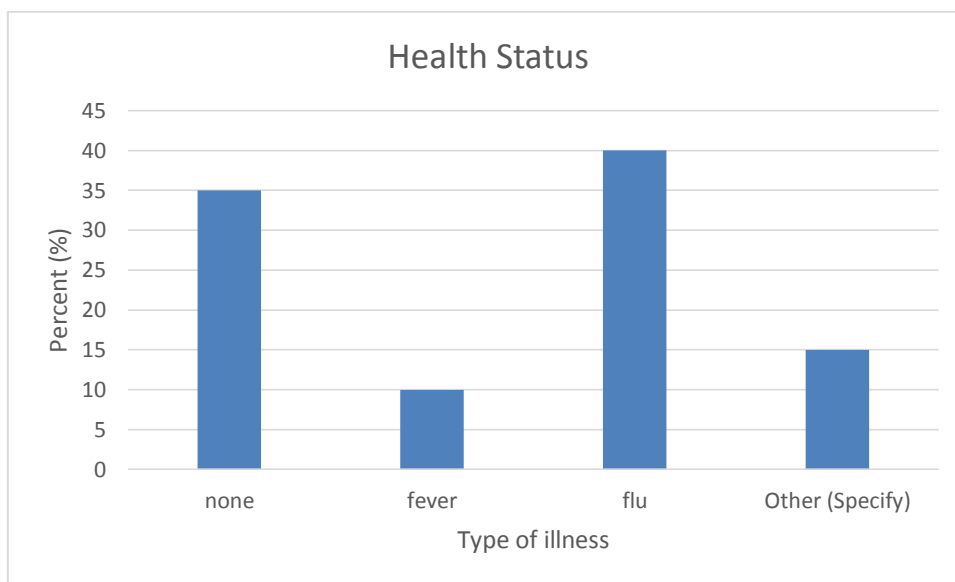
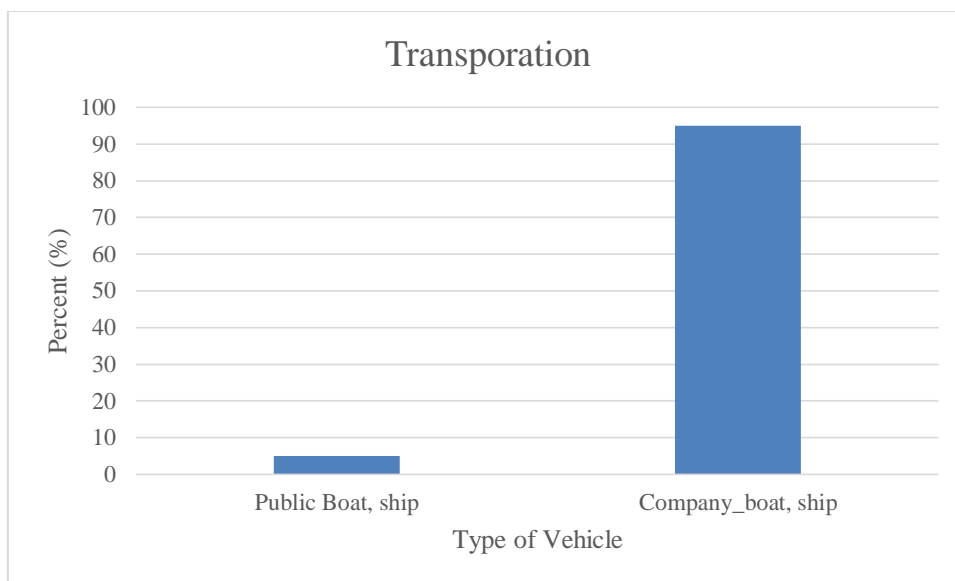


Figure 6-61 Health Status

xiii) Transportation Status

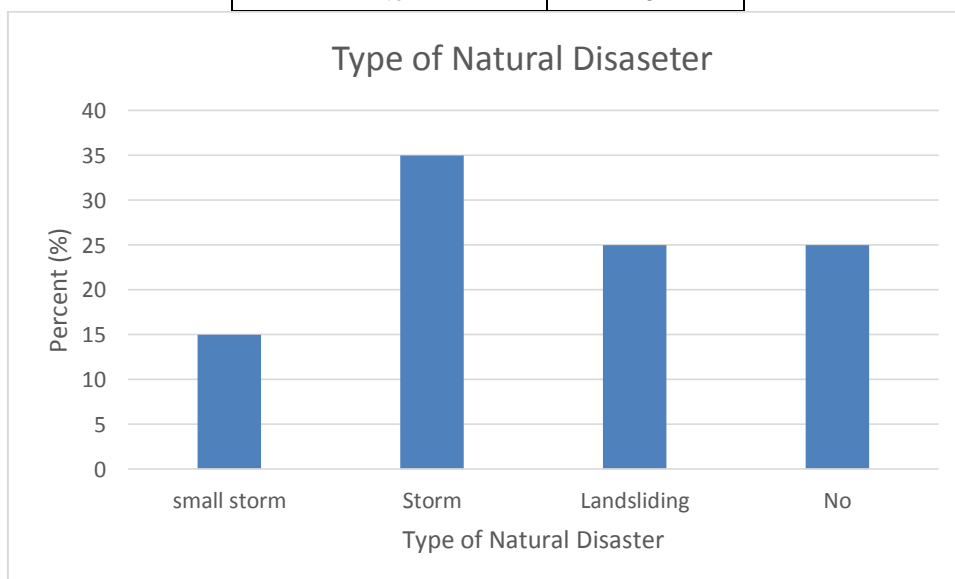
According to the respondents' data, transportation status of Pyin Sa Bu island is good and only the navigation route can be used from Myeik. Pyi Phyo Tun International Co., Ltd. provide boats for transportation. Most of the respondents use company boat, ship for transportation.

**Figure 6-62 Transportation****xiv) Facing of Natural Disaster and Type of Natural Disaster**

In the Pyin Sa Bu Island, 75% of respondents respond that they had faced the natural disaster. 75% of respondents who had answer 'Yes' in facing Natural Disaster respond the type of Natural Disaster. There has not faced any big natural disaster. Most of the respondents answered that 35% of respondents faced storm in this island and 25% of respondents reported land sliding occurs in Pyin Sa Bu Island.

Table 6-41 Facing of Natural Disaster

Facing of Natural Disaster	Percent (%)
Yes	75
No	25

**Figure 6-63 Type of Natural Disaster**



6.11.1 Opinion of the Respondents

The socio-economic study team surveyed the respondents regarding with their opinions based on local/regional development, and environmental benefits related with potential environmental and social positive and negative impact due to proposed project.

Most of the respondents give positive opinion on this project. 40% of respondents answered that the advantages from the proposed project is job opportunity for them whereas 30% of the respondents answered that their income rate will be high when they have experience according to their service year. The rest respondents also give their opinion on the advantages from project that they can get knowledge from pearl culturing project, it is better in economy and this project is good in economy and can increase their income from job.

The surveyor collected the opinion on disadvantages from the proposed project from the respondents. 45% of the respondents did not give any opinion on disadvantages from project. According to the respondents' data on disadvantages from the project, they get bad smell from dead oyster and the project is located in isolated island, they miss their home, family and they face food problem. In addition, there has negative impact while wastes are burning.

With the regarding question on the project involved in local development program, 45% of the respondents don't know whether the project involve in local development program or not and 40% of the respondents say 'Yes'.

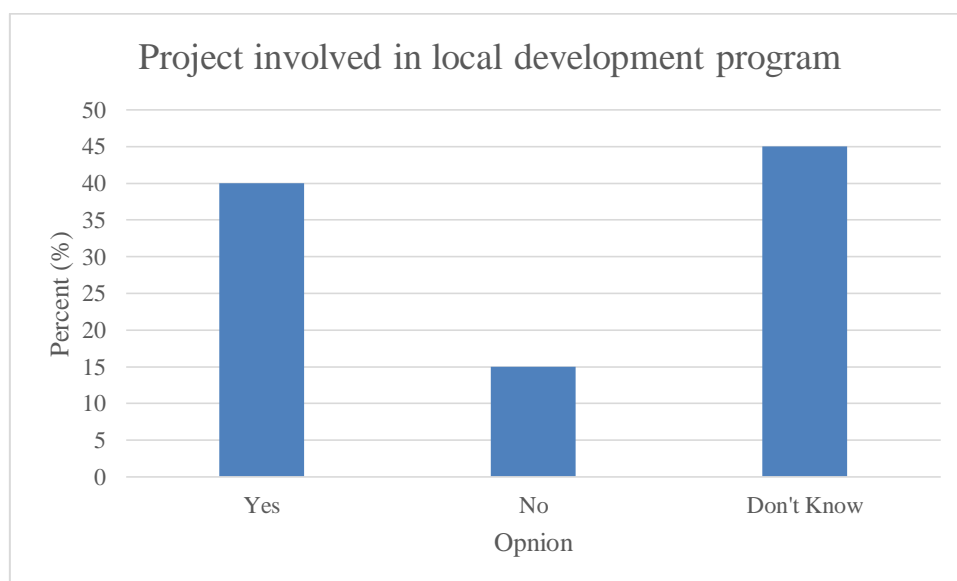


Figure 6-64 Project Involved in local development Program

Additionally, the respondent opinion deal with the potential impact due to proposed project on wastes, it showed 30% of the respondents thought there may affect on environment from wastes cause of the bad smell from panels of oysters. Beside some respondents considered that odor impact from dead oyster, old panel, oyster cleaning and toilet could be impact to the environment. However, 20% of the respondents thought there may not have any impact on socio economic condition and environment.



Figure 6-65 Socio-economic Survey



Chapter (7) IMPACT ASSESSMENT AND MITIGATION MEASURES

7.1 Introduction

This section describes the broad approach that will be used in undertaking the EIA. It also provides the consideration of likely impacts on the environment and social status associated with the proposed project development.

There will be three categorized assessments in this EIA report, they are Physical Environment Assessment, Biological Environment Assessment, and Socio- economic Environment Assessment.

7.1.1 Methodology

The objective of this report is to review baseline environmental information and to identify the potential significant impacts that may be affected by the development of the project. The approach is qualitative and is broadly similar across all of the guidance and for all specialist topic areas, although there may be some variation in the descriptions of the assessment criteria.

7.2 Terrestrial Ecology

The status of the terrestrial flora and fauna of the study area are determined by a review of literature relevant to the area, by discussions with local persons, and by field investigations with respective specialists.

7.3 Marine Ecology

The description of the inshore marine area adjacent to the site and the study area are identified by a review of literature, by discussion of local people and by field survey with professionals.

7.4 WATER QUALITY

The water quality analysis and sampling point identified with respective specialist and followed by guideline of National Environmental Quality (Emission) Guidelines (2015).

The samples were analyzed for the following parameters:

- ❖ pH
- ❖ Temperature
- ❖ Salinity
- ❖ Dissolved Oxygen
- ❖ Biochemical Oxygen Demand
- ❖ Turbidity
- ❖ Nitrate
- ❖ Phosphate
- ❖ Total Coliform bacteria

The proposed parameters are estimated and there may have variation.



7.5 AMBIENT AIR QUALITY

The ambient air quality analysis was performed by Environmental Quality Team and follow by National Environmental Quality Emission Guidelines (2015).

The following parameters will be identified;

- ❖ PM₁₀, PM_{2.5}
- ❖ Nitrogen Dioxide (NO₂)
- ❖ Carbon monoxide (CO)
- ❖ Carbon Dioxide (CO₂)
- ❖ Sulphur Dioxide (SO₂)
- ❖ Wind Direction
- ❖ Wind Speed
- ❖ Relative Humidity
- ❖ Temperature

7.6 NOISE

Noise quality analysis was conducted by Environmental Quality Team and sampling points were identified by respective consultant and specialists.

7.7 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.

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 (6.3) 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

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.

DEVELOPMENT PHASES

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 project as well as any impacts resulting from other temporary works such as working areas and compounds.

Operational impacts are those long-term impacts that will occur as a result of the development of the pearl culture project facility. (e.g. oyster cleaning, panel cleaning, generators, disturbance the natural habitats of the biodiversity).

Decommissioning Phase: includes demolishing of all facilities, longlines, buildings of the project. And then, any existing non- hazardous wastes and hazardous materials/ wastes used in the decommissioning process would be properly handled and disposed of in accordance with governing authority requirements.

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.

7.8 Potential Significant Impacts

7.8.1 Potential Significant Impacts on Construction Phase

The consideration of the construction phase impacts in the following section includes those impacts related to site preparation, clearance works and construction activities.

7.8.1.1 Visual Impact

The project site is located at Pyin Sa Bu Island which is covered 80% of the forest. The site is going to establish according to master plan and the temporary camp is prepared for pearl production testing phase. The site will be cleared top soil due to excavating activities for preparation works for construction and some trees and plants will be cut and removed to prepare land area for construction works. And to culture oyster in water, long lines need to be located in designated place by connecting with floating balls. Locating long lines in the sea can impact the aspect of the visual view. The excavation works may occur permanent landscape change and therefore visual impact due to site preparation must be considered.

7.8.1.2 Ambient Air Quality

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. The potential main source of emission to impact on air quality is generating gas, smoke and dust from construction equipment, movements of construction machines, generating the generators and construction works. The occurrence of dusting is periodic and short-term, lasting for the duration of the construction activity.

7.8.1.3 Noise and Vibration

The use of heavy equipment during site clearance and road construction works, generating the generators, and using the machines such as electric saw to remove and cut of trees and plants will inevitably generate noise, which may create a nuisance to biodiversity of



the island. Although annoying, this negative impact will be short-term (limited to the duration of the construction works). Although it is not considered as significant threat to the health or well-being of humans, if the construction works take place on breeding season of islands' biodiversity, noise impact could significantly affected on them. In addition, vibrating effect on sea may occur when transporting construction materials by driving motor boat with a speed and it can effect on aquatic life.

7.8.1.4 Impact on Soil and Soil Erosion

Vegetation clearance, road construction and excavation works 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. Direct oil spills from the generators and construction machines can damage the characteristics of soil. The flat topography of the site would tend to reduce erosive surface flows, 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. The improper storage of sand, gravel, cement, etc., at the construction sites and mixing these construction materials to fine materials can cause reducing of soil quality. Hazardous and flammable materials (e.g. paints, thinner, solvents, etc.) improperly stored 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.

7.8.1.5 Impact on Water

During the site preparation for construction works, the removal of top soil may affect ground water quality and typically oil spillages from transporting of construction materials by using motor boat and sea routes can impact to marine water and that may be seriously affect to water quality and aquatic. Moreover, during heavy rainfall events, the improper storage of construction materials (sand, gravel, cement, etc.) could flow these materials with rain into the drainage and ultimately into the adjacent marine environment. This would not only represent a waste of materials but 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.

7.8.1.6 Loss of Terrestrial Habitats and Biodiversity

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. 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.

7.8.1.7 Solid Wastes

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 negative impact 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.

Construction workers can generate their wastes from daily activities and domestic wastes (e.g., plastic, bottle, can, waste bags from bathing accessories, leftovers). Improper disposal of food wastes and other domestic forms of construction camp garbage could lead to littering of the site and pollution of adjacent coastal waters.

7.8.1.8 Liquid Wastes

Sanitary wastes from toilets and domestic liquid wastes from construction workers activities can segregate liquid wastes. 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.

7.8.1.9 Hazardous Wastes

The activities of the construction can generate hazardous wastes such as solvents, paints, used oils and oil filters. The improper storage of these materials can contaminate the soil and pollute the coastal water.

7.8.1.10 Fire Hazards

Improper storage of fuel and fueling to boat, vehicles and generator and dumping construction waste materials which can be easily burned can lead to threat of fire hazardous. These hazards are short term effects but poor management can lead to long term loss of environment resources.

7.8.1.11 Occupational Health and Safety

Construction workers can expose accidental risk and injuries due to construction work activities such as accidental falls from heights, construction equipment, slip and falls and cuts from sharp edges and collapse of scaffoldings among others. Exposure of emission dust from the site is potential hazard to the workers' health. Large amount of sewage from increasing construction workers and inadequate number of receptive toilets can cause unhealthy conditions to the workers.

7.8.1.12 Replanting and Landscaping

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 be in large part on determining 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.



7.8.1.13 Employment

Employment creation is the positive affect for local construction workers. The proposed development will potentially offer employment or contractor for during construction period. This will represent a positive short-term impact.

7.8.2 Potential Significant Impacts on Operation Phase

7.8.2.1 Introduction of Alien, Selectively or Genetically Engineered Species

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.

7.8.2.2 Visual Impact

During the operation phase, due to ...activities permanent landscape change may occur and therefore long-term visual modification of the landscape must be considered. The project can affect surrounding landscapes and natural landmarks. In addition, visual landscape impact of locating surface long lines on designated sea and project area in Pyin Sa Bu Island is the insignificant impact.

- Visual impacts due to clearing of trees; and
- Waste Disposal; and
- Surface long line on sea.

7.8.2.3 Ambient Air Quality

Generating the generators to get electricity in project site, using pumping motor to clean oysters and nets, smoking from cooking activity in kitchen and navigating and using of motor boat, pump boat to go the occupational places of long lines locating area for cleaning oysters in the pocket panels using high pressure cleaner are the major sources of emission of gas and particulate matter. Emission gas may occupy CO₂, NO₂, CO, and SO₂. Burning solid wastes also can emit particulate matters and pollutants to air. However, the impact on ambient air quality can be considered as a low significant because the project site is located in the island and marine environment is surrounding the project area and there are a lot of trees and plants in that Pyin Sa Bu Island.

7.8.2.4 Noise and Vibration

Noise may mainly occur from cleaning boat during long lines cleaning operation (using high pressure cleaner by operating motor to clean oysters and nets which are hanged on Surface Long Lines. And vibrating from the movements of cleaning boats and Pyi Phy Tun's transport boats from Myeik to Pyin Sa Bu may impact to biodiversity in marine aquatic life.

7.8.2.5 Impact on Soil and Soil Erosion

During the operation phase, dumping organisms solid wastes after cleaning pockets panels, triangle nets, direct spillage of oil from workshop, maintenance of motor and generators and accumulating domestic wastes and solid wastes before burning in the designated area can contaminate soil quality.



7.8.2.6 Impact on water quality

Accidental oil spill from cleaning boat and pumping boat during the cleaning operation of long line may cause impact on water quality. And during rainy season, contaminated water from discharging of improper dumping waste site to the adjacent sea can contaminate marine water and impact to aquatic life. Cause the oysters and respective nets and panel are cleaned only using by seawater with no chemical usage, liquid wastes from cleaning activities is low significant and there were constructed retaining wall between sea shores and land area at the panel cleaning house, and therefore the leakage of waste water will not be discharged directly to the sea.

7.8.2.7 Loss of Terrestrial Habitats and Biodiversity

(i) Loss of habitat of terrestrial biodiversity

The spring water source is available source for the development. In general, the fresh water usage of pearl culture process is low. Although, the excessive water extraction will cause landslide and land subsidence. The channelization of spring water will be impacted on the daily habitat of terrestrial biodiversity.

(ii) Impact on aquatic life of marine ecosystem due to waste disposing

Disposing wastes (plastic and water bottle) from worker during the oyster cleaning operation, accidental oil spillage from pump boat and noise and vibration from the boats may impact on the marine ecosystem. However, workers are strictly restricted from disposing wastes into the sea and there will only be insignificant impact on the environment due to the wastes.

(iii) Impact on aquatic life of marine ecosystem due to cleansing process

Sea Water 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 be performed only three times in a month, therefore, this impact can be recorded as negligible. Despite of parasite and pathogens can cause severely damage to the pearl farming but in general, there is no significant damage to the aquatic environment.

7.8.2.8 Anchoring

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 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.

7.8.2.9 Solid Waste

Only the insignificant amount of wastes will be generated from the operation activities of pearl culture. Operational wastes such as dead oyster shells, biofouls, getting off the barnacles and seaweed when cleaning panel nets, useless triangle nets, circles nets,



pocked panels are generated as solid wastes. Oyster shells are stored in specific shells stored house. Old nets and pocked panels are repaired and reused to hung oysters in suspended long lines. Some solid wastes from domestic usage such as plastic, bottles, used shampoos, cans, etc. These domestic solid wastes will be disposed in separated waste bins and transferred to designated disposal site for burning. 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.

7.8.2.10 Liquid Waste

Oyster cleaning activities and removal of aquatic organisms (parasitic mollusks), seaweeds and barnacles by cleaning with sea water may leakage discharge liquid wastes in panel cleaning house, floating houses and cleaning boat. Domestic wastewater is generated from staff quarters, kitchens and bathing tanks. Sanitary wastes from toilets and domestic liquid wastes are also major liquid waste in project site. 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.

7.8.2.11 Hazardous Waste

Used storage materials of fuel, lubricants discharged from workshops, and spillage fuels when improper fueling to engine of motor pump boats and electronic waste are the sources of generating hazardous waste in proposed project site.

7.8.2.12 Fire Hazard

During the operation phase, boat incidents and accidents may lead to fire related hazards. Diesel oil storage can cause fire hazard.

7.8.2.13 Occupational Health and Safety

Incidents and accidents, especially related to boats, may occur during the operation phase due to the frequent travel to long line area. Since the project is located in the distant island away from city, workers may suffer from natural disasters and harsh climates, which may, in turn, lead to health-related issues. And the projects components are constructed in flatted area of hill slide, during the rainy seasons, there may be land sliding, soil erosion which can be accident cases in operation project area.

7.8.2.14 Employments

It has been found out that the proposed project will generate positive impacts on socioeconomic conditions in operation phase. According to the proposed development, approximately 90 employments will be offer. It could be identified as long-term and positive impact.



7.8.3 Potential Significant Impacts on Decommission Phase

The followings potential impacts will be generated due to the decommissioning of pearl culture development project.

7.8.3.1 Visual Impact

Only the insignificant impact on marine landscape may be generated due to the decommissioning of surface long lines.

7.8.3.2 Ambient Air Quality

During the decommissioning phase, gaseous emission from the boats using for long line removal may cause impact on the air quality. Domestic waste burning can cause on the air quality.

7.8.3.3 Noise and Vibration

Noise and vibration may occur from the boats using for the decommissioning phase. However, no heavy machinery would be used for decommissioning and therefore only the insignificant quantity of impact would be generated from the process.

7.8.3.4 Impact on Soil and Soil Erosion

During this phase, pearl culture farm facilities will be reclaimed by covering with topsoil at the proposed project site. There will be some localized reclamation of disturbed sites, including re-grading, re-contouring and rehabilitation, thereby reducing potential erosion.

7.8.3.5 Impact on water quality

Accidental oil spill from the boat during decommissioning of long lines may cause impact on water quality.

7.8.3.6 Loss of Terrestrial Habitats and Biodiversity

Disposing wastes (plastic and water bottle) from worker during the decommissioning operation, accidental oil spillage, noise and vibration from the boats may impact on the marine ecosystem. However, workers are strictly restricted from disposing wastes into the sea and there will only be insignificant impact on the environment due to the wastes.

7.8.3.7 Solid Waste

During the demolition phase the dismantling related infrastructure will result in large quantities of solid waste. The waste will consist of demolition debris such as concrete, metal, wood, glass, etc. Most of the demolition waste can be considered less harmful to the environment. There may also generate solid waste from operation work demolishing such as, pumps, long lines, ropes, anchor, nets, and panels and cleaning and removal accessories of oysters and nets cleaning.

Demolishing workers can generate their wastes from daily activities and domestic wastes (e.g., plastic, bottle, can, waste bags from bathing accessories, leftovers). But this effect is the short-term effect in decommissioning phase.

7.8.3.8 Liquid Waste

Sanitary wastes from toilets and domestic liquid wastes from construction workers



activities can segregate liquid wastes. 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.

7.8.3.9 Hazardous Waste

The activities of the demolishing can generate hazardous wastes such as solvents, paints, used oils and oil filters. The improper storage of these materials can contaminate soil and pollute to costal water.

7.8.3.10 Fire Hazards

Improper storage of fuel and fueling to boat, motor boat, generator and dumping demolition waste materials which can be easily burned can lead to threat of fire hazardous. This hazard is short term effect but poor management can lead to long term loss of environment resources.

7.8.3.11 Occupational Health and Safety

Demolition workers can expose accidental risk and injuries due to demolition works activities such as accidental falls from heights, demolition equipment, slip and falls and cuts from sharp edges and collapse of scaffoldings among others. Exposure of emission dust from the site is potential hazards to health of workers. Large amount of sewage from increasing demolition workers and inadequate number of receptive toilets can cause unhealthy conditions to workers.

7.8.3.12 Replanting and Landscaping

During the decommissioning phase, the project project proponent will be placed the environment likely to be original existstant. Landscaping and replanting of trees will be carried out to enhance the ecology and appearance of the site. 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.

7.8.3.13 Employments

During the demolishing works on pearl culture farm, the employments will be disappeared for pearl culture employees. But for the demolishing workers, the decommissioning phase will be generating the employments. However, this phase could be identified as short-term and positive impact.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 7-1 Impact Assessment

Impacts	Likely Impacted environment			Impact Types								Receptors' sensitivity	Magnitude of impact	Impact Assessment	Potential Mitigation Reference	Residual Impact
				Duration		Positive		Negative		Irreversible	Cumulative					
	Terrestrial	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant							
Construction Phase Impact																
Visual Impact	☑	☑			☑			☑				Medium	Medium	Moderate	7.9.1	Minor
Ambient Air Quality	☑	☑	☑		☑			☑				Medium	Low	Minor	7.9.1	Negligible
Noise and Vibration	☑	☑	☑		☑			☑				Medium	Low	Minor	7.9.1	Negligible
Impact on Soil and Soil Erosion	☑	☑	☑		☑			☑		☑		High	Medium	Moderate	7.9.1	Minor
Impact on Water Quality	☑	☑	☑		☑			☑				High	Medium	Moderate	7.9.1	Minor
Loss of Terrestrial Habitats and Biodiversity	☑	☑	☑		☑			☑				Medium	Medium	Moderate	7.9.1	Minor
Solid Wastes	☑	☑	☑		☑			☑				Medium	Low	Minor	7.9.1	Negligible
Liquid Wastes	☑	☑	☑		☑			☑				Medium	Low	Minor	7.9.1	Negligible



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Impacts	Likely Impacted environment			Impact Types								Receptors' sensitivity	Magnitude of impact	Impact Assessment	Potential Mitigation Reference	Residual Impact
				Duration		Positive		Negative		Irreversible	Cumulative					
	Terrestrial	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant							
Hazardous Wastes	☑	☑	☑		☑			☑				Medium	Low	Minor	7.9.1	Negligible
Fire Hazards	☑	☑	☑		☑				☑			Medium	Low	Minor	7.9.1	Negligible
Occupational Health and Safety			☑		☑				☑			Low	Low	Negligible	7.9.1	Negligible
Replanting and Landscaping			☑		☑	☑										
Employment			☑		☑	☑										-
Operation Phase																
Introduction of alien, selectively or genetically engineered species		☑		☑					☑			Low	Negligible	Negligible	7.9.2	Negligible
Ambient Air Quality	☑	☑	☑	☑					☑			Medium	Medium	Moderate	7.9.2	Minor
Noise and Vibration	☑	☑	☑	☑					☑			Medium	Medium	Moderate	7.9.2	Minor
Impact on Soil and Soil	☑	☑	☑	☑				☑		☑		Medium	Medium	Moderate	7.9.2	Minor



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Impacts	Likely Impacted environment			Impact Types								Receptors' sensitivity	Magnitude of impact	Impact Assessment	Potential Mitigation Reference	Residual Impact
				Duration		Positive		Negative		Irreversible	Cumulative					
	Terrestrial	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant							
Erosion																
Impact on Water quality	☑	☑	☑	☑				☑				Medium	Medium	Moderate	7.9.2	Minor
Loss of Terrestrial Habitats and Biodiversity	☑	☑		☑					☑			Medium	Medium	Moderate	7.9.2	Minor
Anchoring		☑			☑				☑			Low	Low	Negligible	7.9.2	Negligible
Solid Wastes	☑	☑	☑	☑				☑				Medium	Medium	Moderate	7.9.2	Minor
Liquid Wastes	☑	☑	☑	☑				☑				Medium	Medium	Moderate	7.9.2	Minor
Hazardous Wastes	☑	☑	☑	☑				☑				Medium	Medium	Moderate	7.9.2	Minor
Fire Hazard	☑	☑	☑	☑				☑				Medium	Medium	Moderate	7.9.2	Minor
Occupational Health and Safety			☑	☑				☑				Medium	Medium	Moderate	7.9.2	Minor
Employment			☑	☑		☑										-
Decommissioning Phase																



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Impacts	Likely Impacted environment			Impact Types								Receptors' sensitivity	Magnitude of impact	Impact Assessment	Potential Mitigation Reference	Residual Impact
				Duration		Positive		Negative		Irreversible	Cumulative					
	Terrestrial	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant							
Ambient Air Quality	☑	☑	☑		☑			☑				Medium	Medium	Moderate	7.9.3	Minor
Noise and Vibration	☑	☑	☑		☑			☑				Medium	Medium	Moderate	7.9.3	Minor
Impact on Soil and Soil Ersoin	☑				☑			☑		☑		Medium	Medium	Moderate	7.9.3	Minor
Impact on Water Quality	☑	☑	☑		☑			☑				Medium	Medium	Moderate	7.9.3	Minor
Loss of Terrestrial Habitats and Biodiversity	☑	☑			☑				☑			Medium	Medium	Moderate	7.9.3	Minor
Solid Wastes	☑	☑	☑		☑			☑				Medium	Medium	Moderate	7.9.3	Minor
Liquid Wastes	☑	☑	☑		☑			☑				Medium	Medium	Moderate	7.9.3	Minor
Hazardous Wastes	☑	☑	☑		☑			☑				Medium	Medium	Moderate	7.9.3	Minor
Fire Hazardous	☑	☑	☑		☑			☑				Medium	Medium	Moderate	7.9.3	Minor
Occupational Health and Safety			☑		☑				☑			Low	Low	Negligible	7.9.3	Negligible
Replanting and Landscaping	☑		☑		☑	☑										



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Impacts	Likely Impacted environment			Impact Types								Receptors' sensitivity	Magnitude of impact	Impact Assessment	Potential Mitigation Reference	Residual Impact
				Duration		Positive		Negative		Irreversible	Cumulative					
	Terrestrial	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant							
Employment			☑		☑		☑									



7.9 Mitigation Adverse Impacts of the Proposed Project

As identified earlier, potential adverse impacts of the proposed project may include air emissions, water, soil, waste disposal and public health and occupational health hazards. Proposed mitigation measures for the above-mentioned adverse impacts are discussed in the following paragraphs.

7.9.1 Mitigation Measures during Construction Phase

7.9.1.1 Mitigation Measures on Visual Impact

- Minimize visual intrusion of clearing of vegetation;
- Do not clear any vegetation for maintenance activities;
- Contact Forest Department personnel and planned to do replanting at selected spots; and
- Where possible the design and the site preparation team should seek to retain the trees, reducing the visual impact as possible.

7.9.1.2 Mitigation Measures on Ambient Air Quality

- Spraying Water to the ground so that the wetted ground can mitigate the emission of dust.
- Engines and Machines should be maintained well and should be used pure fuel to mitigate the emission of gas, smoke to air.
- To prohibit large amount of cutting on big trees and vegetation because trees can absorb impure gas such as CO₂ from the construction activities.
- Construction workers should wear masks during working on construction activities.

7.9.1.3 Mitigation Measures on Noise and Vibration

- 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.
- Equipment operating workers should use ear muffs, where noise level greater than 80 dBA.
- Construction and decommissioning tasks should be avoided during the breeding season of both terrestrial and marine biodiversity.
- The construction materials' transportation boats should reduce the limit and speed of the boat so that not to be vibrated on the marine surface and not to impact on marine biological environments.
- Adjust and minimize the frequency of vehicle usage such as boat, to avoid the anchoring damage to marine environment.

7.9.1.4 Mitigation Measures of Impact on Soil and Soil Erosion

- To the greatest extent possible, phase site clearance 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.

- The stockpiling of construction materials should be properly controlled and managed. Fine-grained materials (sand, cement, etc.) should be stockpiled in temporary warehouse systematically.
- 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.
- The location of temporary dumping site area of construction materials should be selected.

7.9.1.5 Mitigation Measures of Impact on Water Quality

- The transportation of lubricants and fuel to the construction site should only be done in the appropriate vehicles and containers and beware not to spill on marine environment.
- Inappropriate carrying method of fuel tanks from boats to onshore should be avoided.
- The construction materials should be stockpiled away from surface drainage channels and features.

7.9.1.6 Mitigation Measures of Impact on Loss of Terrestrial Habitats and Biodiversity

- 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 of the environmental management plan and sensitized to the environmental issues.
- Reduce turbidity of marine water by avoiding inappropriate dumping of soil from excavation works and should be avoided direct reaching to aquatic ecosystem especially in during rainy season.
- Avoid the application of construction materials on sandy and muddy shore to mitigate loss of habit.

7.9.1.7 Mitigation Measures of Waste Generation

- The contractor should prepare a site waste management plan prior to commencement of building. 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 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.
- Proper solid waste receptacles and septic tanks should be provided in sufficient numbers.
- 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.

7.9.1.8 Mitigation Measures on Fire Hazards

- Flammable fuel 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.
- The transportation of lubricants and fuel to the construction site should only be done in the appropriate vehicles and containers.
- Should be avoided by accidental cases in construction area.

7.9.1.9 Mitigation Measures on Occupational Health and Safety

- To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible.
- 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.
- Should be provided adequate numbers of toilets with respective septic tank.

7.9.1.10 Mitigation Measures on Replanting and Landscaping

- Follow the landscaping plan. Maintain and record 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.

7.9.2 Mitigation Measures during Operation Phase

7.9.2.1 Mitigation Measures of Introduction of Alien, Selectively or Genetically Engineered Species

- For the proposed pearl culture development, the selected species is native culture species, therefore, it can be regarded as negligible impact.

7.9.2.2 Mitigation Measures of Visual Impact

- Minimize visual intrusion of clearing of trees;
- Waste Disposal should be fired at waste disposal site;
- Surface long line should be checked regularly and maintained properly; and



- Where possible the design and the site preparation team should seek to retain the trees, reducing the visual impact as possible.

7.9.2.3 Mitigation Measures on Ambient Air Quality

- Generators should be operated with proper assigns and solar should be used to reduce the usage of generators.
- Motors and engines should be maintained regularly to reduce the emission of gas when operating to clean oysters by using pump boat.
- Final disposal burning sites should be designed at least 100ft far away from operation area and staff housing.

7.9.2.4 Mitigation Measures on Noise and Vibration

- Motors, engines and generator should be placed with a cover.
- The frequency of vehicle usages to clean oysters and panels in surface long lines should be limited.
- The speed of the boats should be reduced in operation area.

7.9.2.5 Mitigation Measures of Impact on Soil and Soil Erosion

- Organism solid wastes should be dumped properly.
- Maintenances and application of machinery have to do in designed workshop placed.
- Fueling activities should be done by using pipes and be careful not to spill on soil.

7.9.2.6 Mitigation Measures of Impact on Water Quality

- Fueling activity should be done carefully
- Drainages have to be maintained and cleaned regularly.
- Educating to the employees especially from dining room and staff house to reduce water usage
- Inappropriate carrying method of fuel tanks from boats to onshore should be avoided.
- The result of the water quality discharging from Panel Cleaning House should be monitored regularly.

7.9.2.7 Mitigation Measures on Loss of Terrestrial Habitats and Biodiversity

- Educating to the employees not to use excessive spring water
- Spring water should be stored in storage tank
- Educating to the employees not to dispose wastes to marine environment
- Use waste bins and dispose to the designated place
- Cleaning the biofouling and boring organisms from pearl oysters can be regarded as negligible impact due to the volume and frequency of the action
- Plantation program should be implemented in forest areas and camp site that contain large patches of spacious lands and are generally devoid of trees
- The selected species should be planted after their nurseries have been developed. Nearly 1-2 years old saplings should be used for the plantation.

7.9.2.8 Mitigation Measures on Anchoring

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



- 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.

7.9.2.9 Mitigation Measures on Solid Waste

- Decompose organic waste and sewage, use as fertilizer in gardening
- Use the proper and systematic waste management
- Sort the type of waste, practice reuse, recycle system
- Dumping wastes from operational activities can be used as fertilizer or animal feeds
- Cleaning activities should be done under the panel cleaning house

7.9.2.10 Mitigation Measure on Liquid Waste

- Apply pits that covered with concrete or linen to avoid the ground water contamination.
- Install filtration tank
- Install systematic drainage system
- Use water treatment system from discharging water

7.9.2.11 Mitigation Measure on Fire Hazards

- Flammable fuel 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.
- The transportation of lubricants and fuel to the project site should only be done in the appropriate vehicles and containers.
- Should be avoided by accidental cases in the project area.

7.9.2.12 Mitigation Measures on Occupational Health and Safety

- To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible.
- Appropriate traffic warning signs, informing road users of a site entrance ahead and instructing them to reduce speed.
- Adjust and minimize the frequency of vehicle usage such as boat, to avoid the anchoring damage to marine environment.
- Should be provided adequate numbers of toilets with respective septic tank.
- Avoid cutting trees in the operation area and plant the trees to reduce the frequency of land sliding
- The plantation can be carried out in lines across the slopes. Species likes shrub, herb and small tree would be used in-between trees. They will help providing a continuous chain of support in retaining debris, reinforcing soil, landslide and increasing the infiltration capacity of the area.
- Conservation of environment through planting of trees and environmental management measures that should be incorporated during construction and operation phases.



- Always Watch and monitor the weather condition
- Provide health care facilities to all of the employee
- Provide purify drinking water
- Provide life jacket to wear when oyster cleaning along the long lines
- Educate and share knowledge on natural disaster

7.9.3 Mitigation Measures during Decommissioning Phase

7.9.3.1 Mitigation Measures on Ambient Air Quality

- Drawing plan systematically to disclose the project
- Provide PPE to all of the demolishing worker
- Burning of waste materials shall not be allowed and the best decommissioning practices should be applied
- Control the transportation frequency of demolished materials

7.9.3.2 Mitigation Measures on Noise and Vibration

- Decommissioning 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.
- Equipment operating workers should use earmuffs, where the noise level greater than 80 dBA.
- Construction and decommissioning work should be avoided during the breeding season of both terrestrial and marine biodiversity.
- The decommissioning materials' transportation boats should reduce the limit and speed of the boat so that not to be vibrated on the marine surface and not to impact on marine biological environments.
- Adjust and minimize the frequency of vehicle usage such as boat, to avoid the anchoring damage to marine environment.

7.9.3.3 Mitigation Measures on Soil and Soil Erosion

- Should be careful not to leakage oil from demolishing activities
- Dispose demolishing wastes properly at the designated dumping site

7.9.3.4 Mitigation Measures on Water Quality

- The transportation of lubricants and fuel to the decommission site should only be done in the appropriate vehicles and containers and beware not to spill on marine environment.
- The demolishing wastes should be stockpiled away from surface drainage channels and features.

7.9.3.5 Mitigation Measures on Loss of Terrestrial Habitats and Biodiversity

- Impact mitigation here seeks to retain and restore as much of the original and natural forested condition of the site or follow the instructions of Myanmar Pearl Enterprise (MPE).
- Avoid the application of decommissioning materials on sandy and muddy shore to mitigate loss of habitat.



7.9.3.6 Mitigation Measures on Waste Generation

- Avoid, minimize, reuse and recycle wastes generated at the project site.
- To reduce and control of solid waste disposal, demolition activities should be conducted with the use of appropriate health and safety procedures in accordance with the regulatory requirements.

7.9.3.7 Mitigation Measures on Fire Hazards

- Flammable fuel 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.
- The transportation of lubricants and fuel to the decommissioning site should only be done in the appropriate vehicles and containers.
- Should be avoided by accidental cases in decommissioning area.

7.9.3.8 Mitigation Measures on Occupational Health and Safety

- To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible.
- Appropriate traffic warning signs, informing road users of a site entrance ahead and instructing them to reduce speed.
- Flagmen should be assigned to control and assists to demolishing 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.
- Should be provided adequate numbers of toilets with respective septic tank.

7.10 Methodology of Marine Biodiversity Environment

Leopold matrix (Leopold 1971): Impact factors have been evaluated separately for each environmental component relevant for the scope of this study, impact magnitude has been calculated by the following scale:

0 – no observable effect

1 – low effect

2 – tolerable effect

3 – medium high effect

4 – high effect

5 – very high effect (devastation)

Impact significance with designations from L to M, according to the following scale:

L – limited impact on location

M – impact of cross-border character

N – impact of national character

O – impact of importance for municipality

R – impact of regional character

Impact probability with designations from M to I, according to the following scale:

M – impact is possible (probability of less than 50%)

V – impact is probable (probability of over 50%)

I – impact is certain (100% probability).



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Impact duration with designation P (occasional/temporary) and D (long term/ permanent).

7.10.1 Potential Significant Impact on Marine biological Environment

The proposed project has three key components such as infrastructure, navigation and aquatic setting were setup to calculate impacts magnitude, impacts significant, impacts probability and impacts duration depends on three phases (construction, operation and decommissioning phases). Infrastructures include construction of staff house, relative operation buildings and laboratory etc. Under navigation category contain motorboats. In aquatic setting, there are many equipment for farming eg., ropes, nets, floats, rafts. Therefore, there are some proper management of waste materials should carry out for the long-term aspect. Because some of these materials could harm to marine ecosystem if there is no proper management of these wastes. Therefore, the detail description of possible mitigation measure for the proposed project was also calculated.

Table 7-2 Impact magnitude for biological component

S/N	Impact factor	Infrastructure	Navigation	Aquatic setting
1	Plankton	0	0	0
2	Mollusks	1	0	1
3	Benthos	2	2	3
4	Coral reefs	1	3	3
5	Fishes	1	1	0

Table 7-3 Impact Significant for biological component

S/N	Impact factor	Infrastructure	Navigation	Aquatic setting
1	Plankton	L	L	L
2	Mollusks	L	L	L
3	Benthos	L	L	L
4	Coral reefs	L	L	L
5	Fishes	L	L	L

Table 7-4 Impact probability for biological component

S/N	Impact factor	Infrastructure	Navigation	Aquatic setting
1	Plankton	M	M	M
2	Mollusks	M	M	M
3	Benthos	M	M	V
4	Coral reefs	M	M	M
5	Fishes	M	M	M

Table 7-5 Impact duration for biological component

S/N	Impact factor	Infrastructure	Navigation	Aquatic setting
1	Plankton	P	P	P
2	Mollusks	P	D	P
3	Benthos	P	D	P
4	Coral reefs	P	D	P
5	Fishes	P	P	P

The proposed project area has rich marine biodiversity. However, mollusk culture and pearl culture in particular, are considered to have a low potential for environmental impact (Simpson, 1998; Naylor et al., 2001; Gavine and McKinnon 2002; Jernakoff 2002; Yokoyama 2002; Crawford *et al.*, 2003; Shumway *et al.*, 2003); however, there have been substantial adverse impacts in the pearl farming regions. According to the result of Leopold matrix the proposed project has low impacts were observed these impacts were also temporarily effects on marine biodiversity.

An unfortunate consequence of the translocation of molluscs has been the spread of a number of other aquatic organisms. These introductions can have serious consequences for aquaculture, commercial fisheries and the aquatic ecosystem. The threat of translocations of some species can be reduced by careful cleaning, although some fouling organisms, particularly some algae, fungi, sponges and polychaetes that bore into the pearl oyster shell, may pose a greater threat (Mao Che *et al.*, 1996). Otherwise, filter feeding bivalves remove suspended material from the water column and in doing so reduce levels of organic material, silt, nutrients, bacteria and other dissolved components. This process can improve water clarity, remove pollutants and have significant environmental benefits (Dame, 1996; Newell, 2004), so much so that in some areas the restoration or introduction of bivalve communities is being encouraged to assist ecological balance (Mann and Evans, 2004).



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

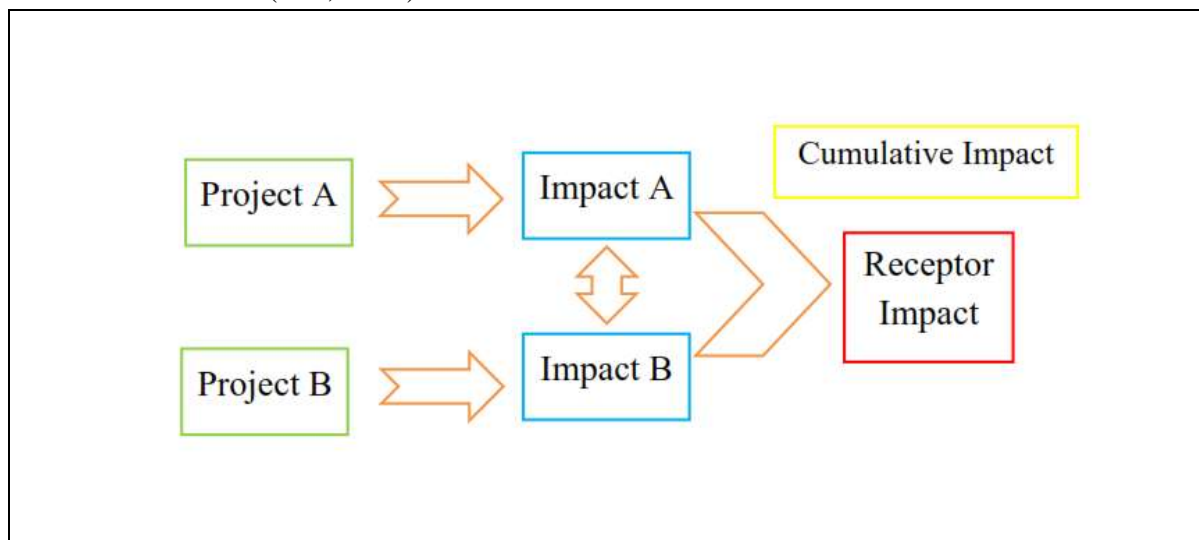
Plastics are commonly used on most pearl farms in ropes, floats and cages. They may contain stabilizers (fatty acid salts), pigments (chromates, cadmium sulphate), antioxidants (hindered phenols), UV absorbers (benzophenones), flame retardants (organophosphates), fungicides and disinfectants (GESAMP, 1991) that can leach into the environment and adversely affect aquatic life. The fuels and oils used to powerboats and generators contain toxic substances that can inadvertently enter the environment through spills or directly through motor discharges.

7.10.2 Mitigation measure on marine biological environment of Proposed project area

- Reduce the using of sandy and muddy shore
- Reduce soil from direct reaching to aquatic ecosystem
- Avoid the application of boats and machinery near the coral reefs
- Avoid oil leakage and direct flow to marine environment
- Dispose the discharging water by using propose treatment system
- Clean regularly on oyster and panels which are hanging in longlines to avoid sedimentation on sea bed
- Dispose wastes according to the waste management plan
- Reduce the speed limitation of boat near long lines and project area

7.11 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 Pyi Phyto Tun pearl culture project are discussed in this chapter. This section deals with cumulative effects of the project and other associated impacts in relation to development are described. During the impact assessment, evaluation of potential cumulative impacts plays an integral part.

Cumulative impacts can be defined as successive and combined impacts of the 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. Therefore, the proponent of near project area does not exist the same project because of that does not have cumulative impact.



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 Pyi Phyto Tun International Co., Ltd. is organized with the following sections:

1. Environmental Management Plan
2. Environmental Monitoring Plan
3. Biodiversity Management Plan
4. Biodiversity Monitoring Plan
5. Waste Management Plan
6. Occupational Health and Safety Plan
7. Community Health and Safety Plan
8. Emergency Preparedness and Response Procedures
9. Corporate Social Responsibility (CSR) Plan
10. Community Grievance Redress Mechanism

8.1 Environmental Management Plan

8.1.1 OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The objectives of Environmental Management Plan are:

- 1) As a reference and commitment for the proponent to implement the EMP for three phases of the project life cycle, construction, operation and decommissioning phases of the project
- 2) It will fulfill the need of the Environmental Conservation Department of the Ministry of Natural Resources and Environmental Conservation (MONREC).
- 3) Serve as a guiding document for the monitoring of environmental and social activities of the project
- 4) Provide detailed framework to mitigate negative impacts on the environment and management actions to be adopted for proper implementation of the project

8.1.2 RESPONSIBILITIES OF THE EMP

In order to effectively implement the EMP, it will be necessary to define the responsibility of various stakeholders. The environmental management activities should comply with existing environmental policy, laws, rules, procedures and emission standards of the Republic of the Union of Myanmar. The following entities are responsible for implementation of the EMP:

- Pyi Phyto Tun International Co., Ltd.
- Environmental Conservation Department
- Third-party Environmental Consultant Firm

Pyi Phyto Tun International Co., Ltd.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The proponent is responsible for ensuring that the performances of project activities are in accordance with the Environmental Management Plan developed and in an environmentally sound manner. The following Health, Safety and Environmental team will be responsible for the implementation of the Environmental Management Plan:

The team is consisted of the following personnel:

- HSE Coordinator will be acting as in-charge of HSE team.
- Environmental Officer
- There will be HSE assistant under the supervision of HSE Coordinator

According to the Environmental Impact Assessment Procedure (2015), clause 103, it is stated that:

“The Project Proponent shall fully implement the EMP, all Project commitments and conditions, and is liable to ensure that all contractors and sub-contractors of the Project comply fully with all applicable Laws, the Rules, this procedure, the EMP, Project commitments and conditions when providing services to the Project”.

HSE COORDINATOR

The responsibilities of HSE Coordinator are as follows:

- Regular site visits and reporting during preparation, operation and decommissioning/closure work to check whether the objectives of EMP are being followed.
- The HSE coordinator must keep full records of environmental management activities and present to annual independent third-party environment audit.
- The HSE coordinator shall provide necessary information and instructions, as well as providing and arranging training to the workers and supervising them to follow safety rules and safe working procedures strictly.
- Undertaking regular safety and health inspections and audits on-site.
- The HSE coordinator shall provide and enforce wearing of effective helmets, and where necessary, safety harnesses, and other personal protective equipment for all employees.
- The HSE coordinator will manage for water usage in every workplace at suitable and easily accessible place for the whole phases.

HSE ASSISTANTS

The HSE Assistants are responsible for assisting HSE Coordinator during the implementation of the HSE plan;

Development and training according to the HSE plan.

BIODIVERSITY MANAGEMENT OFFICER

Biodiversity Officer is responsible and accountable for ensuring the following:

- Provide accurate and relevant environmental advice on native vegetation and biodiversity preservation.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

- Assist with the interpretation and implementation of the Permitted Clearing of Native Vegetation Biodiversity Assessment Guidelines
- Provide input into the development of policies, strategies and projects that monitor emerging trends and enhance the protection of indigenous flora and fauna in the municipality
- Contribute to the development of project briefs and or updating of biodiversity and natural reserves management plans and capital works projects
- Assist with the updating of flora and fauna data and GIS mapping of biodiversity
- Prepare Research study reports, correspondence, applications, newspaper articles and general educational information, as required
- Utilize corporate information management systems to facilitate corporate work in a timely and accurate manner
- Develop positive relationships with relevant State Government, agencies, Councils, environmental and industry organizations, community groups, residents, owners and developers and, as required, support coordination and participate in such discussions
- Develop cross functional relationships across the organization

Table 8-1 Responsible Persons for HSE and Biodiversity Team

Responsible Persons	Responsibilities
Manager (Myeik office)	<ul style="list-style-type: none"> ✓ To implement Environmental Management Plan ✓ To implement Environmental Management Plan ✓ To implement Environmental Monitoring Plan ✓ To implement Biodiversity Management Plan ✓ To implement Emergency Response Plan ✓ To implement Waste Management Plan ✓ To implement Occupational Health and Safety Plan ✓ To implement Community Health and Safety Plan ✓ To implement Emergency Preparedness and Response Procedures ✓ To implement Corporate Social Responsibility (CSR) Plan ✓ To implement Community Grievance Redress Mechanism
Biodiversity Management Team Leader/HSE Coordinator/Kyun Manager (Pyin Sa Bu Island)	<ul style="list-style-type: none"> ✓ To implement Environmental Management Plan ✓ To implement Environmental Management Plan ✓ To implement Environmental Monitoring Plan ✓ To implement Biodiversity Management Plan ✓ To implement Emergency Response Plan ✓ To implement Waste Management Plan ✓ To implement Occupational Health and Safety Plan ✓ To implement Community Health and Safety Plan ✓ To implement Emergency Preparedness and Response Procedures



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Responsible Persons	Responsibilities
	<ul style="list-style-type: none"> ✓ To implement Community Grievance Redress Mechanism ✓ To inform internal Conditions to Manager
Biodiversity Management Team member/HSE Member/Associate Kyun Manager (Pyin Sa Bu Island)	<ul style="list-style-type: none"> ✓ To implement Environmental Management Plan ✓ To implement Environmental Management Plan ✓ To implement Environmental Monitoring Plan ✓ To implement Biodiversity Management Plan ✓ To implement Emergency Response Plan ✓ To implement Waste Management Plan ✓ To implement Occupational Health and Safety Plan ✓ To implement Community Health and Safety Plan ✓ To implement Emergency Preparedness and Response Procedures ✓ To implement Community Grievance Redress Mechanism ✓ To inform internal Conditions to Kyun Manager
Biodiversity Management Team Member/Pearl Chief Operator	<ul style="list-style-type: none"> ✓ To implement Environmental Management Plan ✓ To implement Environmental Management Plan ✓ To implement Environmental Monitoring Plan ✓ To implement Biodiversity Management Plan ✓ To inform internal Conditions to Associate Kyun Manager
HSE Assistant/Health Assistant	<ul style="list-style-type: none"> ✓ To implement Occupational Health and Safety Plan ✓ To implement Community Health and Safety Plan ✓ To implement Emergency Preparedness and Response Procedures ✓ To provide first aid training to all employees

ENVIRONMENTAL CONSERVATION DEPARTMENT

EIA review consists of two stages:

Administrative Review: To assess how well the proponent has complied with the EIA procedure for the report.

Technical Review: To assess whether the technical information is appropriate, sufficient and adequate for a decision on project approval.

The Environmental Management Responsibilities of ECD is to:

- conduct periodic site visits for projects with adverse environmental impacts
- conduct supervision missions for detailed review for projects with significant adverse environmental impacts
- review the periodic environmental monitoring reports submitted to ensure that adverse impacts are mitigated as planned and as agreed.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

- EIA report review committee will lead by EIA Review Coordinator from ECD and the review committee members will comprise of technical and professional experts and are responsible for evaluating the information in the EIA report on the following:
 - Project description, activities and alternatives
 - Environmental setting of the project
 - Impacts of the project
 - Significance of the impacts
 - Cumulative impacts
 - Significance of residual impacts
 - EMP is reasonable to manage and monitor residual effects
 - Issues raised by the public and proposed solutions to those issues are identified. and
 - Use of accepted scientific principles and practices during data gathering and interpreting

THIRD-PARTY ENVIRONMENTAL CONSULTANT FIRM

The Third-Party Consultant Firm is to ensure that the EMP developed up-to-date has been followed properly by Pyi Phyto Tun International Co., Ltd. Periodic audits shall be performed in order to find out whether the expected outcomes are achieved as envisaged in the plan by comparing with the operating standards. If not, corrective actions have to be followed.

Thus, it is necessary to conduct independent Environmental Audit at various stages of the project to find out whether the mitigation measures prescribed in the management are attained and if not what kind of alternatives to be suggested.

The scope of the Environmental Audit should cover the following topics:

- Verify compliance with the stated mitigation/performance targets
- Comply with the relevant environmental legislations
- Ensure that workers are exposure to minimal risks for Occupational Safety and Health
- Advise improvements concerning with Health, Safety and Environment matters
- Liaise closely with the all stakeholders concerning the effectiveness of Grievance Redress Mechanisms, particularly during the construction stage and
- The results of the audits are to be disclosed to the public.



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 8-2 Environmental Management Plan

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
Construction Phase: This phase that corresponds to any event, process, or activity that occurs during the construction of the project.						
Appointment of HSE Coordinator/ HSE Assistant			(2) yrs		HR Dpt of Pyi Phyoo Tun International Co., Ltd.	Managing Director
Appointment of Biodiversity Officer			(2) yrs		HR Dpt of Pyi Phyoo Tun International Co., Ltd.	Managing Director
Visual Impact	All Construction site	<ul style="list-style-type: none"> ❖ Minimize visual intrusion of clearing of vegetation; ❖ Do not clear any vegetation for maintenance activities; ❖ Contact Forest Department personnel and planned to do replanting at selected spots; and ❖ Where possible the design and the site preparation team should seek to retain the trees. 	Throughout the construction period	Minor	Pyi Phyoo Tun International Co., Ltd.	HSE Coordinator
Air Quality	All Construction site	<ul style="list-style-type: none"> ❖ Spraying Water to the ground; ❖ Engines and Machines should be maintained well and should be used pure fuel; ❖ To prohibit large amount of cutting on big trees 	Throughout Construction period	Negligible	Pyi Phyoo Tun International Co., Ltd.	HSE Coordinator



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
		<ul style="list-style-type: none"> and vegetation; and ❖ Construction workers should wear masks. 				
Noise and Vibration	All Construction site	<ul style="list-style-type: none"> ❖ Construction activities should be restricted to normal working hours; ❖ Workers should be equipped with noise protection gear; ❖ Construction should avoid breeding season of both terrestrial and marine biodiversity; ❖ Transportation boats should reduce the limit and speed; and ❖ Adjust and minimize the frequency of vehicle usage such as boat. 	Throughout Construction period	Negligible	Pyi Phyo Tun International Co., Ltd.	HSE Coordinator
Impact on soil and soil erosion	All Construction site	<ul style="list-style-type: none"> ❖ Site clearance to minimize the area of exposed soil; ❖ Re-cover exposed soils with grass; ❖ 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; ❖ Construction materials should be properly controlled and managed (sand, cement, etc.) should be stored in temporary warehouse; 	Throughout Construction period	Minor	Pyi Phyo Tun International Co., Ltd.	HSE Coordinator



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
		<ul style="list-style-type: none"> ❖ Hazardous chemicals (e.g. fuels) should be properly stored in appropriate containers; and ❖ The location of temporary dumping site area of construction materials should be selected. 				
Water Quality	All Construction site	<ul style="list-style-type: none"> ❖ Lubricants and fuel beware not to spill on marine environment; ❖ Fuel tanks from boats to onshore should be avoided; and ❖ Materials should be stockpiled away from surface drainage channels and features. 	Throughout Construction period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Loss of Terrestrial Habits and Biodiversity	All Construction site	<ul style="list-style-type: none"> ❖ Seeks to retain and restore as much of the original and natural forested; ❖ 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 	Throughout Construction period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator and Biodiversity Management Officer



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
		flowering plants; ❖ Should be aware to the environmental management plan and sensitized to the environmental issues; ❖ Reduce turbidity of marine water by avoiding inappropriate dumping of soil from excavation works and should be avoid direct reaching to aquatic ecosystem; and ❖ Avoid the application of materials on sandy and muddy shore to mitigate loss of habit.				
Solid Waste	All construction site	❖ This should include the designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site; ❖ Special attention should be given to minimizing and reducing the quantities of solid produced during site preparation and construction. ❖ To reduce organic waste, softer vegetation may be composted onsite 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	Throughout Construction period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
		necessary; ❖ Proper solid waste receptacles and septic tanks should be provided in sufficient numbers.; ❖ Arrangements should be made for the regular collection of litter and for its disposal; ❖ Sort the type of waste, practice reuse, recycle system; and				
Liquid Waste	All construction site	❖ Arrangements should be made for the regular collection of litter and for its disposal; ❖ Apply pits that covered with concrete or linen to avoid the ground water contamination.	Throughout Construction period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Hazardous Waste	All construction site	❖ Beware not to leakage of oil	Throughout Construction period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Fire Hazards	All construction site	❖ Flammable fuel should be properly stored in appropriate containers (e.g. 'No Smoking') should also be posted around hazardous waste storage and handling facilities; ❖ The transportation of lubricants and fuel to the construction site should only be done in the appropriate vehicles and containers; ❖ Should be avoided by accidental cases in construction area.	Throughout Construction period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Occupational	All construction	❖ To avoid unnecessary accidents, the	Throughout	Negligible	Pyi Phyto Tun	HSE



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
Health and Safety	site	<ul style="list-style-type: none"> transportation frequency should be reduced; ❖ Appropriate warning signs, informing road users of a construction site entrance ahead and instructing them to reduce speed; ❖ Adjust and minimize the frequency of vehicle usage such as boat, to avoid the anchoring damage to marine environment; and ❖ Should be provided adequate numbers of toilets with respective septic tank. 	Construction period		International Co., Ltd.	Coordinator
Landscape Planting	All construction site	<ul style="list-style-type: none"> ❖ The landscaping plan should seek to avoid the use of non-native and potentially invasive species. 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. 	Throughout Construction period		Pyi Phyto Tun International Co., Ltd.	HSE Coordinator and Biodiversity Management Officer
Operation/ Service Phase: The main project activities of services and maintenance are, pearl oyster breeding and pearl production from pearl oyster.						
Introduction Alien, Selectively Genetically Engineered	The proposed project area	<ul style="list-style-type: none"> ❖ the selected species is natively culture species, therefore, it can be regarded as negligible impact. 	Throughout Operation period	Negligible	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
Species						
Visual Impact	All the proposed operation area	<ul style="list-style-type: none"> ❖ Minimize visual intrusion of clearing of vegetation; ❖ Do not clear any vegetation for maintenance activities; ❖ Contact Forest Department personnel and planned to do replanting at selected spots; and ❖ Where possible the design and the site operation team should seek to retain the trees. 	Throughout Operation period	Minor	Pyi Phyo Tun International Co., Ltd.	HSE Coordinator
Ambient Quality	All the proposed operation area	<ul style="list-style-type: none"> ❖ Generators should be operated with proper assigns and solar should be used to reduce the use of generators; ❖ Motors and engines should be maintained regularly ❖ To reduce use the clean oyster pump boat; and ❖ Final disposal burning sites should be designed at least 100ft far away from operation area and staff housing. 	Throughout Operation period	Minor	Pyi Phyo Tun International Co., Ltd.	HSE Coordinator
Noise & Vibration	All the proposed operation area	<ul style="list-style-type: none"> ❖ Motors, engines and generator should be placed with a cover; ❖ The frequency of vehicle usages to clean oysters and panels in surface long lines should be limited; and 	Throughout Operation period	Minor	Pyi Phyo Tun International Co., Ltd.	HSE Coordinator, Biodiversity Officer



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
		❖ The speed of the boats should be reduced in operation area.				
Impact on soil and soil erosion	All the proposed operation area	<ul style="list-style-type: none"> ❖ Organism solid wastes should be dumped properly; ❖ Maintenances and application of machinery have to do in designed workshop placed; and ❖ Fueling activities should be done by using pipes and be careful not to spill on soil. 	Throughout Operation period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator, Biodiversity Officer
Impact on Water Quality	All the proposed operation area	<ul style="list-style-type: none"> ❖ Fueling activity should be done carefully; ❖ Drainages have to be maintained and cleaned regularly; ❖ Inappropriate carrying method of fuel tanks from boats to onshore should be avoided; and ❖ The result of the water quality discharging from Panel Cleaning House should be monitored regularly. 	Throughout Operation period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator, Biodiversity Officer
Loss of Terrestrial Habits and Biodiversity	All the proposed operation area	<ul style="list-style-type: none"> ❖ Educating to the employees not to use excessive spring water; ❖ Spring water should be stored in storage tank; ❖ Educating to the employees not to dispose wastes to marine environment; ❖ Use waste bins and dispose to the designated place ❖ Cleaning the biofouling and boring organisms 	Throughout Operation period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator, Biodiversity Officer



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
		from pearl oysters can be regarded as negligible impact due to the volume and frequency of the action.				
Anchoring	All the proposed operation area	<ul style="list-style-type: none"> ❖ there is no mitigation for this activity, due to the potential number of anchor systems deployed this must be an assessable activity; ❖ the nature of sediments anchoring is regarded as having negligible effect. 	Throughout Operation period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator, Biodiversity Officer
Solid Waste	All the proposed operation area	<ul style="list-style-type: none"> ❖ Decompose organic waste and sewage, use as fertilizer in gardening; ❖ Use the proper and systematic waste management; ❖ Sort the type of waste, practice reuse, recycle system; ❖ Dumping wastes from operational activities can be used as fertilizer or animal feeds; ❖ Cleaning activities should be done under the panel cleaning house. 	Throughout Operation period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator, Biodiversity Officer
Liquid Waste	All the proposed operation area	<ul style="list-style-type: none"> ❖ Decompose organic waste and sewage, use as fertilizer in gardening; ❖ Apply pits that covered with concrete or linen to avoid the ground water contamination; ❖ Install filtration tank; ❖ Install systematic drainage system; 	Throughout Operation period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator, Biodiversity Officer



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
		❖ Use water treatment system from discharging water; and				
Hazardous Waste	All the proposed operation area	<ul style="list-style-type: none"> ❖ Sort the hazardous waste such as oil can, tin, etc. ❖ Apply oil filter tank and reuse it 	Throughout Operation period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator, Biodiversity Officer
Fire Hazards	All the proposed operation area	<ul style="list-style-type: none"> ❖ Flammable fuel should be properly stored in appropriate containers warning signs (e.g. 'No Smoking') should also be posted around hazardous waste storage and handling facilities; ❖ The transportation of lubricants and fuel to the project site should only be done in the appropriate vehicles and containers; and ❖ Should be avoided by accidental cases in the project area. 	Throughout Operation period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Occupational Health and Safety	All the proposed operation area	<ul style="list-style-type: none"> ❖ To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible; ❖ Adjust and minimize the frequency of vehicle usage such as boat, to avoid the anchoring damage to marine environment; ❖ Should be provided adequate numbers of toilets with respective septic tank; 	Throughout Operation period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
		<ul style="list-style-type: none"> ❖ Avoid cutting trees in the operation area and plant the trees to reduce the frequency of land sliding; ❖ Always Watch and monitor the weather condition; ❖ Provide health care facilities to all of the employee; ❖ Provide purify drinking water; ❖ Provide life jacket to wear when oyster cleaning along the long lines; and ❖ Educate and share knowledge on natural disaster. 				
Replanting and Landscaping	All the proposed operation area	<ul style="list-style-type: none"> ❖ Follow the landscaping plan ❖ Maintain and record 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 	Throughout Operation period	Minor	Pyi Phyo Tun International Co., Ltd.	HSE Coordinator
Employment	In Local area	-		Positive Impact		
Decommissioning Phase: After 50 years later, this is the final phase of the project and it will be in relation to the condition as stated in the investment contract.						



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
Decommissioning would require use of the demolishing equipment. Where needed, any existing hazardous material used in demolition of these would be properly handled and disposed of in accordance with governing authority requirements.						
Visual Impact	All the decommissioning site	<ul style="list-style-type: none"> ❖ Minimize visual intrusion of clearing of vegetation; ❖ Do not clear any vegetation for maintenance activities; ❖ Contact Forest Department personnel and planned to do replanting at selected spots; and ❖ Where possible the design and the site preparation team should seek to retain the trees. 	Throughout Decommissioning period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Ambient Air quality	All the decommissioning site	<ul style="list-style-type: none"> ❖ Drawing plan systematically to disclose the project; ❖ Provide PPE to all of the demolishing worker; ❖ Burning of waste materials shall not be allowed and the best decommissioning practices should be applied; and ❖ Control the transportation frequency of demolished materials. 	Throughout Decommissioning period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Noise & Vibration	All the decommissioning site	<ul style="list-style-type: none"> ❖ Decommissioning activities that will generate disturbing sounds should be restricted to normal working hours; ❖ Workers operating equipment that generates noise should be equipped with noise 	Throughout Decommissioning period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
		protection gear; ❖ Decommissioning should avoid breeding season of both terrestrial and marine biodiversity; ❖ Transportation boats should reduce the limit and speed of the boat; and ❖ Adjust and minimize the frequency of vehicle usage such as boat.				
Impact on Soil and Soil Erosion	All the decommissioning site	❖ Should be careful not to leakage oil from demolishing activities; and ❖ Dispose demolishing wastes properly at the designated dumping site.	Throughout Decommissioning period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Impact on Water Quality	All the decommissioning site	❖ Lubricants and fuel beware not to spill on marine environment; and ❖ The demolishing wastes should be stockpiled away from surface drainage channels and features.	Throughout Decommissioning period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Loss of Terrestrial Habitas and Biodiversity	All the decommissioning site	❖ Seeks to retain and restore as much of the original and natural forested condition of the site; and ❖ Sandy and muddy shore to mitigate loss of habit.	Throughout Decommissioning period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Solid Waste	All the	❖ Reuse and recycle wastes generated at the	Throughout	Minor	Pyi Phyto Tun	HSE



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
	decommissioning site	<ul style="list-style-type: none"> ❖ project site; and ❖ To reduce and control of solid waste disposal. 	Decommissioning period		International Co., Ltd.	Coordinator
Liquid Waste	All the decommissioning site	<ul style="list-style-type: none"> ❖ Arrangements should be made for the regular collection of litter and for its disposal ❖ Apply pits that covered with concrete or linen to avoid the ground water contamination 	Throughout Decommissioning period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Hazardous Waste	All the decommissioning site	<ul style="list-style-type: none"> ❖ Beware not to leakage of oil 	Throughout Decommissioning period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Fire Hazards	All the decommissioning site	<ul style="list-style-type: none"> ❖ Flammable fuel should be properly stored in appropriate containers warning signs (e.g. 'No Smoking') should also be posted around hazardous waste storage and handling facilities; ❖ The transportation of lubricants and fuel to the project site should only be done in the appropriate vehicles and containers; and ❖ Should be avoided by accidental cases in the project area. 	Throughout Decommissioning period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator
Occupational Health and Safety	All the decommissioning site	<ul style="list-style-type: none"> ❖ To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible; ❖ Flagmen should be assigned to control; ❖ Adjust and minimize the frequency of 	Throughout Decommissioning period	Minor	Pyi Phyto Tun International Co., Ltd.	HSE Coordinator



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
		vehicle usage such as boat; and ❖ Should be provided adequate numbers of toilets with respective septic tank.				
Replanting and Landscaping	All the decommissioning site	❖ Follow the landscaping plan ❖ Maintain and record 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	Throughout Decommissioning period	Minor	Pyi Phyoo Tun International Co., Ltd.	HSE Coordinator
Employment	All the decommissioning site	-		Positive Impact		



8.2 ENVIRONMENTAL MONITORING PLAN

Monitoring of the environmental and social impacts in the receiving environment is important in evaluating the effectiveness of the mitigation plan, so as to comply with the existing regulatory measures. During the construction, operation and decommissioning phase monitoring will be undertaken to ensure the proposed mitigation measures for negative impacts as well as enhancement measures for positive impacts.

8.2.1 MONITORING PARAMETERS

The monitoring parameters are selected based on impacts identified in the construction, operation and decommissioning phases of the Pearl Culture Development project. The parameters determined will reflect the effectiveness of the mitigation measures and general environmental performance of the project. Monitoring of the parameters will be carried out at the various stages of the project as follows:

Construction Phase: To monitor pollution levels that exist during the construction activities

Operation Phase: To determine the impacts that might arise from the operation of pearl culture development project and office activities

Decommissioning Phase: Decommissioning is assumed to have the same impact as the construction phase and may entail parameters similar to those at the construction phase.

8.2.2 ENVIRONMENTAL MONITORING REPORTS

The proponents have to prepare the periodic (semi-annual) Environmental Monitoring Reports and submitted to ECD and disclosed the such reports to Project Affected Persons (PAPs) promptly upon submission. If unanticipated environmental and or social risks and impacts arise during construction and implementation or operation of the project that will consider in the EIA or EMP, the proponent has to propose the corrective action plan.

Table 8-3 Environmental Monitoring Plan

No.	Environmental Concerns	Parameters	Location	Frequency	Responsible Party	Remarks
Construction Phase						
1.	Air quality	PM ₁₀ , PM _{2.5} , CO, CO ₂ , NO ₂ , SO ₂	One point in construction area	Once	HSE of Pyi Phyto Tun International Co., Ltd. /Third Party	
2.	Noise Level	Noise Level dBA	2 points-noise source in construction area and staff house	Once	HSE of Pyi Phyto Tun International Co., Ltd. /Third Party	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

No.	Environmental Concerns	Parameters	Location	Frequency	Responsible Party	Remarks
3.	Water quality	pH, Color (True), Turbidity, Total Hardness, Calcium, Iron, Chloride, Sulphate, Total Solids, Suspended Solids, Chlorine	1 point – spring water source	Once	HSE of Pyi Phyto Tun International Co., Ltd. /Third Party	
4.	Sewage and wastewater	Regular Maintenance	Septic tank	Throughout construction period	HSE of Pyi Phyto Tun International Co., Ltd. /Third Party	
5.	Solid waste disposal	Waste Management plan	Proposed dump site	Monthly and regularly	HSE of Pyi Phyto Tun International Co., Ltd. /Third Party	
6.	Fire Hazardous	Firefighting Plan	In construction area	Monthly	HSE of Pyi Phyto Tun International Co., Ltd. /Third Party	
Operation Phase						
1.	Air quality	PM ₁₀ , PM _{2.5} , CO, CO ₂ , NO ₂ , SO ₂	One point in Pearl Operation area	Once a year	HSE of Pyi Phyto Tun International Co., Ltd. /Third Party	During operation phase, the environmental monitoring plan should be revised per year if it is
2.	Noise Level	Noise Level dBA	2 points-noise source in pearl operation area and staff house	Once a year	HSE of Pyi Phyto Tun International Co., Ltd. /Third Party	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

No.	Environmental Concerns	Parameters	Location	Frequency	Responsible Party	Remarks
3.	Water quality	Fresh water- pH, Color (True), Turbidity, salinity, DO, Nitrate, Phosphate, Hardness, Chloride, Iron, Copper, Manganese, Zinc, Aluminium, Potassium	Freshwater (spring water) - 1 point	Twice a year	HSE of Pyi Phyto Tun International Co., Ltd. /Third Party	necessary
		Marine water- pH, Salinity, Turbidity, Conductivity, Suspended Solids, Temperature(°C), NO ₃ , PO ₄ , DO, COD, BOD, Oil and grease	Marine Water - 1 point in Long line hanging area	Twice a year		
		Wastewater-pH, Total Suspended Solids, Total Nitrogen, Total Phosphorus, Oil and Grease, Turbidity, Temperature, COD, BOD, Total Coliform Count, Color	Treated water- 1 point in pearl oyster panel cleaning house	Twice a year		
			1 point - Treatment wastewater from kitchen and dining room	Twice a year		
4.	Occupational Health and Safety	Visual check and weekly inspection	kitchen, guest rooms and employee hostels	Monthly	HSE of Pyi Phyto Tun International Co., Ltd.	
5.	Sewage and wastewater	Regular Maintenance	Septic Tank	Twice per Year	HSE of Pyi Phyto Tun International Co., Ltd.	
6.	Solid waste disposal	Waste management Plan	Dumping site	Monthly	HSE of Pyi Phyto Tun International	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

No.	Environmental Concerns	Parameters	Location	Frequency	Responsible Party	Remarks
					Co., Ltd.	
7.	Fire Hazardous	Visual inspection, fire extinguishers and regular check of combustible materials	In Pearl Operation area	Monthly	HSE of Pyi Phy Tun International Co., Ltd.	
8.	Environmental Auditing	Assess the compliance with this EIA, other existing environmental policy, law, rules and instructions	In Pearl Operation area	If necessary	Related Department and Pyi Phy Tun International Co., Ltd.	
Decommissioning Phase						
1.	Air quality	PM ₁₀ , PM _{2.5} , CO, CO ₂ , NO ₂ , SO ₂	One point in decommissioning area	Once before decommissioning	Pyi Pyo Tun International Co., Ltd. /Contractor	
2.	Noise Level	Noise Level dBA	One point in decommissioning area	Once before decommissioning	Pyi Pyo Tun International Co., Ltd. /Contractor	
3.	Water quality	pH, Color (True), Turbidity, Total Hardness, Calcium, Iron, Chloride, Sulphate, Total Solids, Suspended Solids, Chlorine	2 point – Marine water and spring water	Once before decommissioning	Pyi Pyo Tun International Co., Ltd. /Contractor	
4.	Sewage and wastewater	Regular Maintenance	Septic tank	Once before decommissioning	Pyi Pyo Tun International Co., Ltd. /Contractor	
5.	Solid waste disposal	Waste Management plan	Proposed dump site	Once before decommissioning	Pyi Pyo Tun International Co., Ltd. /Contractor	
6.	Rehabilitation	Replantation and Landscaping	project area	-	Pyi Pyo Tun International Co., Ltd.	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The following table describes the cost estimation for Environmental Monitoring and Supervision and these will cost annually. Prices may be varied according to the time and service providers

Table 8-4 Budget allocation for Environmental Monitoring Plan

Sr., No.	Monitoring items	Responsible person	Annual Estimated budget (USD) (provisional)	Frequency	Remark
Construction phase					
1.	Air quality	Contractor/ HSE Team of Pyi Phyto Tun International Co., Ltd.	1,200	Once	
2.	Noise Level		600		
3.	Water quality		1,500		
4.	Sewage and wastewater		1,000		
5.	Solid waste disposal		500		
6.	Fire Hazardous		200		
	Sub-Total		5,000		
Operation phase					
1.	Air quality	HSE Team of Pyi Phyto Tun International Co., Ltd.	1,200	Once a year	Field Measurement
2.	Noise Level		600		
3.	Water quality		2,500	Quarterly (pearl oyster panel cleaning house)	Field Measurement and Lab Analysis for Fresh water and treated water. Twice per year
				Two Times per year (Spring Water, Marine water, Kitchen and Dining room)	
4.	Sewage and wastewater		500	Twice per year (Once in Dry Season,	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Sr., No.	Monitoring items	Responsible person	Annual Estimated budget (USD) (provisional)	Frequency	Remark
				Once in Wet Season	
6.	Solid waste disposal		1,000	Annually	Follow up according to the EMP
7.	Fire Hazardous		300		
	Sub-Total		6,100		
Decommissioning phase					
1.	Air quality	Contractor/ HSE Team of Pyi Phyto Tun International Co., Ltd.	1,200	Once	Only field measurement is included.
2.	Noise Level		600		
3.	Water quality		1,500		
4.	Sewage and wastewater		1,000		
5.	Solid waste disposal		500		
	Sub-Total		4,800		
	Total		15,900		

8.3 BIODIVERSITY MANAGEMENT PLAN

The Pyin Sa Bu Kyun (Bentinck Island) is located in Bee Sart Aw (northern bay) at southwestern part of the Myeik Archipelago, 15.94 miles (25.65 km) far away from the Pandaung Kyun, also known as Letsok-aw island and 57.55 miles (92.62 km) far away from the Myeik Township. The bay is widely opened at the northern part whereas the southern part has small channel. Therefore, diurnal exchange of waterway system occurred during high and low tides. The visual of marine water is greenish in general view and imply with white sandy beach. In this area, the major ecosystems are coral reefs, mangrove, sandy beach and rocky shores.

According to the biodiversity field survey conducted by E Guard's biodiversity survey team on during 13th March 2019 to 15th March 2019, a total of 5 terrestrial fauna species by surveying, 15 terrestrial fauna species by interviewing, 48 flora species, 87 species of phytoplankton, 27 zooplankton species, 8 species of macro benthic organism, 8 species of gastropods, 4 species of bivalves, 1 species of chiton and 2 species of barnacles, 54 species of



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

coral, 22 species of finfish, 1 stingray, 1 squid, 2 crabs and 1 lobsters were recorded at around Pyin Sa Bu Island.

Table 8-5 Biodiversity Management Plan

Sr.	Activity	Residual Impact	Responsibility	Timing
1.	Terrestrial Fauna			
	<p>Awareness raising and comprehensive information of “Dos” and “Don’ts” to all employees at Pyin Sa Bu Kyun.</p> <p>Employees from Pyi Phyto Tun’s Pearl Farm must follow:</p> <ul style="list-style-type: none"> ✓ To dispose wastes according to the waste management plan ✓ Not to hunt or catch any wildlife ✓ To reduce the noise level as much as possible during their breeding season ✓ To note and inform to responsible officer when the employees saw strange species of fauna ✓ Not to distrust their daily habitats ✓ To inform any kind of irregularities (such as dead birds and animals) to authorities ✓ Maintain the forest area in Pyin Sa Bu Island as much as possible ✓ To be fully compliance with Protection of Wildlife and Conservation of Natural Areas Law (2018) 	Minor	Biodiversity Team of Pyi Phyto Tun’s Pearl Farm	Throughout the construction period, operation period and decommissioning period
2.	Flora			
	<p>Awareness raising and comprehensive information of “Dos” and “Don’ts” to all employees at Pyin Sa Bu Kyun.</p> <p>Employees from Pyi Phyto</p>	Minor	Biodiversity Team of Pyi Phyto Tun’s Pearl Farm	Throughout the construction period, operation period and decommissioning period



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Sr.	Activity	Residual Impact	Responsibility	Timing
	<p>Tun's Pearl Farm must follow:</p> <ul style="list-style-type: none"> ✓ To avoid to cut down of trees ✓ To dispose wastes according to the waste management plan ✓ To note and inform to responsible officer when the employees saw strange species of flora ✓ Maintain the forest area in Pyin Sa Bu Island as much as possible <p>To be fully compliance with Protection of Wildlife and Conservation of Natural Areas Law (2018)</p>			
3.	<p>Marine Biodiversity Environment</p> <p>Awareness raising and comprehensive information of "Dos" and "Don'ts" to all employees at Pyin Sa Bu Kyun.</p> <p>Employees from Pyi Phyo Tun's Pearl Farm must follow:</p> <ul style="list-style-type: none"> ✓ To be careful not to leakage fuel and oil from boat to marine environment ✓ Clean regularly of oyster which are hanging on longlines to reduce sedimentation to sea bed ✓ To avoid fishing in pearl farming area ✓ Not to play and destroy of coral reefs ✓ Not to hunt aquatic fauna ✓ To monitor according to biodiversity monitoring plan ✓ To abide according to waste management plan ✓ To reduce speed limit of 	Minor	Biodiversity Team of Pyi Phyo Tun's Pearl Farm	Throughout the construction period, operation period and decommissioning period



Sr.	Activity	Residual Impact	Responsibility	Timing
	motor boat			

8.4 Biodiversity Monitoring Plan

High-density stocking of pearl oysters can impact marine environment because the nutrients consumed (planktons) by the organisms and the deposition of feces. The effects of bio deposition can be a function of a number of factors including the type of infrastructure, stocking density, the type of material deposited, the assimilative ability of the particular environment and hydrology.

Coral reefs play an important role in the life cycle of pearl oysters and other organisms: they are substrates for reproduction, sources of nutrients for oysters and home to many fish and other organisms that play an important role in maintaining oyster health. In French Polynesia, for example, many smaller farms let reef fish remove biofouling from pearl oysters. This practice is founded on healthy fish populations that are often found in reef ecosystems.

Therefore, the monitoring program and assessment are important tools for effective management and can provide information to detect changes in condition that might trigger a management response, determine the cause of changes of concern, and evaluate the effectiveness of management actions for the sustainable development. Monitoring involves repeating surveys measures through time, usually with the aim of detecting change, such as trends in qualitative and quantitative analysis of phytoplankton, zooplankton as well as coral cover.

The frequency of data collection needs to take into account which depend on the magnitude and time scale of potential impacts. Potentially influenced communities are likely to respond slowly and changes will occur gradually.

Table 8-6 Biodiversity Monitoring Plan

No.	Environmental Concerns	Parameters	Location	Frequency	Responsible Party	Remarks
Construction Phase						
1.	Biodiversity Environment (Terrestrial)	Terrestrial Fauna	Pearl Farm of Pyin Sa Bu Island	Once in Construction period	Biodiversity experts and Biodiversity Teams of Pyi Phyo Tun's Pearl Farm	
2.		Flora		Once in Construction period		
3.	Biodiversity Environment (Marine)	Phytoplankton	Station 1,2,3,4 which are	Once in Construction period		



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

No.	Environmental Concerns	Parameters	Location	Frequency	Responsible Party	Remarks
4.		Zooplankton	mentioned in baseline data	Once in Construction period		
5.		Coral Reef	Station 1,2,3,4,5 which are mentioned in baseline data	Once in Construction period		
6.		Fishes	Pyin Sa Bu Island marine area	Once in Construction period		
7.		Benthos	Station 1,2,3,4,5,6,7 which are mentioned in baseline data	Once in Construction period		
8.		Mollusks	mentioned in baseline data	Once in Construction period		
Operation Phase						
1.	Biodiversity Environment (Terrestrial)	Terrestrial Fauna	Pearl Farm of Pyin Sa Bu Island	Once per year	Biodiversity experts and Biodiversity Teams of Pyi Phyotun's Pearl Farm	Monitoring Period in 1 st year, 2 nd year and 3 rd year
2.		Flora		Once per year		
3.	Biodiversity Environment (Marine)	Phytoplankton	Station 1,2,3,4 which are mentioned in baseline data	Once per year		
4.		Zooplankton				
5.		Coral Reef	Station 1,2,3,4,5 which are mentioned in baseline data	Once per year		
6.		Fishes	Pyin Sa Bu Island marine area	Once per year		
7.		Benthos	Station	Once per		



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

No.	Environmental Concerns	Parameters	Location	Frequency	Responsible Party	Remarks
			1,2,3,4,5,6,7	year		
8.		Mollusks	which are mentioned in baseline data	Once per year		
Decommissioning Phase						
1.	Biodiversity Environment (Terrestrial)	Terrestrial Fauna	Pearl Farm of Pyin Sa Bu Island	Once in Decommissioning period	Biodiversity experts and Biodiversity Teams of Pyi Phy Tun's Pearl Farm	
2.		Flora		Once in Decommissioning period		
3.	Biodiversity Environment (Marine)	Phytoplankton	Station 1,2,3,4 which are mentioned in baseline data	Once in Decommissioning period		
4.		Zooplankton		Once in Decommissioning period		
5.		Coral Reef	Station 1,2,3,4,5 which are mentioned in baseline data	Once in Decommissioning period		
6.		Fishes	Pyin Sa Bu Island marine area	Once in Decommissioning period		
7.		Benthos	Station 1,2,3,4,5,6,7 which are mentioned in baseline data	Once in Decommissioning period		
8.		Mollusks		Once in Decommissioning period		



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 8-7 Cost Estimation for Biodiversity Monitoring Plan

S/N	Item	Price (USD)	Unit	Day	Amount (USD)	Remark
1	Compressor	2000	1	-	2000	SCUBA Gears
2	Tank	400	6	-	2400	
3	Regulator	1500	2	-	3000	
4	Computer	1700	2	-	3400	
5	BCD	1200	2	-	2400	
6	Wet suit	400	2	-	800	
7	Mask	150	2	-	300	
8	Snorkel	50	2	-	100	
9	Fins	250	2	-	500	
10	Boots	70	2	-	140	
11	Gloves	50	2	-	100	
12	Guage	250	2	-	500	
13	Srurface marker	70	2	-	140	
14	Per diem fees	10	4	10	400	Monitoring
15	Professional fees	800	4	-	3200	
16	Sampling materials	100	-	-	100	
17	Reporting	800	-	-	800	
Subtotal					20280	
Contingency 5%					1014	
Grand total					21294	

8.5 Waste Management Plan

The proposed project is located on the isolated island associated both terrestrial and marine environment. To protect and reduce the impact on these environments, waste management plan plays the critical role. To reduce the impact from waste disposing, the project proponent must locate the final disposal point which will be at least 50 ft far away from staff house to dispose solid wastes for the purpose of burying and burning. General wastes from operation, staff houses and kitchen and dining room will be collected in separated bins and sorted the



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

wastes and some dry wastes will be burned in designated disposal point and wet wastes will be buried.

Table 8-8 Type of Wastes and Sources

Waste Type	Source	Estimated Amount
plastic (drink bottle, used bath room products, used snack bags, etc.), paper, cans, leftovers, organic wastes (flowers and plants, branches, leaves, grass)	Kitchen, Dining room, staff house	36 kg/day
Liquid waste	Kitchen, Dining room, staff house and toilets	5400 gal/day
Oyster's shell	Laboratory/ Operation Room	30060 pcs/year
Used nets, panels, ropes, floating balls	Floating house, panel cleaning house, longlines	-
Organic wastes (barnacles, seaweeds off, biofouling, boring organisms)	Floating house, panel cleaning house, longlines	-
Oil can, paint solvent	Maintenance house	-

8.5.1 Waste Management Plan for Pearl Oyster Breeding and Pearl Production Operation Process

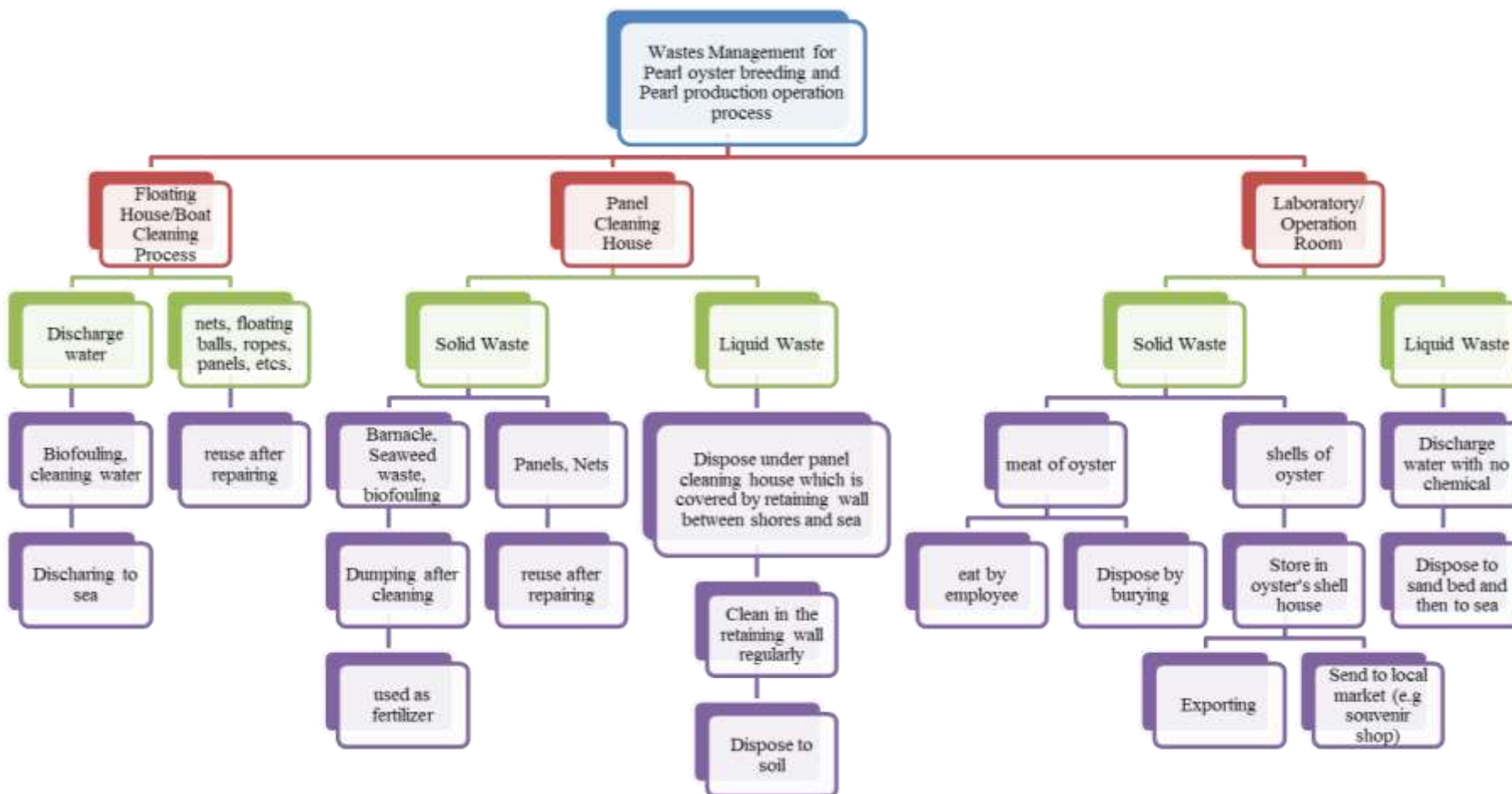


Figure 8-1 Waste Management Plan for Pearl Oyster Breeding and Pearl Production Operation Process

8.5.2 Waste Management Plan for staff house and kitchen

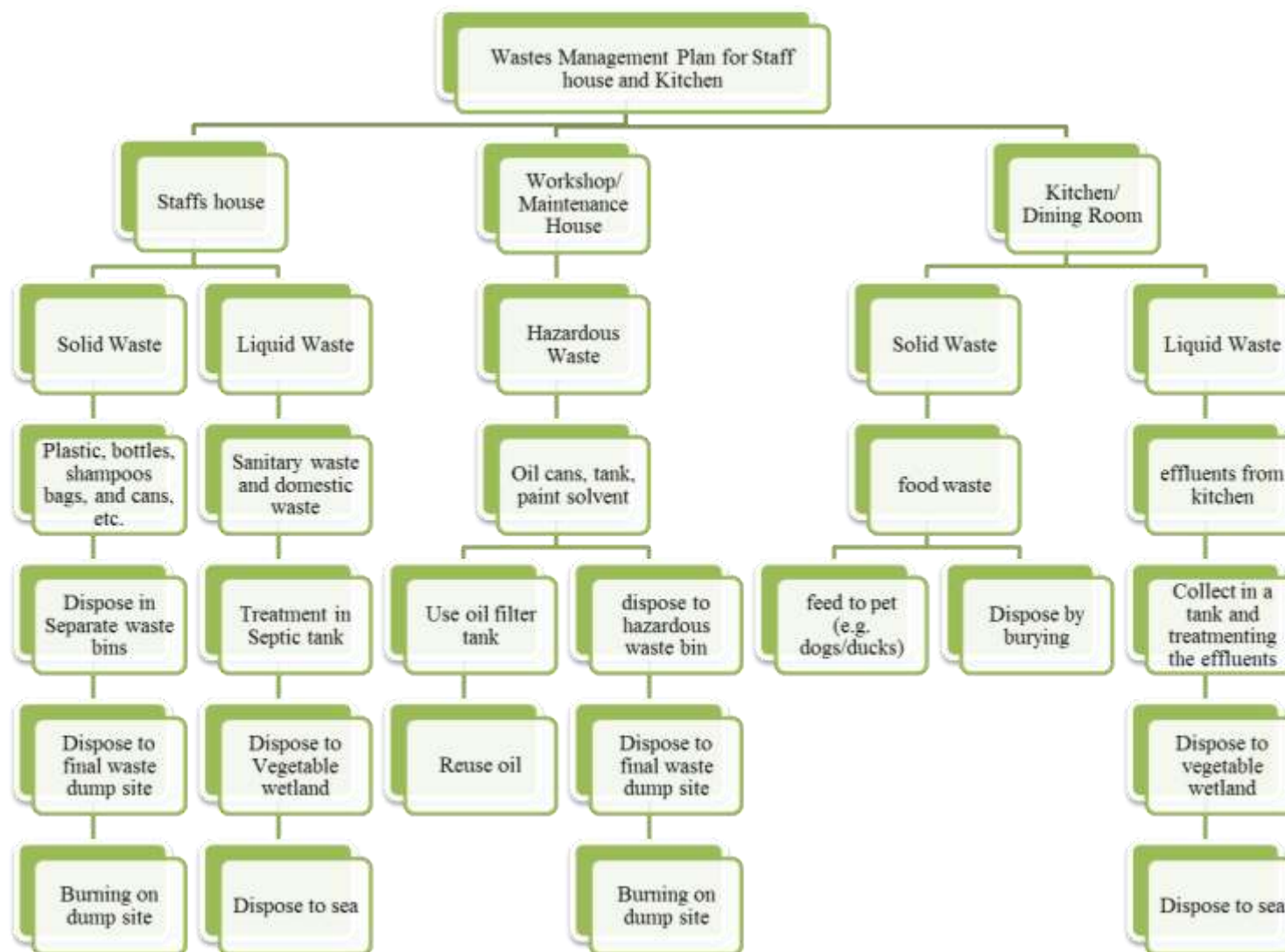


Figure 8-2 Waste Management Plan for Staff House and Kitchen



The proponent shall abide the following practices to implement the waste management plan:

- ✓ To use separate bins to dispose according to the sorts of wastes
- ✓ To educate strictly to the employees not to dispose plastics waste in marine environment
- ✓ Not to release the discharge wastes from panel cleaning house and operation room directly to sea and should use appropriate treatment system
- ✓ To store oyster shells in designed storage house
- ✓ To clean regularly under panel cleaning house
- ✓ Burning process should be done far away from staff house and operation area (at least 1000 ft away)

8.6 Occupational Health and Safety Plan

The project proponent should appoint one Health, Safety and Environment (HSE) Coordinator for Health, Safety and Environment (HSE) issues throughout the lifespan of the pearl culture project. HSE Coordinator is responsible for implementation and monitoring of Environmental Management Plan (EMP) and Monitoring Plan as well as coordination with Proponent, local authorities and the nearby communities. HSE coordinator also makes regular review of EMP to cover all potential impacts, amendments and modifications. The employees of the Pyi Phyto Tun's Pearl Farm must meet the following activities to implement Occupational Health and Safety Plan.

Table 8-9 OHSE plan

Phases	Activities
Preparation, Operation and Demolishing/Closure Phases	Safety Training
	First Aid Training
	Basic Fire Fighting Training
	Annual Health Examination
	Emergency Preparedness and Response Training

8.7 Community Health and Safety Plan

This community health and safety plan is intended to improve environment conditions which affect the surrounding communities. This can be placed in safe condition by adopting the following measures for prevention of accidents and hazards.

(a) Community Diseases

- Developing and implementing the health awareness training
- Providing health services of community health clinic



- Promoting collaboration with local authorities to enhance the awareness of public health services and facilities to the workers' families and community

(b) Safety and Security

- Trespassing by workers must be prohibited and the appropriate disciplinary action must be taken.
- Access to construction sites must be restricted
- Precaution and warning sign for health and safety risks must be placed around the project site
- Public awareness programmes must be developed to know the potential impacts of pearl culture project

8.8 Emergency Preparedness and Response Procedures

Emergency response procedures and systems are those procedures for handling sudden or unexpected emergency situations. These objectives are:

- Prevent fatalities and injuries to workers
- Protect the environment and people in the community
- Reduce damage to building, stock and equipment,
- Accelerate the resumption of normal operations

The project proponent should prepare an emergency preparedness plan in order to prevent the consequences of natural disasters such as fire, landslide 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 pearl culture project. The prevention, preparedness and response plan for fire hazards and landslides are described as follows:

8.8.1 Natural Hazardous

8.8.1.1 CYCLONES

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 and 18% 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 (eg. The Cyclone Nargis), there is



uncertainty that cyclones will not cross the southern coastal zone of Myanmar in the near future.

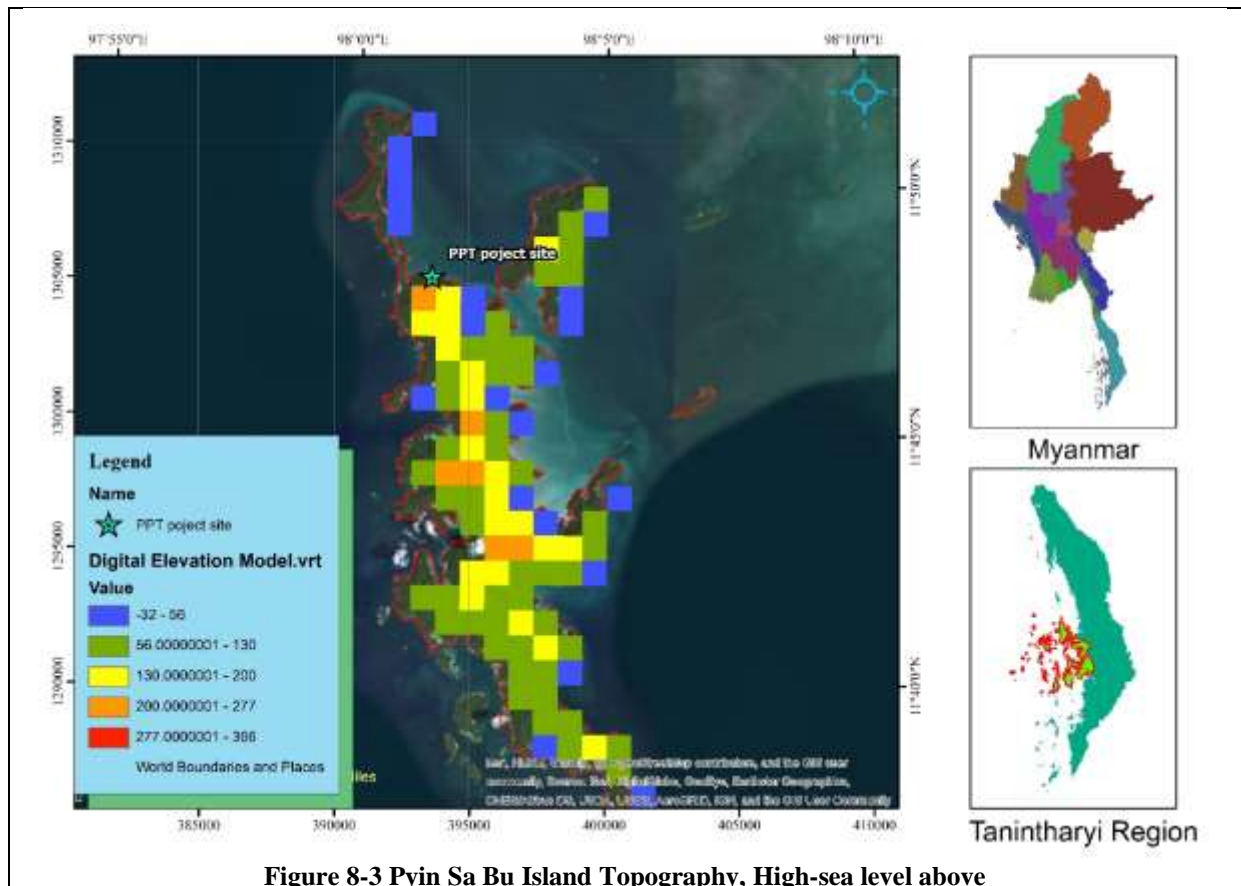
According to the literature, while comparing three Myanmar major coastline, Rakhine, Ayeyarwady and Tanintharyi, Tanintharyi region had least major cyclone hit. The location of proposed project is located within the gulf makes it less impacted range of effects of cyclones and storm surges.

8.8.1.2 STORM SURGE

Storm surge is an extraordinary flooding due to a storm. It generally occurs due to waves generated by the strong wind in tropical revolving storms. The slope of the coastline is considered as one of the important factors controlling the intensity of storm surge. Myanmar, borders with the Bay of Bengal and the Andaman Sea, with its 2400 km long coast line are potentially threatened by the waves, cyclones and associated weather.

8.8.1.3 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.



8.8.2 Natural Hazards Response Plan

- 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 both employees and guests.

8.8.3 Fire Prevention, Preparedness and Response

Oil barrel and diesel will be stored in the project compound for the generator use; without proper storage, there is a high risk of fire hazards. Therefore, the emergency response plan for fire hazards is described as follows:

- Keep use and storage of combustibles to a minimum.
- Store flammable liquids in approved containers in well-ventilated storage areas.
- Smoking is totally prohibited near the storage area of flammable liquids.

- Place oily polishing rags or waste in covered metal cans.
- Store adequate quantity of water for firefighting
- Fire extinguishers should be provided in the project site. It is very effective life-saving tools, if they are used properly. Fire extinguishers come in different varieties. It is important to choose the right kind of extinguishers for putting out different types of fire. Check for the following symbols on the label of fire extinguishers as shown in **Figure -2**.



Figure 8-4 Components of a Fire Extinguisher

Fires have been classified into five categories based on the type of fuel as follows:

Types of Fires				
A	B	C	D	
Fire that is burning from wood, rubbish, paper and other ordinary fuels.	Fire that involves flammable liquids, such as petrol, gasoline and paints.	Fire that involves electrical equipment, transformers and electrical appliances.	Fire that is burning from combustible metals such as magnesium and titanium.	Fire stemming from cooking media (vegetable or animal oils and fats, etc.)

Type A, B and C of fires can occur at the project site during preparation, operation and decommissioning/closure phase. Although there are many kinds of fire extinguishers, the most appropriate fire extinguishers should be used for the pearl culture operation as shown in Figure 8-4.

Extinguisher	Type of fire					
	Color	Type	Solids (wood, paper, cloth, etc.)	Flammable Liquids	Flammable Gases	Electrical Equipment
	Red	Water	Yes	No	No	No
	Yellow	Foam	Yes	Yes	No	Yes
	Blue	Dry Powder	Yes	Yes	Yes	Yes
	Black	Carbon Dioxide (CO2)	No	Yes	No	Yes
	Green	Halon	Halon extinguishers are not recommended due to their toxic nature and ozone damage to the environment. Existing halon extinguishers will no longer be re-filled and should be replaced with a suitable alternative.			

Figure 8-5 Types of Fire Extinguishers

Uses of a fire extinguisher properly

Remember the acronym **PASS**.



P – Pull the pin- the pin releases a locking mechanism and will allow you to discharge the extinguisher.



A - Aim at the base-not the flames. This is important- in order to put out the fire, you must extinguish the fuel.



S – Squeeze the trigger – this will release the extinguishing agent in the extinguisher. If the handle is released, the discharge will stop.



S – Sweep from side to side – using a sweeping motion, move the fire extinguisher back and forth until the fire is completely out. Operate the extinguisher from a safe distance, several feet away, and then move towards the fire once it starts to diminish. Be sure to read the instructions on your fire extinguisher different fire extinguishers recommend operating them from different distances.



Safety Tips on Fire

Do's to prevent a fire	Don'ts to prevent a fire
<ul style="list-style-type: none">• Keep fire extinguishers in the project site.• Keep a separate water tank for fire extinguishing.	<ul style="list-style-type: none">• Do not let children play with fire.• Do not use lamps, candles, etc. near bamboo sheet/ wooden partitions or mosquito nets.• Do not pile hay or corn stems near houses.• Do not use petrol for lighting or start a fire.• Do not store fuel and fuel oil near the fire place.• Do not use higher or candle light near fuel oil.

8.8.4 Landslide Prevention, Preparedness and Response

Land Conversion can occur due to removal of existing vegetation, large excavation activities in the ground. So, the prevention, preparedness and response plan for a landslide are described as follows:

- Keep records of erosion, landslide masses.
- Never construct buildings on the debris without the proper analysis of ground stability and resistance. Loosened masses can subside when load is added to them.
- Try to protect the slopes. Prevent people from excavating, removing materials from the soil or cutting trees without proper advice from the technical experts.
- Avoid building houses at the base of slopes that are prone to landslides.
- Replant trees where they have been removed to prevent soil erosion.
- Prevent deforestation and vegetation removal.
- Avoid weakening the slope.
- Retaining walls efficiently reduce localized landslide hazards, like in the case where cuts into the slopes are needed to build a road or a house as shown in **Figure 8-6**. However, they have to be used with caution because they might also increase the hazard if water in the soil is not allowed to drain properly.
- Proper water runoff must be ensured, especially where houses and roads have disrupted the natural flow patterns. This can be achieved by providing a proper canalization network.
- Drainage: good ground drainage is essential to prevent saturation and consequent weakening.
- Reforestation: Root systems bind materials together and plants, both prevent water percolation and take water percolation and take water up out of the slope. Tree roots help holding the different soil layers together and hinder landslides as shown in **Figure 8-7**.

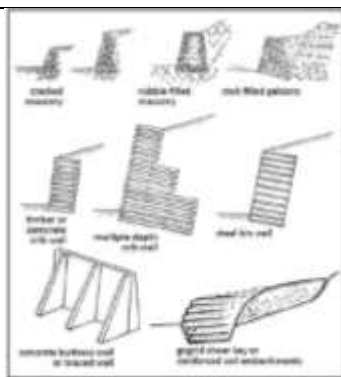


Figure 8-6 Examples of low-cost retaining walls

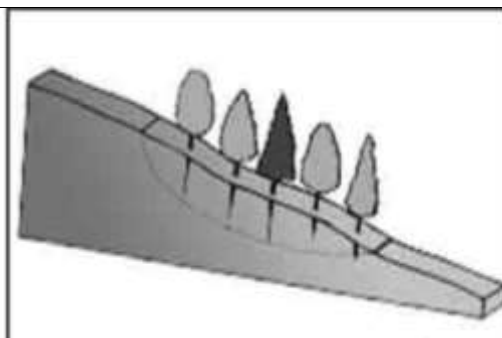


Figure 8-7 Tree roots help holding the different soil layers together and hinder landslide

Safety Tips on Landslide

Do's to prevent landslide	Don'ts to prevent prevent
<ul style="list-style-type: none"> • Listen to weather forecasts on the radio, TV about heavy rain. Continuous heavy rainfall within a period of a few hours has the potential to trigger landslides. • Listen for abnormal sounds of soil and rock movement or breaking of trees. They may be associated with landslide movements. • Contact your local authority, village disaster preparedness committee, fire services department, or Myanmar Police Force. Local officials are the best persons who are able to assess potential dangers. • If you are near a stream or channel, be alert for any sudden increase or decrease in water flow and for a change from clear to muddy water. Such changes may indicate debris flow activity upstream, so be prepared to move quickly. 	<ul style="list-style-type: none"> • Do not build near steep slopes, close to mountain edges, near drainage ways or natural erosion valleys. • Never go closer to observe cracks on the slope. If you spot cracks, inform the authorities and move out from the area.

During Landslide and After a Landslide

During Landslide	After a Landslide
<ul style="list-style-type: none"> • Quickly move out of the path of the landslide or debris flow. Moving away from the path of the flow to a stable area will reduce your risk. • If escape is not possible, curl into a tight ball and protect your head. A tight ball will provide the best protection for your body. 	<ul style="list-style-type: none"> • Stay away from the slide area. There may be danger of additional slides. • Listen to local radio or television stations for the latest emergency information. • Replant damaged sites as soon as possible since erosion caused by loss of ground cover can lead to flash flooding. • Seek the advice of a geotechnical expert for evaluation landslide hazards or designing corrective techniques to reduce landslide risk. A professional will be able to advise you on the best ways to prevent or reduce landslide risk, without creating further hazard.



8.8.5 Oil Spill Response Plan

Any oil spills, regardless of size must be contained and cleaned up in a safe and effective manner. Spills that can threaten public health or the environment will need to be attended immediately. In order to determine the proper response procedures, type of discharges can be classified into “incidental” and „non-incidental” depending on the following characteristics

8.8.5.1 OIL SPILL RESPONSE CRITERIA

Incidental discharges	Non-Incidental discharges
The discharge is small (e.g., less than 20 gallons)	The discharge is large enough to spread beyond the immediate area.
The discharge can be easily contained	The discharge cannot be contained
The discharge is unlikely to reach a navigable waterway, storm sewer or sanitary drain	The discharge may reach a navigable waterway, storm sewer, or sanitary drain
Cleanup procedures do not pose a health or safety hazard	The discharge requires special equipment or training to clean up
Proper response equipment is available for a safe clean up	The discharge poses a hazard to human health or the environment

8.8.5.2 STEPS FOR OIL SPILL RESPONSE

If the responder comes across a potential oil release, follow the following steps:

- **Incidental Spills**
 - ✓ Secure the site, for protecting the health and safety of personnel responding to the release and the community close by.
 - ✓ Control and contain the spill using nearby absorbent booms, socks or soil.
 - ✓ Notify the HSE Coordinator
 - ✓ Clean up the spill- record the quantity of spill
 - ✓ Complete the Spill Incident Report –to provide accurate information and organize training sessions to prevent future spills.
- **Non-Incidental Spills**
 - ✓ **Secure the site**, for protecting the health and safety of personnel responding to the release and the community close by.
 - ✓ **Contact the HSE Coordinator** and decide if the site personnel can control and contain the spill effectively.
 - ✓ **Contact the nearest Fire Department** for major spills to help assist with the control and containment of the release.
 - ✓ **Control and contain the spill** using absorbent booms, socks and soil until the fire department arrives. Focus on storm sewers and nearby waterways.
 - ✓ **Clean up the spill**-Oil and lubricant reclaimed after the spill will be recorded on the Oil Spill Disposal Record.
 - ✓ Complete the Spill Incident Report- to provide accurate information efficiently to the spill response authorities.



8.8.6 Corporate Social Responsibility (CSR) Plan

Pyi Phyo Tun International Company Limited implements Corporate Social Responsibility (CSR) plan together with EMP during its 30 years operation period. The objective of this plan is to create social welfare of miners and the local community, and to prove that the establishment of proposed of the pearl culture project. Even though the project proponent participates in implementation of CSR plan using 2% of the net profit starting from the very first year of the project, the company focuses more on regional development. A CSR plan formulated for the proposed project can be described in Table 8-10.

Pyi Phyo Tun International Company Limited has planned the commitments with Environmental Conservation Department under the Ministry of Natural Resource and Environmental Conservation Depart (MONREC).

Table 8-10 Corporate Social Responsibility Plan

No.	Activity	Responsible Company	Frequency	Estimated Amount (% of Net Profit)
1.	All around development in schools	Pyi Phyo Tun International Company Limited	Annually	0.4%
2.	Contribution to communication	Pyi Phyo Tun International Company Limited	Annually	0.4%
3.	Contribution to employees for health and wellbeing, retirement planning, training and development, social welfare	Pyi Phyo Tun International Company Limited	Annually	0.8%
4.	Contribution to regional development	Pyi Phyo Tun International Company Limited	Annually	0.4%
Total				2.0%

8.8.7 Community Grievance Redress Mechanism

People who live in the project effective area or stakeholders can complain about the impacts that they suffer though Grievance Committee, which includes the responsible persons of Pyi Phyo Tun International Company Limited quarter administrator and representative of Township Fire Department. Small issues are solved at the Grievance Committee stage and other unresolved problems are submitted to higher responsible authorities and finally decided by the court in legal terms. The following diagram show steps of Grievance Redress Mechanism of Pyi Phyo Tun International Company Limited.

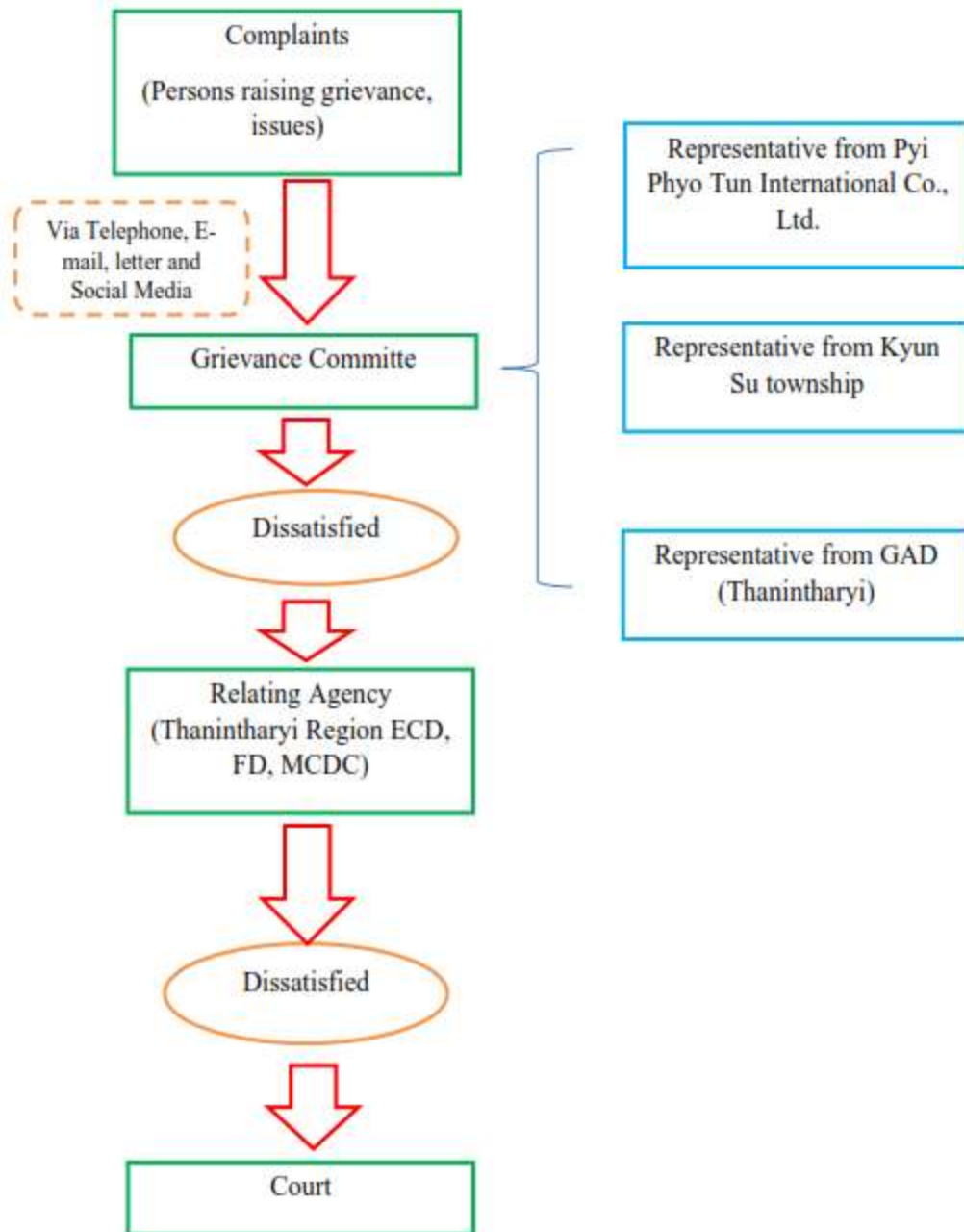


Figure 8-8 Steps of Grievance Redress Mechanism of Pyi Phyto Tun International Co., Ltd.



Chapter (9) PUBLIC CONSULTATION AND DISCLOSURE

9.1 Necessity of Stakeholders Meeting

According to the Environmental Impact Assessment Procedure (2015), stakeholder meeting is one of the necessities processes to perform EIA study. Public disclosure is required to hold in the scoping stage 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.

9.2 Define Public Consultation

Consultation meeting was held at Basic Education High School, Pa Htet Village, Myeik Township, Tanintharyi Region with various interested parties including government organizations, administrative, zone committee members 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) Government Sectors
- (2) Local communities, potentially affected person in the project area, and other interested people related with this project.

9.3 Public Consultation Process

Public participation can be considered as the required element of the EIA process. In this EIA study, couples of stakeholder's participations were made. On 28th July 2019, a public consultation and disclosure ceremony was held at Basic Education High School, Pa Htet Village, Kyun Su Township, Myeik District, Tanintharyi Region in order to disclose the project information to the following personnel:

- Institutions (Local or Government Authorities at Kyun Su Township)
- Individuals (Groups with special interests, business community etc.)
- Project affected people around Kyun Su Township and Myeik
- Interested persons (politicians and religious leaders, etc.)

It is aimed at disclosing the findings of environmental and social studies and the likely impacts upon them as well as mitigation and monitoring schemes to remediate the impacts caused by the project activities. The impacts were studied for all activities to be carried out in three phases: construction phase, operation phase and decommissioning phase it is also aimed at receiving public recommendations, feedbacks upon the studies. Presentation activity photos of public hearing and consultation, ceremony is mentioned in the **Figure**. The public hearing consultation meeting's agenda was held according to the following program:



E Guard Environmental Services Co., Ltd.

**Meeting Minutes****Subject:** Pyi Phyto Tun Oyster Breeding and Pearl Cultivation Project Public Consultation for EIA stage**Date:** 28th July 2019**Venue:** Basic Education High School (Pa Htet)**Time:** 9:00 AM -12:00 PM**Attendees:**

Member of Parliament	-	2
Governmental Staff	-	22
Local Stakeholders	-	127
Private Staff	-	40
Media	-	10
Total	-	205

Note Taker: Nway Phyu Pyar Oo (Project Assistant)**9.3.1 Agenda:**

Agenda (1)	Registration
Agenda (2)	Opening Remarks by U Min Oo, Kyun Su Township Administrator
Agenda (3)	Presentation of Project Outline by U Maung Maung Twin, Manager of Pyi Phyto Tun International Co., Ltd.
Agenda (4)	Presentation of EIA by U Soe Min, Director of E Guard Environmental Services
Agenda (5)	Exchange Opinions, Questions and Answers
Agenda (6)	Closing Remarks by U Hla Soe, Yay Kan Taung Township Administrator



9.3.2 Public Consultation's Meeting Minute of Pearl Culture Project

1. Opening Remarks by U Min Oo, Kyun Su Township Administrator

2. Presentation of Project Outline by U Maung Maung Thwin, Manager of Pyi Phyo Tun International Co., Ltd

3. Presentation of EIA by U Soe Min, Director of E Guard Environmental Services

4. Discussion

(a) **U Khun Lwin (Local):** How will you protect the project site area so that it will not be like the disposal site in future due to the project? Will PPT become the island owner? How will you deal with opposition to the project?

U Maung Maung Twin (Manager): We (PPT International Co., Ltd) will take full responsibility to protect the environment. Since our project nature also demands clean environment in order to breed oysters successfully for pearl cultivation, we assure that there will be no impact on the environment due to our project.

U Soe Min (Director): For island owner question, PPT only receives the work permit to operate its project on the island and it does not mean it will become the permanent island owner. Local people can still obtain access to the island and they can also visit onto the island with proper request. As in the case of opposition, we fully aware of those opposition and will consider their feedback and suggestion for our future operation.

U Khun Lwin (Local): In my opinion, it would be better to conduct public consultation in the project site so that attendee can observe the current condition of project operation by themselves which may, in turn, help to understand more about the project.

(b) **U Kyi Htwe, (Restaurant Owner Association):** Some of the customers asked that they would like to visit to Pearl Island but we have heard that access to these islands is not permitted. Since tourism is one of the main businesses in Myeik, we (Restaurant Owner Association) would like to request the responsible authorities to allow travel permit to these pearl islands for visit., In my opinion, by doing so will not only promote tourism sector but also allow customers to buy the pearl with more reasonable prices than buying them in the market. So, we would like to encourage all the owners of pearl cultivation project to participate with us in order to promote tourism in Myeik.

MONREC: Total 5 pearl islands (2 in Myeik and 3 in Kaw Taung) have been granted permit for tourism visit and we will continue to grant access to more islands in accordance with the market demand and the instruction of central government.

(c) **Dr. Wah Wah Min (Zoology Professor, Myeik University):** I have heard that only one species of oyster is suitable for pearl cultivation and I would like to know



whether another species will be able to use for pearl cultivation process. Since that project is one of the sources of foreign income in the region, I would like to suggest the company to provide job opportunities for local people and contribute in local and regional development processes. I firmly believe that by doing so will lead to win-win situation.

U Maung Maung Twin (Manager): Currently, only one species of oyster is used for the pearl cultivation process since there is still no alternative species for that process. Even though another species of oyster can be breed for pearl cultivation, the produced pearl is found to be low quality and is not suitable for the market. Currently we have implement research for that but it is still in its early stage. We also operate our project to be in accordance with the surrounding environment since we fully aware that getting support from local people is the only to be successful in the future.

- (d) **U Kyi Lwin (Assistant Director, Myeik ECD):** I would like to know whether there is any waste disposal plan for the project and I would like to suggest planning for waste disposal in the future.

U Soe Min (Director): Detail plan for waste disposal are described in detail in the Pyi Phyto Tun EIA report. Today's presentation is only focused on the potential impacts due to the project and their mitigation measures.

- (e) **U Myo Thura (Deputy Officer, Myeik ECD):** Is the environmental monitoring plan is sufficient for the project? If it is sufficient, could you please give me the reason?

U Soe Min (Director): Yes, the plan is sufficient because the nature of this project which is located on the island, is different from other projects located on the land.

- (f) **U Kyi Lwin (Assistant Director, Myeik ECD):** Since the project site is located far from the coast and present long line in the sea, how will you manage travelling to and near the project site to avoid boat accidents?

U Aung San (Co-Manager): We have placed guards near the long line and project areas and whenever the boats approach near the project area, they will guide them through the area to avoid long line placed in the sea.

- (g) **Dr. Htoo Nay Aung (Regional Hluttaw Representative):** I have found out the difference between the date included in MIC proposal and that in the book and also the maps. I would like to suggest to send the final EIA book to the Hluttaw when it gets approve from ECD. And then Project site is located in the Kyun Su Township so that around project area need to get CSR plan first. Is there any plan for Social Impact Assessment?

U Maung Maung Twin (Manager): There are two maps: one from Myanmar Pearl Enterprise and one from estimated square feet map. When our production stage starts, we donated 2% of the CSR fund, but our production does not start yet.

U Soe Min (Director): Social impact is ready include in Environmental Impact Assessment. In the Environmental Impact Assessment report: the following are included: there are water quality, air quality surrounding environment, social survey



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

and biodiversity. We have to discuss with project proponent whether can follow it or not. When the report preparing is finished, the project proponent reports to Environmental Conservation Department.

Closing Ceremony

Closing Remark by U Hla Soe, Yay Kan Taung Township Administrator. He thanked to all attendees for this public consultation.

Stakeholders' Meeting Photos Records



Registration Area



Registration Area



Registration



Registration



Introduction by U Min Oo (Township Administrator)



Presentation about the pearl process by U Mg Mg Thwin



Presentation about the EIA by U Soe Min



Presentation about the EIA by U Soe Min



Question and Discussion by U In Mg Shwe (Local people, Yay Kan Taung)



Answer by U Mg Mg Thwin



Question and Discussion by U Kyi Htwe (Chairman, Myanmar Restaurant Association)



Question by Daw War War Min (Lecturer, Zoology Department, Myeik University)



Question by U Kyi Lwin (Assistant Director, ECD)



Answer by U Soe Min



**Question and Discuss by Dr. Htoo Nay Aung
(Regional Hluttaw Representative)**



**Question by U Zun Mg Mg (Editor-in-chief, The
Mirror Newspaper)**



**Thank Words by U Hla Oo (Village Tract Leader,
Yay Kan Taung Village Tract)**



Attendees



Attendees



Attendees



The detail Presentation files are attached in Appendix (11) and (12).'

9.3.3 Recommendation from Attendees

Among the 205 of attendees, the recommendation and comment forms from 6 of attendees were received to implement the project of pearl culture and regional development program. The recommendation and comments forms from attendees are attached in **Appendix (14)**.

9.4 Disclosing of Environmental Impact Assessment (EIA) for Pearl Culture Development Project

ပြည်ဖြိုးထွန်း အပြည်ပြည်ဆိုင်ရာ ကုမ္ပဏီလီမိတက်၏ မှတ်ကောင်သားဖောက်ခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်းနှင့် ပတ်သက်၍ရေးသားပြုစုထားသော ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာ (EIA) ကိုအများပြည်သူများဝင်ရောက်လေ့လာသုံးသပ်၍ အကြံပြုချက်များပေးနိုင်ပါရန် အောက်ပါနေရာများတွင် ဖြန့်ဝေပေးပို့ထားရှိပါသည်။

၁။ ပြည်ဖြိုးထွန်း အပြည်ပြည်ဆိုင်ရာ ကုမ္ပဏီလီမိတက်၊ အမှတ် (၁၅)၊ ၁၁လမ်း၊ လမ်းမတော်မြို့နယ်၊ ရန်ကုန်မြို့၊ ရန်ကုန်တိုင်းဒေသကြီး

၂။ ပြင်စာကျွန်း (ပုလဲမွေးမြူခြင်းနှင့် ပုလဲထုတ်ယူခြင်း စီမံကိန်းတည်နေရာ)၊ ရေမြစ်ကြီး ကျေးရွာအုပ်စု၊ ကျွန်းစုမြို့နယ်၊ မြိတ်ခရိုင်၊ တနင်္သာရီတိုင်းဒေသကြီး

၃။ အီးဂတ်ပတ်ဝန်းကျင်ဆိုင်ရာ ဝန်ဆောင်မှုကုမ္ပဏီ၏ဝက်ဘ်ဆိုက်

(<http://www.eguardservices.com/disclosure>)

၄။ ကျွန်းစုမြို့နယ်အုပ်ချုပ်ရေးမှူးရုံး၊ မြိတ်ခရိုင်၊ တနင်္သာရီတိုင်းဒေသကြီး

၅။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ မြိတ်မြို့နယ်၊ မြိတ်ခရိုင်၊ တနင်္သာရီတိုင်းဒေသကြီး။



Chapter (10) CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusion

This Environmental Impact Assessment (EIA) Report and Environmental Management Plan (EMP) was prepared by E Guard Environmental Services Co., Ltd. for Pearl Culture Development Project proposed by Pyi Phyto Tun International Company Limited. The main objective of the study is to identify the major environmental impacts due to the implementation of the project activities in all three phases (preparation phase, operation phase and decommissioning phase). Environmental Impact Assessment (EIA) has been conducted for the proposed project under the Environmental Impact Assessment Procedure as per the comments of Environmental Conservation Department (ECD). The project proponent has to implement the proposed project in compliance with the National laws and regulations for environmental protection.

In this EIA report study, baseline environmental data collection and site visit activities conducted on 13th 14th March, 2019. According to the data interpretation for ambient air quality, noise level and water quality results were compared with National and Environmental Quality (emission) guideline and international guideline standards. According to the observed data, dust level of PM10 and PM 2.5 are within the guideline value. Other gases are within the limit of guideline values. Noise level results are also within the acceptable limit of guideline values. Surface water results consist among parameter within the limit of guideline values but aluminum parameter is exceeding the limit of guideline values. Therefore, if this surface water is used, it must be purified. Waste water point (1) results consist among parameter are within the limit of guideline values but Total suspended solids and Biochemical oxygen demand are exceeding the limit of guideline values. Waste water point (2) results consist among parameter are exceeding the limit of guideline values. Therefore, these waste water must be treatment with waste water treatment system. Therefore, there is low significant impact to the environmental and socio-economic.

According to the data from field survey, there are 23 species of fauna, 48 species of flora, 87 species of phytoplankton, 27 species of zooplankton, 8 species of benthos, 8 species of gastropods, 4 species of bivalves, 1 species of chiton, 2 species of barnacles, 54 species of coral and 22 species of fishes recorded in IUCN red-list status. Project proponent have to follow biodiversity management plan to avoid harmful impact on them. Biodiversity Management Plan have also to be implemented by the proponent by appointing Biodiversity Management Officer. Biodiversity Management Officer need to cooperate with HSE Coordinator and they are responsible to implement the biodiversity management plan and need to revise per yearly if it is necessary.

This project can create job opportunities for local people in all three phases. The assessment of each impact is based on consideration of the magnitude, duration, extent and probability of activities which are going to be carried out during preparation, operation and decommissioning phases. The impacts for the environment are mostly low during the implementation of the project. All of the impacts during preparation, operation and



decommissioning phases can be minimized by using mitigation measures and implementing Environmental Management Plan.

Environmental Monitoring Plan (EMOP) must need to implement for monitoring the environmental quality of the proposed project. Then, the estimated budget need for implementing Environmental Management Plan and Environmental Monitoring Plan are mentioned in this report. Moreover, CSR plan, firefighting plan, emergency preparedness and response plan, mine closure plan and grievance redress mechanism to solve the complaints related with the proposed project are also described in this report. It is also necessary to consider every opinion of all stakeholder potential to be affected by the development of the proposed project.

10.2 Recommendations for Future Works

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 EMP is approved by concerned authorities, strict implementation is essential.
- ✓ For full and proper implementation of EMP, well understanding and supports by proponent and authority is deem necessity.
- ✓ Well experienced and knowledgeable HSE Manager and HSE Assistants shall be appointed.
- ✓ Daily, monthly and annual action plan shall be formulated based on this EMP and practiced at operation level.
- ✓ Keep full records of environmental management activities and present to annual independent third-party environment audit.
- ✓ Follow the audit report and comments.
- ✓ Abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar.
- ✓ Implement Grievance Redress Mechanism (GRM) to solve the complaints and Corporate Social Responsibility (CSR) plan.
- ✓ Implement EMP and EMOP for balancing development and environmental conservation

Finally, the proponent should follow the comments and suggestions made by ECD after reviewing this EIA report. Once EMP is approved by concerned authorities, effective implementation of EMP by the project proponent is essential. The proponent should abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar.



Reference

International Finance Corporation, 2007. Environmental, Health and Safety Guidelines: Construction and Decommissioning, World Bank Group.

International Finance Corporation, 2007. Environmental, Health and Safety Guidelines: Occupational Health and Safety, World Bank Group.

International Finance Corporation, 2007. Environmental, Health and Safety Guidelines: General, World Bank Group.

International Finance Corporation, 2007. Environmental, Health and Safety Guidelines for Mining, World Bank Group.

World Health Organization, 2010. WHO guidelines for indoor air quality: selected pollutants, regional office for Europe.

National Environmental Quality (Emission), 2015. NEQ Guidelines

Myanmar Andaman Co., Ltd Pearl oyster breeding project Environmental Management Plan prepared by E-Guard Environmental Services

Belparl Myanmar Co., Ltd of Pearl oyster breeding project Environmental Management Plan prepared by E-Guard Environmental Services



Appendix (1) Commitment Letter to follow legal frameworks



PYI PHYO TUN INTERNATIONAL COMPANY LIMITED.

No. 15, 11th Street, Lanmadaw Township, Yangon, Myanmar.
Tel : 95-1-2300460, 95-1-2300480 E-mail : manageppt@yangon.net.mm Fax : 95-1-2300475, 2300481

Commitment to follow legal frameworks including Environmental Conservation Law, Rules, Standards and Mitigation Measure Stated in the Environmental Management Plan (EMP) for the Proposed Project

With regard to the above matter, we, Pyi Phyto Tun International Co., Ltd have applied permission for Pearl Culture Project at Pyin Sa Bu Island, Kyun Su Township, Myeik District, Tanintharyi Region. Our company strongly commits that all our operations will be performed in an environmental friendly manner by following existing laws and regulations especially Environmental Conservation Law 2012, Environmental Conservation Rules 2014, National Environmental Quality (Emission) Guideline (2015) and relevant environmental standards through successful implementation of mitigation measures stated in the Environmental management Plan (EMP) of the Proposed Project.



DR. AUNG LWIN
Chairman
Pyi Phyto Tun International Company Limited



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (2) Commitment Letter to follow Commitments and Mitigation Measures



PYI PHYO TUN INTERNATIONAL COMPANY LIMITED.

No. 15, 11th Street, Lanmadaw Township, Yangon, Myanmar.
Tel : 95-1-2300460, 95-1-2300480 E-mail : manageppt@yangon.net.mm Fax : 95-1-2300475, 2300481

Subject: To follow Commitments and Mitigation Measures stated in the Environmental Management Plan of Environmental Impact Assessment Report (EIA)

With regard to the above matter, we, Pyi Phyto Tun International Co., Ltd strongly commits that EIA report for our project is strong and complete, we obeyed Rules and Regulations including EIA procedure in preparing EIA report and we will follow our commitments, mitigation measures and EMP which are mentioned in the EIA report for our proposed project.



Yours Respectfully,

DR. AUNG LWIN
Chairman

Pyi Phyto Tun International Company Limited



Appendix (3) Commitment Letter by Third Party



No. (11), Airport Avenue Road, (၁၀၀၈၆၆၆၆၆၆၆၆)
Yangon Airport Road, Saw Bwar Gyi Gone Quarter,
Insein Township, Yangon 11011, Myanmar.
Tel: (95) 1 666512 Fax: (95) 19667757
H.P (95) 9 44801676



Commitment to follow and compliance with Environmental Conservation Law, Rules, Environmental Impact Assessment Procedure, National Environmental (Quality) Emission Guidelines, Standards and Mitigation Measures Stated in the Environmental Management Plan (EMP) of EIA report

With regard to the above matter, we, E Guard Environmental Services has prepared the Environmental Impact Assessment (EIA) Report for Pearl Culture Development project. Our company strongly commits that this EIA report has been prepared by following Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental Impact Assessment Procedure (2015), National Environmental (Quality) Emission Guidelines (2015) and relevant environmental standards through successful implementation of mitigation measures and monitoring plan stated in the Environmental Management Plan (EMP) of EIA Report.

Soe Win
Director

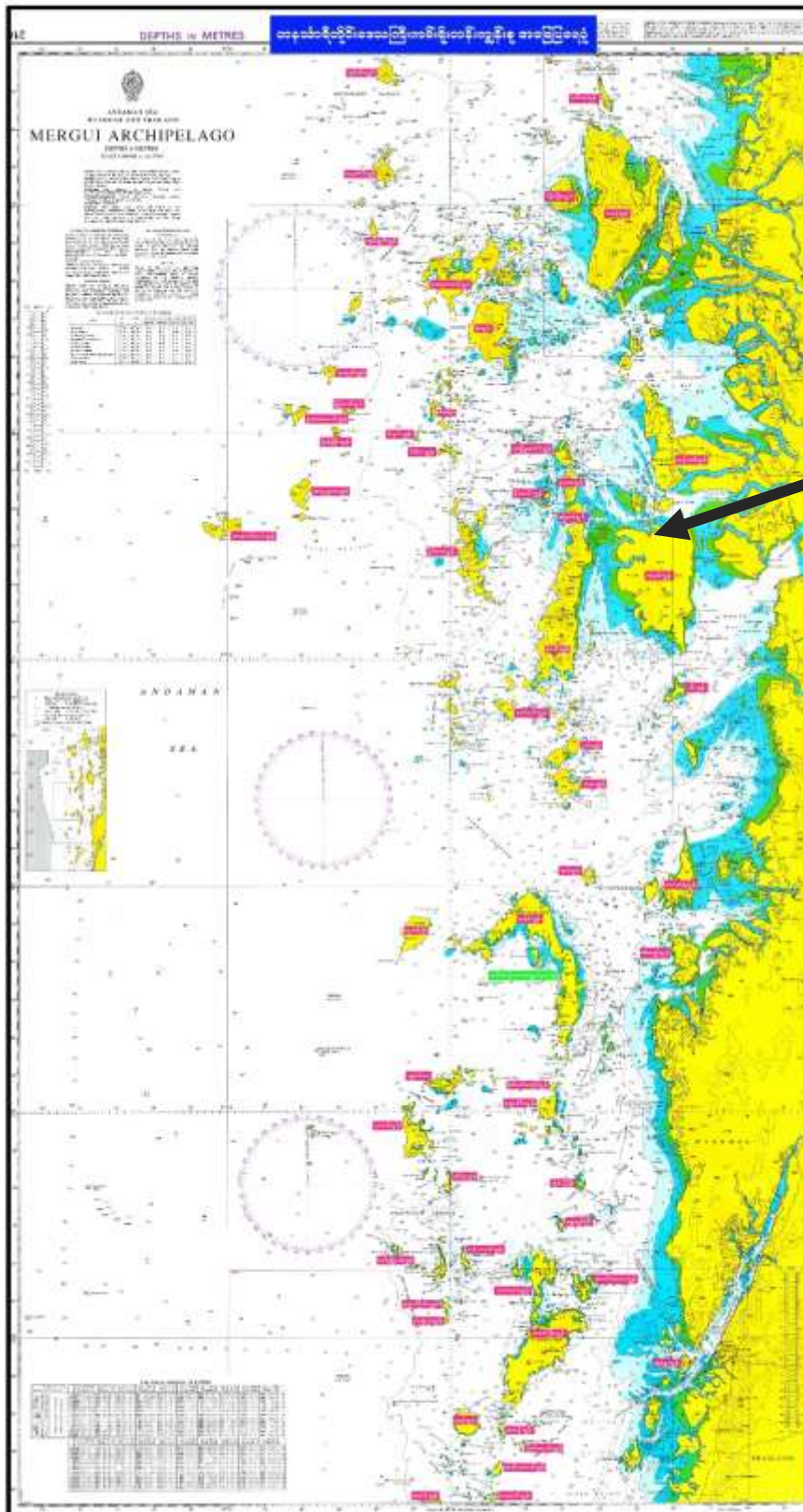
E guard Environmental Services



Email: info@eguardservices.com

URL: www.eguardservices.com

Appendix (4) Islands in Taninthari Region



Pyin Sa Bu
Island



Appendix (5) Surface Water Result



Laboratory Technical Consultant: U Saw Christopher Masing
B.Sc Engg (Civl), Dip S E (Drift) Lecturer of YIT (Rood), Consultant (V.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001

Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0319 594

WATER QUALITY TEST RESULTS FORM

Client Pyi Phyo Tun International Co., Ltd.
Nature of Water Surface Water
Location Myeik Township
Date and Time of collection 16.3.2019
Date and Time of arrival at Laboratory 18.3.2019
Date and Time of commencing examination 19.3.2019
Date and Time of completing 21.3.2019

Results of Water Analysis

WHO Drinking Water Guideline
(Geneva - 1993)

pH	7.3		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	38	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	6	mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness		mg/l as CaCO ₃	
Magnesium Hardness		mg/l as CaCO ₃	
Total Alkalinity		mg/l as CaCO ₃	
Phenolphthalein Alkalinity		mg/l as CaCO ₃	
Carbonate (CaCO ₃)		mg/l as CaCO ₃	
Bicarbonate (HCO ₃)		mg/l as CaCO ₃	
Iron	0.48	mg/l	0.3 mg/l
Chloride (as CL)	7	mg/l	250 mg/l
Sodium chloride (as NaCl)		mg/l	
Sulphate (as SO ₄)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids		mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese	0.02	mg/l	0.05 mg/l
Phosphate	Nil	mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity	0.1	ppt	

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

Tested by

Signature:

Name:

Hein
Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name:

Soe Thir
Soe Thir
B.E (Civl) 1980
Technical Officer
ISO TECH Laboratory

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No. 18, Lanthit Road, Nantharagone Quarter, Insein Township, Yangon, Myanmar.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (6) Surface Water Result (Continued)



Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc. Engg. (Civil), Dip. S.E. (Drill) Lecturer of YIT (Ratd), Consultant (Y.C.D.C.), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/ Page 2 of 2

W0319 594

WATER QUALITY TEST RESULTS FORM

Client: Pyi Phyto Tun International Co., Ltd.
Nature of Water: Surface Water
Location: Myeik Township
Date and Time of collection: 16.3.2019
Date and Time of arrival at Laboratory: 18.3.2019
Date and Time of commencing examination: 19.3.2019
Date and Time of completing: 21.3.2019

Results of Water Analysis

WHO Drinking Water Guideline (Geneva - 1993)

Temperature (°C)	25.0	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (N.NO ₃)	0.9	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH ₃)		mg/l	
Ammonium (NH ₄)		mg/l	
Dissolved Oxygen (DO)	7.4	mg/l	
Chemical Oxygen Demand (COD)		mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)		mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)	Nil	mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (Si)		mg/l	

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

Tested by

Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

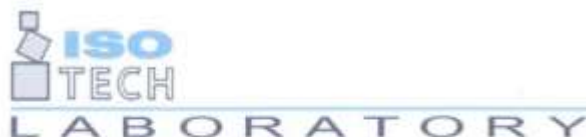
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No.15, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-30339661, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (7) Laboratory Result of Wastewater (Point – 1)



Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg (Civil), Dip S E (Delft) Lecturer of YIT (Ratd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)



WTL-RE-001

Issue Date - 01-1-2016

Effective Date - 01-1-2016

Issue No - 1.0/ Page 1 of 1

M0319 057

WATER QUALITY TEST (MICROBIOLOGY) RESULTS FORM

Client Pyi Phyo Tun International Co., Ltd.
Nature of Water Wastewater (Point - 1)
Location Myeik
Date and Time of collection 16.3.2019
Date and Time of arrival at Laboratory 18.3.2019
Date and Time of commencing examination 18.3.2019
Date and Time of completing 19.3.2019

Results of Water Analysis

WHO Drinking Water Guideline (Geneva - 1993)

Total Coliform Count	40	CFU/100ml	Not detected
Thermotolerant (fecal) Coliform Count	10	CFU/100ml	Not detected
pH	7.3		6.5 - 8.5
Turbidity	352	NTU	5 NTU
Colour (True)	200	TCU	15 TCU
Free Chlorine	Nil	mg/l	
Total Chlorine	Nil	mg/l	

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

: < - Less than

Tested by

Signature: Hein
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

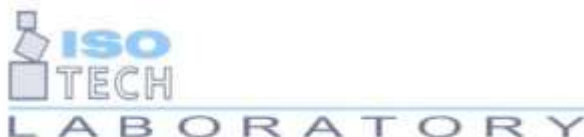
Signature: Soe Thit
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co., Ltd.)

No.18, Lanthit Road, Nantharagone Quarter, Insein Township, Yangon, Myanmar.

Ph: 01-640955, 09-73225175, 09-30339651, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

Appendix (8) Laboratory Result of Wastewater (Point – 1) (Continued)



Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc. Engg. (Civil), Dip. S.E. (Deflt) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)



WTL-RE-001

Issue Date - 01-12-2012

Effective Date - 01-12-2012

Issue No. - 1.0 / Page 1 of 2

WW0319 109

WATER QUALITY TEST RESULTS FORM

Client	Pyi Phyo Tun International Co.,Ltd.
Nature of Water	Wastewater (Point - 1)
Location	Myeik
Date and Time of collection	16.3.2019
Date and Time of arrival at Laboratory	18.3.2019
Date and Time of commencing examination	17.3.2019
Date and Time of completing	22.3.2019

Results of Water Analysis

WHO Drinking Water Guideline
(Geneva - 1993)

pH		6.5 - 8.5
Colour (True)	TCU	15 TCU
Turbidity	352 NTU	5 NTU
Conductivity	micro S/cm	
Total Hardness	mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness	mg/l as CaCO ₃	
Magnesium Hardness	mg/l as CaCO ₃	
Total Alkalinity	mg/l as CaCO ₃	
Phenolphthalein Alkalinity	mg/l as CaCO ₃	
Carbonate (CaCO ₃)	mg/l as CaCO ₃	
Bicarbonate (HCO ₃)	mg/l as CaCO ₃	
Iron	mg/l	0.3 mg/l
Chloride (as CL)	mg/l	250 mg/l
Sodium chloride (as NaCL)	mg/l	
Sulphate (as SO ₄)	mg/l	500 mg/l
Total Solids	mg/l	1500 mg/l
Suspended Solids	mg/l	
Dissolved Solids	mg/l	1000 mg/l
Manganese	mg/l	0.05 mg/l
Phosphate	mg/l	
Phenolphthalein Acidity	mg/l	
Methyl Orange Acidity	mg/l	
Salinity	ppt	

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

Tested by

Signature: _____

Name: _____

ISO TECH Laboratory

Approved by

Signature: _____

Name: _____

Technical Officer
ISO TECH Laboratory

(a division of WEG Co., Ltd.)

No.18, Lanthit Road, Nantharapone Quarter, Insein Township, Yangon, Myanmar.

Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com



Appendix (9) Laboratory Result of Wastewater (Point – 1) (Continued)



Laboratory Technical Consultant: U Saw Christopher Maung

B.Sc Engg. (Civil), Dip S E (Civil) Lecturer of YIT (Refit), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001

Issue Date - 01-12-2012

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Issue No - 1.0/ Page 2 of 2

WW0319 109

WATER QUALITY TEST RESULTS FORM

Client	Pyi Phyto Tun International Co., Ltd.
Nature of Water	Wastewater (Point - 1)
Location	Myeik
Date and Time of collection	16.3.2019
Date and Time of arrival at Laboratory	18.3.2019
Date and Time of commencing examination	17.3.2019
Date and Time of completing	22.3.2019


Results of Water Analysis

WHO Drinking Water Guideline
(Geneva - 1993)

Temperature (°C)	25.0	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (N.NO ₃)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH ₃)		mg/l	
Ammonium (NH ₄)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	128	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	60	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (Si)		mg/l	

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

Tested by

Signature: 

Name:

Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature: 

Name:

Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co., Ltd.)

No. 18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.

Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (10) Laboratory Result of Wastewater (Point – 1) (Continued)



ANALYSIS REPORT

ORIGINAL

Job Ref: 2000391/19
Date: 25/03/2019
Page 1 of 1

Sample Described as : Waste Water
Client Name : Pyi Phyo Tun International Co.,Ltd
Sample Received Date : 18. March .2019
Sample Brought By : Client
Sample Marking : WW-1
Sample Location : Myaik
Analysed Date : 19. March .2019
Lab Code No. : 088/19

No.	Test Parameter	Method	LOQ	Unit	Result
1	pH	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 4500-H* B.Electrometric Method	-		7.30
2	Total Suspended Solid	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 2540-D.Dried at 103-105 °C	20	mg/L	1093
3	Total Nitrogen	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 4500-N _{org} B.Macro Kjeldahl Method	1	mg/L	<1
4	Total Phosphorous	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;4500-P E.Ascorbic Acid Method	0.01	mg/L	<0.01
5	Oil & Grease	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;5520B	5	mg/L	<5

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(Signature)
(Nu Nu Yi)
Manager

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SGS (Myanmar) Limited

Minerals Services, 79/D, Bo Chain Street, 8 H Mile, Hsing Township, Yangon, Myanmar
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Member of SGS Group(SGS SA)





ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (11) Laboratory Result of Wastewater (Point -2)



Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg. (Civl), Dip S.E.(Drft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001

Issue Date - 01-12-2012

Effective Date - 01-12-2012

Issue No - 1.0/ Page 2 of 2

WW0319 110

WATER QUALITY TEST RESULTS FORM

Client Pyi Phyto Tun International Co., Ltd.
Nature of Water Wastewater (Point - 2)
Location Myeik
Date and Time of collection 16.3.2019
Date and Time of arrival at Laboratory 18.3.2019
Date and Time of commencing examination 17.3.2019
Date and Time of completing 22.3.2019

Results of Water Analysis

WHO Drinking Water Guideline (Geneva - 1993)

Temperature (°C)	25.0	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (N.NO ₃)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH ₃)		mg/l	
Ammonium (NH ₄)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	256	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	110	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (Si)		mg/l	

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

Tested by

Signature: *Hein*
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature: *Soe Thir*
Name: Soe Thir
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

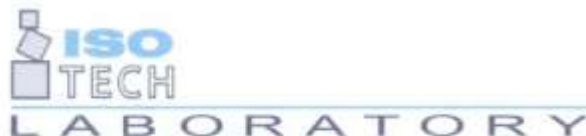
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No. 18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (12) Laboratory Result of Wastewater (Point -2) (Continued)



Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg. (Civil), Dip S.E.(Delft) Lecturer of YIT (Raid), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)



WTL-RE-001

Issue Date - 01-1-2016

Effective Date - 01-1-2016

Issue No - 1.0/ Page 1 of 1

M0319 058

WATER QUALITY TEST (MICROBIOLOGY) RESULTS FORM

Client Pyl Phyto Tun International Co., Ltd.
Nature of Water Wastewater (Point - 2)
Location Myeik
Date and Time of collection 16.3.2019
Date and Time of arrival at Laboratory 18.3.2019
Date and Time of commencing examination 18.3.2019
Date and Time of completing 19.3.2019

Results of Water Analysis

WHO Drinking Water Guideline (Geneva - 1993)

Total Coliform Count	30	CFU/100ml	Not detected
Thermotolerant (fecal) Coliform Count	8	CFU/100ml	Not detected
pH	6.8		6.5 - 8.5
Turbidity	199	NTU	5 NTU
Colour (True)	110	TCU	15 TCU
Free Chlorine	Nil	mg/l	
Total Chlorine	Nil	mg/l	

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

: < - Less than

Tested by

Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.

Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (13) Laboratory Result of Wastewater (Point -2) (Continued)



Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg (Civil), Dip S.E.(Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)



WTL-RE-001

Issue Date - 01-12-2012

Effective Date - 01-12-2012

Issue No - 1.0/ Page 1 of 2

WW0319 110

WATER QUALITY TEST RESULTS FORM

Client Pyi Phyo Tun International Co., Ltd.
Nature of Water Wastewater (Point - 2)
Location Myeik
Date and Time of collection 18.3.2019
Date and Time of arrival at Laboratory 18.3.2019
Date and Time of commencing examination 17.3.2019
Date and Time of completing 22.3.2019

Results of Water Analysis

WHO Drinking Water Guideline (Geneva - 1993)

pH		6.5 - 8.5
Colour (True)	TCU	15 TCU
Turbidity	199 NTU	5 NTU
Conductivity	micro S/cm	
Total Hardness	mg/l as CaCO ₃	500 mg/l as CaCO ₃
Calcium Hardness	mg/l as CaCO ₃	
Magnesium Hardness	mg/l as CaCO ₃	
Total Alkalinity	mg/l as CaCO ₃	
Phenolphthalein Alkalinity	mg/l as CaCO ₃	
Carbonate (CaCO ₃)	mg/l as CaCO ₃	
Bicarbonate (HCO ₃)	mg/l as CaCO ₃	
Iron	mg/l	0.3 mg/l
Chloride (as CL)	mg/l	250 mg/l
Sodium chloride (as NaCL)	mg/l	
Sulphate (as SO ₄)	mg/l	500 mg/l
Total Solids	mg/l	1500 mg/l
Suspended Solids	mg/l	
Dissolved Solids	mg/l	1000 mg/l
Manganese	mg/l	0.05 mg/l
Phosphate	mg/l	
Phenolphthalein Acidity	mg/l	
Methyl Orange Acidity	mg/l	
Salinity	ppt	

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

Tested by

Signature: Hein

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist

Approved by

Signature: Soe Thit

Name: Soe Thit
B.E (Civil) 1986,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co., Ltd.)

ISO TECH Laboratory

No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.

Ph: 01-640955, 09-73225175, 09-3039681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (14) Laboratory Result of Wastewater (Point -2) (Continued)



ANALYSIS REPORT

ORIGINAL

Job Ref: 2000391/19

Date: 25/03/2019

Page 1 of 1

Sample Described as : Waste Water
Client Name : Pyi Phyto Tun International Co.,Ltd
Sample Received Date : 18. March .2019
Sample Brought By : Client
Sample Marking : WW-2
Sample Location : Myaik
Analysed Date : 19. March .2019
Lab Code No. : 089/19

No.	Test Parameter	Method	LOQ	Unit	Result
1	pH	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 4500-H ⁺ B.Electrometric Method	-		6.20
2	Total Suspended Solid	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 2540-D.Dried at 103-105 °C	20	mg/L	187
3	Total Nitrogen	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012; 4500-N _{org} B.Macro Kjeldahl Method	1	mg/L	12.88
4	Total Phosphorous	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;4500-P E.Ascorbic Acid Method	0.01	mg/L	2.440
5	Oil & Grease	Standard methods for the examination of water & waste water APHA ,AWWA & WEF,22nd ed, 2012;5520B	5	mg/L	28.0

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(Nu Nu Yi)
Manager

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Appendix (15) Public Consultation's Invitation Card

တွေ့ဆုံဆွေးနွေးပွဲဖိတ်ကြားလွှာ

တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းရှိ ပြည်မြို့ထွန်းအင်တာနေရှင်နယ်ကုမ္ပဏီလီမိတက်မှ အကောင်အထည်ဖော်ဆောင်ရွက်လျက်ရှိသည့် မှတ်ကောင်မွေးမြူခြင်း၊ ပုလဲဇော်ယူခြင်းလုပ်ငန်းနှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment - EIA) လုပ်ငန်းအဆင့်ဆင့်ကို ဥပဒေ၊ လုပ်ထုံးလုပ်နည်းများနှင့်အညီ တတိယအဖွဲ့အစည်းဖြစ်သည့် E Guard Environmental Services မှ ဆောင်ရွက်လျက်ရှိပါသည်။ သို့ဖြစ်ပါ၍ အဆိုပါ လုပ်ငန်းစဉ်အရ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားပွဲကို အောက်ပါအစီအစဉ်အတိုင်း ကျင်းပမည်ဖြစ်သဖြင့် တက်ရောက် ပေးနိုင်ပါရန် လေးစားစွာဖြင့် ဖိတ်ကြားအပ်ပါသည်။

အစီအစဉ်

နေ့ရက် 28 ၂၈-၇-၂၀၁၉ (တနင်္ဂနွေနေ့)

အချိန် နံနက်(၈:၃၀)နာရီမှ (၁၁:၀၀)နာရီအထိ

နေရာ “အခြေခံပညာအထက်တန်းကျောင်း(ပထက်)” ပထက်ကျေးရွာ၊ ကျွန်းစုမြို့နယ်။

ပြည်မြို့ထွန်းအင်တာနေရှင်နယ်ကုမ္ပဏီလီမိတက်

Appendix (16) Newspaper Announcement (The Mirror)

[illegible]

Appendix (17) Newspaper Announcement (Myanmar Alin)

[illegible]



Appendix (18) Public Consultation's Presentation about Pearl Culture Project





**Appendix (19) Public Consultation's Presentation about Pearl Culture Project
(Continued)**

**ပြည်ခြံထွန်းအင်တာနေရှင်းနယ်ကုမ္ပဏီလီမိတက်
ဒါရိုက်တာအဖွဲ့ဝင်များစာရင်း**

စဉ်	အမည်	မှတ်ပုံတင်အမှတ်	ရာထူး	နေရပ်လိပ်စာ
၁	ဒေါက်တာအောင်လွင်	၁၂/အလန(နိုင်)၀၃၃၈၇၉	ဥက္ကဋ္ဌ	အမှတ်(၁၅)၊ ၁၁ လမ်း၊ လမ်းမတော်မြို့နယ်၊ ရန်ကုန်မြို့။
၂	ဦးလှသန်း	၆/မအရ(နိုင်)၀၅၇၃၀၃	အုပ်ချုပ်မှု ဒါရိုက်တာ	အမှတ်(၁၅)၊ ၁၁ လမ်း၊ လမ်းမတော်မြို့နယ်၊ ရန်ကုန်မြို့။
၃	ဒေါ်သက်စန္ဒာ	၁၂/ဒဂန(နိုင်)၀၂၃၄၄၄	ဒါရိုက်တာ	အမှတ်(၁၅)၊ ၁၁ လမ်း၊ လမ်းမတော်မြို့နယ်၊ ရန်ကုန်မြို့။
၄	ဒေါ်ခင်သန်းရီ	၆/မအရ(နိုင်)၀၂၇၁၁၅	ဒါရိုက်တာ	အမှတ်(၁၅)၊ ၁၁ လမ်း၊ လမ်းမတော်မြို့နယ်၊ ရန်ကုန်မြို့။
၅	ဒေါ်တင်ဝါ	၆/မအရ(နိုင်)၀၅၆၄၃၂	ဒါရိုက်တာ	အမှတ်(၁၅)၊ ၁၁ လမ်း၊ လမ်းမတော်မြို့နယ်၊ ရန်ကုန်မြို့။

**ပြည်ခြံထွန်းအင်တာနေရှင်းနယ်ကုမ္ပဏီလီမိတက်
ဒါရိုက်တာအဖွဲ့ဝင်များစာရင်း**

စဉ်	အမည်	မှတ်ပုံတင်အမှတ်	ရာထူး	နေရပ်လိပ်စာ
၆	ဒေါ်မြင့်မြင့်ကြူ	၆/မအရ(နိုင်)၀၁၁၅၉၈	ဒါရိုက်တာ	အမှတ်(၁၅)၊ ၁၁ လမ်း၊ လမ်းမတော်မြို့နယ်၊ ရန်ကုန်မြို့။
၇	ဒေါ်ဆုသီရိနွယ်	၁၂/လမတ(နိုင်)၀၃၃၄၂၁	ဒါရိုက်တာ	အမှတ်(၁၅)၊ ၁၁ လမ်း၊ လမ်းမတော်မြို့နယ်၊ ရန်ကုန်မြို့။
၈	ဒေါ်မြတ်သီရိနိုင်	၁၂/လမတ(နိုင်)၀၃၅၂၃၆	ဒါရိုက်တာ	အမှတ်(၁၅)၊ ၁၁ လမ်း၊ လမ်းမတော်မြို့နယ်၊ ရန်ကုန်မြို့။
၉	ဦးမြတ်ကိုကို	၆/မမန(နိုင်)၁၄၄၇၀၄	ဒါရိုက်တာ	အမှတ်(၁၅)၊ ၁၁ လမ်း၊ လမ်းမတော်မြို့နယ်၊ ရန်ကုန်မြို့။



Appendix (20) Public Consultation's Presentation about Pearl Culture Project (Continued)

နိဒါန်း

- ❖ တနင်္သာရီတိုင်းဒေသကြီးသည် ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်၏ တောင်ဘက်စွန်းတွင်တည်ရှိကာ ကပ္ပလီပင်လယ်ပြင်နှင့် အများဆုံးထိစပ်လျက်ရှိပြီး ပုလဲမွေးမြူရန် ရေမြေသဘာဝကောင်းမွန်သော နေရာတစ်ခုဖြစ်ပါသည်။
- ❖ တနင်္သာရီကမ်းရိုးတန်းတလျှောက်တွင် ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်းများမှာ အောင်မြင်ဖြစ်ထွန်းလျက်ရှိသဖြင့် နိုင်ငံတော်နှင့်တနင်္သာရီတိုင်းဒေသကြီးအတွက် ဂုဏ်ယူဝင့်ကြွားစရာ ဖြစ်ပါသည်။
- ❖ ထိုသို့အောင်မြင်ဖြစ်ထွန်းလျက်ရှိသော ပုလဲမွေးမြူခြင်းလုပ်ငန်းများသို့ သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနနှင့် (၁၀.၂.၂၀၁၆)ရက်နေ့တွင် လုပ်ငန်းလုပ်ကိုင်ခွင့်စာချုပ်ချုပ်ဆိုခဲ့ပြီး ဝန်ကြီးရုံး၏ (၁၅.၂.၂၀၁၆)ရက်စွဲပါ ခွင့်ပြုမိန့်အမှတ်၊ ၀၀၀၅/၂၀၁၆ ဖြင့် လုပ်ငန်းလုပ်ကိုင်ခွင့် ခွင့်ပြုပေးခဲ့သည့်အတွက် ကျန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စာကုကျွန်းတွင် ပြည့်ပြီးထွန်းအင်တာနေရှင်နယ်ကုမ္ပဏီလီမိတက်မှ ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်းကို (၁၀.၂.၂၀၁၆)ရက်နေ့တွင် စတင်လုပ်ကိုင်ဆောင်ရွက်ခဲ့ပါသည်။
- ❖ ရင်းနှီးမြှုပ်နှံမှု ငွေပမာဏမှာ မြန်မာငွေကျပ်သန်း(၂၀၀၀)ဖြစ်ပါသည်။
- ❖ ပြင်စာကုကျွန်း၊ ပုလဲမွေးမြူရေးလုပ်ငန်းအား မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင်ထံသို့ (၂၂.၈.၂၀၁၆)ခုနှစ်တွင် အဆိုပြုချက်တင်ပြထားပြီးဖြစ်ပါသည်။

ရည်ရွယ်ချက်

- ❖ ပြည်တွင်း/ပြည်ပရတနာပြပွဲ များတွင် မြန်မာပုလဲများကို ပြသရောင်းချခြင်းဖြင့် နိုင်ငံတော်သို့ နိုင်ငံခြားငွေပိုမိုရရှိစေရန်။
- ❖ နိုင်ငံတော်အတွက် ထိုက်သင့်သောအခွန်ဘဏ္ဍာငွေများ ရရှိစေရန်။
- ❖ ဒေသခံတိုင်းရင်းသားများတွင် အလုပ်အကိုင်အခွင့်အလမ်းများရရှိစေရန်။
- ❖ ဒေသတွင်း ပညာရေး၊ ကျန်းမာရေး၊ လူမှုရေးကဏ္ဍများ ပိုမိုတိုးတက်လာစေရန်။
- ❖ ပုလဲမွေးမြူရေးနည်းပညာများ ဖွံ့ဖြိုးတိုးတက်လာစေရန်။



Appendix (21) Public Consultation's Presentation about Pearl Culture Project (Continued)

တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေနံတောင်ကျေးရွာအုပ်စု၊ ပြင်စာဘူကျွန်း၊ ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်း ဧရိယာမြေပုံ



စီမံကိန်းဆိုင်ရာအချက်အလက်များ

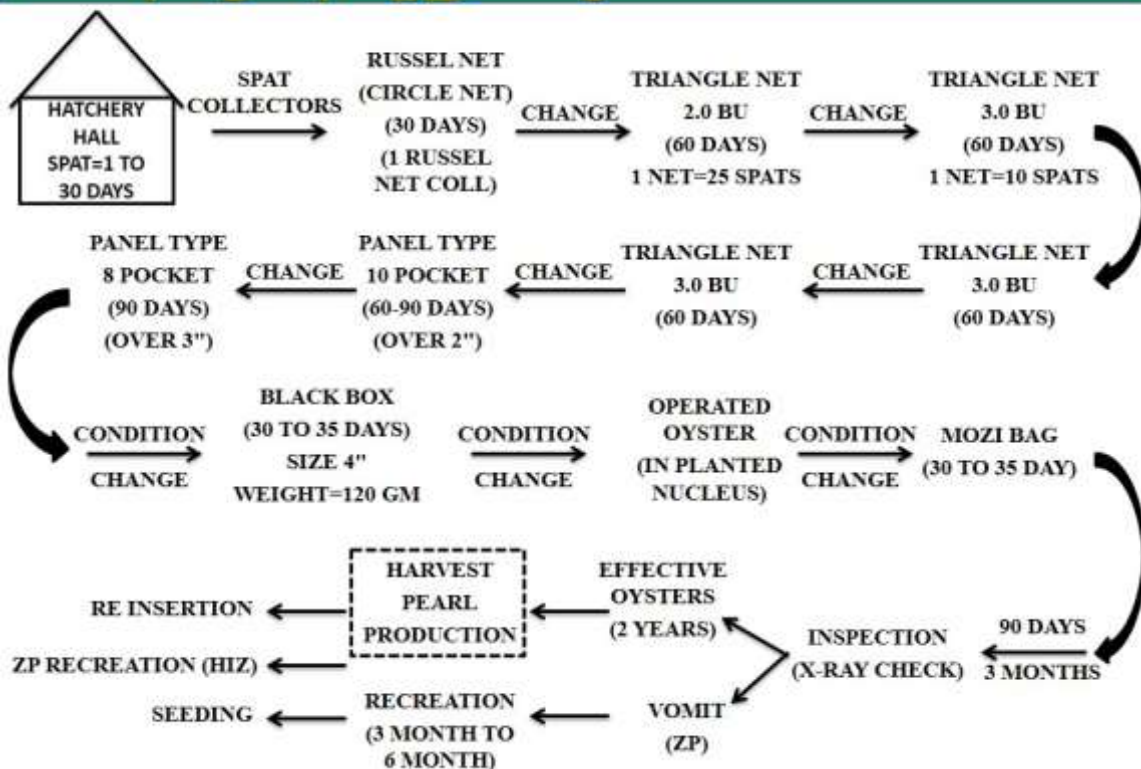
- ❖ (၁၀.၂.၂၀၁၆)ရက်နေ့မှ(၉.၂.၂၀၂၁)ရက်နေ့အထိ (၁၅)နှစ်သက်တမ်း ခွင့်ပြုထားပါသည်။
- ❖ စီမံကိန်းဧရိယာ(မြေပြင်+ရေပြင်)စုစုပေါင်းဧကမှာ (၈၆၄၆.၄)ဧကဖြစ်ပါသည်။
- ❖ နှစ်စဉ်အရွယ်ရောက်မှတ်ကောင်(၈၀၀၀၀)မှ(၁၀၀၀၀၀)ကြား မွေးမြူနိုင်ရန် စီစဉ်ဆောင်ရွက်ထားရှိပါသည်။
- ❖ စမ်းသပ်(၂)နှစ်ကာလအတွင်း မြန်မာပုလဲထုတ်လုပ်ရေးလုပ်ငန်းမှ စမ်းသပ်မွေးမြူရန် မှတ်ကောင်(၃၀၀၀)ကောင်အား ပြည့်ဖြိုးထွန်းအင်တာနေရှင်နယ်ကုမ္ပဏီလီမိတက်၊ ပုလဲမွေးမြူထုတ်လုပ်ရေးလုပ်ငန်း၊ ပြင်စာဘူကျွန်းရေပြင်တွင် မွေးမြူစေခဲ့ပါသည်။ အဆိုပါ မှတ်ကောင်များအား (၂၆.၁.၂၀၁၇)ရက်နေ့တွင် ဝတ်ဆံသွင်းလုပ်ငန်း စတင်ဆောင်ရွက်ခဲ့ပါသည်။ ၎င်းမှတ်ကောင်များအား (၁၆.၉.၂၀၁၈)ရက်နေ့တွင် ပုလဲဖော်ခြင်းဆောင်ရွက်ခဲ့ရာ ပုလဲ(၁၃၆၄)လုံး၊ အလေးချိန်(၆၀၆.၆၀ မီမီ)ရရှိခဲ့ပါသည်။
- ❖ ယခုအချိန်သည် စမ်းသပ်ကာလပြီးဆုံးပြီး ထုတ်လုပ်မှုကာလသို့ စတင်အခြေပြုကာလ ဖြစ်ပါသည်။ ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လအထိ မှတ်ကောင်သားပေါက်မွေးမြူမှုမှာ ၂၉၆၇၉၆ ကောင် မွေးမြူထားရှိပြီးဖြစ်ပါသည်။

Appendix (22) Public Consultation's Presentation about Pearl Culture Project
(Continued)

စီမံကိန်းဆိုင်ရာအချက်အလက်များ

- ❖ ယနေ့အချိန်ထိ ရေသေမှတ်ခွဲ(၂၃၄၉၆)ချပ်၊ အလေးချိန်(၄၆၉၉.၂၀) ပေါင်နှင့် ခွဲသတ်မှတ်ခွဲ (၁၇၆၀၈)ချပ်၊ အလေးချိန်(၃၅၂၁.၆၀)ပေါင် ရရှိပြီးဖြစ်ပါသည်။
- ❖ နှစ်စဉ်ရေဂါလံ(၃၆၅၀၀၀)ဂါလံလိုအပ်လျက်ရှိပြီး အဆိုပါလိုအပ်သောရေချိုးများအား ပြင်စတု ကျွန်းပေါ်ရှိ စီမံရေစမ်းရေများကို အသုံးပြုလျက်ရှိပါသည်။
- ❖ လုပ်ငန်းအတွက်လိုအပ်သော လျှပ်စစ်ဓါတ်အားများကို ကုမ္ပဏီပိုင်ဒီဇယ်မီးစက်များဖြင့် လျှပ်စစ်ဓါတ်အား ထုတ်ယူသုံးစွဲလျက်ရှိပါသည်။
- ❖ ပုလဲမွေးမြူရေးလုပ်ငန်းအတွက် ခန့်ထားသောဝန်ထမ်းအင်အားမှာ (၁၂၀)ဦးဖြစ်ပါသည်။ ဒေသခံတိုင်းရင်းသား ၇၇% နှင့် အခြားမြို့နယ်များမှ ပညာရှင် ၂၃% တို့ဖြစ်ပါသည်။
- ❖ လုပ်ငန်းလည်ပတ်ရန်အတွက် ရေယာဉ်ကြီး(၆)စင်းနှင့် ဂျန်စင်(၉)စီးတို့အား အသုံးပြုလျက် ရှိပါသည်။

စီမံကိန်းလုပ်ငန်းစဉ်ပြကားချပ်



Appendix (23) Public Consultation's Presentation about Pearl Culture Project
(Continued)

သားပေါက်ငယ်များ



သားပေါက်ငယ် များ ပင်လယ်တွင်းရှိ လောင်းလိုင်းတန်းတွင်ထားရှိမွေးမြူပုံ



Appendix (24) Public Consultation's Presentation about Pearl Culture Project
(Continued)

ကြီးထွားလာသောသားပေါက်ငယ်များ အရွယ်အစားအလိုက်အဆင့်ဆင့်ရွေးချယ်နေပုံ



ရွေးချယ်ပြီးရှင်သန်လျက်ရှိသောမုတ်ကောင်များ



Appendix (25) Public Consultation's Presentation about Pearl Culture Project
(Continued)

ကြီးထွားလာသော အရွယ်ရောက်မှတ်ကောင်များအား ဝတ်ဆံသွင်းနေပုံ



ကြီးထွားလာသော အရွယ်ရောက်မှတ်ကောင်များအား ဝတ်ဆံသွင်းထားရှိမှု



Appendix (26) Public Consultation's Presentation about Pearl Culture Project
(Continued)

မြန်မာပုလဲလုပ်ငန်းကြီးကြပ်မှုဖြင့် စမ်းသပ်ပုလဲ(၁၂၀၀)အား ဖော်ယူနေပုံ



စမ်းသပ်ပုလဲဖော်ယူမှုမှ ရရှိသောပုလဲများ



Appendix (27) Public Consultation's Presentation about Pearl Culture Project
(Continued)

သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းမှုအခြေအနေ

- ❖ ပြည့်ဖြိုးထွန်းအင်တာနေရှင်နယ်ကုမ္ပဏီလီမိတက်၊ ပုလဲမွေးမြူရေးလုပ်ငန်းတွင် အသုံးပြုသောလှေများ၊ ဂျန်ဆင်များအား ပင်လယ်ပြင်အတွင်း စက်သုံးဆီ၊ ချောဆီများ ယိုစိမ့်မှုမရှိစေရေးအတွက် တင်းကြပ်စွာသတိပေးခြင်း။
- ❖ မုတ်ကောင်မွေးမြူရာတွင် အသုံးပြုသည့်ပစ္စည်းဟောင်းများ၊ ဝန်ထမ်းများစွန့်ပစ်သော အမှိုက်များအား မြေကျင်းများတူးကာ စနစ်တကျစွန့်ပစ်စေခြင်း။
- ❖ ကျွန်းစခန်းပေါ်ရှိ သစ်တောများအား တရားမဝင်ခုတ်လှဲမှုမရှိစေရေး၊ တောမီးမရှိစေရေးအတွက်တို့အတွက် တင်းကြပ်စွာထားမြစ်ခြင်း။
- ❖ ပင်လယ်ပြင်အတွင်း ဂေဟစနစ်ပျက်စီးမှုမရှိစေရန် သန္တာကျောက်တန်းများ ချိုးဖဲ့ယူဆောင်ခြင်းမပြုလုပ်ရန် တင်းကြပ်စွာထားမြစ်ခြင်း။
- ❖ ၂၀၁၉ ခုနှစ်၊ မိုးဦးကာလတွင် မာကျန်ရှား၊ မဟော်ဂနီ၊ ပျဉ်းကတိုး၊ ပိတောက်နှင့် တမလန်းပင် (၅၀၀)ပင်ကို စိုက်ပျိုးထားရှိပါသည်။

မိုးရာသီသစ်ပင်စိုက်ပျိုးမှုမှတ်တမ်းဓာတ်ပုံ





Appendix (28) Public Consultation's Presentation about Pearl Culture Project
(Continued)

ပြည်ပြီးထွန်းအင်တာနေရှင်နယ်ကုမ္ပဏီလီမိတက်မှ ဒေသဖွံ့ဖြိုးရေးအတွက်
ကဏ္ဍပေါင်းစုံမှပါဝင်ဆောင်ရွက်မှု

- ❖ ပြည်ပြီးထွန်းအင်တာနေရှင်နယ်ကုမ္ပဏီလီမိတက်၊ ပုလဲမွေးမြူရေးလုပ်ငန်းအနေဖြင့် လမ်းပန်းဆက်သွယ်မှုကောင်းမွန်စေရန် သဲချောင်းကျေးရွာ၊ ရေကန်တောင်ကျေးရွာ၊ ဝဲကျွန်းကျေးရွာများသို့ ဘိလပ်မြေအိတ်များလှူဒါန်းခြင်း၊ ဒေသခံပြည်သူများ၊ ဒေသခံ ရေလုပ်သားများနှင့် ငါးဖမ်းရေယာဉ်များ ရေချိုအလွယ်တကူရရှိစေရေးအတွက် လမ်းကြောင်းပြဘောသီးများချထားပေးပြီး ပြင်စာကုကျွန်းကြီးနှင့် ပြင်စာကုငယ်ကျွန်း တို့တွင် ရေပိုက်လိုက်များသွယ်တန်းပေးထားခြင်း၊
- ❖ မြိတ်မြို့သာယာလှပရေးအတွက် မြို့တွင်းလမ်းဆုံ များ၌ ဣန္ဒိယမီးသီးများပါဝင်သော ဓါတ်တိုင်(၁၀)ချောင်းအားလှူဒါန်းပေးခြင်း၊
- ❖ ပညာရေး ကဏ္ဍဖွံ့ဖြိုးတိုးတက်စေရန် အခြေခံပညာအထက်တန်းကျောင်း(ပထက်)၊ ကန်ပြင်စာသင်ကျောင်း၊ သစ်ယာဝစာသင်ကျောင်း၊ အင်းလေးမြိုင်မူကြိုကျောင်းစသော ကျောင်းများအတွက် လိုအပ်ချက်များအား လှူဒါန်းပေးခြင်းတို့ ဆောင်ရွက်ပေးခဲ့ ပါသည်။

ပြည်ပြီးထွန်းအင်တာနေရှင်နယ်ကုမ္ပဏီလီမိတက်မှ ဒေသဖွံ့ဖြိုးရေးအတွက်
ကဏ္ဍပေါင်းစုံမှပါဝင်ဆောင်ရွက်မှု

- ❖ ကျန်းမာရေးကဏ္ဍဖွံ့ဖြိုးတိုးတက်စေရန်အတွက် ပုလဲမွေးမြူရေးလုပ်ငန်းနှင့် အနီး ဝန်းကျင်ရှိ အရေးပေါ်လူနာများအား ကုမ္ပဏီပိုင်, စနန် ဩအေ များဖြင့် အချိန်မီ ဆေးရုံသို့ပို့ဆောင်ပေးခြင်း၊
- ❖ ယခင်နှစ် ၂၀၁၈ ခုနှစ်တွင် တနင်္သာရီမြို့နယ်၌ ရေကြီးမှုဖြစ်ပွားစဉ် ကုမ္ပဏီပိုင် ,စနန် ဩအေ (၂)စင်းဖြင့် ကယ်ဆယ်ရေးလုပ်ငန်းများတွင် ပါဝင်ကူညီဆောင်ရွက် ပေးခြင်း၊
- ❖ ရွှေသာလျောင်းဘုရားကြီး ဘက်စုံဖွံ့ဖြိုးတိုးတက်စေရေးအတွက် လိုအပ်သော အထောက်အပံ့များအား လှူဒါန်းပေးခြင်း တို့ကိုပါဝင်ကူညီဆောင်ရွက်ပေးခဲ့ပါသည်။
- ❖ အများပြည်သူများ လွယ်ကူစွာသွားလာနိုင်ရေးအတွက် ကျွန်းစုမြို့တွင် ဆိပ်ခံဗော (၁)ခုအား လှူဒါန်းပေးခြင်း။

Appendix (29) Public Consultation's Presentation about Pearl Culture Project
(Continued)

ကျွန်းစုမြို့ဒေသခံပြည်သူများသွားလာမှုလွယ်ကူရေးအတွက်
တန်ဖိုး(၄၁၃၈၈၉၆၅/)တန်ဖိုးရှိဆိပ်ခံစောတ်တားလှူဒါန်းမှုမှတ်တမ်းဓာတ်ပုံများ



မြိတ်မြို့တွင်း လမ်းမီးတိုင်များ တပ်ဆင်လှူဒါန်းထားမှု မှတ်တမ်းဓာတ်ပုံ



Appendix (30) Public Consultation's Presentation about Pearl Culture Project
(Continued)

သဲချောင်းကျေးရွာ၊ ဗရကန်တောင်ကျေးရွာ၊ ဝဲကျွန်းကျေးရွာများသို့ ဘိလပ်မြေအိတ်များလှူဒါန်းနေသော
မှတ်တမ်းဓာတ်ပုံ



နိဂုံး

ပြည့်ဖြိုးထွန်းအင်တာနေရှင်နယ်ကုမ္ပဏီလီမိတက်၊ ပုလဲမွေးမြူထုတ်လုပ်ရေး လုပ်ငန်းအနေဖြင့်
မြန်မာပုလဲလုပ်ငန်း တိုးတက်ဖွံ့ဖြိုးလာစေပြီး နိုင်ငံတော်အတွက် အခွန် အခများ ပိုမိုရရှိစေရန်ရည်သန်၍
ကြိုးပမ်းဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။ ကုမ္ပဏီ လုပ်ငန်း အောင်မြင်မှုရရှိစေရန်
သက်ဆိုင်ရာဝန်ကြီးဌာနများ၏ လမ်းညွှန်ပံ့ပိုးမှုနှင့် ဒေသခံများ၏ အကြံပြုဆွေးနွေးမှုများအတိုင်း
ကြိုးပမ်းဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။



Appendix (31) Public Consultation's Presentation about Environmental Impact Assessment



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ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း



စီမံကိန်း၏ဖြစ်နိုင်ခြေရှိသော အကျိုးသက်ရောက်မှုများ

စစ်ဆေးခြင်း



- ✓ သိသာထင်ရှားမှု ရှိ၊ မရှိ
- ✓ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ဆောင်ရွက်ရန် လိုအပ်ခြင်း ရှိ၊ မရှိ
- ✓ သတ်မှတ်ထားသောအထောက်အထားများ ပြုစုတင်ပြရန်လိုအပ်ခြင်း ရှိ၊ မရှိ

ဆောင်ရွက်သည့်အဖွဲ့ အစည်း - E Guard Environmental Services Co., Ltd.




စိစစ်ခွင့်ပြုမည့်အဖွဲ့ အစည်း - သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

လိုက်နာရမည့် နည်းဥပဒေ၊ စည်းမျဉ်းစည်းကမ်းများ - ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော် ဖွဲ့စည်းပုံအခြေခံဥပဒေ (၂၀၀၈) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ နည်းဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ

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Appendix (32) Public Consultation about Environmental Impact Assessment
(Continued)

ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းစဉ်

အစီရင်ခံစာ အပေါ်သုံးသပ်အကဲဖြတ်ခြင်း နှင့်
ခွင့်ပြုချက် ပေးခြင်း
(သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး
ဝန်ကြီးဌာန)

➤ **ဒေသလူထုဆွေးနွေးပွဲ (နောက်ဆုံး အဆင့်)**

➤ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အတွက် စစ်တမ်းကောက်ယူခြင်းနှင့်အစီရင်ခံစာ ပြင်ဆင်ခြင်း

➤ **ဒေသလူထုဆွေးနွေးပွဲ (ကနဦး အဆင့်)**

➤ နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း
(အကြံ ဆန်းစစ်ခြင်းနှင့် လေ့လာရေး အစီအစဉ် ရေးဆွဲခြင်း) ၂၀၁၈၊ ဒီဇင်ဘာလ၊ (၁၂)ရက်

ရွေးချယ်ကောက်နုတ်ခြင်း
 ဒေသလူထုဆွေးနွေးပွဲ (နောက်ဆုံး အဆင့်) တွင် ပါဝင်သောလုပ်ငန်းစဉ်များ

- ၁။ စီမံကိန်းဆိုင်ရာအချက်အလက်များထုတ်ဖော်ခြင်း။
- ၂။ ပတ်ဝန်းကျင်ဆိုင်ရာနှင့်လူမှုရေးဆိုင်ရာဆန်းစစ်လေ့လာမှုများ၊ စုံစမ်းစစ်ဆေးမှုများ ဆောင်ရွက်ခြင်း။
- ၃။ စီမံကိန်းကြောင့်ထိခိုက်နိုင်သူများ၊ ရပ်ရွာအခြေပြုလူမှုအဖွဲ့အစည်းများ၊ ဒေသဆိုင်ရာလူထုနှင့် အုပ်ချုပ်ရေးအဖွဲ့များ သက်ဆိုင်ရာဌာနများနှင့်တွေ့ဆုံညှိနှိုင်းမှုများဆောင်ရွက်ခြင်း။

၃

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း၏ ရည်ရွယ်ချက်များ

- စီမံကိန်းဆောင်ရွက်မှုကြောင့်ဖြစ်ပေါ်လာနိုင်သည့် ပြဿနာရပ်များကို ဖော်ထုတ်ခြင်း
- ထိခိုက်လာနိုင်မှုများကိုလျော့ချပေးနိုင်မည့်အစီအစဉ်များကို အကြံပြုတင်ပြခြင်း
- စောင့်ကြပ်ကြည့်ရှုမည့်အစီအစဉ်များ ကြိုတင်ပြင်ဆင်ပြီးအကောင်အထည်ဖော်ဆောင်ရွက်ခြင်း
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်း လုံလောက်မှု ရှိ/မရှိဆန်းစစ်ခြင်း

အများပြည်သူနှင့် ဆွေးနွေးညှိနှိုင်းသဘောထားရယူခြင်း၏ရည်ရွယ်ချက်များ

- ဖြစ်ပေါ်လာနိုင်သည့် ကောင်းကျိုး/ဆိုးကျိုးများကိုတင်ပြခြင်း
- ပါဝင်ပတ်သက်သူများ၏အမြင်နှင့်အကြံပြုချက်များ၊ ထိခိုက်သက်ရောက်လာနိုင်မှုများကိုလျော့ချပေးနိုင်မည့်အစီအစဉ်များ၊ စောင့်ကြပ်ကြည့်ရှုမည့်အစီအစဉ်များတွင် ထည့်သွင်းစဉ်းစားပေးခြင်း
- စီမံကိန်းအကောင်အထည်ဖော်ဆောင်ရွက်ခြင်းနှင့် လည်ပတ်ခြင်း၏ ပွင့်လင်းမြင်သာမှုနှင့် တာဝန်ယူနိုင်မှု တိုးတက်စေခြင်း
- အငြင်းပွားမှုလျော့ချခြင်းနှင့် စီမံကိန်းအကောင်အထည်ဖော်ရာတွင် ချောမွေ့မှုရှိရန်ဆောင်ရွက်ခြင်း

၄

Appendix (33) Public Consultation about Environmental Impact Assessment
(Continued)



၅



စီမံကိန်းအတွင်းလေထုအရည် အသွေး တိုင်းတာနေပုံ



စီမံကိန်းအနီးရှိ မြေပေါ်ရေနမူနာကောက်ယူပုံ

၆

Appendix (34) Public Consultation about Environmental Impact Assessment
(Continued)



စီမံကိန်းအတွင်းဆူညံသံအဆင့် တိုင်းတာသည့်ပုံ



စီမံကိန်းအတွင်းစွန့်ပစ်ရေအရည်အသွေး တိုင်းတာသည့်ပုံ
(မုတ်ကောင်ခြင်းဆေးသည့်အလုပ်ရုံမှ စွန့်ပစ်ရေ) အမှတ် (၁)

၇



စီမံကိန်းအတွင်းစွန့်ပစ်ရေအရည်အသွေး တိုင်းတာသည့်ပုံ
(မီးဖိုချောင်သုံးစွန့်ပစ်ရေ) အမှတ် (၂)

၈



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (35) Public Consultation about Environmental Impact Assessment (Continued)

<div> စီမံကိန်းပတ်ဝန်းကျင်ရှိ လေအရည်အသွေးရလဒ်များ </div>						
စဉ်	အမည်	တိုင်းတာရရှိသည့် တန်ဖိုး	လမ်းညွှန်ချက် တန်ဖိုးများ	ယူနစ်	လမ်းညွှန်ချက်၏ ပျမ်းမျှကာလံာချိန်	အဖွဲ့အစည်း
၁။	PM10	၂၀	၅၀	μg/m3	(၂၄) နာရီ	NEQG
၂။	PM2.5	၈.၈၂	၂၅	μg/m3	(၂၄) နာရီ	NEQG
၃။	CO	၀	၃၅	ppm	(၂၄) နာရီ	NAAQS
၄။	CO2	၁၉၃.၄၃	၅၀၀၀	ppm	(၂၄) နာရီ	ACGIH
၅။	SO2	၂.၃၃	၂၀	μg/m3	(၂၄) နာရီ	NEQG
၆။	NO2	၁၁၇.၃၉	၂၀၀	μg/m3	(၂၄) နာရီ	NEQG

၉

<div> စီမံကိန်းပတ်ဝန်းကျင်ရှိ ဆူညံသံအရည်အသွေးရလဒ်များ </div>							
အမှတ်	တည်နေရာ	အချိန်	ဆူညံသံ အရင်းအမြစ်	ဆူညံသံ လက်ခံသူ	လမ်းညွှန်ချက် တန်ဖိုးများ	လမ်းညွှန်ချက်၏ ပျမ်းမျှကာလံာချိန်	အဖွဲ့အစည်း
၁	စီမံကိန်း အတွင်း	နေ့ (၇:၀၀ - ၂၂:၀၀)	၅၄.၄၆	၅၁.၁၁	၅၅	(၂၄) နာရီ	NEQG
		ည (၂၂:၀၀ - ၇:၀၀)	၄၃.၉၇	၄၄.၁၇	၄၅	(၂၄) နာရီ	NEQG

၁၀



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (36) Public Consultation about Environmental Impact Assessment (Continued)

စီမံကိန်းပတ်ဝန်းကျင်ရှိ မြေပေါ်ရေအရည်အသွေးရလဒ်များ				
မြေပေါ်ရေ	ယူနစ်	မြေပေါ်ရေအရည်အသွေးရလဒ်တန်ဖိုးများ	WHO Guideline	National drinking water quality standards. 2014. Ministry of Health, Myanmar. (draft)
pH (on site)	-	၇.၉	-	၆.၅ - ၈.၅
Temperature (on site)	°C	၂၇	-	-
Salinity (on site)	ppt	၀.၄	-	-
Dissolved Oxygen (on site)	mg/l	၈	-	-
Turbidity (on site)	NTU	၇	-	၅
Nitrate	mg/l	၀.၉	၅၀ mg/l total nitrogen	၅၀
Phosphate	mg/l	Nil	-	-
Hardness	mg/l	၆	-	၅၀၀
Chloride	mg/l	၇	၂၅၀	၂၅၀
Iron	mg/l	၀.၄၈	-	၁
Copper	mg/l	Nil	၂	၂
Manganese	mg/l	၀.၀၂	၀.၅	၀.၄
Zinc	mg/l	Nil	၃	၃
Aluminum	mg/l	၀.၂၁၄	၀.၂	၀.၂
Potassium	mg/l	၀.၅၅	-	-

စီမံကိန်းပတ်ဝန်းကျင်ရှိ စွန့်ပစ်ရေအရည်အသွေးရလဒ်များ					
စွန့်ပစ်ရေ အမှတ် (၁)	စွန့်ပစ်ရေ အမှတ် (၂)	ယူနစ်	စွန့်ပစ်ရေ အမှတ် (၁) ရလဒ် တန်ဖိုးများ	စွန့်ပစ်ရေ အမှတ် (၂) ရလဒ် တန်ဖိုးများ	NEQG လမ်းညွှန်ချက်တန်ဖိုးများ
pH	pH	-	၇.၃	၆.၈	၆-၉
Total Suspended Solids	Total Suspended Solids	mg/l	၁၀၉၃	၁၈၇	၅၀
Total Nitrogen	Total Nitrogen	mg/l	<၁	၁၂.၈၈	၁၀
Total Phosphorus	Total Phosphorus	mg/l	<၀.၀၁	၂.၄၄	၂
Oil and Grease	Oil and Grease	mg/l	<၅	၂၈	၁၀
Turbidity	Turbidity	NTU	၃၅၂	၁၉၉	-
Temperature	Temperature	°C	၂၅	၂၅	<၂၅ ^၁
Chemical Oxygen Demand (COD)	Chemical Oxygen Demand (COD)	mg/l	၁၂၈	၂၅၆	၂၅၀
Biochemical Oxygen Demand (BOD)	Biochemical Oxygen Demand (BOD)	mg/l	၆၀	၁၁၀	၅၀
Total Coliform Count	Total Coliform Count	CFU/100 ml	၄၀	၃၀	၄၀၀
Color	Color	TCU	၂၀၀	၁၁၀	-

Appendix (37) Public Consultation about Environmental Impact Assessment
(Continued)

စီမံကိန်းပတ်ဝန်းကျင်ရှိ ဇီဝမျိုးစုံမျိုးကွဲများလေ့လာခြင်း

ငါးမျိုးစိတ်များ

- စီမံကိန်းဧရိယာအနီးရှိ စာရင်းကောက်ယူရခဲ့သောငါးများတွင် အချက်အလက်မလုံလောက်သောမျိုးစိတ် (၂)မျိုး၊ မျိုးသုဉ်းရန်စိုးရိမ်စရာမရှိသောမျိုးစိတ် (၃)မျိုး၊ အချက်အလက်ဖော်ပြထားခြင်းမရှိသောမျိုးစိတ် (၁၉)မျိုး နှင့် မျိုးသုဉ်းနိုင်ဖွယ်ရှိသောမျိုးစိတ် (၁) မျိုး တို့ပါဝင်ပါသည်။

သတ္တဓာတ်ကျောက်တန်းများ

- စီမံကိန်းဧရိယာအနီးရှိ စာရင်းကောက်ယူရခဲ့သော သတ္တဓာတ်ကျောက်တန်းများတွင် အချက်အလက်မလုံလောက်သောမျိုးစိတ် (၂)မျိုး၊ မျိုးသုဉ်းရန်စိုးရိမ်စရာမရှိသောမျိုးစိတ် (၂၄)မျိုး၊ မျိုးသုဉ်းရန်စိုးရိမ်ဖွယ်ရှိသောမျိုးစိတ် (၁၆)မျိုး၊ မျိုးသုဉ်းနိုင်ဖွယ်ရှိသောမျိုးစိတ် (၇) မျိုး တို့ပါဝင်ပါသည်။

နို့တိုက်သတ္တဝါများ

- စီမံကိန်းဧရိယာအနီးရှိ စာရင်းကောက်ယူရခဲ့သော နို့တိုက်သတ္တဝါများတွင် မျိုးသုဉ်းရန်စိုးရိမ်စရာမရှိသောမျိုးစိတ် (၄)မျိုး၊ မျိုးသုဉ်းနိုင်သောမျိုးစိတ် (၁)မျိုးတို့ပါဝင်ပါသည်။

ငှက်မျိုးစိတ်များ

- စီမံကိန်းဧရိယာအနီးရှိ စာရင်းကောက်ယူရခဲ့သော ငှက်မျိုးစိတ်များတွင် မျိုးသုဉ်းရန်စိုးရိမ်စရာမရှိသောမျိုးစိတ် (၇)မျိုး ပါဝင်ပါသည်။

မှတ်ချက် - ဇီဝမျိုးစုံမျိုးကွဲများလေ့လာခြင်းမှ တွေ့ရှိချက်များကိုလည်း ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာ (EIA report) တွင်ပြည့်စုံစွာဖော်ပြထားပါသည်။

၁၃

လူမှုစီးပွားစစ်တမ်းကောက်ယူခြင်း

မှတ်ချက် - လူမှုစီးပွားစစ်တမ်းကောက်ယူခြင်းမှ တွေ့ရှိချက်များကိုလည်း ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာ (EIA report) တွင်ပြည့်စုံစွာဖော်ပြထားပါသည်။

Appendix (38) Public Consultation about Environmental Impact Assessment
(Continued)

ပုလဲမွေးမြူထုတ်လုပ်ခြင်းလုပ်ငန်းသက်ရောက်မှုအဆင့်သတ်မှတ်ခြင်း 					
ထိခိုက်မှု အဆင့်	ထိခိုက်မှု ဖော်ပြချက်	တည်ဆောက် သည့်ကာလ	လုပ်ငန်းလည်ပတ် သည့် ကာလ	စီမံကိန်း ဖျက်သိမ်းသည့် ကာလ	စုစုပေါင်း
အလွန်နည်း (very low)	လုံးဝသက်ရောက်မှုမရှိသော အနေအထား	-	၃	၆	၉
နည်း (low)	သက်ရောက်မှုနည်းပါး	၆	၂	၃	၁၁
အလယ် အလတ် (moderate)	သက်ရောက်မှုအနည်းငယ်ရှိ၍ ကောင်းမွန်စေရေး ဆောင်ရွက်ရန်လိုအပ်	၃	၄	-	၇
များ (high)	ထင်ရှားသောသက်ရောက်မှုရှိ၍ ကောင်းမွန်စေရေး အမှန်တကယ် ဆောင်ရွက်ရန် လိုအပ်	-	-	-	-
အလွန်များ (very high)	ရေရှည်ဆောင်ရွက်ရန် မသင့်တော်သော အနေအထား	-	-	-	-
စုစုပေါင်း		၉	၉	၉	၂၇





Appendix (39) Public Consultation about Environmental Impact Assessment
(Continued)




ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

ထိခိုက်မှုများ လျော့နည်းစေသည့် အရေးယူဆောင်ရွက်မှုများနှင့်
စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်

စီမံကိန်းတည်ဆောက်သည့် ကာလ

၁၈

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူဆောင်ရွက်မှု
၁။	မြင်ကွင်းပသာဒ	<ul style="list-style-type: none"> သစ်ပင်များခုတ်ထွင်ရှင်းလင်းခြင်းနှင့် မြေရှင်းလင်းခြင်း။ Surface Long Lines များ နေရာချထားခြင်း။ 	<ul style="list-style-type: none"> သစ်ပင်များခုတ်ထွင်ရှင်းလင်းရာတွင် တက်နိုင်သမျှ ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့နည်းအောင်စီစဉ်ဆောင်ရွက်ရန်၊ ကြီးထွားမှုနှုန်းမြန်ပြီး ဒေသခံမျိုးရင်းပင်များမှ အပင်မျိုးစေ့များနှင့် အပင် ပေါက်များကို ထိန်းသိမ်းထားပြီး စီမံကိန်းအတွင်း ပြန်လည်စိုက်ပျိုးပေးခြင်း။ လုပ်ပိုင်ခွင့် ရရှိထားသော ရေပြင်ဧရိယာတွင် သက်ဆိုင်ရာ အဖွဲ့အစည်း၏ လမ်းညွှန်ချက်အတိုင်း Surface long lines များအား စနစ်တကျနေရာချထားခြင်း။

၁၉



Appendix (40) Public Consultation about Environmental Impact Assessment
(Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၂။	လေအရည်အသွေး	<ul style="list-style-type: none"> သစ်ပင်များစုတ်ထွင်ရှင်းလင်းခြင်း ယာယီအဆောက်အဦ ဆောက်လုပ်ခြင်း လုပ်ငန်းသုံး ပစ္စည်းများ သယ်ယူပို့ဆောင်ခြင်းနှင့်စက်ယန္တရားများ ဘေးများမှဖုန်နှင့် မီးခိုးများထွက်ရှိခြင်း။ စီမံကိန်းတည်ဆောက်ရေးပစ္စည်းများ သယ်ဆောင်သည့် ရေယာဉ်များ မောင်းနှင်သွားလာခြင်းမှ အခိုးအငွေ့ထွက်ရှိခြင်း။ အရေးပေါ် သုံးမီးစက်များ နှိုးခြင်းမှ အမှုန်အမွှားများ ထွက်ရှိခြင်း။ လေတိုက်ခြင်းကြောင့် စုပုံထားသည့် စွန့်ပစ်ပစ္စည်းများမှ ဖုန်လွင့်ခြင်း။ စုပုံထားသည့် စွန့်ပစ်ပစ္စည်းများ မီးရှို့ခြင်း။ 	<ul style="list-style-type: none"> သစ်ပင်များစုတ်ထွင်ရှင်းလင်းရာတွင် တက်နိုင်သမျှ ပတ်ဝန်းကျင်ထိခိုက်မှု၊ လျော့နည်းအောင် စီစဉ်ဆောင်ရွက်ရန် လုပ်ငန်းခွင်ကာကွယ်ရေးပစ္စည်းများအသုံးပြုစေခြင်းဖြစေခြင်း။ တည်ဆောက်ရေးပစ္စည်းများ သယ်ဆောင်သည့် ရေယာဉ်များနှင့် စက်ပစ္စည်းများကို ပုံမှန်စစ်ဆေးခြင်း။ ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ယာဉ်များအား စီမံကိန်းဧရိယာအတွင်း အရှိန်ကို လျော့ချစေခြင်း ကောင်းမွန်သည့် စက်ပစ္စည်းများ အသုံးပြုစေခြင်း။ စွန့်ပစ်ပစ္စည်းများအား မီးမရှို့မီ စနစ်တကျ စုပုံထားရှိခြင်း။

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စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၃။	ဆူညံသံ နှင့် တုန်ခါမှု	<ul style="list-style-type: none"> စီမံကိန်းဧရိယာအတွင်း လမ်းပြင်ခြင်းတို့မှ အသုံးပြုသည့် ပြင်ဆင်ရေး စက်ပစ္စည်းတို့မှ ဆူညံသံများထွက်ရှိခြင်း။ တည်ဆောက်ရေးလုပ်ငန်းသုံး စက်ပစ္စည်းများ၊ မီးစက်များ၊ အသုံးပြုခြင်းမှ တုန်ခါမှုနှင့် ဆူညံသံများ ထွက်ရှိခြင်း။ တည်ဆောက်ရေးလုပ်ငန်းသုံး ပစ္စည်းများ သယ်ဆောင်သည့် ရေယာဉ်များမောင်းနှင်သွားလာခြင်းမှ ဆူညံသံနှင့် တုန်ခါမှုထွက်ရှိခြင်း။ 	<ul style="list-style-type: none"> သတ်မှတ်ထားသောအလုပ်ချိန်အတိုင်း လုပ်ငန်းဆောင်ရွက်ခြင်း။ လုပ်ငန်းသုံးယာဉ်များနှင့် စက်ပစ္စည်းများကို ပုံမှန်စစ်ဆေးခြင်း။ ဆူညံသံကျယ်လောင်စွာ ထွက်နိုင်သော လုပ်ငန်းများ ဆောင်ရွက်ချိန်တွင် လုပ်ငန်းခွင်ကာကွယ်ရေးပစ္စည်းများ အသုံးပြုစေခြင်း။ ပစ္စည်းများအတင်အချလုပ်စဉ် ယာဉ်များ၏စက်များကို ရပ်ထားခြင်း။ လုပ်ငန်းသုံးရေယာဉ်များအား အမြန်နှုန်းသတ်မှတ်ခြင်း။

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Appendix (41) Public Consultation about Environmental Impact Assessment
(Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၄။	မြေအရည်အသွေး	<ul style="list-style-type: none"> အပေါ်ယံမြေဆီလွှာပျက်စီးခြင်း၊ သစ်ပင်များခုတ်ထွင် ရှင်းလင်းခြင်းနှင့် မြေရှင်းလင်းခြင်း။ မြေတူးစက်ဖြင့်မြေတူးခြင်းကြောင့် မြေပြောင်းလဲခြင်း။ လုပ်ငန်းသုံး ယာဉ်ယန္တရားများ၊ စက်များ နှင့် ဆီသိုလှောင်သောနေရာမှ ဆီများယိုစိမ့်ခြင်း။ 	<ul style="list-style-type: none"> လုပ်ငန်းတည်ဆောက်ရေးကာလတွင် အပေါ်ယံမြေဆီလွှာများကို ပျက်စီးမှုအနည်းဆုံးဖြစ် အောင်ဖယ်ရှား၍ ပြန်လည်အသုံးပြုနိုင်ရန်၊ ထိန်းသိမ်းခြင်း၊ သိုလှောင်ခြင်း။ တူးဖော်ထားသည့် မြေများကို စနစ်တကျ စုပုံထားခြင်း၊ ပြန်လည်အသုံးပြုခြင်း။ လုပ်ငန်းသုံး စက်ယန္တရားများကို ပုံမှန် စစ်ဆေးခြင်း။ ဆီစစ်သံကန်များတွင် ယိုစိတ်သည့် ဆီများကို ပြန်လည်အသုံးပြုခြင်း။ ကောင်းမွန်သောဆီပေါများ အသုံးပြုခြင်း။
၅။	ရေအရည်အသွေး	<ul style="list-style-type: none"> မိုးတွင်းကာလမြေရှင်းလင်းခြင်းနှင့် မြေတူးဖော်ခြင်း။ သစ်ပင်များခုတ်ထွင်ရှင်းလင်းခြင်း။ အပေါ်ယံမြေဆီလွှာများကို စုပုံထားခြင်းမှ မြေအောက်ရေယိုစိမ့်မှုဖြစ်ခြင်း။ စက်ပစ္စည်းများ၊ တည်ဆောက်ရေးသုံးရေယာဉ်များမှ ဆီယိုစိတ်ခြင်း။ တည်ဆောက်ရေးကာလ လုပ်သားများမှ စွန့်ပစ်ပစ္စည်းများထွက်ရှိခြင်း။ 	<ul style="list-style-type: none"> မိုးရာသီတွင် မြေတူးလုပ်ငန်းများကို တတ်နိုင်သမျှ မဆောင်ရွက်ခြင်း။ ရေစီးရေလာကောင်းမွန်စေရန် ရေနုတ်မြောင်းများဖောက်လုပ်ထားခြင်း။ လုပ်ငန်းသုံးရေယာဉ်များနှင့် စက်ပစ္စည်းများကို ပုံမှန်စစ်ဆေးခြင်း။ စက်ပစ္စည်းများကို သတ်မှတ်ဧရိယာ အတွင်းတွင် ပြင်ဆင်ခြင်း။ စွန့်ပစ်ပစ္စည်းများကို ရေထဲသို့ မပစ်ရန် တားမြစ်ထားခြင်း။

JJ

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၆။	စွန့်ပစ်ပစ္စည်း (အစိုင်အခဲနှင့် အရည်)	<ul style="list-style-type: none"> အပေါ်ယံမြေဆီလွှာပျက်စီးခြင်း အလုပ်သမားများမှ တစ်ကိုယ်ရေသုံးစွန့်ပစ်အမှိုက်များ (ပလတ်စတစ်၊ ပုလင်း)။ အလုပ်သမားများ အသုံးပြုသော သန့်စင်ခန်းများမှစွန့်ပစ်အရည်များ။ လုပ်ငန်းသုံး ယာဉ်များနှင့် စက်များမှ အန္တရာယ်ဖြစ်စေသော အသုံးပြုပြီး စက်သုံးဆီများ။ အခြားသောအသုံးပြုပြီး ပစ္စည်းများ ဖြစ်သည့် သံတိုသံစများ၊ ဘီလပ်မြေ အိတ်ခွံများ၊ သုတ်ဆေးဘူးခွံ၊ မှန်ကွဲများစသည့် အစိုင်အခဲစွန့်ပစ် ပစ္စည်းများ။ 	<ul style="list-style-type: none"> အပေါ်ယံမြေဆီလွှာစုပုံသည့် နေရာသတ်မှတ်ခြင်း။ စီမံကိန်းအတွင်းအသုံးပြုပြီးစွန့်ပစ်ပစ္စည်းများစွန့်ပစ် စွန့်ပစ်ရန် အမှိုက်ပုံးများထားရှိခြင်း။ စွန့်ပစ်ပစ္စည်းများထဲမှပြန်လည်အသုံးပြုနိုင်သောပစ္စည်းများအားပြန်လည် အသုံးပြုခြင်း။ အလုပ်သမားများအတွက် လုံလောက်သော အိမ်သာများ ထားရှိပေးခြင်း။ အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းများ၊ အသုံးပြုပြီးဆီများအား ဆီစစ်သံကန်များ အသုံးပြုပြီး သိုလှောင်ခြင်း။ စီမံကိန်းဧရိယာအတွင်း စွန့်ပစ်ပစ္စည်းများ စုပုံရန်ယာယီနေရာ သတ်မှတ်ခြင်း။ အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းများကို သီးခြားခွဲထားခြင်း။

JP



Appendix (42) Public Consultation about Environmental Impact Assessment
(Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၇။	ကျန်းမာရေး၊ ရေပေး စီစဉ်မှု၊ ရေပေးမှု၊ ဂေဟစနစ်	<ul style="list-style-type: none"> မြေရင်းလင်းခြင်းအတွက် အပင်များ ခုတ်လှဲခြင်း။ ရေထဲသို့ စက်ဆီ၊ ချောဆီများ မတော်တဆယိုစိတ်ခြင်း။ ဆောက်လုပ်ရေး လုပ်ငန်းများကြောင့် ဆူညံသံများဖြစ်ပေါ်ခြင်း။ တည်ဆောက်ရေးလုပ်ငန်းသုံး ပစ္စည်းများ သယ်ဆောင်လာသည့် ရေယာဉ်များမောင်းနှင်သွားလာခြင်းမှ တုန်ခါမှုဖြစ်ပြီး ရေနေသတ္တဝါများအပေါ်ထိခိုက်မှု 	<ul style="list-style-type: none"> အပင်များခုတ်လှဲခြင်းကို ရှောင်ရှားခြင်း။ အန္တရာယ်ရှိရာတိုင်းပစ္စည်းများ၊ ဆီများ၊ ချောဆီ၊ စက်ဆီ နှင့် ပစ္စည်းများအား ရေထဲသို့ မစွန့်ရန်။ အလုပ်ချိန်ကို သတ်မှတ်ထားရှိခြင်း။ တည်ဆောက်ရေးလုပ်ငန်းသုံး ပစ္စည်းများ သယ်ဆောင်လာသည့် ရေယာဉ်များမောင်းနှင်သွားလာခြင်းအား အမြန်နှုန်းနှင့် အရှိန်နှုန်း သတ်မှတ်ထားရှိခြင်း

၂၄

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၈။	မီးဘေးအန္တရာယ်	<ul style="list-style-type: none"> လောင်စာဆီများ သိုလှောင်ထားခြင်း။ မီးလောင်လွယ်ပစ္စည်းများ စုပုံထားရှိခြင်း။ 	<ul style="list-style-type: none"> မီးသတ်ရေသိုလှောင်ကန်နှင့် မီးသတ်ဆေးဗူးများထားရှိရန်။ မီးဘေးအန္တရာယ်နှင့် ပတ်သတ်သောဆိုင်ရာတိုင်းများထားရှိရန်။
၉။	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး	<ul style="list-style-type: none"> လုပ်ငန်းသုံး ပစ္စည်းများကြောင့် ထိခိုက်ခြင်း။ လုံခြုံစိတ်ချမှုမရှိသော လုပ်ငန်းခွင်ဖြစ်ပါက အန္တရာယ်ရှိနိုင်ခြင်း။ အလုပ်သမားများ ဝင်ရောက်လာသဖြင့် လူဦးရေကိုးလာခြင်းကြောင့် အညစ်အကြေးများလာခြင်းနှင့် ကူးစက်ရောဂါများ ဖြစ်ပွားနိုင်ခြင်း။ 	<ul style="list-style-type: none"> အလုပ်သမားများအား လုပ်ငန်းခွင်သုံး အကာအကွယ်ပစ္စည်းများ (PPE) အသုံးပြုစေခြင်းနှင့် ထိုပစ္စည်းများမပါပဲ စီမံကိန်းအတွင်း ဝင်ခွင့်မပြုခြင်း။ မတော်တဆမှုများဖြစ်ပွားပါက အရေးပေါ် သုံးရန် ဆေးဝါးများ ထောက်ပံ့ထားခြင်း။ ကျွမ်းကျင်လုပ်သားများကိုသာ လုပ်ကိုင်စေခြင်း။ သောက်သုံးရေအလုံအလောက်ထားရှိပေးခြင်း။

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Appendix (43) Public Consultation about Environmental Impact Assessment
(Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၁၀။	လူမှုစီးပွားရေး	<ul style="list-style-type: none"> ကောင်းကျိုး 	<ul style="list-style-type: none"> ဒေသခံများအတွက် အလုပ်အကိုင်အခွင့်အလမ်းများ ပေါ်ပေါက်လာခြင်း၊ ဝင်ငွေတိုးပွားလာခြင်း၊ လူနေမှုအဆင့်အတန်းတိုးတက်လာခြင်း၊

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ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

ထိခိုက်မှုများလျော့နည်းစေသည့် အရေးယူဆောင်ရွက်မှုများနှင့်
စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်

စီမံကိန်းလည်ပတ်သည့် ကာလ

၂၇





Appendix (44) Public Consultation about Environmental Impact Assessment
(Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူဆောင်ရွက်မှု
၁။	မြင်ကွင်းပသာဒ	<ul style="list-style-type: none"> မုတ်ကောင်များ ချောမွေ့မြူသည့် surface long lines များ ချထားခြင်း။ 	<ul style="list-style-type: none"> surface Lone line များကို စနစ်တကျ ထိန်းသိမ်းလုပ်ဆောင်စေခြင်း။
၂။	လေအရည်အသွေး	<ul style="list-style-type: none"> လုပ်ငန်းသုံးစက်ပစ္စည်းများ၊ မီးစက်များ၊ ရေစုပ်စက်များ မောင်းနှင်အသုံးပြုခြင်းမှ အနီးအငွေ့နှင့် အမှုန်အမွှားများ ထွက်ရှိခြင်း။ စားဖိုဆောင်တွင် ချက်ပြုတ်ခြင်းမှ ထွက်ရှိလာသော မီးခိုးငွေ့များနှင့် အမှုန်များ။ Long Lines ချထားသော လုပ်ငန်းခွင် ရေပြင်ခရီးယာသို့ သွားရောက်သည့် ရေယာဉ်များ မောင်းနှင်သွားလာခြင်းမှ အနီးအငွေ့များ ထွက်ရှိခြင်း။ စီမံကိန်းတွင်း ထွက်ရှိသည့် စွန့်ပစ်ပစ္စည်းများအား မီးရှို့ဖျက်ဆီးခြင်း။ 	<ul style="list-style-type: none"> အရည်အသွေးကောင်းမွန်သည့် စက်ပစ္စည်းနှင့် လောင်စာဆီကို အသုံးပြု စေခြင်း။ ယာဉ်/စက်များ ပုံမှန် ထိန်းသိမ်းစစ်ဆေးခြင်း။ စားဖိုဆောင်မှ ထွက်ရှိလာသည့် မီးခိုးငွေ့များနှင့် အမှုန်များကို ပတ်ဝန်းကျင်ထိခိုက်မှုအနည်းဆုံး ဖြစ်စေမည့် အဆောက်အအုံကို Master Plan တွင်ပါသည့် ပုံစံအတိုင်းတည်ဆောက်ရန်။ Long Lines ချထားသော လုပ်ငန်းခွင် ရေပြင်ခရီးယာသို့ သွားရောက်သည့် ရေယာဉ်များ သွားလာသည့် အခေါက်အရေအတွက်အား စနစ်တကျ အလုပ်ချိန်သတ်မှတ်၍ သွားစေခြင်း။ မီးရှို့ရန်သတ်မှတ်ထားသော နေရာတွင် စနစ်တကျ မီးရှို့ဖျက်ဆီးခြင်း။

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စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူဆောင်ရွက်မှု
၃။	ဆူညံသံနှင့် တုန်ခါမှု	<ul style="list-style-type: none"> လုပ်ငန်းသုံးစက်ပစ္စည်းများ၊ မီးစက်များ၊ ရေစုပ်စက်များ အသုံးပြုခြင်းမှ ဆူညံသံထွက်ရှိမှု။ လုပ်ငန်းသုံးရေယာဉ်များ၊ သယ်ယူပို့ဆောင်ရေးအတွက် အသုံးပြုသည့် ရေယာဉ်များ မောင်းနှင်ခြင်းမှ ဆူညံသံနှင့် တုန်ခါမှု ထွက်ရှိခြင်း။ ရေပြင်ခရီးယာတွင် မုတ်ကောင်ခြင်းများရေဆေးခြင်း၊ သန့်ရှင်းရေးလုပ်ရာတွင် အသုံးပြုသည့် ရေစုပ်စက်မော်တာမှ ဆူညံသံထွက်ရှိခြင်း။ 	<ul style="list-style-type: none"> ယာဉ်/စက်များအသုံးပြုခြင်းနှင့် ပုံမှန်စစ်ဆေးခြင်း။ မီးစက်များကိုအသံလုံသောအခန်းတွင်ထားရှိခြင်း။ စက်ပစ္စည်းပြင်ဆင်ထိန်းသိမ်းရေးအတွက် စီစဉ်ထားရှိခြင်း။ လုပ်ငန်းသုံးရေယာဉ်များအား လုပ်ငန်းခွင်အတွင်း အမြန်နှုန်းသတ်မှတ်ထားရှိခြင်း၊ အခေါက်အရေအတွက် အနည်းဆုံးဖြစ်အောင် လျော့ချမောင်းနှင်ခြင်း။ မုတ်ကောင်သန့်ရှင်းရေးလုပ်သည့် လုပ်သားများ ဆူညံမှုလျော့နည်းစေရန် ရေစုပ်စက်မော်တာများကို အကာအကွယ်များဖြင့် ထားရှိစေခြင်း။

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Appendix (45) Public Consultation about Environmental Impact Assessment
(Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၄။	မြေအရည်အသွေး	<ul style="list-style-type: none"> ရေယာဉ် စက်ယန္တရားများ၊ မီးစက်များ၊ ရေရှုပ်စက်များ ပြင်ဆင်ခြင်းမှ ထွက်ရှိလာသော စက်ဆီ၊ ချောဆီ၊ ဒီဇယ်ဆီများ ယိုဖိတ်ကျဆင်းမှု၊ စီမံကိန်းတွင်း စွန့်ပစ်ပစ္စည်းများ စနစ်တကျစွန့်ပစ်ဘဲ စုပုံထားခြင်းမှ မြေအရည်အသွေးအပေါ် သက်ရောက်လာနိုင်မှု၊ မှတ်ကောင်ခြင်းများတွင် ကပ်ညီနေသော ခရု၊ ခက်ရင်း များ ကို သန့်ရှင်းရေးလုပ်ပြီး စုပုံစွန့်ပစ်ထားသည့် မြေစာပုံ။ 	<ul style="list-style-type: none"> လုပ်ငန်းသုံးစက်ပစ္စည်းများမှ စက်ဆီ၊ ချောဆီမယိုဖိတ်စေရန် ဆီစစ်သံကန်များ အသုံးပြုစေခြင်း၊ လုပ်ငန်းစဉ်မှ ထွက်ရှိလာသော စွန့်ပစ်ပစ္စည်းများကို အမျိုးအစားသတ်မှတ်၍ အမှိုက်ပုံတွင်စွန့်ပစ်ခြင်း၊ စွန့်ပစ်ထားသည့် မြေစာပုံကို ပြန်လည်အသုံးချနိုင်ရန် ဆောင်ရွက်ခြင်း (ဥပမာ- တိရိစ္ဆာန်အစာ ပြုလုပ်ခြင်း)
၅။	ရေအရည်အသွေး	<ul style="list-style-type: none"> ဝန်ထမ်းအိမ်ရာများ၏ ရေချိုးခန်း၊ သန့်စင်ခန်းများမှ ထွက်ရှိလာသော ရေဆိုးများ၊ စားဖိုဆောင်မှ ရေဆိုးများထွက်ရှိခြင်း၊ လုပ်ငန်းခွင်သုံး ရေယာဉ်များမှ ရေပြင်ဧရိယာအတွင်း ဆီယိုဖိတ်မှု၊ မှတ်ကောင်ခြင်းဆေးရုံနှင့် မှတ်ကောင်များ သန့်ရှင်းရေးလုပ်ခြင်းမှ အရည်စွန့်ပစ်ပစ္စည်းများ ထွက်ရှိခြင်း၊ ကမ်းအနီး ကုန်တင်ကုန်ချ ပြုလုပ်သည့်အခါ (အထူးသဖြင့် ဆီပေါများ) ရေတွင်မျောချ သယ်ဆောင်ခြင်းဖြင့် ပင်လယ်ရေ အရည်အသွေးအပေါ် ထိခိုက်စေခြင်း။ 	<ul style="list-style-type: none"> စားဖိုဆောင်နှင့် အလုပ်သမားရိပ်သာမှ ရေသုံးစွဲမှု၊ ကန်သတ်လျှော့ချနိုင် ရန်အတွက် ရေဓမ္မတာရေး အသိပညာပေးအစီအစဉ်များ လုပ်ဆောင် ပေးခြင်း၊ ရေနုတ်မြောင်းများ စနစ်တကျ ထားရှိခြင်း၊ ရေနုတ်မြောင်းများ ပိတ်ဆို့မှုမှ ကာကွယ်ရန် ပိုက်လိုင်းများ၊ ရေစစ်ထုတ် နေရာများအား ရှင်းလင်းခြင်း၊ ထိန်းသိမ်းခြင်း၊ လုပ်ငန်းခွင်သုံး ရေယာဉ်များအား ဆီယိုဖိတ်မှုမရှိစေရန် စနစ်တကျ ထိန်းသိမ်းစောင့်ရှောက်ခြင်း၊ မှတ်ကောင်ခြင်းဆေးရုံသို့ အလုပ်ရုံမှထွက်ရှိလာသည့် ရေအရည်အသွေးအား စောင့်ကြပ်ကြည့်ရှုပိုင်းတာရန်၊ ဆီပေါများကမ်းချသည့်အခါ ရေတွင်မျောချသယ်ဆောင်ခြင်းကို မလုပ်ဆောင်စေခြင်း။

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၆။	စွန့်ပစ်ပစ္စည်း (အစိုင်အခဲနှင့် အရည်)	<ul style="list-style-type: none"> ပုလဲဖော်ယူပြီးကျန်ရှိသည့် မှတ်ခွံများ၊ အသုံးပြု၍မရတော့သည့် စွန့်ပစ် ပိုက်ကွန်များ (Triangle Nets) ၊ panel များ၊ မှတ်ကောင်ခြင်းဆေးရုံမှ ထွက်ရှိလာသော အစိုင်အခဲနှင့် အရည်စွန့်ပစ်ပစ္စည်းများ၊ ဝန်ထမ်းအိမ်ရာမှ ထွက်ရှိလာသော တစ်ကိုယ်ရည်သုံး စွန့်ပစ်ပစ္စည်းများ၊ စားဖိုဆောင်မှ ထွက်ရှိလာသောစွန့်ပစ်ရေ၊ 	<ul style="list-style-type: none"> မှတ်ခွံများကို သိုလှောင်ရုံဖြင့် စနစ်တကျ သိုလှောင်ထားရန်၊ စီမံကိန်းမှ ထွက်ရှိလာသည့် စွန့်ပစ်ပစ္စည်းများကို စနစ်တကျ သိမ်းဆည်းထားပြီး ပြန်လည်အသုံးပြုရန်၊ သတ်မှတ်ထားသောနေရာများတွင်သာ စွန့်ပစ်ရန်၊ အမှိုက်များကို လျှို့ဝှက်ထဲသို့ မစွန့်ပစ်ရန် တားမြစ်ထားခြင်း၊ မှတ်ကောင်ခြင်းဆေးရုံမှ ထွက်ရှိလာသော အစိုင်အခဲနှင့် အရည်စွန့်ပစ်ပစ္စည်းများ၊ ဝန်ထမ်းအိမ်ရာမှ ထွက်ရှိလာသည့် တစ်ကိုယ်ရည်သုံး စွန့်ပစ်ပစ္စည်းများကို အမျိုးအစားခွဲခြားပြီး အမှိုက်ပုံတွင် စွန့်ပစ်စေခြင်း၊ အိမ်သာများလုံလုံလောက်လောက်ထား ရှိပေးခြင်း၊ စားဖိုဆောင်ထွက်ရှိလာသည့် စွန့်ပစ်ရေများကို ပြန်လည်သန့်စင်ပြီးမှ စွန့်ပစ်စေခြင်း။



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (46) Public Consultation about Environmental Impact Assessment (Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၇။	ကုန်းနေ၊ ရေနေ ဇီဝမျိုးစုံမျိုးကွဲ များ၏ ဂေဟစနစ်	<ul style="list-style-type: none"> စွန့်ပစ်အမှိုက်များအား သတ်မှတ်ထားသောနေရာများတွင် စနစ်တကျမစွန့်ပစ်ဘဲ ပင်လယ်ထဲသို့ စွန့်ပစ်ခြင်း၊ ရေယာဉ်များမှ စက်ဆီများ ယိုဖိတ်ပြီး ရေနေသတ္တဝါတို့ အပေါ် သက်ရောက်မှု မှု၊ ရေယာဉ်များ မောင်းနှင်သွားလာခြင်းမှ ဆူညံသံနှင့် တုန်ခါမှုကြောင့် ရေနေသတ္တဝါတို့ အပေါ် သက်ရောက်မှု၊ စွန့်ပစ်ရေများအား ပြန်လည်သန့်စင်မှုမရှိဘဲ တိုက်ရိုက်စွန့်ပစ်ခြင်း၊ 	<p>ဒေသမျိုးရင်းဇီဝမျိုးစုံမျိုးကွဲများကိုကာကွယ်ရန်:</p> <ul style="list-style-type: none"> စီမံကိန်းနှင့်ကင်းလွတ်သောအပင်များရှင်းလင်းခြင်းလင်းခြင်းကိုလျော့ချခြင်း၊ တောတွင်းထင်းခုတ်ခြင်း၊ ဆေးဘက်ဝင်အပင်များနှင့် သစ်သီးဝလံများ ခူးဆွတ်ခြင်းများမှတားမြစ်ခြင်း၊ တရားမဝင်သစ်ခုတ်ခြင်း၊ အမဲလိုက်ခြင်းများကို မပြုလုပ်ရန် အသိပညာ ပေးခြင်း၊ ဇီဝမျိုးစုံမျိုးကွဲများကို (၂) နှစ်တစ်ကြိမ် စစ်တမ်းကောက်ယူခြင်းနှင့် စောင့်ကြပ်ကြည့်ရှုခြင်း ပြုလုပ်ရန်၊ ရေပြင်တွင် လုပ်ငန်းဆောင်ရွက်သည့် ရေလုပ်သား များ Pump boat လုပ်သားများကို စွန့်ပစ်အမှိုက် များ ပင်လယ်ပြင်သို့ မစွန့်ပစ်ရန် ပညာ ပေးခြင်း၊ Long Line များသန့်ရှင်းရေးလုပ်သည့် မော်တော်ဘုတ်များမှ ရေပြင် ဧရိယာသို့ ဆီယိုဖိတ်မှု မရှိစေရန် သေချာ စစ်ဆေးခြင်း။

၃၂

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၈။	မီးဘေးအန္တရာယ်	<ul style="list-style-type: none"> လောင်စာဆီများ သိုလှောင်ထားခြင်း၊ မီလောင်လွယ်ပစ္စည်းများ စုပုံထားရှိခြင်း။ 	<ul style="list-style-type: none"> မီးသတ်ဆေးဘူးများ တပ်ဆင်ခြင်း၊ မီးဘေးအန္တရာယ်နှင့်ပတ်သက်သည့် ဆိုင်းဘုတ်များ တပ်ဆင်ခြင်း၊ စက်ယန္တရားများ၊ မီးစက်များကိုပုံမှန်စစ်ဆေးပေးခြင်း၊ မီးလောင်လွယ်သော၊ ဖောက်ကွဲလွယ်သော အရာများကို သတိထား ကိုင်တွယ်စေရန် သတိပေးဆိုင်းဘုတ်များ တပ်ဆင်သတိပေးခြင်း၊
၉။	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး	<ul style="list-style-type: none"> ရေပြင်ဧရိယာရှိ လုပ်ငန်းတည်ရှိရာသို့ သွားရောက်ခြင်းမှ မတော်တဆ ထိခိုက်အန္တရာယ်ရှိနိုင်မှု ရာသီဥတု သဘာဝဘေးအန္တရာယ်ကြောင့် ကျန်းမာရေးဆိုင်ရာ ဆိုးကျိုးသက်ရောက်နိုင်မှုများ ခြစ်ပေါ်နိုင်ခြင်း အလုပ်သမားများ ဝင်ရောက်လာသဖြင့် လူဦးရေတိုးလာခြင်းကြောင့် အညစ်အကြေးများလာခြင်းနှင့် ကူးစက်ရောဂါများ ခြစ်ပွားနိုင်ခြင်း။ လုပ်ငန်းခွင်ဧရိယာတွင်း ရေကြီးခြင်း၊ မုန်တိုင်းဝင်ရောက်ခြင်းနှင့် မြေပြိုခြင်း 	<ul style="list-style-type: none"> ကျွန်းကျင်လုပ်သားများအားခန့်အပ်ထားခြင်း၊ ဝန်ထမ်းများအားကျန်းမာရေးစောင့်ရှောက်ပေးခြင်း၊ အရက်သေစာသောက်စားခြင်းနှင့်မူးယစ်ဆေးဝါးသုံးစွဲခြင်း သုံးစွဲခြင်းကို တင်းကြပ် စွာတားမြစ်ခြင်း၊ လုပ်သားများသောက်သုံးရန်အတွက် သောက်သုံးရေကိုလုံလောက်စွာ ထားရှိပေးခြင်း၊ လုံလောက်သောအိမ်သာများ၊ မိလ္လာကန်နှင့်အမှိုက်ပုံးများထားရှိပေးခြင်း၊ ရေယာဉ်များဖြင့် သွားလာ၍ လိုင်းများသန့်ရှင်းရေး လုပ်ခြင်း အန္တရာယ် ကင်းစေရန် အသက်ကယ်အင်္ကျီများ ဝတ်ဆင်စေခြင်း၊ အရေးပေါ် သုံးဆေးဝါးများနှင့်ဆေးသေတ္တာများအား လက်လှမ်းမီရာတွင် ထားရှိခြင်း၊ ကူးစက်ရောဂါများမပြန့်ပွားရေးအတွက်ပညာပေးလုပ်ငန်းများဆောင်ရွက် ခြင်း၊ ရှေးဦးသူနာပြုစရေးသင်တန်းများလုပ်ဆောင်ပေးခြင်း၊ သဘာဝဘေးအန္တရာယ် သတိပေးအကြောင်းကြားစာများ၊ မိုးလေဝသအခြေအနေအထား အမြဲစောင့်ကြည့်ခြင်း မြေပြိုခြင်းအား လျော့နည်းစေရန် သစ်ပင်များ စိုက်ပျိုးခြင်း၊ သစ်ပင်များအား မဆင်မခြင်ခုတ်လှဲခြင်းအား တားမြစ်ခြင်း။

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Appendix (47) Public Consultation about Environmental Impact Assessment
(Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၁၀။	လူမှုစီးပွားရေး	<ul style="list-style-type: none"> ကောင်းကျိုး 	<ul style="list-style-type: none"> ဒေသခံများလုပ်အကိုင် အခွင့်အလမ်း ဖော်ပေါက်လာခြင်း၊ ဝင်ငွေတိုးပွားလာခြင်း၊ လူနေမှုအဆင့်အတန်းတိုးတက်လာခြင်း၊



စီမံကိန်းလည်ပတ်သည့်ကာလတွင် ဇီဝမျိုးစုံမျိုးကွဲများအတွက် ထိခိုက်မှုများလျော့နည်းစေရေးနည်းလမ်းများ



သန္တာကျောက်တန်းနှင့် ငါးမျိုးစိတ်များအပေါ် ထိခိုက်မှု လျော့ပါးစေရေးနည်းလမ်းများ

စီမံကိန်းလည်ပတ်သည့် ကာလတွင် သဲသောင်များနှင့် ရွှံ့ပြင်များသည် သတ္တဝါများ၏ အရေးပါသောစားကျက်များ၊ ပေါက်ပွားရာနေရာများ ဖြစ်သောကြောင့် ထိုနေရာများကိုအသုံးပြုမှုကိုအနည်းဆုံးဖြစ်အောင်တတ်နိုင်သမျှလျော့ချရပါမည်။ သန္တာကျောက်တန်းများရှိသောနေရာများတွင် မော်တော်ဘုတ်များအား အရှိန်ပြင်းပြင်းမောင်းနှင်ခြင်းကို ရှောင်ရှားခြင်းဖြင့် တုန်ခါမှုနှင့် ရေလှိုင်းများကြောင့် သန္တာကျောက်ခက်/ကျောက်တန်းများ ကျိုးပဲ့ခြင်းကို လျော့ချပေးနိုင်ပါသည်။

စောင့်ကြပ်ကြည့်ရှုမည့်အစီအစဉ်

အဓိကဦးစားပေးဆောင်ရွက်ရမည့်အမျိုးအစားများမှာ ရေမျှောပင်ငယ်များ၊ ရေမျှောကောင်ငယ်များ နှင့် သန္တာကျောက်တန်းများဖြစ်ကြပါသည်။ အဆိုပါစောင့်ကြပ်ကြည့်ရှုမည့်အစီအစဉ်ကို Line Transect Method ဖြင့်ဆောင်ရွက်မည်ဖြစ်ပါသည်။ ထိုသို့ဆောင်ရွက်ရာတွင် ရေမျှောပင်ငယ်များ နှင့် ရေမျှောကောင်ငယ်များ ကိုစောင့်ကြပ်ကြည့်ရှုမှုကို တစ်နှစ်လျှင် သုံးကြိမ် နှင့် သန္တာကျောက်တန်းများအတွက်ကိုမူ တစ်နှစ်လျှင်တစ်ကြိမ်ဆောင်ရွက်သင့်ပါသည်။



Appendix (48) Public Consultation about Environmental Impact Assessment
(Continued)




ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

ထိခိုက်မှုများလျော့နည်းစေသည့် အရေးယူဆောင်ရွက်မှုများနှင့်
စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်

စီမံကိန်းပိတ်သိမ်းသည့်ကာလ

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စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူဆောင်ရွက်မှု
၁။	မြင်ကွင်းပသာဒ	<ul style="list-style-type: none"> Surface long line များ ပြန်လည်ဖျက်သိမ်းခြင်း 	<ul style="list-style-type: none"> ကြီးထွားမှုနှုန်းမြန်ပြီးဒေသခံမျိုးရင်းပင်များမှ အပင်မျိုးစေ့နှင့်အပင်ပေါက်များကိုထိန်းသိမ်းထားပြီးလုပ်ငန်းပြီးဆုံးသည့်ကာလတွင် ပြန်လည် စိုက်ပျိုးပေးခြင်း။ surface long line လုပ်ငန်းဖျက်သိမ်းမှု ဆောင်ရွက်ခြင်းအား စနစ်တကျ ဖြုတ်သိမ်းခြင်း။
၂။	လေအရည်အသွေး	<ul style="list-style-type: none"> ပိတ်သိမ်းကာလတွင် ပင်လယ်ပြင်ရှိ Long Line များဖြုတ်သိမ်းသည့် လုပ်ငန်းသုံး မော်တော်ဘုတ်များမှ ထုတ်လွှတ်သည့် အမှီးအငွေ့များ စီမံကိန်းလုပ်ငန်းဖျက်သိမ်းစဉ် လုပ်ငန်းသုံးစက်ပစ္စည်းများ မှ ထုတ်လွှတ်သော အမှီးအငွေ့များကြောင့် လေထုညစ်ညမ်းခြင်း 	<ul style="list-style-type: none"> လုပ်ငန်းပိတ်သိမ်းရန်အတွက်အစီအစဉ်များစနစ်တကျ ရေးဆွဲခြင်း။ ယာဉ်များသွားခြင်းကို စနစ်တကျထိန်းချုပ်ဆောင်ရွက်ခြင်း။ စီမံကိန်းလုပ်ငန်းဖျက်သိမ်းစဉ်တွင် အသုံးပြုသည့် စက်ပစ္စည်းများကို အရည်အသွေးကောင်းမွန်သည့် လောင်စာဆီများကို အသုံးပြုစေခြင်း။ လုပ်ငန်းခွင်ကာကွယ်ရေးအသုံးအဆောင်ပစ္စည်းများအားထောက်ပံ့ပေးခြင်း။

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Appendix (49) Public Consultation about Environmental Impact Assessment
(Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူဆောင်ရွက်မှု
၃။	ဆူညံသံနှင့် တုန်ခါမှု	<ul style="list-style-type: none"> လုပ်ငန်းဖျက်သိမ်းသည့် အခါ အသုံးပြုသည့် မော်တော်ဘုတ်များမှ ဆူညံသံနှင့် တုန်ခါမှုထွက်ရှိခြင်း ပိတ်သိမ်းခြင်းလုပ်ငန်းစဉ်တွင် အသုံးပြုသော မီးစက်နှင့် စက်ပစ္စည်းများ၊ သယ်ယူပို့ဆောင်ရေးယာဉ်မှ ဆူညံသံထွက်ရှိမှု။ 	<ul style="list-style-type: none"> လုပ်ငန်းပိတ်သိမ်းသည့်အခါ ရေယာဉ်များအား လုပ်ငန်းစဉ်အတွင်း အမြန်နှုန်းသတ်မှတ်ထားရှိခြင်း နှင့် လုပ်ငန်းစဉ်အတွင်း အရှိန်လျော့မောင်းနှင်စေခြင်း။ လုပ်ငန်းပိတ်သိမ်းမှုများကို နေ့အချိန်တွင် ဆောင်ရွက်စေခြင်း။ လုပ်ငန်းစဉ်ကာကွယ်ရေးအသုံးအဆောင်ပစ္စည်းများအား ထောက်ပံ့ပေးခြင်း။

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စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၄။	မြေအရည်အသွေး	<ul style="list-style-type: none"> စက်ဆီ၊ ချောဆီများ ယိုဖိတ်စီးကျခြင်း။ စွန့်ပစ်ပစ္စည်းများအား စုပုံထားရှိခြင်း။ 	<ul style="list-style-type: none"> လုပ်ငန်းဖျက်သိမ်းသည့် စက်ပစ္စည်းများမှ စက်ဆီ၊ ချောဆီမယိုဖိတ်စေရန် စနစ်တကျ အသုံးပြုခြင်း ဖျက်သိမ်းရာမှ ထွက်ရှိလာသည့် စွန့်ပစ်ပစ္စည်းများကို စနစ်တကျ စွန့်ပစ်ရန် မြေနေရာသတ်မှတ်၍ စွန့်ပစ်ခြင်း။
၅။	ရေအရည်အသွေး	<ul style="list-style-type: none"> ဖျက်သိမ်းခြင်းလုပ်ငန်းစဉ်မှထွက်ရှိလာသော ရေဆိုးများ။ ဖျက်သိမ်းခြင်းလုပ်ငန်းစဉ်တွင် အသုံးပြုသည့် မော်တော်ဘုတ်များမှ ဆီယိုဖိတ်ခြင်း 	<ul style="list-style-type: none"> မိလ္လာကန်နှင့်အိမ်သာများကို စနစ်တကျပြန်လည် ဖျက်သိမ်းခြင်း။ သွယ်ယူထားသောရိုက်လှိုင်းများကိုစနစ်တကျပြန်လည် ဖြုတ်ယူခြင်းနှင့် ပြန်လည် အသုံးပြုစေခြင်း။

၃၉



Appendix (50) Public Consultation about Environmental Impact Assessment
(Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၆။	စွန့်ပစ်ပစ္စည်း (အစိုင်အခဲနှင့် အရည်)	<ul style="list-style-type: none"> ဖျက်သိမ်းရာတွင် အသုံးပြုသော ပစ္စည်းများ၊ ဖျက်သိမ်းရာမှ ထွက်ပေါ်လာသော အစိုင်အခဲစွန့်ပစ်ပစ္စည်းများ၊ သံတိုသံစများ ဖျက်သိမ်းသည့် လုပ်သားများမှ ထွက်ရှိလာသော တစ်ကိုယ်ရည် စွန့်ပစ်ပစ္စည်းများနှင့် အညစ်အကြေးအရည်များ အန္တရာယ်ရှိသော စက်ဆီ၊ ရောဆီထည့်ထားသောဘူးများ 	<ul style="list-style-type: none"> အမှိုက်များအား အမျိုးအစားအလိုက် သီးခြားစီခွဲ၍ စွန့်ပစ်စေခြင်း။ အချို့စွန့်ပစ်ပစ္စည်းများကို မြေဖိုခြင်း၊ ပြန်လည်အသုံးပြုစေခြင်း။ လောင်ဆီများ၊ မီးလောင်လွယ်သော၊ ပေါက်ကွဲစေတတ်သော အရာများ ကို သတိထား၍ ကိုင်တွယ်စေခြင်း။

၄၀

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၇။	ကုန်းနေ၊ ရေနေ ဇီဝမျိုးစုံမျိုးကွဲ များ၏ ဂေဟစနစ်	<ul style="list-style-type: none"> ပိတ်သိမ်းကာလတွင် ဖျက်သိမ်းသည့် လုပ်သားများမှ စွန့်ပစ်အမှိုက်များ ရေပြင်သို့ စွန့်ပစ်ခြင်း ပိတ်သိမ်းသည့်ကာလတွင် လုပ်ငန်းစဉ်သုံး မော်တော်ဘုတ်များမှ ဆီယိုဒီတီခြင်း ဇီဝမျိုးစုံမျိုးကွဲများ ပြောင်းရွှေ့ခြင်း။ 	<p>ဒေသမျိုးရင်းဇီဝမျိုးစုံမျိုးကွဲများကိုကာကွယ်ရန်</p> <ul style="list-style-type: none"> တောတွင်းတိရစ္ဆာန်များ အတွက် ဘေးမှိန်နေရာများ သတ်မှတ်၍ အမဲ မလိုက်စေရန် အရံအတားများနှင့် သတိပေးဆိုင်းဘုတ်များ ထားရှိ ခြင်း။ တောတွင်းထင်းခုတ်ခြင်း၊ဆေး ဘက်ဝင်အပင်များနှင့်သစ်သီးဝလံ များ ခူးဆွတ်ခြင်းများမှတားမြစ်ခြင်း။ တရားမဝင်သစ်ခုတ်ခြင်း၊ အမဲလိုက်ခြင်းများကို မပြုလုပ်ရန် အသိပညာ ပေးခြင်း။ Long Line များဖြတ်သိမ်းသည့် မော်တော်ဘုတ်များမှ ရေပြင် ဧရိယာသို့ ဆီယိုဒီတီမှုမရှိစေရန် သေချာ စစ်ဆေးခြင်း။ ဒေသမျိုးရင်းပင်များ နှင့် ရှင်သန်ကြီးပြန်သော သစ်ပင်များကို ပြန်လည် စိုက်ပျိုးရန်။ လုပ်ငန်းပိတ်သိမ်းသည့် ကာလတွင် ဇီဝမျိုးစုံမျိုးကွဲများ၏ အခြေအနေကို စစ်တမ်းကောက်ယူ၍ ပြန်လည်တင်ပြရန်နှင့် စောင့်ကြပ်ကြည့်ရှုရန်။

၄၁



Appendix (51) Public Consultation about Environmental Impact Assessment
(Continued)

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၈။	မီးဘေးအန္တရာယ်	<ul style="list-style-type: none"> လောင်စာဆီများ သိုလှောင်ထားခြင်း၊ မီးလောင်လွယ်ပစ္စည်းများ စုပုံထားရှိခြင်း။ 	<ul style="list-style-type: none"> မီးသတ်ဆေးဘူးများ တပ်ဆင်ခြင်း၊ မီးဘေးအန္တရာယ်နှင့်ပတ်သက်သည့် ဆိုင်းဘုတ်များ တပ်ဆင်ခြင်း၊ စက်ယန္တရားများ၊ မီးစက်များကိုပုံမှန်စစ်ဆေးပေးခြင်း၊ မီးလောင်လွယ်သော၊ ပေါက်ကွဲလွယ်သော အရာများကို သတိထား ကိုင်တွယ်စေရန် သတိပေးဆိုင်းဘုတ်များ တပ်ဆင်သတိပေးခြင်း။
၉။	လုပ်ငန်းစဉ် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး	<ul style="list-style-type: none"> ဖျက်သိမ်းသည့် လုပ်ငန်းစဉ်သုံး ပစ္စည်းများဖြင့် မတော်တဆထိခိုက်နိုင်မှုများဖြစ်ခြင်း၊ လုပ်ငန်းပိတ်သိမ်းခြင်းဖြစ်စဉ်မှ ထွက်ရှိလာသော အမှုန်အမွှားများကြောင့် လုပ်သားများ၏ ကျန်းမာရေးထိခိုက်မှုများ 	<ul style="list-style-type: none"> ရှေးဦးသူနာပြုသင်တန်းများ၊ မီးသတ်သင်တန်းများနှင့် အခြား စက်ပစ္စည်းများကိုင်တွယ်အသုံးပြုနည်း သင်တန်းများပို့ချခြင်း ကျွမ်းကျင်လုပ်သားများကိုသာ လုပ်ကိုင်စေခြင်း။ သောက်သုံးရေအလုံအလောက်ထားရှိပေးခြင်း။ မိုးလေဝသအခြေအနေအား အမြဲစောင့်ကြည့်ခြင်း


၄၂

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၁၀။	လူမှုစီးပွားရေး	<ul style="list-style-type: none"> ကောင်းကျိုး 	<ul style="list-style-type: none"> ဒေသခံများ အလုပ်အကိုင်အခွင့်အလမ်း ပေါ်ပေါက်လာခြင်း၊ ဝင်ငွေတိုးပွားလာခြင်း။ လူနေမှုအဆင့်အတန်းတိုးတက်လာခြင်း။
၁၁။	ယခင်အခြေအနေအတိုင်း ပြန်လည်ပြုပြင်ခြင်း	<ul style="list-style-type: none"> အပင်များပြန်လည်စိုက်ပျိုးခြင်း မြေဆီလွှာများပြန်လည်ဖုံးအုပ်ပေးခြင်း သက်ဆိုင်ရာဌာန၏ လမ်းညွှန်ချက်များအတိုင်း လိုက်နာဆောင်ရွက်ခြင်း 	<ul style="list-style-type: none"> ဒေသမျိုးရင်းပင်များနှင့်ကြီးမြင့်သော အပင်များကိုပြန်လည်စိုက်ပျိုးခြင်း (သစ်ပင်များ၊ ချုံတောများ၊ သီးပင်စားပင်များ) နှင့် ပြန်လည်မွမ်းမံခြင်းကိုသက်ဆိုင်ရာဌာနမှကျေနပ်သည့်အခြေအနေထိဆောင်ရွက်ပေးခြင်း။

၄၃



Appendix (52) Public Consultation about Environmental Impact Assessment
(Continued)



**စီမံကိန်းပိတ်သိမ်းသည့်ကာလတွင် ဇီဝမျိုးစုံမျိုးကွဲများအတွက်
ထိခိုက်မှုများလျော့နည်းစေရေးနည်းလမ်းများ**



သန္တာကျောက်တန်းနှင့် ငါးမျိုးစိတ်များအပေါ် ထိခိုက်မှု လျော့ပါးစေရေးနည်းလမ်းများ
စီမံကိန်းပိတ်သိမ်းသည့် ကာလတွင် သန္တာကျောက်တန်းများရှိသောနေရာများတွင် လုပ်ငန်းပိတ်သိမ်းချိန်တွင် အသုံးပြုသည့်
မော်တော်ဘုတ်များအား အရှိန်ပြင်းပြင်းမောင်းနှင်ခြင်းကို ရှောင်ရှားခြင်းဖြင့် တုန်ခါမှုနှင့် ရေလှိုင်းများကြောင့်
သန္တာကျောက်ခက်/ကျောက်တန်းများ ကျိုးပဲ့ခြင်းကို လျော့ချပေးနိုင်ပါသည်။

စောင့်ကြပ်ကြည့်ရှုမည့်အစီအစဉ်
အဓိကဦးစားပေးဆောင်ရွက်ရမည့်အမျိုးအစားများမှာ ရေမျှောပင်ငယ်များ၊ ရေမျှောကောင်ငယ်များ နှင့်
သန္တာကျောက်တန်းများဖြစ်ကြပါသည်။ အဆိုပါစောင့်ကြပ်ကြည့်ရှုမည့်အစီအစဉ်ကို Line Transect Method
ဖြင့်ဆောင်ရွက်မည်ဖြစ်ပါသည်။ ထိုသို့ဆောင်ရွက်ရာတွင် ရေမျှောပင်ငယ်များ နှင့် ရေမျှောကောင်ငယ်များ ကိုစောင့်ကြပ်ကြည့်ရှုမှုကို
တစ်နှစ်လျှင် သုံးကြိမ် နှင့် သန္တာကျောက်တန်းများအတွက်ကိုမူ တစ်နှစ်လျှင်တစ်ကြိမ်ဆောင်ရွက်သင့်ပါသည်။

ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်

စီမံကိန်းတည်ဆောက်သည့် ကာလ			
စဉ်	ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်	တိုင်းတာမည့်အကြိမ်	စစ်ဆေးတိုင်းတာမည့်နေရာ
၁	လေထုအရည်အသွေး	တစ်နှစ် တစ်ကြိမ်	စီမံကိန်းဧရိယာအတွင်း
၂	ဆူညံသံ	တစ်နှစ် တစ်ကြိမ်	ဆူညံသံထွက်သည့်နေရာ နှင့် ဝန်ထမ်းတန်းလျား
၃	ရေအရည်အသွေး	တစ်နှစ် တစ်ကြိမ်	စီမံကိန်းဧရိယာအတွင်း မုတ်ကောင်ခြင်းဆေးသည့် နေရာမှစွန့်ပစ်ရေနှင့် မီးဖိုချောင်သုံးစွန့်ပစ်ရေထွက်သည့်နေရာ
၄	စွန့်ပစ်ပစ္စည်း	လစဉ်	စီမံကိန်းဧရိယာအတွင်း
၅	မီးဘေးအန္တရာယ်	လစဉ်	စီမံကိန်းဧရိယာအတွင်း



Appendix (53) Public Consultation about Environmental Impact Assessment
(Continued)


ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်

စီမံကိန်းလည်ပတ်သည့် ကာလ			
စဉ်	ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်	တိုင်းတာမည့်အကြိမ်	စစ်ဆေးတိုင်းတာမည့်နေရာ
၁	လေထုအရည်အသွေး	တစ်နှစ် တစ်ကြိမ် (မြောက်သွေ့ရာသီ)	စီမံကိန်းဧရိယာအတွင်း
၂	ဆူညံသံ	တစ်နှစ် တစ်ကြိမ် (မြောက်သွေ့ရာသီ)	ဆူညံသံထွက်သည့်နေရာ နှင့် ဝန်ထမ်းတန်းလျား
၃	ရေအရည်အသွေး	သုံးလတစ်ကြိမ်	စီမံကိန်းဧရိယာအတွင်း မှတ်ကောင်မြင်းဆေးသည့် နေရာမှစွန့်ပစ်ရေ
		မြောက်လတစ်ကြိမ်	မီးဖိုချောင်သုံးစွန့်ပစ်ရေထွက်သည့်နေရာ နှင့် မြေပေါ်ရေ
၄	စွန့်ပစ်ပစ္စည်း	လစဉ်	စီမံကိန်းဧရိယာအတွင်း
၅	မီးဘေးအန္တရာယ်	လစဉ်	စီမံကိန်းဧရိယာအတွင်း
၆	ဘေးအန္တရာယ် ကင်းရှင်းရေး	လစဉ်	စီမံကိန်းဧရိယာအတွင်း
၇	ပတ်ဝန်းကျင် ဆိုင်ရာ စာရင်းစစ်	နှစ်စဉ်	ဆူညံသံထွက်သည့်နေရာ နှင့် ဝန်ထမ်းတန်းလျား


ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်

စီမံကိန်းပိတ်သိမ်းသည့် ကာလ			
စဉ်	ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်	တိုင်းတာမည့်အကြိမ်	စစ်ဆေးတိုင်းတာမည့်နေရာ
၁	ဆူညံသံ	လုပ်ငန်းပိတ်သိမ်းပြီးချိန်	စီမံကိန်းဧရိယာအတွင်း
၃	ရေအရည်အသွေး	လုပ်ငန်းပိတ်သိမ်းပြီးချိန်	မြေပေါ်ရေ နှင့်ပင်လယ်ရေ
၄	စွန့်ပစ်ပစ္စည်း	လုပ်ငန်းပိတ်သိမ်းပြီးချိန်	စီမံကိန်းဧရိယာအတွင်း
၅	သဘာဝပတ်ဝန်းကျင် ပြန်လည်ပြုပြင်ခြင်း	လုပ်ငန်းပိတ်သိမ်းပြီးချိန်	စီမံကိန်းဧရိယာအတွင်း

Appendix (54) Public Consultation about Environmental Impact Assessment
(Continued)



စောင့်ကြပ်ကြည့်ရှုရမည့်နည်းလမ်းများ



- ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး တာဝန်ခံမှ တိုက်ရိုက်စောင့်ကြပ်ခြင်း။
- ပတ်ဝန်းကျင်ထိခိုက်မှု ရှိ၊ မရှိကို ပုံမှန်စစ်ဆေးခြင်း၊ တားမြစ်ထိန်းချုပ်ခြင်း။
- ပြည်သူလူထု၏အကြံပြုချက်များ၊ ဆွေးနွေးချက်များနှင့် ကန့်ကွက်မှုများအတွက် သတင်းများ ရယူပြီး ဖြေရှင်းဆောင်ရွက်ခြင်း။
- ပါဝင်ပတ်သက်ခြင်းမရှိသည့် ကြားနေအဖွဲ့ အစည်းမှစစ်ဆေးခြင်း။

၄၈



အရေးပေါ်ကိစ္စများအတွက်စီမံချက်



မီးဘေးအန္တရာယ်

- မီးဘေး လုံခြုံရေးစီမံချက် (ကြိုတင်/ဖြစ်ပွားချိန်/ပြန်လည်ထူထောင်ခြင်းကာလ)ရေးဆွဲခြင်း

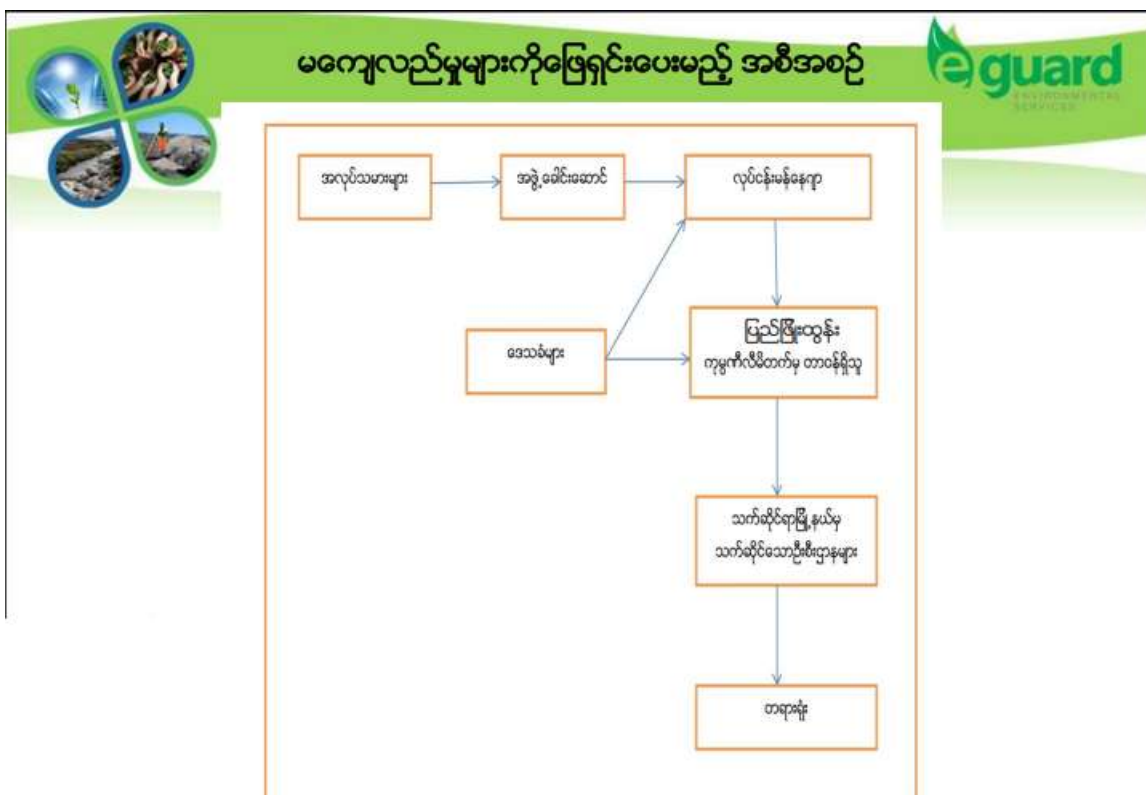
ကြိုတင်ကာကွယ်ရေးနည်းလမ်း	ဖြစ်ပွားချိန်အတည်ပြုပြီး ဖြေရှင်းမည့် နည်းလမ်း	ပြန်လည်ထူထောင်မည် ည့်ကာလ
<ul style="list-style-type: none"> • မီးသတ်ပစ္စည်းကိရိယာများထားရှိခြင်း၊ • လုံလောက်သောရေပမာဏနှင့် မီးသတ်ဆေးဘူးများအသင့်ထားရှိခြင်း၊ • မြင်လွယ်ကြားလွယ်သော အချက်ပေးစနစ်များ တပ်ဆင်ခြင်း၊ • သတိပေးဆိုင်းဘုတ်များထားရှိခြင်း၊ • မီးဘေးအန္တရာယ် ကြိုတင်ကာကွယ်ရေး သင်တန်းပေးခြင်း၊ • အရေးပေါ် မီးဘေးအန္တရာယ်သရုပ်ပြ လေ့ကျင့်သင်ကြားပေးခြင်း၊ 	<ul style="list-style-type: none"> • အရေးပေါ်အခြေအနေအား အခြားနေရာများသို့ မကူးစက်စေရန် ဆောင်ရွက်ခြင်း၊ • လူနှင့်ပစ္စည်းများပျက်စီးဆုံးရှုံးမှု အနည်းဆုံးဖြစ်စေရန်၊ • ထိရောက်သောကယ်ဆယ်မှုနှင့် ဆေးဝါးကုသမှုပေးခြင်း၊ • ဘေးကင်းရာသို့ ပို့ဆောင်ပေးခြင်း၊ 	<ul style="list-style-type: none"> • သက်ဆိုင်ရာ တာဝန်ရှိသူများ၊ သက်ဆိုင်ရာ အဖွဲ့အစည်းများနှင့် ပူးပေါင်းဆောင်ရွက်ခြင်း၊



Appendix (55) Public Consultation about Environmental Impact Assessment
(Continued)

လူမှုစီးပွားတာဝန်ယူမှု (CSR)		
အသားတင်အမြတ်ငွေ၏ ၂% ကို ရန်ပုံငွေအဖြစ် ထားရှိပြီး အောက်ပါလုပ်ငန်းများတွင် အသုံးပြုရန်ရည်ရွယ်ထားသည်။		
စဉ်	အကြောင်းအရာ	ရာခိုင်နှုန်း
၁။	ပညာရေးအတွက် အထောက်အပံ့	၀.၄%
၂။	ကျန်းမာရေးအတွက် အထောက်အပံ့	၀.၄%
၃။	လူမှုစီးပွားအထောက်အပံ့	၀.၄%
၄။	သဘာဝဘေးအန္တရာယ်ကာကွယ်ရေး	၀.၄%
၅။	ဒေသဖွံ့ဖြိုးရေးအတွက် အထောက်အပံ့	၀.၄%
စုစုပေါင်း		၂%

၅၀



၅၁



Appendix (56) Public Consultation about Environmental Impact Assessment
(Continued)



နိဂုံး



ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း	- သက်ရောက်မှု / ထိခိုက်မှု အနည်းငယ် ရှိ
ရရှိနိုင်သောအကျိုးကျေးဇူးများ	<ul style="list-style-type: none"> - နိုင်ငံတော်အတွက် အခွန်ငွေရရှိစေခြင်း - ဒေသဖွံ့ဖြိုးတိုးတက်စေခြင်း - ဒေသခံပြည်သူများ အလုပ်အကိုင်ရရှိစေခြင်း

၅၂



အကြံပြုချက်



- ပတ်ဝန်းကျင်ထိခိုက်မှု အနည်းဆုံးဖြစ်စေရန်
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ သိမှတ်ဖွယ်ရာများအား ဖြန့်ဝေပေးရန်
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး၊ လုပ်ငန်းခွင်အန္တရာယ်ကင်းရှင်းရေး သင်တန်းများ ပေးရန်
- လက်တွေ့ လုပ်ငန်းအတွေ့အကြုံများကိုအခြေခံ၍ပိုမိုကောင်းမွန်သောစီမံချက်များ ဆောင်ရွက်ရန်

၅၃



**Appendix (57) Public Consultation about Environmental Impact Assessment
(Continued)**



http://www.mediafire.com/folder/kaifyz1l8cnl7/Pyi_Phyo_Tun_Public_Consultation_Power_Point





ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (58) Attendance List Record

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ဗြိတိန်၊ ကျွန်းကျွန်း၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်ဖပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	မိုးသောဦး	မကွေး	လယ်သမား		
၂။	ဒေါ်အေးခင်	ဆင်သောဦး	အလုပ်သမား	၀၉၂၅၆၄၅၈၄၈၇	ခင်
၃။	ဒေါ်အေးခင်	ဆင်သောဦး	အလုပ်သမား	၀၉၄၇၃၄၇၆၇၀	ခင်
၄။	ဒေါ်အေးခင်	မကွေး	အလုပ်သမား (PPT)	၀၉၂၅၀၈၃၄၅၇၀	ခင်
၅။	ဒေါ်အေးခင်	မကွေး	အလုပ်သမား	၀၉၈၇၇၀၇၇၇၇	ခင်
၆။	ဒေါ်အေးခင်	မကွေး	အလုပ်သမား	၀၉၇၆၇၇၇၇၇	ခင်
၇။	ဒေါ်အေးခင်	မကွေး	အလုပ်သမား	၀၉၇၆၇၇၇၇၇	ခင်
၈။	ဒေါ်အေးခင်	မကွေး	အလုပ်သမား	၀၉၇၆၇၇၇၇၇	ခင်
၉။	ဒေါ်အေးခင်	မကွေး	အလုပ်သမား	၀၉၇၆၇၇၇၇၇	ခင်
၁၀။	ဒေါ်အေးခင်	မကွေး	အလုပ်သမား	၀၉၇၆၇၇၇၇၇	ခင်



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (59) Attendance List Record (Continued)

Pyl Phyto Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်ဖ်ပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦးအောင်ကျော်	ကျောက်ဆောင်	ကျောက်ဆောင်		
၂။	ဦးကျော်အောင်ကျော်	ကျောက်ဆောင်	ကျောက်ဆောင်	၀၇၂၁၈၇၄၇၇၇	
၃။	ဦးကျော်အောင်ကျော်	ဆုံချောင်း	ကျောက်ဆောင်		
၄။	ဦးကျော်အောင်ကျော်	ဆုံချောင်း	ကျောက်ဆောင်		
၅။	ဦးကျော်အောင်ကျော်	ဆုံချောင်း	ကျောက်ဆောင်	၀၇၇၈၅၆၇၇၈	
၆။	ဦးကျော်အောင်ကျော်	ဆုံချောင်း	ကျောက်ဆောင်	၀၇၇၇၇၇၇၇၇	
၇။	ဦးကျော်အောင်ကျော်	ဆုံချောင်း	ကျောက်ဆောင်	၀၇၇၇၇၇၇၇၇	
၈။	ဦးကျော်အောင်ကျော်	ဆုံချောင်း	ကျောက်ဆောင်	၀၇၇၇၇၇၇၇၇	
၉။	ဦးကျော်အောင်ကျော်	ဆုံချောင်း	ကျောက်ဆောင်	၀၇၇၇၇၇၇၇၇	
၁၀။	ဦးကျော်အောင်ကျော်	ဆုံချောင်း	ကျောက်ဆောင်	၀၇၇၇၇၇၇၇၇	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (60) Attendance List Record (Continued)

Pyl Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စာကွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ဖုလံပေါက်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း၊

ရပ်မိရပ်ဖ်ပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦးမြင့်ဝင်း	မအူရာ	ဒ်	0942221271	
၂။	မေစိုက်	မအူရာ	မိမိ		
၃။	မသန်းမိုး	မအူရာ	မိမိ	09426357730	
၄။	ဒေါ်အေးမော်	မအူရာ	မိမိ	09429122796	
၅။	ဒေါ်အေးသိန်း	မအူရာ	မိမိ	09892667493	
၆။	ဦးကျော်စိုး	မအူရာ	မိမိ		
၇။	ဦးမင်းမြတ်	အထက (မ.အ.)	ကျောင်းဝန်	09422197738	
၈။	တင်အောင်	အောင်အောင်မောင်	ဒ်	-	
၉။	မိမိ	မိမိ မအူရာ	"	-	
၁၀။	ဒေါ်စိုင်း	မအူရာ	မိမိ	0925100283	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (61) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ဗြိတိသိန်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စတုကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ ဒီမိုကရေစီဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်ဖပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	အိုင်အေ	အောင်အောင်			
၂။	ခင်စန္ဒာ	အောင်အောင်	ဂျေမီနီ		
၃။	သန်းသန်း	အောင်အောင်	ဂျေမီနီ		
၄။	သန်းသန်း	အောင်အောင်	ဂျေမီနီ		
၅။	သန်းသန်း	အောင်အောင်	ဂျေမီနီ		
၆။	သန်းသန်း	အောင်အောင်	ဂျေမီနီ		
၇။	သန်းသန်း	အောင်အောင်	ဂျေမီနီ		
၈။	သန်းသန်း	အောင်အောင်	ဂျေမီနီ		
၉။	သန်းသန်း	အောင်အောင်	ဂျေမီနီ		
၁၀။	သန်းသန်း	အောင်အောင်	ဂျေမီနီ		



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (62) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ပြည်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ဓနုရပ်ကွက်တွင်ရှိသော မုတ်ကောင်ဖွေးမြို့ခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ ဒီမိုကရေစီဆောင်ရွက်မှုများ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်ဖ်ပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦးဦး	ဓနုရပ်ကွက်	စည်စည်မျှင်အေးမြ	၀၇၄၇၃၇၀၂၆၄	ဦး
၂။					
၃။					
၄။					
၅။					
၆။					
၇။					
၈။					
၉။					
၁၀။					



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (63) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းဘူလီနယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ မြင်စဘူကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲမွေးမြူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ ဒီမိုကရေစီဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်ဖပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဒေါ်ဝင်းစန္ဒာ	ပထက်	၄၉	၀၇၃၄၄၄၇၆၆	ဝင်း
၂။	ဒေါ်ခင်စု	ပထက်	၄၉		စု
၃။	ဒေါ်မြဝင်း	ပထက်	၄၉		ဝင်း
၄။	ဒေါ်စုစု	ပထက်	၄၉		စု
၅။	ဒေါ်ခင်စု	ပထက်	၄၉		စု
၆။	ဒေါ်မြဝင်း	"	ကျေးရွာအုပ်စု		မြဝင်း
၇။	ဒေါ်ခင်စု	"	၄၉		စု
၈။	ဒေါ်ခင်စု	"	၄၉	၀၇၄၄၇၈၇၈၁၅၃	ခင်စု
၉။	ဒေါ်ခင်စု	ပထက်	၄၉	၀၇၃၃၃၁၃၃၆	ခင်စု
၁၀။	ဒေါ်ခင်စု	"	၄၉		ခင်စု



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (64) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ဖြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စတုကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်မပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဇော်				
၂။	ဒေါ်မြဝင်း	၁၁၇၇	အထက်ကျွန်း		ဒေါ်မြဝင်း
၃။	ဦးအောင်ကျော်	၁၁၇၇	ဗြိသိက		ဦးအောင်ကျော်
၄။	ဦးအောင်	ရေကန်တောင်	ရေကန်တောင်	၀၉၇၆၄၃၆၄၂၁၇	ဦးအောင်
၅။	ဦးအောင်	ရေကန်တောင်	ရေကန်တောင်	၀၉၇၆၄၃၆၄၂၁၇	ဦးအောင်
၆။	ဦးအောင်အောင်	ပထမ	အထက်ကျွန်း	၀၉၇၆၄၃၆၄၂၁၇	ဦးအောင်အောင်
၇။	ဦးအောင်အောင်	ရေကန်တောင်		၀၉၇၆၄၃၆၄၂၁၇	ဦးအောင်အောင်
၈။	ဦးအောင်အောင်	ရေကန်တောင်	ရေကန်တောင်	၀၉၇၆၄၃၆၄၂၁၇	ဦးအောင်အောင်
၉။	ဦးအောင်	ရေကန်တောင်	ရေကန်တောင်		ဦးအောင်
၁၀။	ဦးအောင်	ရေကန်တောင်	ရေကန်တောင်		ဦးအောင်



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (65) Attendance List Record (Continued)

Pyl Phyto Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ပြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ဖုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်ဖ်ပြည်သူများ ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဒေါ် ၃၆ စန်း	ဆင်မယုတ်သာ	လုပ် ၃၀ ကို		စန်း
၂။	ဒေါ်အေးစန်း	ဆင်မယုတ်သာ	စေ့လုပ်ရိုး	၀၇-၇၇၈၃၈၆၇၇	စန်း
၃။	ဒေါ်အေးစန်း	ဆင်မယုတ်သာ	စေ့လုပ်ရိုး	၀၇-၇၇၈၃၇၇၇၃	စေ့
၄။	အောင်အောင်	ဆင်မယုတ်သာ	မြို့သူ		စိ
၅။	ဒေါ် ၀၇	ဆင်မယုတ်သာ	မြို့သူ		စိ
၆။	ဒေါ်အေးစန်း	ဆင်မယုတ်သာ	မြို့သူ	၀၇-၇၇၈၃၇၇၇၃	အေး
၇။	ဒေါ်အေးစန်း	ဆင်မယုတ်သာ	မြို့သူ		အေး
၈။	ဒေါ်အေးစန်း	ဆင်မယုတ်သာ	မြို့သူ		အေး
၉။	ဒေါ်အေးစန်း	ဆင်မယုတ်သာ	မြို့သူ	၀၇-၇၇၈၃၇၇၇၃	အေး
၁၀။	ဒေါ်အေးစန်း	ဆင်မယုတ်သာ	မြို့သူ		အေး





ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (66) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ ကနဦးစီစဉ်သော ကြီးကြပ်ရေးနှင့် ပြင်ဆင်မှုများ ပြုလုပ်ရာတွင် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	အောင်စိုးမိုး	ဝဲချောင်း	မိမိ		၁/၆
၂။	အောင်အေးစိုး	ဝဲချောင်း	မိမိ		၆၃၁
၃။	အောင်စိုး	အိမ်ဝဲကျပ်	မိမိ		၅
၄။	အောင်မိုး	ဝဲချောင်း	မိမိ		၁၃
၅။	ဝင်းစိုး	ဝင်းစိုး	လေ့လာရေး		၅၆
၆။	အောင်အောင်အောင်	ဝဲချောင်း	မိမိ		၁၃၆
၇။	စင်စိုး	ဝဲချောင်း	စင်စိုး		၆
၈။	အောင်အောင်အောင်	ဝဲချောင်း	အောင်အောင်အောင်		၁၃
၉။	အောင်အောင်အောင်	မိမိ ဝဲချောင်း	မိမိ		၁၁၁၁
၁၀။	မောင်အောင်	ဝဲချောင်း	မိမိ		အောင်



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (67) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းရမြို့နယ်၊ ရေနံတောင်ကျေးရွာအုပ်စု၊ ပြင်စတုကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ကျေးသေးရွာသင်း	ပထက်	မြို့	၀၉,၂၅၀၇၇,၇၆၈	Aye
၂။	ကြည်ကြည်မြို့နယ်	ပထက်			မြတ်
၃။	ဒွေးရွာ	ပထက်			ဒွေး
၄။	ဒွေးရွာ				ဒွေး
၅။	လေးလေးရွာ				လေး
၆။	မြို့နယ်				မြို့
၇။	မြို့နယ်				မြို့
၈။	ခပ်လေး				ခပ်လေး
၉။	ခပ်လေး				ခပ်လေး
၁၀။	ခပ်လေး				ခပ်လေး



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (68) Attendance List Record (Continued)

Pyl Phyto Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ဗြိတိသိန်၊ ကျွန်းဆူမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်ဆင်ကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် လုပ်ငန်းလုပ်ငန်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ မိမိတို့ဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်ဖပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဒေါ်ခင်ခင်ဆု	၁၈၈၈	၅၃	၀၉၇၄၅၄၅၆	ခင်
၂။	ဦးဖိုးမင်း (ဦးဖိုးမင်း) ဆု	၁၈၈၈	၇၇၇၇	၀၉၇၆၇၃၇၈	မင်း
၃။	ဒေါ်ခင်ခင်	၁၈၈၈	၅		
၄။	၀၃				
၅။	ဒေါ်ခင်ခင်	၁၈၈၈	ဒေါ်ခင်ခင်		ဒေါ်ခင်ခင်
၆။	ဒေါ်ခင်ခင်		၅၃		၀၆၃၃
၇။					
၈။					
၉။					
၁၀။					



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (69) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ဗြိတိသိန်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲမွေးယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်ဖ်ပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	မခင်လေးဖြေ	သံဖြေ			မခင်လေးဖြေ
၂။	ကျေးဇူး	ဘိက္ခင်	၆၅		ကျေးဇူး
၃။	ကျေးဇူး	"	"		မိုး
၄။	ကျေးဇူး	"	"		မိုး
၅။	ကျေးဇူး	"	"		မိုး
၆။	ကျေးဇူး	"	"		မိုး
၇။	ကျေးဇူး	"	"	၀၉၄၇၂၇၃၁၇၆	မိုး
၈။					
၉။					
၁၀။					



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (70) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ပြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ မြင်စာကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ နိမိတ်ရည်ရှိသူများ၊ ရင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်ဖပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	မေတ္တ ဖြူ	၁			မေတ္တ ဖြူ
၂။	မအူ ကုန်း	၂			မအူ
၃။	မအူ ကုန်း	၂ ကျွန်း			မအူ
၄။	မအူ ကုန်း	၂			မအူ
၅။	မအူ ကုန်း	၂			မအူ
၆။	မအူ ကုန်း	၂			မအူ
၇။	မအူ ကုန်း	၂			မအူ
၈။					
၉။					
၁၀။					



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (71) Attendance List Record (Continued)

Pyl Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ပြည်နယ်၊ ကျွန်းရိုးမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ရပ်မိရပ်ဖပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦး ဦးမြတ်	ပထမိန်	ခဏ ခဏ		အကြီး
၂။	ဒေါ်ခင်လွင်	ပထမိန်	သင်္ချာ		ဒေါ်ခင်လွင်
၃။	ခင်မိုးဝင်း	ပထမိန်	မြို့သူ	၀၇၄၂၁၆၆၈၁၇၂	ခင်မိုး
၄။	ဒေါ်လွင်လွင်	ပထမိန်	မြို့သူ		ဒေါ်
၅။	ဒေါ်ခင်အေး	ပထမိန်	မြို့သူ		လှ
၆။	ဒေါ်မောင်ရင်	ပထမိန်	မြို့သူ		ချစ်
၇။	ဒေါ်ခင်မိုး	ပထမိန်	မြို့သူ		ခင်မိုး
၈။					
၉။					
၁၀။					



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (72) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်ဆင်ကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း

ပုဂ္ဂလိကကုမ္ပဏီများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဖုန်းနံပါတ်	လက်မှတ်
၁။	သက်ဦး		PPT	၀၇၇၇၁၅၀၈၅၁၆	၀၆
၂။	ထက်ပါလွင်		PPT	၀၇-၇၇၁၅၀၈၅၁၆	ထက်
၃။	ဘွဲ့အေး		PPT	၀၇၇၀၃၀၄၅၄	ဘွဲ့အေး
၄။	အေးဝင်းဖြိုး		PPT	၀၇-၇၇၇၆၇၀၁၁၇	ဖြိုး
၅။	ဒေါ်အိအိအေး	ဦးကြည်	PPT မူလ	၀၇၇၇၆၈၀၁၇၇၇	အိအိအေး
၆။	ဦးကမ္ဘီ	မန္တလေးတိုင်းဒေသကြီး၊ ပုသိမ်မြို့နယ်၊ ရွှေကျင်ကျေးရွာအုပ်စု၊ ရွှေကျင်ကျေးရွာအုပ်စု	မန္တလေးတိုင်းဒေသကြီး၊ ပုသိမ်မြို့နယ်၊ ရွှေကျင်ကျေးရွာအုပ်စု၊ ရွှေကျင်ကျေးရွာအုပ်စု	၀၇၇၇၇၈၀၁၆၅၇	ကမ္ဘီ
၇။	ဒေါ်အိအိအေး	ပုသိမ်တိုင်းဒေသကြီး၊ ပုသိမ်မြို့နယ်၊ ရွှေကျင်ကျေးရွာအုပ်စု၊ ရွှေကျင်ကျေးရွာအုပ်စု	ပုသိမ်တိုင်းဒေသကြီး၊ ပုသိမ်မြို့နယ်၊ ရွှေကျင်ကျေးရွာအုပ်စု၊ ရွှေကျင်ကျေးရွာအုပ်စု	၀၇-၇၇၇၇၅၅၇၇	အိအိအေး
၈။	ဦးအိအိအေး		PPT	၀၇-၇၇၇၇၅၅၇၇	အိအိအေး
၉။	ခင်မင်းသိ		PPT	၀၇၇၇၀၇၃၇၃၇၆	ခင်
၁၀။	ကျော်မိုး		PPT	၀၇၇၇၆၆၆၆၆၆၆	မိုး



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (73) Attendance List Record (Continued)

Pyl Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ပြိတ်ခရိုင်၊ ကျွန်းရူပိုဒယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲခေပ်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း

ရပ်ကွက်အမည်နှင့် နေရပ်လိပ်စာ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦးမြင့်စောမြင့်	ပြင်စောကျွန်း	မြေ ၁ မြေ	445568613	
၂။	ဒေါ်ခင်စု	ဒေါ်ခင်စု	ဒေါ်ခင်စု	444444444	
၃။	ဒေါ်ခင်စု	ဒေါ်ခင်စု	ဒေါ်ခင်စု	0944444444	
၄။	ဒေါ်ခင်စု	ဒေါ်ခင်စု	ဒေါ်ခင်စု	0944444444	
၅။	ဒေါ်ခင်စု	ဒေါ်ခင်စု	ဒေါ်ခင်စု	09768738794	
၆။	ဒေါ်ခင်စု	ဒေါ်ခင်စု	ဒေါ်ခင်စု	09768738794	
၇။	ဒေါ်ခင်စု	ဒေါ်ခင်စု	ဒေါ်ခင်စု	0944444444	
၈။	ဒေါ်ခင်စု	ဒေါ်ခင်စု	ဒေါ်ခင်စု	0944444444	
၉။	ဒေါ်ခင်စု	ဒေါ်ခင်စု	ဒေါ်ခင်စု	0944444444	
၁၀။	ဒေါ်ခင်စု	ဒေါ်ခင်စု	ဒေါ်ခင်စု	0944444444	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (74) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

မုတ်ကောင်မွေးမြူရေး

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦးဝင်းလှိုင်	ကျွန်းစု	PPT. ပုလဲ	၀၇-၄၂၃၇၇၄၇၈	
၂။	ဦးကျော်ကျော်ဝင်း	ပုလဲ	P.P.T. ပုလဲ	၀၇ ၂၈၇၄၃၄၈၁	
၃။	ဒေါ်ခင်စု	ပုလဲ	PPT.	၀၇ ၃၅၁၁၄၆၀၈	
၄။	ဒေါ်ခင်ကျော်စု	ပုလဲ	PPT	၀၇ ၄၅၄၅၆၀၆၃၃	
၅။	ဒေါ်ခင်စု	ပုလဲ	PPT	၀၇ ၃၇၆၀၈၄၈	
၆။	ဒေါ်ခင်စု	ပုလဲ	PPT	၀၇ ၄၇၃၇၃၇၈	
၇။	ဒေါ်ခင်စု	မြိတ်	Myanmar Tobacco	၀၇ ၇၇၇၇၇၈၁၄၇	
၈။	ဒေါ်ခင်စု	မြိတ်	ပုလဲ	၀၇ ၄၄၇၃၅၆၀၈	
၉။	ဒေါ်ခင်စု	မြိတ်	PPT	၀၇ ၃၅၄၄၆၆၈၁၇	
၁၀။	ဒေါ်ခင်စု	ပုလဲ	ပုလဲ	၀၇ ၄၇၃၀၃၇၃၆	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (75) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ဗြိတိသိန်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်ဆော့ကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဓာတ်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

ပုဂ္ဂလိကကုမ္ပဏီများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဖုန်းနံပါတ်	လက်မှတ်
၁။	မြ.မြ.စိုး	အထွေထွေ ဗဟိုဌာန	PPT	၀၇-၄၇၇၈၈၆၀၇	
၂။	မြ.မြ.စိုး	"	PPT	၀၇၇၇	မြ
၃။	ဦး.ဦး.ဝင်း	"	PPT	၀၇-၄၄၈၃၈၇၀၄	
၄။	မိုး.ခင်.ခင်	"	PPT	၀၇၈၇၇၇၅၅၅၅၇	ခင်
၅။	မြ.စိုး	"	PPT	၀၇၈၇၇၇၅၅၅၅၇	စိုး
၆။	မိုး.ဝင်း	"	PPT		မိုး.ဝင်း
၇။	မိုး.ဝင်း	"	PPT	၀၇၇၇၇၇၅၅၅၇	မိုး
၈။	မိုး.ဝင်း	"	PPT	၀၇၇၇၇၇၅၅၅၇	မိုး.ဝင်း
၉။	မိုး.ဝင်း	"	PPT	၀၇၇၇၇၇၅၅၅၇	
၁၀။	ဦး.ကို.ကို	မ/ထုတ်ဖော်ရေးဌာန (HR)	P.P.T. Col. S. S. S.	၀၇၇၇၇၇၅၅၅၇	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (76) Attendance List Record (Continued)

Pyi Phyto Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ ဖိမိက်နှိုးဆော်ရက်စွဲရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း

အစိုးရဌာနဆိုင်ရာအဖွဲ့အစည်းများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦးမျိုးလွင်	ဦးမင်းဇော်မိုး	၆၇၈၄၆	၀၇-၄၃၃၇၆၂၄၁၁	
၂။	ဦးမင်းမင်းသိန်း	မောင်မိုးမိုး	၈	၀၇၄၂၄၄၀၂၀၅၃	
၃။	ဦးထွန်းစိုး	လ/တ ပိုင်ချစ်	၈	၀၇၂၅၀၂၃၄၅၆	
၄။	ဦးကျော်စိုး	လ/တ ဦးစီးဌာန	စောင့်စောင့်လမ်း	၀၇-၄၂၄၃၇၀၂၈၄	
၅။	ဦးမောင်စွန်းမိုး	ဦးစီးအရာရှိ	မိမိမိမိမိ	၀၇၆၇၆၂၇၁၀၇၀၇	
၆။	ဦးမောင်မောင်	မောင်မောင်မောင်	၆၇၈၄၆	၀၇၄၄၄၂၇၆၀၃	
၇။	ဦးကျော်စိုး	စ. ဇ. မ		၀၇-၄၅၀၃၅၄၅၄၅	
၈။					
၉။	ဦးမောင်မောင်	ဦးမောင်မောင်	၆၇၈၄၆	၀၇၂၅၄၄၀၂၄၅၆	
၁၀။	ဦးကျော်စိုး	လ/တ အကြီးကြပ်ရေး	ECO	၀၇-၄၄၀၂၃၇၇၁၁	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (77) Attendance List Record (Continued)

Pyl Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ပြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

အစိုးရဌာနဆိုင်ရာအဖွဲ့အစည်းများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦးမျိုးသူလ	ဦးစီးအရာရှိ	ECD	၀၇-၂၆၈၅၄၀၀၅၇	
၂။	ဦးဦးကော့ဝိသု	အတွင်းရေးမှူး	NLD	၀၇-၄၂၂၂၂၂၅၅၄	
၃။	ဦးအောင်ကျော်စိုး	ဥက္ကဋ္ဌ	-	၀၇-၄၂၇၂၈၀၇၀၀	
၄။	ဦးအောင်အောင်	ဥက္ကဋ္ဌ	-	၀၇-၂၅၀၄၆၇၁၁၈	
၅။	ဦးကျော်စိုး	ဥ	ဥ	-	
၆။	ဦးဝင်းကျော်စိုး	စောကစုမား	စာရင်းစစ်ရေးမှူး	၀၇-၂၅၄၀၃၈၈၇	
၇။	ဦးမျိုးလှိုင်	ဒုတိယ	အထူးအမှုဆောင်	၀၇-၂၂၂၂၃၁၂၃	
၈။	ဦးဝင်းအောင်	ဒုတိယ	ရင်းနှီးမြှုပ်နှံရေး	၀၇-၂၆၂၇၂၈၀၀၂	
၉။	ဒက်တာစွယ်စိုး	ဥက္ကဋ္ဌ	ဆေးကုသရေးဌာန	၀၇-၄၂၇၃၉၂၁၀၈	
၁၀။	ဦးစိုးစိုး	ဥက္ကဋ္ဌ	ကျန်းမာရေးဌာန	၀၇-၄၂၆၅၁၀၀	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (78) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ပြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

အစိုးရဌာနဆိုင်ရာအဖွဲ့အစည်းများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦး အိုင်	မောင်	မောင်	၀၉ ၈၇၂၅၂၆၂၄	
၂။	ဒေါ်ဝင်း	ဦး	ဦး	၀၉ ၄၀၇၂၇၄၇၂	
၃။	ဦးမိုး	ဦး	ဦး	၀၉ ၈၇၆၄၇၃၅	
၄။					
၅။					
၆။					
၇။					
၈။					
၉။					
၁၀။					



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (79) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ဖြိတ်ခရိုင်၊ ကျွန်းစုမြို့နယ်၊ ခရကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စတုကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း၊

သတင်းမီဒီယာများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	ရာထူး	သတင်းဌာန	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦးစွန်စန်စန်	စာရေး-မျိုးစွယ်	စာရေး-ဇော် (အောင်)	၀၅၆၅၅၈၀၆၅၅	
၂။	ဦးအောင်အောင်	"	"	၀၇၄၂၂၁၅၅၇၇	
၃။	ဒေါ်စိုးစိုးစိုး	သတင်းထောက်	တနင်္သာရီ	၀၇၇၈၅၃၁၆၅၃၅	
၄။	ဦးစိုးအောင်အောင်	အထွေထွေ	တနင်္သာရီ	၀၇-၇၈၁၁၇၈၁၇၈	
၅။	ဦးခိုင်လွင်	ပြုစုရေး	ပြုစုရေး	၀၇၄၆၀၀၅၅၅၀	
၆။	ကိုအောင်ကျော်	မှတ်တမ်း	DVB	၀၇၇၈၁၅၅၅၅၇	
၇။	ကိုစန်စန်စန်	"	Mizzima	၀၇၄၂၂၂၁၅၅၇၇	
၈။	ဒေါ်စိုးစိုး	သတင်းထောက်	Eleven Media	၀၇၅၄၄၄၄၄၄	
၉။	အောင်အောင်	သတင်းထောက်	တနင်္သာရီ	၀၇၅၅၅၅၅၅၅	
၁၀။	ဦးစိုးစိုး	သတင်းထောက်	သတင်းထောက်	၀၇၄၄၄၄၄၄၄	



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (80) Attendance List Record (Continued)

Pyl Phyto Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ဖြိတ်ခရိုင်၊ ကျွန်းရမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စာကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲပေါက်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

လွှတ်တော်

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	ရာထူး	လွှတ်တော်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦး-ထွန်းလှောင်	ဗဟိုအမှုဆောင်	ဗဟိုအမှုဆောင်	၀၉၂၆၁၀၅၂၂၆၂	
၂။	ဦး-တိုးလွင်	"	"	၀၉၂၅၀၁၂၈၇၂၀	
၃။					
၄။					
၅။					
၆။					
၇။					
၈။					
၉။					
၁၀။					



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Appendix (81) Attendance List Record (Continued)

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ မြိတ်ခရိုင်၊ ကျွန်းရမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်စောကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ ဒီမိုကရေစီဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားယူခြင်း (Public Consultation) အခမ်းအနားသို့ တက်ရောက်သည့်သူများစာရင်း။

INGO, NGO နှင့် အစိုးရမဟုတ်သောအဖွဲ့အစည်းများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၈ ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဒေါ် ဖွဲ့နီ ဖွဲ့နီ	ကတည်းက ရှိသူ	မြိတ်ခရိုင် ကျွန်းရမြို့နယ်	၀၉၇၆၀၃၄၀၅၃၀	
၂။	မိုးလှိုင် ဇော်	Logistic	လေ့ကျင့်ရေး	၀၉၇၇၀၂၁၄၀၆၇	
၃။	legi Htwe	preparation	Restoration Assn	၀၉၇၆၀၃၄၀၅၃၇	
၄။	ဒေါ်အေးအေး	၄	၄	၀၉၇၇၁၂၂၂၅၅	
၅။					
၆။					
၇။					
၈။					
၉။					
၁၀။					

Appendix (82) Recommendation Letter of Attendees from Public Consultation

Pyi Phyo Tun International Co., Ltd. မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ဗြိတိန်၊ ကွန်းရမြို့နယ်၊ ရေကန်တောင်ကျေးရွာအုပ်စု၊ ပြင်ဆောင်ကျွန်းတွင်ရှိသော မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်းနှင့် ပတ်သက်၍ မတ်ဝန်းကျင်ထိခိုက်မှုမဏ္ဍိုင်ခြင်း (Environmental Impact Assessment - EIA) ဆိုင်ရာ လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာကိစ္စရပ်များ ရှင်းလင်းတင်ပြခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း (Public Consultation) အခမ်းအနား


အကြံပြုလွှာ

မုတ်ကောင်မွေးမြူခြင်းနှင့် ပုလဲဖော်ယူခြင်းလုပ်ငန်း

နေ့စွဲ: ၂၀၁၇.၂.၁၉ (တနင်္ဂနွေနေ့)

အကြံပြုချက်များအား ထောက်တွင်ဖော်ပြပေးပါရန်၊ လူကြီးမင်း၏ အကြံပြုချက်များအားကိုက်လိုက်ကြည့်လိုပါသည်။		
အမည်	ကျော်မိုးစန်း	လူကြီးမင်း၏ အမည်မဖော်ပြလိုပါက ချန်လှပ်ထားနိုင်ပါသည်။
ဆက်သွယ်ရန်ဖုန်း	၀၉၄၅၀၇၇၀၇၅၇	
အလုပ်အကိုင်	ကျေးကွက်စိုက်ပျိုးရေး - E.C	
နေရပ်လိပ်စာ	၈၈၈၈၈၈၈၈	
<p>နိုင်ငံရေး အကျိုးအမြတ် အကျိုးအမြတ် အကျိုးအမြတ်</p> <p>အကျိုးအမြတ် အကျိုးအမြတ် အကျိုးအမြတ်</p> <p>အကျိုးအမြတ် အကျိုးအမြတ် အကျိုးအမြတ်</p> <p>အကျိုးအမြတ် အကျိုးအမြတ် အကျိုးအမြတ်</p> <p>အကျိုးအမြတ် အကျိုးအမြတ် အကျိုးအမြတ်</p> <p>အကျိုးအမြတ် အကျိုးအမြတ် အကျိုးအမြတ်</p> <p>အကျိုးအမြတ် အကျိုးအမြတ် အကျိုးအမြတ်</p> <p>အကျိုးအမြတ် အကျိုးအမြတ် အကျိုးအမြတ်</p> <p>အကျိုးအမြတ် အကျိုးအမြတ် အကျိုးအမြတ်</p>		

Appendix (88) MIC Approval letter (continued)




ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်
မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင်
ခွင့်ပြုမိန့်

ပုံစံ (၃)

ခွင့်ပြုမိန့်အမှတ် ၁၈၀/၂၀၁၉ ၂၀၁၉ ခုနှစ်၊ စက်တင်ဘာလ ၃၀ ရက်

မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု ကော်မရှင်သည် မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု ဥပဒေပုဒ်မ ၂၅(ဂ)အရ ဤခွင့်ပြုမိန့်ကို ထုတ်ပေးလိုက်သည် -


- (၁) ရင်းနှီးမြှုပ်နှံသူအမည် ဦးဆောင်ညွှန်ကြားရေးမှူး၊ မြန်မာ့ပုလဲ ထုတ်လုပ်ရေးနှင့် ရောင်းဝယ်ရေးလုပ်ငန်း
- (၂) နိုင်ငံသား မြန်မာ
- (၃) နေရပ်လိပ်စာ မြန်မာ့ကျောက်မျက်ရတနာပြတိုက်၊ နေပြည်တော်
- (၄) ပင်မအဖွဲ့အစည်းအမည်နှင့်လိပ်စာ သယံဇာတနှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာန၊ ရုံးအမှတ်- ၁၉၊ နေပြည်တော်
- (၅) ဖွဲ့စည်းရာအရပ် မြန်မာ
- (၆) ရင်းနှီးမြှုပ်နှံသည့်လုပ်ငန်းအမျိုးအစား မုတ်ကောင် သားဖောက် မွေးမြူခြင်း၊ မုတ်ကောင်ပြုစုစောင့်ရှောက်ခြင်း၊ ပုလဲမွေးမြူခြင်း၊ ပုလဲဖော်ယူရောင်းချခြင်းလုပ်ငန်း
- (၇) ရင်းနှီးမြှုပ်နှံသည့်အရပ်ဒေသ(များ) ပြင်စဘူကျွန်း၊ ကျွန်းစုမြို့နယ်၊ မြိတ်ခရိုင်၊ တနင်္သာရီတိုင်းဒေသကြီး
- (၈) နိုင်ငံခြားမတည်ငွေရင်းပမာဏ မရှိ
- (၉) နိုင်ငံခြားမတည်ငွေရင်းယူဆောင်လာရမည့်ကာလ မရှိ
- (၁၀) စုစုပေါင်းမတည်ငွေရင်းပမာဏ(ကျပ်) ၂,၀၀၀.၀၀၀ သန်း (အမေရိကန်ဒေါ်လာ ၀.၀၄၀ သန်း အပါအဝင်)
- (၁၁) တည်ဆောက်မှု/ပြင်ဆင်မှုကာလ ၆ လ
- (၁၂) ရင်းနှီးမြှုပ်နှံမှုခွင့်ပြုသည့် သက်တမ်း ၁၅ နှစ်
- (၁၃) ရင်းနှီးမြှုပ်နှံမှုပုံစံ ရာခိုင်နှုန်းပြည့်မြန်မာနိုင်ငံသားရင်းနှီးမြှုပ်နှံမှု
- (၁၄) မြန်မာနိုင်ငံတွင်ဖွဲ့စည်းမည့်ကုမ္ပဏီအမည် ပြည်မြိုးထွန်း အင်တာနေရှင်နယ် ကုမ္ပဏီလီမိတက်



(သောင်းထွန်း)
ဥက္ကဋ္ဌ



Appendix (89) MIC Approval letter (continued)


THE REPUBLIC OF THE UNION OF MYANMAR
Myanmar Investment Commission
PERMIT

Form (3)
P000144

Permit No. 180 /2019 Dated 30 September 2019

This permit is issued by the Myanmar Investment Commission in accordance with the Section 25(c) of the Myanmar Investment Law.

(1) Investor Name MANAGING DIRECTOR, MYANMAR PEARL ENTERPRISE

(2) Citizenship MYANMAR

(3) Residential Address MYANMA GEMS MUSEUM, NAY PYI TAW

(4) Name and Address of Principal Organization MINISTRY OF NATURAL RESOURCES AND ENVIRONMENTAL CONSERVATION, NO. 19, NAY PYI TAW

(5) Place of Incorporation MYANMAR

(6) Type of Business BREEDING, REARING OF OYSTER AND SALES OF CULTURED PEARL

(7) Place(s) of Investment Project PYIN SA BU ISLAND, KYUN SU TOWNSHIP, MYEIK DISTRICT, TANINTHAYI REGION

(8) Foreign Capital Amount NIL

(9) Period for Foreign Capital to be brought in NIL


(10) Total Amount of Capital (Kyat) 2,000.000 MILLION (INCLUDING US\$ 0.040 MILLION)

(11) Construction/ Preparation Period 6 MONTHS

(12) Validity of Permit 15 YEARS

(13) Form of Investment WHOLLY MYANMAR OWNED

(14) Name of Company Incorporated in Myanmar PYI PHYO TUN INTERNATIONAL COMPANY LIMITED


(Thaung Tun)
Chairperson

