MYANDAWEI INDUSTRIAL ESTATE COMPANY LIMITED

FINAL REPORT
Environmental Management Plan (EMP)

FOR

SMALL PORT

DAWEI SEZ INITIAL PHASE DEVELOPMENT

Prepared by

TEAM Consulting Engineering and Management Public Company Limited

TOTAL Business Solution Co., Ltd.

April 2018

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27th April 2018

Dr. Somchet Thinaphong, Managing Director:

Myandawei Industrial Estate Company Limited ("MIE")

6th Floor, Salomon Business Center, 224/A U Wisara Road, Bahan Township, Yangon, the Republic of the Union of Myanmar

Subject: Submission of Final Report of ESIA for Dawei SEZ Initial Phase Development of Small Port Project, Dawei District, the Republic of the Union of Myanmar

With reference to the Letter No. 3(2)/16 (D) (3578/2017), from The Ministry of Natural Resources and Environmental Conservation, on matter about submitting to reply the confirmation for "Environmental Impact Assessment (ESIA) report of Small Port project by Myandawei Industrial Estate Co., Ltd at the initial stage of Dawei Special Economic Zone".

We are pleased to submit the Final Report of ESIA for Dawei SEZ Initial Phase Development of Small Port Project, Dawei District, The Republic of the Union of Myanmar (include ESIA and EMP for Small Port, and RAP for Coastal Road to Small Port) for your consideration.

Sincerely yours,

S. Boonyuen

Dr. Sirinimit Boonyuen

Senior Executive Vice President - International

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FINAL REPORT

ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR DAWEI SEZ INITIAL PHASE DEVELOPMENT OF SMALL PORT PROJECT

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INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1 NEED FOR ENVIRONMENTAL MANAGEMENT PLANS (EMPs)

Results of an ESIA study for a proposed development project (Small Port Project) will not lead to any practical outcomes if the proposed mitigation measures and monitoring program are not implemented in the construction and operational phases of the proposed project. Therefore, an ESIA study will need to extend beyond impact assessment to planning for implementation of the proposed mitigation measures and monitoring program. In this regard, the results of the ESIA study will need to cover preparation of two Environmental Management Plans (EMPs): (i) one EMP for implementation by the contractor in the construction phase; and (ii) one EMP for implementation by the project proponent in the operational phase. Recognizing this fact, the ESIA Procedure (2015) requires the ESIA study to include preparation of a Construction phase EMP (CEMP) and an Operational phase EMP (OEMP).

The two EMPs are defined in the ESIA Procedure (2015) as follows:

Construction Phase EMP *means a detailed and comprehensive EMP for the pre-construction and construction phase of a Project. Such plan shall present all relevant commitments, Emission Limit Values, Environmental Quality Standards and other environmental requirements and include a description of the construction works, present an overview of Adverse Impacts, present mitigation measures and monitoring programs together with time schedules, overview maps, images, aerial photos, satellite images, site layout plans, cross-sections, transects, environmental management and monitoring sub-plans for each construction site, thematic sub-plans, and management procedures as appropriate.*

Operational Phase EMP *means a detailed and comprehensive EMP for the operational phase of a Project. Such plan shall present all relevant commitments, Emission Limit Values, Environmental Quality Standards and other environmental requirements. The plan shall include a description of the Project operations, installations, and infrastructure, and shall present an overview of Adverse Impacts, present mitigation measures together with time schedules, overview maps, images, aerial photos, satellite images, site layout plans, cross-sections, transects, environmental management and monitoring sub-plans for each Project site, thematic sub-plans, and management procedures as appropriate.*

In case of decommissioning phase, the EMPs are similar to those recommended for the construction phase. The EMP during commissioning phase depends on decision of the Concerned Authorities confirm to remove of all components at the end of concession.

The above two definitions clearly indicate that the two EMPs required by Ministry of Natural Resources and Environment Conservation (MONREC) will be comprehensive and have more details than conventional EMPs presented in ESIA reports of the past. This requirement of MONREC is in line with current good ESIA practices.

1.2 GENERIC SCOPE OF AN EMP

Environmental management is based on the basic principle of management known as the Deming cycle (PDCA Cycle): Plan (P), Do (D), Check (C) and Act (A) (see ***Figure 1.2-1***). Environmental management thus consists of four (4) related tasks:

(i) Plan (P) - what need to be done;

(ii) Do (D) - implement the plan;

(iii) Check (C) - monitor and evaluate the results of implementation and;

(iv) Act (A) - taking corrective actions to improve the results, if found inadequate

FIGURE 1.2-1 : PDCA CYCLE FOR ENVIRONMENTAL MANAGEMENT

Therefore, an EMP will need to cover the following subjects: (i) mitigation measures to be implemented; (ii) arrangements for the implementation of mitigation measures; (iii) monitoring, evaluating and reporting of the implementation of mitigation measures to provide feedback information on whether the environmental performance deviates from the prescribed benchmarks; (iv) corrective actions process if the environmental performance below the benchmarks, environmental incident response, and emergency plan; (v) arrangements for operating the Social Management System (EMS), including organizational structure, responsibilities, documentation, training, communication, and management review; and (vi) involvement of stakeholders or affected people in environmental management, including public grievance redress mechanism.

It should be noted that the context of the six (6) elements of environmental management during project construction will be different from those during project operation. Therefore, it is preferable to present a CEMP separate from an OEMP to facilitate their use and reference.

1.3 ORGANIZATION OF THIS EMP DOCUMENT

This EMP document is structured to follow the two outlines as appropriate within the environmental management context of this Project. The essence of each chapter following this introductory chapter is as follows:

Chapter 2 - Project Proponent's environmental and social policy and commitments

Chapter 3 - Institutional Arrangements

Chapter 4 - Legal Requirements

Chapter 5 - Summary of Impacts and Mitigation Measures

Chapter 6 - Construction Phase EMP

Chapter 7 - Operation Phase EMP

Chapter 8 - Emergency Plan

Chapter 9 - Implementation Budget and Schedule

1.4 NEED FOR UPDATING THE EMPs

The CEMP and OEMP presented in this Document are based on preliminary project designs and initial construction plans and schedules. Therefore, the two EMPs should be considered as framework plans. They are intended to provide framework and prescribe requirements for the preparation of detailed CEMP and OEMP by the Engineering Procurement Construction (EPC Contractor). In this regard, the Project Proponent will require the EPC Contractor to prepare a detailed CEMP in due course before commencing the construction, and a detailed OEMP in due course before commercial operation of the project.

The Contractor will use the CEMP presented in this Document as the basis to prepare a detailed CEMP based on the Contractor's final designs, construction plan and methods, and construction schedule. The scope and content of the Contractor's CEMP will not be less than the scope and content of the CEMP in this Document. The Contractor's CEMP shall be contractually binding. During the construction, the Contractor will implement the Contractor CEMP under the supervision of the Project Manager to be appointed by the Project proponent (Owner).

As the Contractor will be responsible for the design, supply, installation, testing, and commissioning of the Small Port and its associated facilities, the Contractor will use the OEMP presented in this Document as the basis for preparing a detailed OEMP based on the actual construction, results of plant commissioning, and final operational procedures. The Small Port Management Team of the Project Proponent or Owner will review and revise the Contractor's OEMP as appropriate to prepare the Owner's OEMP for implementation in the operational phase.

For clarity, the application of the ESIA's EMPs as above described is shown as a diagram in ***Figure 1.4-1***.

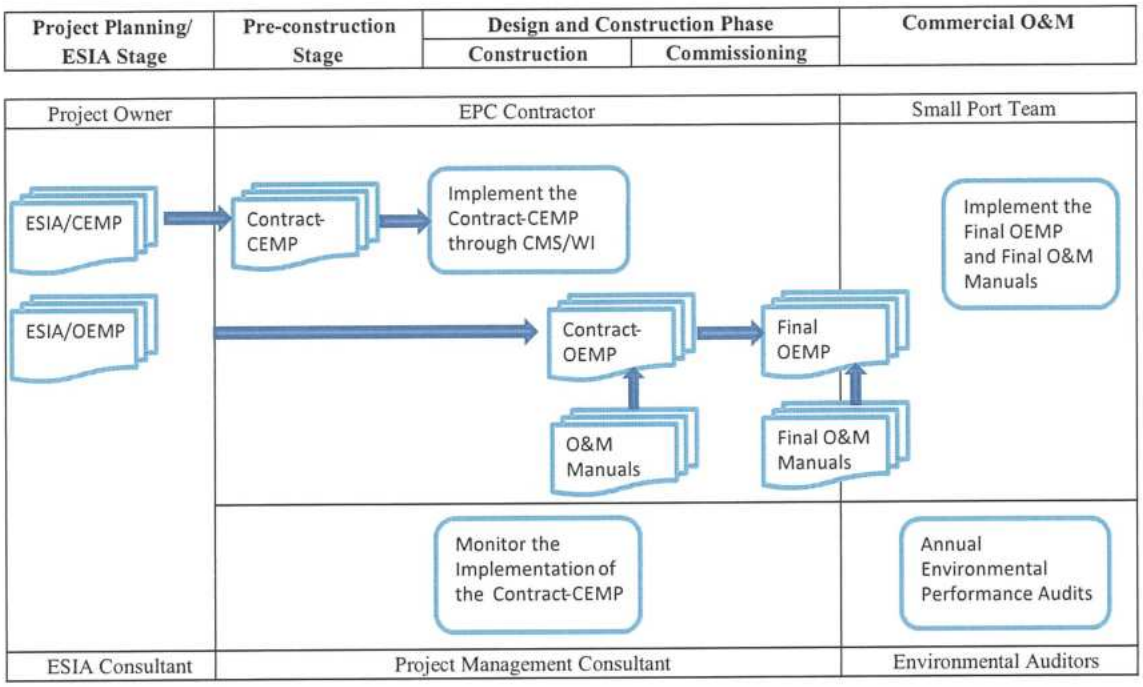

FIGURE 1.4-1 : APPLICATION OF THE ESIA'S EMPs

CHAPTER 2

PROJECT PROPONENT'S ENVIRONMENTAL AND SOCIAL POLICY AND COMMITMENTS

CHAPTER 2

PROJECT PROPONENT'S ENVIRONMENTAL AND SOCIAL POLICY AND COMMITMENTS

2.1 CORPORATE ENVIRONMENTAL AND SOCIAL POLICIES

The Project Proponent is committed to the sustainable development principle. In this regard, the Project Proponent will manage environmental aspects of the Project in accordance with the Corporate Governance Policy, Italian-Thai, 2015

The Company has established the policy in term of environment and social which can summarize as follow:

Policy on occupational safety, health, and working environment

- Occupational safety and good working environment maintenance are responsibilities of all employees to cooperative perform in order to afford safety to themselves, company, and related person.
- The Company shall encourage all employees to understand and recognize occupational safety and health concern in their operation.
- The Company recognizes an important of operational accident prevention.
- The Company shall support and promote the improvement of working environment and working with safety and healthy.
- The management shall supervise occupational safety, health, and working environment of the subordinates according to related Company's regulation.
- The Company shall support and promote safety campaign for maximum effectiveness of an application of the policy in practice.
- The Company shall monitor and evaluate an application of the policy on occupational safety, health, and working environment for efficient and effectiveness according to legal requirements

Policy on the Corporate Social Responsibility

- The Corporate Governance The management system of the Company shall have efficiency, transparency, and accountability for the confidence of shareholders, investors, stakeholders and related parties and lead to the sustainable growth of the Company.
- The Business Ethics the Company believed that moral in business operation can benefit the Company in the long-term. The Company will avoid engaging the activities which are against morality.
- The Respect to Human Right and Labor Equity Human resource is the effective factor to drive the business and add value for the corporate. The Company, therefore, shall improve their working environment and provide them a chance to training for skill enhancement.

- The Responsibility to the Consumer The construction business is high competition. The success of previous project and the satisfaction of the customer can benefit to the Company competitive advantage. The Company, therefore, shall maintain its standard of goods and services and can be the part of society to mitigate the social problems.

- The Community Development the community's sustainability is one of the significant factors which can support the Company's business. The Company will establish the activities which can strengthen the community for example the education support, human resource development, employment creation, and other development project.

- The Environmental Concern the people nowadays concern for the environment. The operation with suitable environmental impact protection system can help the Company timely complete the project. The Company, therefore, shall set the environmental impact protection system comply with laws and regulation and participate in environmental activities with other part of society.

- CSR Report the Company will disclose the information related to CSR activities of the Company in the annual report.

In line with this policy, the Project will commit to the followings:

During Pre-Construction and Construction: The Project will endeavour to minimize environmental impacts and meet all EHS requirements during the construction. This will be achieved through adopting designs, construction methods, construction management practices, and impact mitigation measures.The Project EHS performance will be measured and evaluated against applicable national or international standards and guidelines prescribed by MONREC or proposed in the CEMP.In addition, the Project will establish an EMS for the Project construction.

During Operation: The Project will endeavor to minimize environmental impacts and meet all EHS requirements of the Small Port operation and maintenance (O&M). This will be achieved through adopting: (i) best available technologies in the Small Port design and operation; and (ii) effective impact mitigation measures proposed in the ESIA. The Project EHS performance will be measured and evaluated against applicable national or international standards and guidelines prescribed by MONREC or proposed in the OEMP. The Project will also establish an EMS specific for the Small Port operation, which will follow principles and good practices in environmental management of Small Port.

2.2 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM (ESMS)

The Project Proponent will establish an Environmental and Social Management System (ESMS) to support the implementation of the CEMP and the OEMP. The ESMS for the construction phase is described in the CEMP while that for the operational phase is described in the OEMP.

In addition, the Project Proponent will require the Engineering Procurement Construction (EPC) Contractor to establish its own ESMS to support its implementation of the detailed CEMP.

2.3 ENVIRONMENTAL AND SOCIAL PROCEDURES AND GUIDELINES

Health, safety, environmental management general guidelines, and health, safety and environmental risk assessment for site activities will be established in accordance with the policy stated in ***Section 2.1***.

2.4 ENVIRONMENTAL AND SOCIAL COMMITMENTS

MIE's environmental and social commitments are clearly indicated in its policy statement in ***Section 2.1***. In this Project, MIE will make at most efforts to minimize environmental and social impacts that the Project may cause in its construction and operation, MIE recognizes the need for the Project to exist in harmony with all stakeholders, particularly the communities surrounding the Project site.

CHAPTER 3

INSTITUTIONAL ARRANGEMENTS

CHAPTER 3

INSTITUTIONAL ARRANGEMENTS

3.1 RESPONSIBILITIES OF THE PROJECT PROPONENT

The Project proponent is legally responsible for environmental performance of the Project as prescribed in the Environmental Compliance Certificate (ECC) and other permits. The Project proponent will report to Ministry of Natural Resources and Environment Conservation (MONREC) on the Project's environmental and social performance, also to other authorities responsible for specific environmental and social issues relevant to the Project.

Specifically, the Project Proponent will have the following responsibilities:

Pre-Construction and Construction Phases

1) Ensure that the Contractor will update the CEMP presented in this document to prepare a detailed CEMP based on the results of detailed design, construction plan, and construction schedule.

2) Establish and operate an environmental and social management system (ESMS) containing elements outlined in this EMP.

3) Supervise the Contractor closely in implementing the Contractor CEMP as an integral part of its project implementation management and construction supervision.

4) Submit periodic monitoring and audit reports to MONREC as required in the ESIA Procedure and concerned authorities such as Port Authorities.

5) Notwithstanding the periodic monitoring reports to be submitted to MONREC, keep MONREC and other concerned authorities informed of any serious environmental events and responses to the events.

6) Conducting periodic audit of environmental and social performances of the Contractor.

Operational Phase

1) Ensure that the Contractor will update the OEMP presented in this document to prepare a detailed OEMP based on the results of detailed design, results of commissioning, and operational manuals.

2) Establish and operate an ESMS containing elements outlined in this EMP. The ESMS will be part of the management system of the power plant.

3) Establish an Environmental, Health and Safety (EHS) unit within the organization for operation and maintenance of the Small Port Facilities (both onshore and offshore areas). The EHS unit will be adequately staffed with qualified personnel.

4) Ensure that the Small Port Manager will operate the ESH unit to comply with all ESH requirements prescribed in the ECC.

5) Submit periodic monitoring and audit reports to MONREC as required in the ESIA Procedure and concern authorities such as Port Authorities.

6) Notwithstanding the periodic monitoring reports to be submitted to MONREC, keep MONREC and other concerned authorities informed of any serious environmental events and responses to the events.

7) Conducting annual audit of environmental and social performances of the Small Port.

3.2 RESPONSIBILITY OF THE CONTRACTOR

The Contractor, including its approved sub-contractors, is contractually responsible to the Project proponent for environmental performance of the project construction as prescribed in the Contract.

Specifically, the Contractor will have the following responsibilities:

1) Prepare a detailed Contractor CEMP for review and approval by the Project Proponent. The Contractor CEMP should follow the outline prescribed by the Project Proponent as proposed in ***Appendix 6A***.

2) Implement the mitigation measures during the construction through construction method statements and work instructions in strict conformance with environmental conducts prescribed in the Contract.

3) Ensure that all process and environmental control equipment meet all technical specifications related to their environmental performance.

4) Conduct periodic monitoring and reporting of its compliance with the environmental and social performance prescribed in the Contract.

5) Ensure that its sub-contractors shall comply with the Contractor CEMP.

6) Consistently update the Contractor CEMP and submit the updated version to the Project Proponent for approval.

3.3 RESPONSIBILITY OF MONREC AND PORT AUTHORITIES

MONREC is the key agency to monitor and evaluate environmental performance of the construction and operation.

Other agencies concerned such as Port Authorities will cooperate with MONREC in the monitoring and evaluation of project implementation and environmental performance of the project during pre-construction, construction, and operation phase.

3.4 RESPONSIBILITY OF STATE/REGION AND DISTRICT AUTHORITIES

Local government authorities are the regulator to monitor and evaluate environmental performance of the pre-construction, construction, and operation.

3.5 RESPONSIBILITY OF THE ENVIRONMENTAL, HEALTH AND SAFETY (EHS) UNITS

In the construction phase, the Project proponent will establish an EHS unit within its project management organization. In the operational phase, the Project proponent will establish an EHS unit within the organization for Operation and Maintenance of the Small Port and its associated facilities. Functions and responsibilities of the two EMS units are described in the CEMP and OEMP.

Arrangements for Operating the EMS

There are three (3) key groups with responsibility for environmental management of the Project:

- Project proponent or Project Owner who manages the Project through a Project Manager;
- Contractor as the party undertaking the pre-construction and construction; and
- MONREC through Environmental Conservation Department (ECD), Port Authorities, and other government agencies at the regional, township and community levels.

CHAPTER 4

LEGAL REQUIREMENTS

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LEGAL REQUIREMENTS

4.1 SUMMARY OF KEY LEGAL REQUIREMENTS

Environmental management of the Project will comply with legal requirements pertinent to the EMP prescribed in the Environmental Conservation Rules (2014), and the EIA Procedure (2015).

A. Environmental Conservation Rules (2014)

Chapter IX of Environmental Conservation Rules (2014), Articles 41 to 46 prescribes the tasks regarding Waste Management under the control of MONREC and the Environmental Conservation Department. Waste management covers hazardous wastes, solid wastes, wastewater and emissions.

B. ESIA Procedure (2015)

Articles in the EIA Procedure (2015) relevant to the preparation and implementation of the EMPs are summarized in ***Table 4.1-1***. Preparation and implementation of the two EMPs will need to comply with relevant articles in the table.

TABLE 4.1-1

CONTENT OF THE ESIA PROCEDURE (2015) RELEVANT TO THE EMPS

Subject	Relevant Articles
Content of the EMPs	63
Project Approval Requirements	
- Issuance of an ECC	70
- Conditions of the ECC	87,88,89,90,91,92,93,94,95,96,97,98,99,100,101
- Submission of an CEMP and OEMP	91,92,94,100
Revision and updating the EMPs	94,95,96,97,98,99,101
Implementing the EMPs	102,103,104,105
Monitoring and Reporting	
- Responsibility for Monitoring	106,107
- Content of Monitoring Report	109
- Submission of Monitoring Report	108
- Disclosure of Monitoring Report	110
- Inspection by MONREC	111,112,113,114,115,116,117,118,119,120,121,122

4.2 PROJECT STANDARDS

Environmental management of the Project during construction and operation will comply with the national or international environmental guidelines and standards as appropriate. The international guidelines and standards will be adopted only when the national guidelines and standards do not exist. In addition, the Project will control stack emissions following the standards which are specifically agreed in the drafted concession agreement of the Project.

Table 4.2-1 presents international ambient environmental quality standards to be adopted as the national ambient environmental quality standards have not yet been issued. ***Table 4.2-2 to Table 4.2-3*** presents national environmental quality standard (ambient air and noise). ***Table 4.2-4*** presents national effluents level standards to be adopted for port, harbor, and terminal project. The national effluents level standards for port, harbor, and terminal projects will be set for management plan of this project.

TABLE 4.2-1

RELEVANT INTERNATIONAL ENVIRONMENTAL GUIDELINES AND STANDARDS

Subjects	Parameters	Standard Values	References
Ambient Air Quality (24 hour average)	TSP average 24 hour PM10 average 24 hour NO_x as NO_2 average 1 hour NO_x as NO_2 average 24 hour SO_2 average 24 hour	230 µg /m^3 150 µg /m^3 200 µg /m^3 150 µg /m^3 125 µg /m^3	- Thermal Power: Guidelines for New Plant, Pollution Prevention and Abatement Handbook WORLD BANK GROUP, 1998 - WHO Ambient Air Quality Guidelines stated on Environmental, Health, and Safety Guidelines: Environment Air Emissions and Ambient Air Quality of International Finance Corporation, 2007
Ambient Noise Levels - industrial and commercial area - residential areas	Leq (24 hrs) Leq (1 hr) Lmax	70 dB(A) 55 dB(A)daytime 45 dB(A) nighttime 115 dB(A)	Environmental, Health, and Safety (EHS) Guidelines: General EHS Guide GUIDELINES:ENVIRONMENTAL NOISE MANAGEMENT, IFC, 2007
Vibration - for industrial buildings and residential building	Peak Particle Velocity (PPV) Human Response (PPV)	5 mm/s 0.035 in/sec (Bare Perceptible)	DIN4150 Wiss, 1974
Coastal Water Quality	DO pH Nitrate Nitrogen Phosphates as P Lead Cadmium Mercury Temperature (incremental increase) SS	not less than 4 mg/L 5.0-9.0 ≤ 60 µg/L ≤ 15 µg/L for coastal ≤ 45 µg/L for estuarine water ≤ 8.5 µg/L ≤ 10 µg/L ≤ 0.16 µg/L < 2° C above the maximum Ambient water temperature < 50 mg/L	Marine water quality criteria for the ASEAN Region for aquatic life protection, 2008 ASEAN proposed Marine Water Quality Criteria (Only Malaysia)
Sediment Quality	Total Chromium Total Arsenic Total Lead Total Nickel Total Zinc Total Copper Total Mercury	Maximum limits 81 µg /kg 8.2 µg/kg 46.7 µg /kg 20.9 µg /kg 150 µg /kg 34 µg /kg 0.15 µg /kg	International Association for Impact Assessment (IAIA) NOAA Screen Quick Reference Table, 2004
Groundwater Quality	pH at 25°C Nitrate-Nitrogen Nitrite-Nitrogen Cadmium Lead Arsenic Copper Mercury	6.5-8.5 ≤ 11 µg /L ≤ 0.9 µg /L ≤ 0.003 µg /L ≤ 0.01 µg /L ≤ 0.01 µg /L ≤ 2 µg /L ≤ 0.006 µg /L	WHO's Guidelines for Drinking Water Quality, 2011
Thermal Heat Flux	Safe level of exposure at the property line of storage facility	5 kW/m^2 (1,600 Btu/hr ft^2)	NFPA 59A (standards for the production facility)

TABLE 4.2-2

NATIONAL AMBIENT AIR QUALITY STANDARD

Parameter	Average Period	Guideline Value (µg/m^3)
Nitrogen Dioxide	1-year	40
	1-hour	200
PM-10	1-year	20
	24-hour	50
Sulfur Dioxide	24-hour	20
	10 minute	500

Source: National Environmental Quality (emission) Guidelines 2015, Myanmar

TABLE 4.2-3

NATIONAL NOISE LEVEL STANDARD

Receptor	One Hour LAeq (dBA)	
	Day Time (07:00-22:00)	Nighttime (22:00-7:00)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Source: National Environmental Quality (emission) Guidelines 2015, Myanmar

TABLE 4.2-4

NATIONAL EFFLUENTS LEVEL STANDARDS TO BE ADOPTED FOR PORT, HARBOUR, AND TERMINAL PROJECT

Parameter	Unit	Maximum Concentration
Biological oxygen demand	mg/l	30
Chemical oxygen demand	mg/l	125
Oil and grease	mg/l	10
pH	-	6-9
Total coliform bacteria	100 ml	400
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50

Sources : 1) National Environmental Quality (emission) Guidelines 2015, Myanmar
2) World Bank/IFC, April 2007

CHAPTER 5

SUMMARY OF IMPACTS AND MITIGATION MEASURES

CHAPTER 5
SUMMARY OF IMPACTS AND MITIGATION MEASURES

5.1 PROJECT DESCRIPTION

5.1.1 Project Background

The Project will involve physical development in sectors-transport

The transport sector development will construct a small port to serve, in conjunction with the recently completed small port, sea transport need of the initial phase development of Dawei Special Economic Zone (DSEZ).

5.1.2 Project Location and Overview of the Project Site

The Project can be divided into three major components: (i) onshore component; (ii) offshore component and; (iii) the project coastal road. The onshore facilities will be constructed on a 100 acre land plot outside DSEZ. The offshore facilities will inside of coastal water area (Estuary of Pan Din In River) accommodating one breakwaters, an approach channel, and one jetty for vessel. The small port site is approximate 4.4 km distance northern from Muangmagan beach. The project coastal road will include two paved traffic lanes, capable of handling heavy trucks for hauling goods to and from the small port. The length of road approximated 9 km.

5.1.3 Project Development and Implementation Schedule

The project construction will take about 15 months to complete. The concession agreement was obtained in early august 2015, the Project should be completed for operation in 2017.

5.1.4 Project Facilities

(a) Small Port

Table 5.1-1 summarizes salient information on the major facilities to be constructed or acquired under the Project.

TABLE 5.1-1

SUMMARY OF MAJOR PROJECT FACILITIES

Facilities	Key Information	Purposes or Functions
Access Channel		Entrance with adequate water depth for various type of vessels
- capacity	One vessel per hour in each direction	
- dimension	Length 3 km, width 150 m., depth 8 m.	
- turning cycle	Diameter 360 m, depth 8 m.	
Breakwater	One breakwater which 1.6 km long	Minimize wave in mooring area
Revetment	Slope protection length 400 m.	Prevent shoreline erosion caused by waves generated by vessels and tug boats
Stock yard	2 stocks yard, each covering an area about 20 acres	Store container of material and equipments.

Source: ITD, 2016

(b) The project coastal road

The project coastal road will be 8.3 km long and 7 m wide with 1 m ROW. The road will be paved with asphalt concrete. Cross drainage will be provided at strategic locations to allow drainage of storm water under the road into the sea and will be upgraded for four lane in future depended on demanded. Lighting will be provided along the road as necessary. A bridge will be constructed at km 3+000 with 30 m. length for crossing a stream.

The layouts of small port facilities and 8.3 km of the project coastal road are presented in ***Figure 5.1-1*** to ***Figure 5.1-3***, respectively.

5.1.5 Design Codes, Standards and Guidelines

The design of Project facilities will comply with the following design codes and standards and guidelines include Euro Code (BS EN) for structure design, Maritime Structure (BS 6349), PIANC for approach channel design.

5.1.6 Pre-Construction Phase

During the pre-construction phase, project activities related to site preparation will have environmental implications. Major tasks include land acquisition, land clearing, and land filling and compaction. In addition, the construction of the project coastal road will necessitate relocation of about 12 houses in Nga Pitat Village with full compensation for land, houses and properties in accordance with the resettlement action plan to be prepared. The pre-construction of the project will be completed in about 4-5 months.

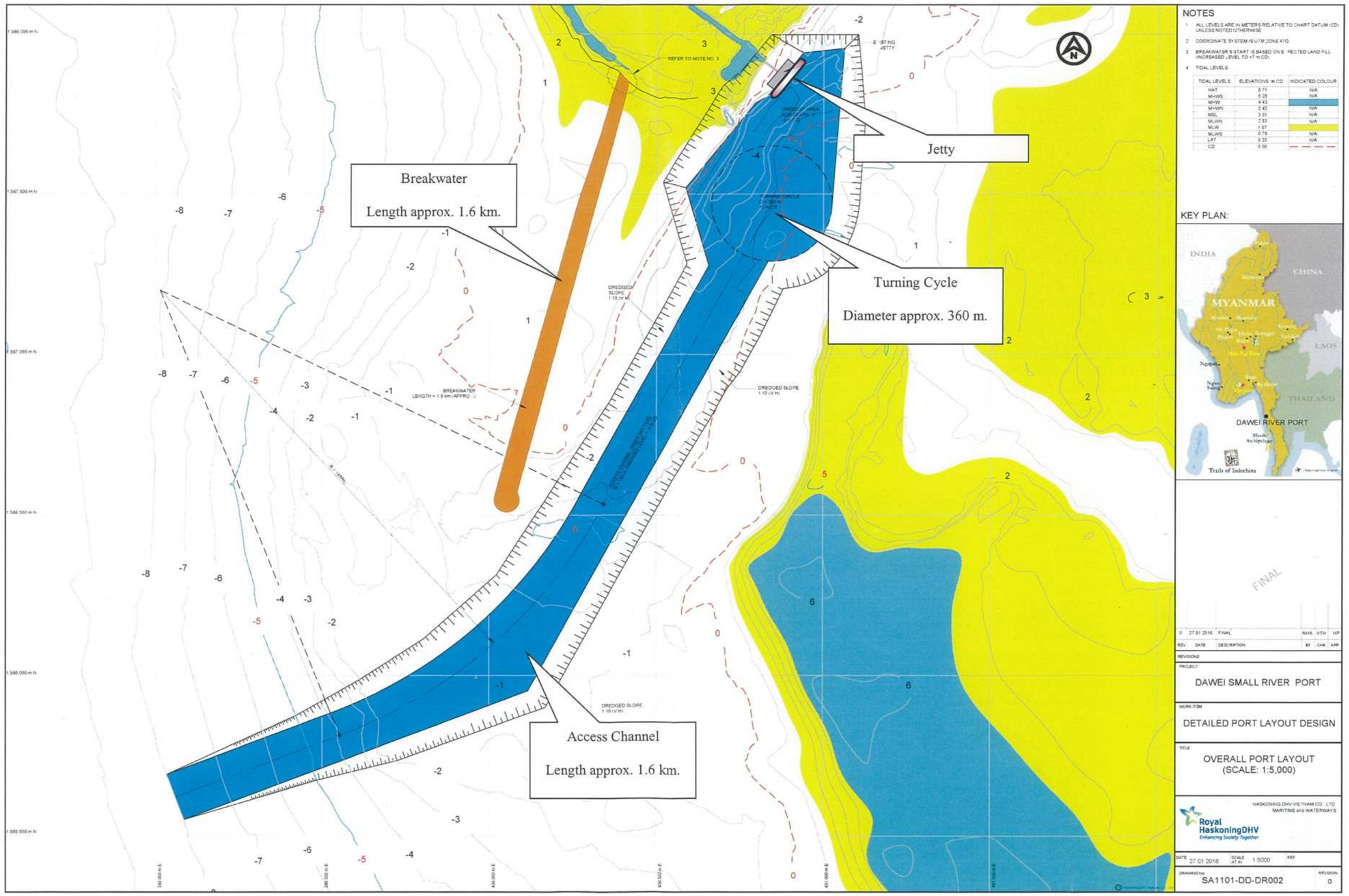


FIGURE 5.1-1 : LAYOUT OF OFFSHORE FACILITIES

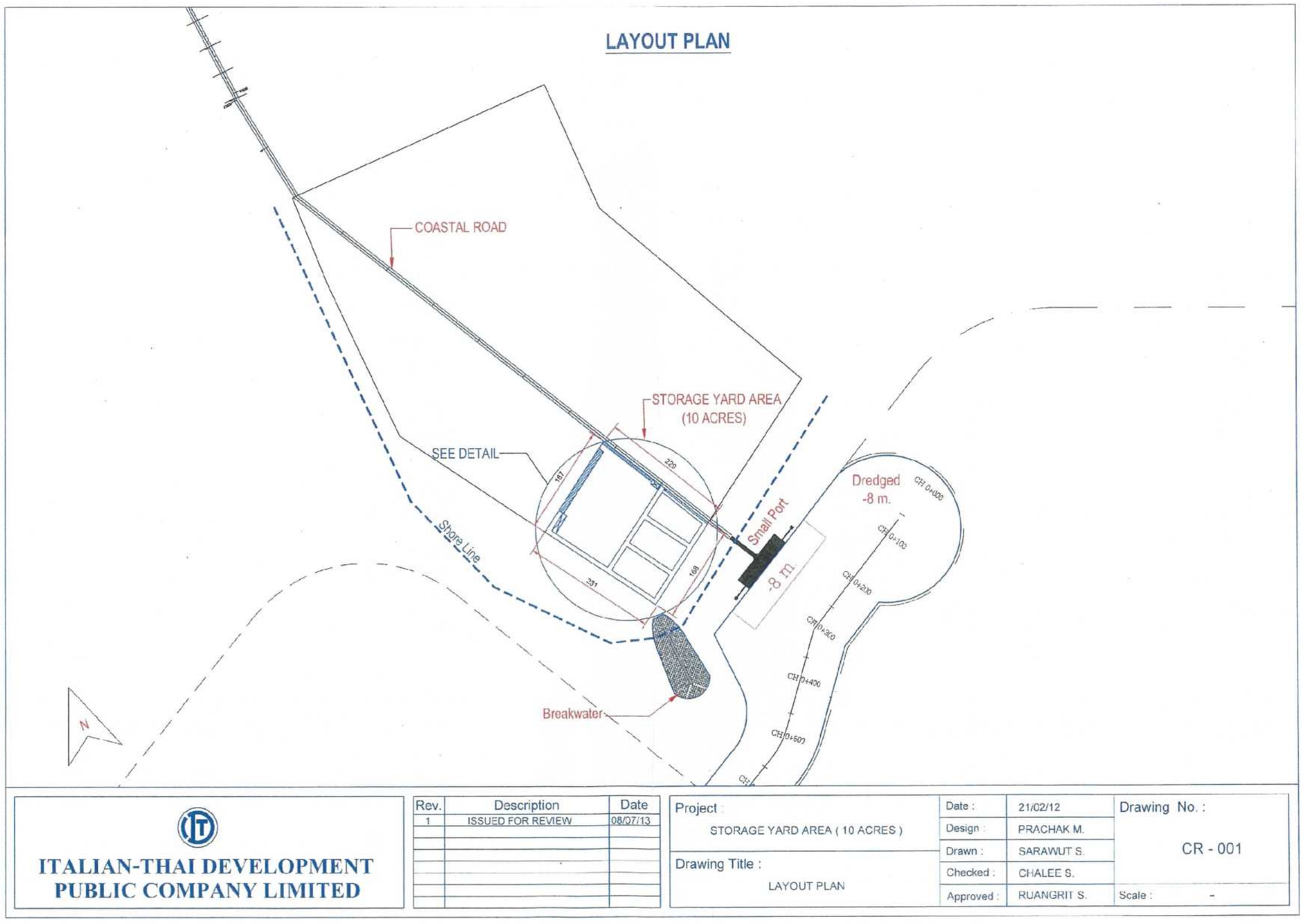


FIGURE 5.1-2 : LAYOUT OF ONSHORE FACILITIES

FIGURE 5.1-3 : LOCATION OF THE PROJECT COASTAL ROAD AREA

5.1.7 Construction Phase

(a) Onshore Structure of Small Port

The construction of storage yards will consist of the following activities; (i) foundation works including piling; (ii) construction of reinforced concrete floors; and (iii) construction of drainage facilities and support utilities such as lighting.

(b) Construction of the project coastal road

The construction of the project coastal road will essentially be civil works, involving clearing the road alignment corridor, grading, compacting, sub-base construction, surfacing, and construction of drainage systems and stream crossing along the road.

(c) Construction of Offshore Facilities

(c1) Dredging

The construction of small port will necessitate dredging of the sea bed to create the approach channel, ship turning area, and ship berths. The total volume of dredged material is approximately 5,200,000 m^3. None of dredged material will be disposed in both offshore and onshore areas. All of 5,200,000 m^3 of dredged material will be used for reclamation of stockyard area and land filling in other DSEZ projects.

(c2) Breakwater Construction

One rock breakwater will be constructed-the breakwater about 1.6 km long. The breakwater has been planned as rubble mound breakwaters. It consists of a mound of coarse stone, also known as a core, covered or protected by blankets or layers of heavier stones. The construction requires the use of both land-based and floating heavy equipment. Typical land-based equipments are used is crawler cranes, hydraulic excavators, bulldozers, and tipper trucks. Floating equipment commonly used is floating crane and hopper barges. Tugboats are used for moving the floating equipment.

(c.3) Other Offshore Structure

The construction of the jetty and ship berths will consist of the following activities: (i) piling; (ii) construction of support foundations; and (iii) construction of reinforced concrete decks and platforms.

(d) Construction Materials

Basic construction materials such as sand and aggregate will be sourced from quarries near DSEZ and from the dredged materials, if suitable. Cement, steel and other materials will be procured from sources in Thailand or Myanmar whichever will be more cost-effective. Large stones for construction of the breakwater will be sourced from a local quarry.

(e) Man Power

It is anticipated that 273 man powers are required for construction phase.

(f) Construction Schedule

The small port and project coastal road would be completed in 15 months.

5.1.8 Operation Phase

Port Operation: The Small Port shall basically serve the General Cargo ship in the initial stage and then gradually convert to Container ship in the future, subject to the demand growth. The number of vessel to mooring at small port is approx. 1 vessel/hour.

Maintenance Dredging: Maintenance dredging of the approach channel would need to be carried out one time per two years depending on the rate of sedimentation and monsoon. The frequency and the extent of maintenance dredging will be determined by the design engineers.

Beach Erosion Rehabilitation: The wave breaker could create beach erosion on one side and beach accretion on the other side. Sand from the accretion side will be removed to fill up the eroded beach.

Port Waste Management: Wastes from ships will need to be collected and treated in facilities to be provided before disposal at the selected sites.

Project Coastal Road: Conditions of the project coastal road will be routinely examined and repair and maintenance will be carried out to ensure good conditions of the traffic surface and road safety. The annual maintenance period of coastal road is approximate 1 time per year

5.2 IMPACTS DURING CONSTRUCTION AND MITIGATION MEASURES

The summary major impact assessment and mitigation measures during 4 phases (pre-construction, construction, operation, and decommission phase) were described in ***Table 5.2-1*** to ***Table 5.2-4***.

TABLE 5.2-1

SUMMARY IMPACT ASSESSMENT AND MITIGATION MEASURE DURING PRE-CONSTRUCTION PHASE

Environmental and Social Issue	Impacts	Control Priority	Mitigation Measures
Impact on Ecosystem	The Small Port Project will eliminate 64.8 acres of degraded mangrove, 16.2 acre of natural mangrove, and 10.3 acres of beach forest and swamp areas. The Project Coastal Road will eliminate only 13.84 acres of beach forest.	Medium	• Survey and record flora and fauna species in the Project site before land clearing. If endangered flora and fauna species are found, they should be moved to protected swamps and mangrove areas. • In consultation with concerned authorities such as MOECAF, Forest Department, and Local Villagers, design and implement a mangrove reforestation program in areas outside DSEZ. The purpose is to compensate for the loss of mangrove area by the Project. • Green buffer zones should be created around the boundaries of the Project site. • Tree cutting will be avoided and cannot be done without prior permission from the Project Proponent's Project Manager.
Biomass Waste Disposal	The clearance of vegetation cover could generate as much as 6,839.90 tons of biomass waste for small port site and 13.84 tons of biomass waste for project coastal road	Medium	• The biomass wastes will consist of trunks, stems, branches, and leaves. The components that could be used for construction, charcoal making, and firewood should be sorted out. The remaining unusable components should be reduced in size and disposed of in the Project site by land fill. No open burning should be allowed.
Impacts on Livelihood of Villagers	For small port project, villagers in Nga Pitat Village will be adverse affected due to loss of some part of mangrove area. This area is one of sources of firewood for villagers. For project coastal road, 12 households of Nga Pitat village who living within the right of way will be relocated to proposed resettlement area at Nga Pitat village.	High	(1) Small Port The Project Proponent should design and implement a long term of livelihood restoration program (LRP) for the affected people in consultation with them and the concerned authorities. The LRP will provide training and initial supports to assist the affected people to enhance their income through increasing efficiency of their current economic activities or creating secondary sources of income through new economic activities. (2) Project coastal road The Project Proponent will need to prepare a detailed of resettlement plan in consultation with the 12 affected households, village headman and committees of Nga Pitat Village, and concerned authorities including MONREC. The plan will need approval from these authorities. If justified, supports will be provided to the 12 affected households to enable them to adjust to the new resettlement site.
Environmental Disturbances Caused by Dust, Noise and Gaseous Emissions	Increase dust, noise, and emissions from land clearing and land filling activities and mobile equipment.	Medium	Fugitive dust will be generated most during the compaction. Frequent water spraying is normally used to suppress dust and it could reduce as much as 75% of the dust. Noise of mobile equipment is difficult to control at source. A practical measure is to provide ear muff to workers working in the excessive noise environment. In addition, temporary sound barrier should be setting during land clearance and land filling small port and project coastal road to reduce noise impact to Sakhanthit and Nga Pitat Villages.

TABLE 5.2-2

SUMMARY IMPACT ASSESSMENT AND MITIGATION MEASURE DURING CONSTRUCTION PHASE

Environmental and Social Issue	Impacts	Control Priority	Mitigation Measures
Impacts from Gaseous Emission	Increase exhaust gas emission from heavy equipments and vehicles	Low	• Adopt procedures to avoid construction vehicles idling for excessive periods (e.g. more than 5 minutes) if required to queue to enter the construction sites; • Maintain all construction equipment in proper working conditions according to the manufacturer's specifications. • Provide adequate training to the equipment operators in the proper use of equipment. • Use the proper size of equipment for the job. • Use the equipment fitted engines with latest low emission technologies (repowered engines, electric drive trains). • Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines). • Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes. • Ensure all construction vehicles and stationary plant and equipment powered by diesel motors are fitted with emission control measures, and are regularly maintained to manufacturers' specifications.
Noise	Increase noise level from heavy equipment and vehicle during construction of small port and project coastal road on sensitive receptor (Sakhanthit and Nga Pitat Villages).	Medium	• Major construction activities which generate loud noise should be limited to only during the day time. Activities that are necessary to be carried out at night time will need approval of the site engineers, and will need to have adequate noise control equipment or measures. • Speeds of vehicles in the construction site will not be more than 40 km/hr. • Noise performance requirements of construction equipment will need to be clearly stated in contract specifications. • Temporary sound barriers or shielding should be installed for non-mobile equipment. • The EPC contractor will be required to regularly monitor ambient noise levels at the receptors, particularly during the noise generation period. • The construction environmental management plan will need to include an efficient complaints redress procedure and an efficient corrective action procedure to address the none compliance of noise performance.

TABLE 5.2-2

SUMMARY IMPACT ASSESSMENT AND MITIGATION MEASURE DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issue	Impacts	Control Priority	Mitigation Measures
Coastal Water and Marine Aquatic Ecology	- Increase of water turbidity during dredging activities. - Siltation during dredging is approximate 500 m. from approach channel, It is not make affected to coral reef and seagrass areas. The reason is the nearest coral reef area from small port is North Island with distance approx. 28 km. whereas the nearest seagrass area from small port is locate on Myiek with distance approx. 40 km. - The effected from dredging activities to endanger species is negligible due to none of any endanger species found in and around project site.	Medium	**(a) Dredging Activities** • Use techniques to minimize adverse impacts on aquatic life from the re-suspension of sediments; • Contractor must establish the baseline coastal water quality around the dredging and disposal area by conducting daily monitoring program at least 3 months prior to dredging activities. • The dredging activities must be stopped if total suspended solid exceeds 50 mg/L at any time. • Check and maintenance sediment transfer pipe daily to ensure proper condition and prevent pipe damage cause of sediment spill into sea. • In case of damage on sediment pipe, the dredging activities must be stopped. • Prepare wave gauge, tide gauge, and anemometer to establish long term environmental information in this project area. • Check and maintenance all machine and equipment to prevent oil leakage into sea. • Check and maintenance TSHD and CSD to ensure that no sediment overflow into the sea. • Project Engineering should strictly control and prohibit contractor to dispose sediment from dredging activities into the sea and outside designated disposal area. • Monitoring coastal water quality especially during dredging activities and the results must be sent to all concerned agencies. **(b) Disposal** • Avoid off shore disposal activities to prevent impact on coastal water quality and marine ecology. • Use the dredged materials for on-land disposal within the Initial Industrial to the maximum extent. **(c) Marine Ecology** • Apply the same mitigation measures as recommended for coastal water quality. • Monitoring marine ecology especially during dredging activities and the results must be sent to all concerned agencies. • Provide information on the construction schedule and dredging area to local fishermen living near the port. • Coordinate with local authorities to protect coral and other marine resources.

TABLE 5.2-2

SUMMARY IMPACT ASSESSMENT AND MITIGATION MEASURE DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issue	Impacts	Control Priority	Mitigation Measures
Wastewater	During the construction phase, the following wastewaters will be generated and need to be controlled: - Domestic sewage generated by daily living activities of about 273 construction personnel at peak of the construction (approx. 41 m^3/day) - Wash waters in the construction site, mainly from truck wheel washing and concrete wash waters (approx. 42 m^3/day) - Surface runoff (84,218 m^3 from small port and 39,060 m^3 from project coastal road)	Medium	**Surface Runoff** • The site preparation activities, including land clearing and site filling and compaction, should be carried out during the dry season to avoid the problem of surface runoff with high turbidity discharging into the open sea or nearby drainage channels, if exist. • The construction site should be surrounded by temporary fences to limit the amount of sediment that could be washed from the construction area during the raining time into the sea. • To prevent contamination of the surface runoff, potential contamination sources will be covered with roof. The surface runoff would contain only suspended solids washed out from the open area. • Construct a temporary drainage system to collect the surfaced runoff from the construction area for both small port and project coastal road to avoid the discharge of surface runoff into the open sea. • The collected storm water will be drained into a retention pond for removal of suspended solids before discharging into the sea or a nearby drainage channel, if exist. After the construction, the retention pond will be retained and used for wastewater management during the operational phase. **Domestic Wastewater** • Toilet wastes will be separated from grey water or salvage. • Kitchen and canteen waste water will be discharged into oil and grease trap tank before draining into a retention pond. • Toilet wastes will be discharged into a septic tank (or more than one septic tank) with a hydraulic retention time of about 5 days. The volume of toilet wastes is estimated at about 20% of the total volume of domestic wastewater, or about 3 m^3/d. Alternatively, toilet wastes and grey water could be treated in a package sewage treatment plant. • Grey water will be discharged into the retention pond. • The retention pond will be designed as an oxidation pond with a hydraulic retention time of about 7 days. **Wash Waters** • The concrete wash water and the wheel wash water will be discharged into a concrete settling basin. The effluent will be treated to adjust the pH, if necessary, and reused. The remaining effluent will be discharged into the retention pond. • Water in the retention pond will be used for dust suppression on unpaved areas in the construction site, watering of the green area, concrete washing, and wheel washing.

TABLE 5.2-2

SUMMARY IMPACT ASSESSMENT AND MITIGATION MEASURE DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issue	Impacts	Control Priority	Mitigation Measures
Construction Wastes	During the construction of Project facilities, the following waste materials will be generated: - Vegetation from site clearance - Spoils and excavated materials from earth works (rocks, soil) - Construction material debris (concrete, wood, scrap metal) - Hazardous waste (empty fuel drums, used oil filters, batteries, spent solvents, oils) - Domestic wastes from site workers (food waste, waste paper, packaging)	High	**General Requirements** An efficient construction waste management system should be established and implemented. Construction waste will need to be classified and sorted out at source for disposal. The disposal methods will depend on the types of wastes: direct reuse in the construction, sale and recycling of materials, land filling for inert materials and specific treatment method for each type of hazardous materials. Haphazard disposal of construction waste in or off the construction site will be prohibited. No burning of wastes will be allowed. **Construction and Land Clearing Wastes** Site preparation waste should be disposed at a suitable land fill site to be selected by contractors with approval of concerned authority. Construction wastes should be handled by the existing municipal solid waste collection and disposal services. If such service is not possible, the construction wastes would need to be disposed off in the Project site or recycle. They may be buried in areas designated for green areas. **Non-construction Wastes** Non-construction wastes will be disposed off with the construction wastes. Provide adequate number of refuse bins or containers with tight covers, daily collection of disposal. **Hazardous Wastes** Hazardous wastes will be handled by a licensed hazardous waste contractor. If this service is not available, the Contractor will need to find appropriate arrangements for safe permanent storage, or other appropriate methods of disposal. A Hazardous Waste Management System covering waste classification, separation, collection, storage, transfer and disposal should be set up and operated. The waste management system will comply with applicable regulation of the government, if any.

TABLE 5.2-2

SUMMARY IMPACT ASSESSMENT AND MITIGATION MEASURE DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issue	Impacts	Control Priority	Mitigation Measures
Road Traffic	Increase number of vehicles (approx. 25 vehicles/day for small port and 18 vehicles/day for project coastal road) may increase chance on road damage and accident to local villagers.	Medium	• Consultation with the concerned authorities at the national, regional, and township levels on develop and implement a Construction Traffic Management Plan t • Measures to manage the operation of the construction truck fleet for incorporation into a Construction Vehicle management sub-plan. • Heavy trailer trucks transporting heavy and large plant equipment will have to be directed by a traffic police car. • Post warning signs along the right of way where the access road construction takes place. • Implement management measures to avoid, or minimize increase in traffic caused by the project works in local streets as practicable; • Notify the local community about proposed changes to local traffic access arising from construction activities, and provide clear signage of changed traffic conditions and take other measures to ensure safe traffic movement; • Employ local people a Nga Pitat village to give a sign when local villagers walk across the road during construction • Prepare and implement an employee parking policy for the construction work sites to manage the impacts on car parking in the vicinity of worksites and help avoid project parking in local streets
Navigation	Impacts during the construction phase would be impeded local navigation due to dredging and construction of offshore facilities and increased risk of accidents. The number of vessels approx. 9 vessels/day during construction phase	Medium	• A comprehensive Vessel Traffic System and Management Information System (VTS MIS) will be required for this Terminal. • Install signs and warning signs that can be clearly seen (200 meter from the construction area) to show the boundary of offshore construction areas. • All vessels operating in nighttime must receive special permits. • All concerned safety rules have to follow the laws related to transportation section of Myanmar. • Provide information on the boundaries of offshore construction areas to all fishing boat operators. • Train all concerned crew on navigation safety in the offshore construction areas. • Carry out routine check and maintenance of vessels to follow safety instructions. • Prepare and maintain readiness for implementing an emergency plan related to marine accidents.
Community Health, Safety and Security	**Health Risk:** Without proper management, the influx of construction workers could pose health risks to the communities. Communicable diseases such as sexually transmitted diseases, tuberculosis and hepatitis are areas of concern. **Security Risk:** The influx of workers could also pose security risks to the communities in terms of crimes and drug abuses.	Medium	**Health Risks** • All recruited workers should receive health examinations for screening of major communicable diseases before employment. Subsequently, annual check-ups should be provided. • Symptoms of major communicable diseases, if noted, should be immediately reported to the district medical officer for proper treatment. • Provide health awareness training to workers on hygiene and sanitation, communicable and infectious diseases. **Security Risks** • The EPC contractor will be required to establish and implement a site security system and appropriate measures, including prevention of drug abuse.

TABLE 5.2-2

SUMMARY IMPACT ASSESSMENT AND MITIGATION MEASURE DURING CONSTRUCTION PHASE (CONT'D)

Environmental and Social Issue	Impacts	Control Priority	Mitigation Measures
Local Communities	**(i) Local Economy**: The Project construction will generate a cash flow of about US$ 21,840 per month from local services (estimate from household survey during January 2015), particularly foods and sundries. Thus local economy will be boosted up. **(ii) Livelihood**: The major livelihood effect is adjustment of 12 household that relocated from project coastal road right-of-way in new relocated area and impact during construction phase to local villager around project sites such as accident from project transportation, impede of navigation, and loss of some area forest resources that change for small port site. **(iii) Infrastructure and Services**: The Project construction could compete with the communities in using limited local infrastructure and services include local road and medical service. **(iv) Culture and Tradition:** construction personnel, who are not local, could have conflicts with locals related to differences in cultural and traditional practices and value.	Medium	**(i) Local Economy** • Priority should be given to local employment, especially the villages close to the construction site; e.g. Nga Pitat, Nyaung Bin Seik, Sakhanthit, Pan Din In, and Veenapin villages. • The recruitment process should be fair and transparent and wage rates are commensurate with experiences and qualifications. • The employment conditions will need to comply with the requirements in the national labor law, the social security law and standard wage rate, and other applicable laws and regulations. • The Project Proponent should establish good relationship with the locals and provide the locals with timely information about the project, likely impacts and mitigation measures, and procedures to address local concerns and grievances. • Disclose relevant information before the construction of major components and during the construction through such methods as Information billboard, Information disclosure via village headmen or village community leaders • Conduct attitude surveys to collect information on local concerns, issues, and problems of the communities (200 samples within 5 villages). **(ii) Livelihood** • Continue restore livelihoods through provision of knowledge for strengthening occupation career as proposed during pre-construction phase **(iii) Infrastructure and Services:** • Transportation of construction materials must avoid peak traffic hours. • Speed limits should be imposed on heavy vehicles traveling in the public road to lessen the damage caused to the main road. • Services including water supply, waste disposal, sewage treatment and health services should be provided within the construction site. • Roads damaged by the construction related traffic will have to be repaired as soon as possible by the Project. • Consultation with villagers to inform them about an increase of traffic and duration of transportation works • Establish safety rules and regulations, and practice accordingly. • Establish First Aid service at the construction site. **(iv) Culture and Tradition** • All project personnel should be made aware of local cultures, traditions and norms. • The Project Proponent should establish good relationship with the locals and actively support and participate in traditional and cultural events.

TABLE 5.2-3

SUMMARY IMPACT ASSESSMENT AND MITIGATION MEASURE DURING OPERATION PHASE

Environmental and Social Issue	Impacts	Control Priority	Mitigation Measures
Ambient Air Quality and Greenhouse Gas	**Ambient Air Quality** The main air quality impact during operation is increase number of vehicle that using project coastal road. **Greenhouse Gas** Main Source of greenhouse gas emission during operation of Project facilities will mostly result from vessels (approx. 1 general cargo/hr.) The calculation results is very less (0.29 Mt CO_2 eq.) or 0.29% when compare with Total GHG Emissions Excluding Land-Use Change and Forestry in Myanmar (98.93 MtCO2 eq.	Medium	• Use low sulfur diesel fuel • Check and maintenance vehicle regularly to minimize the exhaust emission. • Speed reductions by vessels approaching a port can result in significant reductions in nitrogen oxide emissions. • Control and formulate monitoring program on air quality throughout operation period.
Noise	The impact from operation of small port is vehicle using project coastal road. The major sensitive receptor that get affect from noise level increase is Nga Pitat village (close to project site).	Medium	• Limit speed of vehicles at the Project site at 40 km/hr. and speed of ships. • Install temporary noise barriers, if necessary, to minimize noise impacts on sensitive areas • Transportation shall be carried out only during the day time. • Always maintain road surface in good condition.
Maintenance Dredging	Increases in turbidity of the sea water during maintenance dredging which will be impact on coastal water quality and marine ecology	Medium	• The mitigation measures are similar to those proposed for dredging during the construction phase
Shoreline Stability	Affect the sediment supply from the catchment area and interrupt the sand supply from the estuaries to the beach system. For this project, the affected come from setting of 1.6 km of breakwater.	Medium	• Recheck and reclaim sand (bleach nourishment) on the eroded beach around the shoreline of Project site every year. • Based on limited physical and environmental information available, as well as engineering judgment, Regular shoreline monitoring is recommended to gain the necessary information and prepare the setback line or beach erosion protection with hard structure such as groynes if high erosion on the shoreline.
Waste Waters	Waste Waters of the small port will come from the following sources: • Ship wastes • Port Wastewaters include domestic sewage from port workers and wastewater from washing of port facilities • Stormwater	Medium	**Ship Wastes** • The port operation office will need to enforce appropriate controls on the discharge of ship wastes in line with MARPOL. • In addition, the port operation office will need to prepare a contingency plan and establish an organization for implementing the plan including reporting system to effectively handle oil and chemical spillage incidents from ships. **Port Wastewaters** • In addition to a waste treatment system for handling ship wastes, a central wastewater collection and treatment system will be required to take care of domestic sewage and other port wastewaters. • The port operation office should try to reuse wastewater as much as possible to minimize its volume. • The port operation office will prohibit ships and port operators to discharge all kinds of wastes and wastewaters directly into the Andaman Sea.

TABLE 5.2-3

SUMMARY IMPACT ASSESSMENT AND MITIGATION MEASURE DURING OPERATION PHASE (CONT'D)

Environmental and Social Issue	Impacts	Control Priority	Mitigation Measures
Waste	During the operation phase, the following waste will be generated and need to be controlled: • Used lubricant. • Sludge and other solid wastes from wastewater treatment plants • Hazardous waste such as used batteries, chemicals etc. • Garbage, about 20 kg/day of garbage will be generated by the port workers and staff.	Medium	**1. Used Lubricant** Set up and operate a system for collection of used lubricant and engine oils in all workshops and engine maintenance facilities. Contractors will be appointed to remove and dispose the collected lubricant and oils. **2. Solid Wastes from Wastewater Treatment Plants** If the wastewater is treated using such high rate biological processes as activated sludge process and a fixed film aerobic process, the sludge dewatering unit of the wastewater treatment plants will generate organic sludge with 20-35% water content. This surplus sludge could be disposed of as garbage or could be used as fertilizer in the green area. **3. Hazardous Wastes** The port operation office will need to set up and operate a hazardous waste management system covering waste classification, separation, collection, storage, transfer and disposal. The hazardous waste management system will comply with applicable regulations of the government, if any. It will need to have a registration system to enable tracking of hazardous wastes. The hazardous wastes will be storage and disposed by hazardous waste service. The method of disposal will follow best international practices. If hazardous waste disposal services are not available, the port operation office may consider using the outside services. **4. Garbage** If the port area cannot be served by the garbage collection services of the local government, the port operation office will need to address this issue. It will need to set up and operate a simple garbage management system as the garbage volume will be small, less than two tons per day. Proper containers will be provided at all garbage sources for collection and storage at sources before collection. The garbage will be daily collected using a small garbage truck and transported to a disposal site inside or outside the port area as appropriate.
Land traffic	The land traffic impact comes from transportation of construction equipment, materials, and workers that use project coastal road to DSEZ zone such as LNG Terminal, Initial Phase Power Plant and ITD Camp Site.	Medium	• Prepare and implement an improvement program for improving safety of the local road network to cope with expected increase in traffic volume during port operations. • Construction the bridge at Nga Pitat village for local villagers and children walk across the project coastal road. • In addition, the local administration should impose a regulation limiting truck traffic speed in the areas around the port at not exceeding 40 km/hr.
Navigation	Port operations will invariably increase traffic in the coastal waters within the port operational area. Approximate 1-2 of vessels/hour will navigate to small port area.	Medium	• The port will have a vessel traffic management system to ensure navigation safety and keep records of vessels calling at the port. • The navigation area will have adequate number of buoys and signs to clearly indicate the navigation channel and the port boundary.
Community Development Supports	During the operational phase, the impacts of the small port both positive and negative on the nearby communities will be much less than those during the construction. In the public consultation meetings, several participants requested supports for electricity supply and improve on local road.	Medium	• The Project Proponent should consider a CSR program to provide community assistance in line with these needs. The CSR program would need to be designed and implemented in consultation with the authorities concerned and the community leaders.

TABLE 5.2-4

SUMMARY IMPACT ASSESSMENT AND MITIGATION MEASURE DURING DECOMMISSION PHASE

Environmental and Social Issue	Impacts	Control Priority	Mitigation Measures
Environmental Disturbances Caused by Dust and Noise	The effects of dust diffusion and noise during demolition and land reclamation activities to closest sensitive areas (Sakhanthit and Nga Pitat villages,).	Medium	Fugitive dust will be generated most during the land reclamation. Frequent water spraying is normally used to suppress dust and it could reduce as much as 75% of the dust. Noise of mobile equipment is difficult to control at source. A practical measure is to provide ear muff to workers working in the excessive noise environment. In addition, temporary sound barrier should be setting during demolition and land reclamation of small port to reduce noise impact to Sakhanthit and Nga PitatVillages.
Coastal Water and Marine Ecology	The main concern will be increases in turbidity of the sea water during demolition of offshore facilities such as breakwater, jetty, and support facilities. This situation will be impact on coastal water quality and marine ecology.	Medium	• Avoid demolition of offshore structure. Consider to planting the mangrove around breakwater. This can reduce impact on coastal water marine ecology in term of increase turbidity during demolition of offshore structure. • If cannot avoid demolition activities, project must be design and technology to minimize impact on coastal water and marine ecology in term of increase turbidity. • The project developer/contractor must monitor the coastal water quality and marine ecology around offshore facilities at least 3 months prior to demolition activities and after demolition complete.
Waste	The increase of solid wastes generated during the decommission phase are as follows: • Solid waste from worker and demolition area such as garbage, glass, and food waste. • Residue such as wood scrap, steel, cement etc. • Hazardous waste such as used batteries, chemicals etc.	Low	• The Contractor will design and implement a waste segregation system and procedure and communicate it to all worker to strictly adhere to the segregation procedure; • An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. Each waste category will be segregated into recycling, reuse and disposal sub-categories.
Land Reclamation	During decommission phase, the land use will be change from port area to open area after demolition complete.	Medium	Developer should design with discuss with concerned authority and local villagers to management on the open land after demolition complete. Typical utilization on the open land such as mangrove reforestation, develop agriculture land, transfer port and area to local authorities to confirm use.

CHAPTER 6

CONSTRUCTION PHASE EMP

CHAPTER 6
CONSTRUCTION PHASE EMP

6.1 OBJECTIVES OF THE CEMP

For the Project proponent, the objective of environmental management of Project construction is to ensure that the construction will not create significant impacts and will meet all applicable standards and guidelines and requirements prescribed as conditions for issuing an Environmental Compliance Certificate (ECC). The standards, guidelines and requirements will be prescribed in the Contract.

The key objective of the Owner-CEMP (OCEMP) is to establish a clear operational framework and requirements for environmental management during the construction phase of the Project. Based on the OCEMP, the Contractor will prepare a Contractor-CEMP (CCEMP) which will have operational details based on the detailed designs, construction methods, and construction schedule. The CCEMP will therefore be part of the Contract.

6.2 MAPS

Project construction will take place at one site. ***Figure 6.2-1*** is a base map of the main construction site and villages within 5 km radius. The site layout plan (DSEZ and Small Port) is shown in ***Figure 5.1-2*** and ***5.1-3*** of ***Chapter 5***.

6.3 IMPACTS AND MANAGEMENT PLANS

Types, magnitudes, durations, and locations of environmental impacts during construction vary as the construction progresses. ***Table 6.3-1*** shows anticipated environmental impacts.

The following issues will be managed during the construction phase: (i) general construction, (ii) noise; (iii) waste management; (iv) air quality management, (v) wastewater management; (vi) traffic management include land traffic and navigation, (vii) OSH management, (viii) resource management, (ix) social environment, and (x) coastal water and marine ecology. The Contractor will update the sub-plans and include in the Contractor-CEMP. Each sub-plan will be a working document and as such it will be reviewed and amended or updated as deemed necessary to reflect changes in construction schedule and management review changes.

TABLE 6.3-1

ANTICIPATED IMPACTS AT VARIOUS MONTHS OF THE CONSTRUCTION

Construction Activities	Impacts
Onshore Preparation	Dust, Noise, Wastewater, Solid Waste, Road Traffic, Mangrove, Social and Livelihood
Dredging Activities	Coastal Water , Marine Ecology, and Navigation
Breakwater and offshore construction	Coastal Water and Marine Ecology, and Navigation

Note: Duration of activities based on tentative project implementation schedule in ***Chapter 4*** of main text.

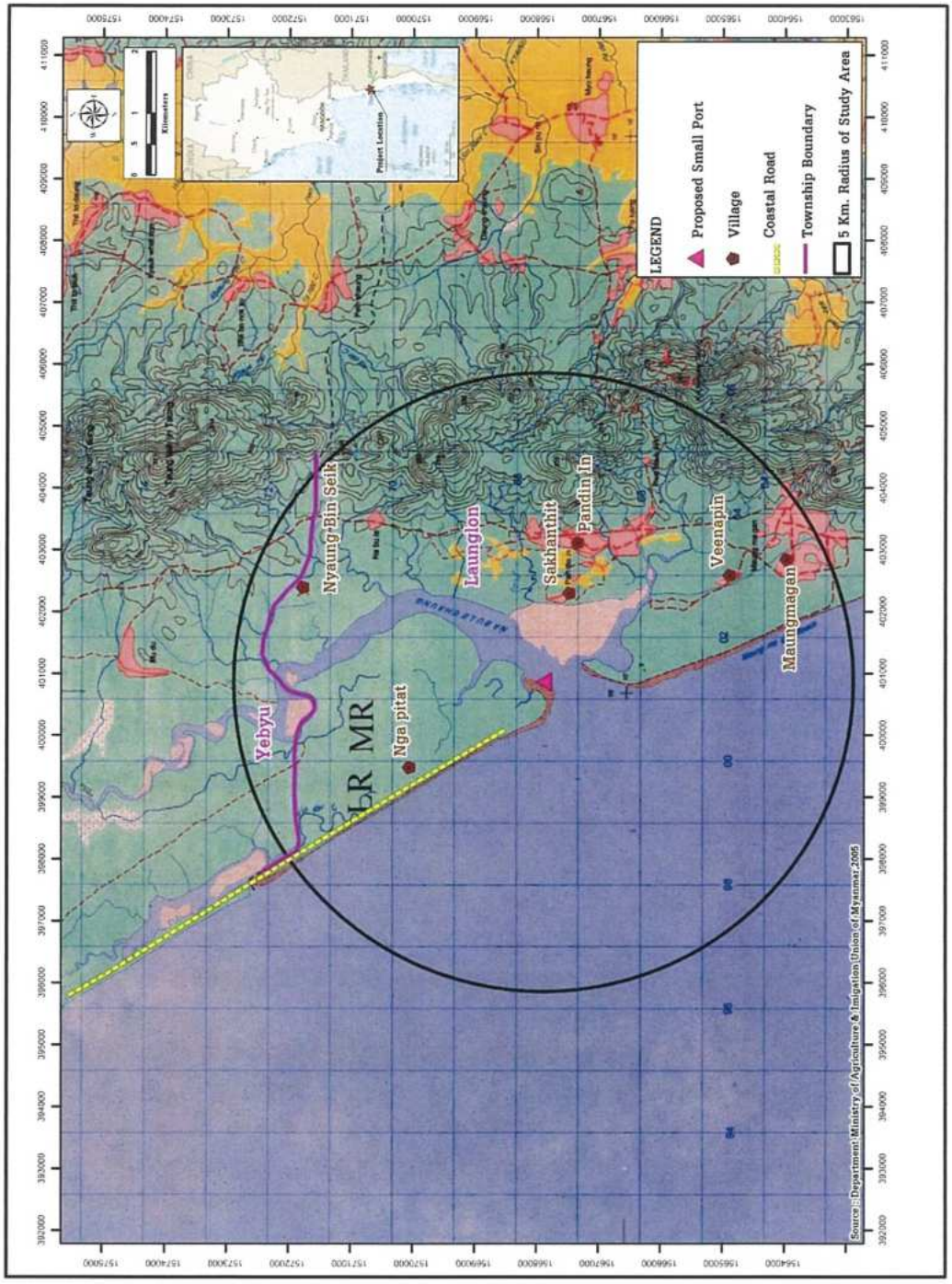


FIGURE 6.2-1 : THE PROJECT CONSTRUCTION SITE AND SURROUNDING VILLAGES

6.4 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

The Project proponent and the Contractor will both be involved in environmental management of the Project construction. The Contractor will select construction methods or practices that have least environmental impacts, thus meeting environmental performance targets prescribed in the Contract. During the construction, the Contractor will implement, under supervision of the Project proponent, impact mitigation measures prescribed in the Contract.

The Project proponent and the Contractor will have to establish and operate their own environmental management systems (EMS) for the Project construction. The two EMSs will be related and based on the same information base. The Project proponent's EMS will be focused on monitoring and reviewing environmental compliance at the Project level as part of the Project management. The Contractor's EMS will be focused on environmental management at the task level as part of the construction management. The two EMSs will therefore be complementary and will enable the Contractor and the Project proponent to complete the Project construction with no significant environmental impacts.

The EMS of the Project Proponent will adopt the following procedures:

6.4.1 Monitoring, Evaluation and Reporting

6.4.1.1 Scheduled Environmental Monitoring and Evaluation

Before commencing the construction, the Contractor will review and update existing data on relevant baseline environmental condition, particularly at locations expected to be affected by the construction.

Scheduled monitoring of environmental performance is required throughout the construction phase of the Project to evaluate compliance with legal requirements, the environmental management objectives, and relevant policies, standards and guidelines. The monitoring and evaluation will enable the overall effectiveness of the environmental controls to be determined and allow areas of non-compliance to be identified so corrective actions can be taken.The environmental monitoring plan for each issue to be managed is also presented in each sub-plan.

Environmental monitoring will be undertaken according to the following:

- The Contractor's Environmental, Health and Safety (EHS) Manager is responsible for implementing the monitoring plans, and arranging training and specialist consultants for the monitoring as required.
- The monitoring will be conducted by the Contractor using the approved methods stated in the Contract.
- Environmental results not meeting the required standards will be managed as per the corrective action process and issued with a non-compliance report.
- The EHS Manager will advise the Contractor Project Manager of any non-compliance from monitoring and will report these to the Owner's EHS Manager as required.

6.4.1.2 Site Inspections

In addition to scheduled environmental monitoring, the Contractor's EHS Manager will conduct daily, weekly, and monthly general inspections at the construction site. The objectives are to early identify or detect factors which, if unattended to, could result in major environmental events and/or non-compliance. A general scope of inspections is outlined below in ***Table 6.4-1*** and it will need to be updated when the detailed construction plan is made.

The daily inspections will be informal visual inspections to observe conditions of the construction sites. The focus will be on the Small Port construction site where construction activities are concentrated.

The weekly inspections will be formal visual inspections in more details than the daily inspections.

The Contractor's EHS Manager will be responsible for the daily and weekly site inspections. The Owner's EHS Manager will participate in the weekly site inspections, and occasionally in the daily site inspections.

The monthly inspections will be conducted in more detail than the weekly inspections. The monthly inspections will also include risk triggers identified in the environmental risk management plan. The monthly inspections will be conducted jointly by personnel from both sides, including the Project Managers, the Construction Manager and the EHS Managers.

TABLE 6.4-1

OUTLINE OF SITE INSPECTION PLAN FOR CONSTRUCTION

	Inspection Focus	Daily Inspection	Weekly Inspection	Monthly Inspection
1.	**Onshore**			
1.1	Project Clearance	√	√	√
1.2	Land Leveling	√	√	√
1.3	Sanitation Condition of Worker Camp, Canteen, Office, Construction Site		√	√
1.4	Storage of Construction Material and Hazardous Material		√	√
1.5	Fugitive Dust	√	√	√
1.6	Ambient Noise Level	√	√	√
1.7	Safety in Work Place	√	√	√
1.8	Drainage	√	√	√
1.9	Traffic Accident	√	√	√
1.10	Wastewater Disposal	√	√	√
1.11	Risk Trigger			√
2.	**Offshore**			
2.1	Coastal Water Quality and Marine Ecology	√	√	√
2.2	Navigation Accident	√	√	√
2.3	Safety in Work Place	√	√	√
2.4	Risk Trigger			√

6.4.2 Environmental Incidents

6.4.2.1 Definition of an Environmental Incident

In addition to scheduled environmental monitoring, the monitoring will also cover environmental incidents. An environmental incident during Project construction is an occurrence which has (or potentially could have had) a negative or adverse effect on the environment. An adverse effect is something that causes (or could have caused) environmental harm. An environmental incident can also be a deviation from a requirement or practice prescribed in this CEMP and the Contractor CEMP. This means there has been a failure to follow the established process or procedures that help the Project achieve best practice (e.g. failure to report a spill). Some environmental incident could create an emergency, i.e. its impact is so serious that it has to be promptly dealt with. Potential environmental incidents and emergencies are identified in the environmental risk assessment for the construction phase in ***Chapter 5***.

6.4.2.2 Environmental Incident Form

An environmental incident, once noted, has to be recorded in an Environmental Incident Form (EIF). A standard Environmental Incident Form (EIF) template will be used for all site specific activities throughout the construction of the Project.

6.4.2.3 Environmental Incident Register

The Contractor's EHS Manager will input all data from completed EIFs as soon as possible to generate an Environmental Incident Register (EIR). A standard Environmental Incident Register (EIR) will be controlled by the Contractor's EHS Manager. It will contain all environmental incidents occurring on the construction sites of the Small Port and other components. The EIR will be discussed regularly at the project environmental performance review meetings. These meetings will discuss the corrective actions taken, and the preventative measures that have been put in place.

6.4.3 Monitoring Reports

Two types of monitoring reports will be generated in the environmental monitoring and site inspections. The first type is reports generated for internal use to provide feedback to the EMS. The second type is reports generated for submission to Ministry of Natural Resources and Environment Conservation (MONREC), which will be disclosed to public as prescribed in ***Chapter IX*** of the ESIA Procedure.

6.4.3.1 Internal Monitoring Reports

Site Inspection Reports

The Contractor's EHS Manager will record results of the daily inspections in daily site inspection notes. The Contractor's EHS Manager and Construction Manager will review the daily site inspection notes on a weekly basis to confirm that the checks and subsequent required works are being carried out, and additional inspections are included as per construction progress.

For weekly inspections, the Contractor's EHS Manager will present results of the inspections in weekly site inspection reports for discussion in the weekly project review meetings. Both the daily inspection notes and weekly inspection reports will highlight factors or events that could lead to non-compliance and will need attention of the Contractor's Project Manager.

The Contractor's EHS Manager will prepare monthly site inspection reports as part of the monthly environmental monitoring reports.

Environmental Monitoring Reports

The Contractor's EHS Manager will prepare monthly environmental performance reports for submission to the Owner's Project Manager. The monthly environmental monitoring report will concisely present (i) results of scheduled environmental monitoring and site inspections carried out during the month; (ii) identified non-compliance, if any, and causes of the non-compliance; (iii) complaints received; (iv) environmental incidents; (v) associated investigations and corrective actions taken; (vi) proposed changes to the monitoring plan, if any; and (vii) work program for the following month.

The monthly environmental performance reports will be discussed in the monthly project status review meetings or in separate monthly environmental performance meetings as appropriate.

6.4.3.2 Monitoring Reports for Submission to MONREC

Based on the monthly internal monitoring reports and results of the monthly review meetings, the Owner's EHS Manager will prepare a project environmental monitoring report every six months for submission to MONREC. This report as prescribed in the ESIA Procedure (***Article 108,109***, and ***110***) will contain the followings:

- Documentation of compliance with all Conditions;
- Progress made to date on implementation of the EMP against the submitted implementation schedule;
- Difficulties encountered in implementing the EMP and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar future difficulties;

- Number and type of non-compliance with the EMP and proposed remedial measures and timelines for completion of remediation;
- Accidents or incidents relating to the occupational and community health and safety, and the environment; and
- Monitoring data of environmental parameters and conditions as committed in the EMP or otherwise required.

The monitoring reports should also present the construction progress over the report period.

6.4.4 Corrective Actions

The Contractor will be instructed by the Owner's Project Manager to take corrective actions for any identified non-compliance with prescribed environmental indicators. Taking corrective actions in the context of CEMP will have to be a part of project management and will use the same procedure for taking corrective actions in project management. The procedure proposed in the CEMP will therefore have to be reviewed and revised as necessary to make it similar to the procedure for project management.A single procedure for taking corrective actions should be used in project management.

The Contractor is required to establish own procedure for corrective actions related to EHS non-compliances.

A. Categories of Non-Compliances

Non-compliances cover non-compliance with legal requirements, non-conformance with internal requirements of the Project, inadequate environmental performance, environmental incident, and complaints or grievances received from the public. Non-compliances could be identified from the following:

- External EHS audits;
- Internal EHS audits;
- Site inspection notes and reports;
- Schedule environmental monitoring;
- Complaints, grievance or inquiries registers;
- Environmental incident registers;
- Specific environmental studies and reports;
- Directives from MONREC/ECD or other government authorities;
- Review meetings;
- Recommendations from any project staff member, Contractor or visitors, which are considered by the EHS Manager and the Project Manager to warrant investigation.

B. Categories of Non-Compliances

EHS non-compliances can be identified, ranked and recorded at three levels. Once the level of non-compliance has been established the appropriate tool shall automatically be selected for closing out the non-compliance. The actions required for each are detailed below; also a temporary work suspension for cause may be enforced in case of Level A or B non- compliances.

Level A:A critical non-compliance situation, typically including material damage to or a reasonable expectation of impending material damage to an ecologically or socially sensitive resource or has the potential for an extreme health and safety incident. Intentional disregard of project standards which may lead to a serious EHS incident is also classified as Level A.

Level B: A non-compliance situation that has not yet resulted in clearly identified damage or irreversible impact to sensitive important resource, or has the potential for a serious health and safety incident. It requires expeditious corrective action and site specific attention to prevent such effects. Repeated Level B non-compliance may become Level A non-compliance if left unattended or are continuously recurring.

Level C: A non-compliance situation not consistent with the original requirements but not believed to present an immediate threat to an identified important resource, community or employee health and safety. Repeated Level C non-compliance may become Level B non-compliance if left unattended.

The non-compliance may also be of a procedural nature where the Contractor has failed to implement specified requirements and actions. In this case, the Contractor may need to take actions to ensure the procedural requirements are effectively implemented.

C. Responsibilities and Process

The Owner's EHS Manager will be responsible for identifying and ranking EHS non-compliances. However, all Project management personnel are encouraged to help identify EHS non-conformance.

The Owner's EHS Manager will take actions according to the category of non-compliances.

For Level A Non-Compliances: The Owner's EHS Manager will report the identified non-conformances to the Project Manager with recommendations on corrective actions and instructions for the Contractor.

For Level B Non-Compliances: The Owner's EHS Manager will issue instructions to the Contractor in consultation with the Project Manager and the Resident Engineer as necessary.

For Level C Non-Compliances: The Owner's EHS Manager will instruct the Contractor to take appropriate corrective actions.

The Project Manager will be responsible for:

- Issuing instructions to the Contractor to take corrective actions within a given timeframe;
- Follow up on corrective actions taken by the Contractor;
- Evaluate the results of taking corrective actions;
- Prepare a non-compliance report to close the case.

The Contractor will be required to conduct an investigation of the non-compliance to determine its root causes and formulate effective actions to correct the root causes.

For Level B and C non-compliances, the Contractor will submit a brief note on corrective actions to be taken to the EHS Manager and the Resident Engineer, if the corrective actions are related to change in construction practices.

For Level A non-compliances, the Contractor will submit a brief report on the results of investigation and proposed corrective actions to the Project Manager through the EHS Manager and the Resident Engineer, if the corrective actions are related to change in construction method.

D. Corrective Action Request

Instructions to the Contractor will be in the form of Corrective Action Request (CAR). The CAR will contain: (i) information sources of non-compliance; (ii) description of non-compliance; (iii) category of non-compliance; (iv) originator; and (v) time frame for corrective actions.

The corrective action requirements will be included in the requirement tracking system of the project management information system.

E. Non-Compliance Report

The EHS Manager will prepare a brief non-compliance report based on the CAR and reports from the Contractor. The non-compliance report will contain: (i) information in the CAR; (ii) corrective actions taken by the Contractor; (iii) implementation period; (iv) results; and (v) recommendation for further actions, if any. The non-compliance report should be in one or two pages in a Form to be designed.

Each and every non-compliance report will be closed out on a progressive basis, until construction is completed.

Non Compliance Report Forms will be verified and closed out by the originator or his designee. Correspondence referring to a proposed course of action shall be referenced and attached to the Non Compliance Report Form as appropriate and stored within the Project Documentation System.

6.5 EMERGENCY RESPONSE PLAN

The Contractor will be required to prepare an emergency response plan to efficiently and effectively cope with accidents and emergencies which may occur during the construction period. Considering the nature and magnitude of the construction and the construction site, the emergency response plan would deal with work accidents and accidental fires. Natural emergency events such as earthquakes and floods would be very unlikely. Consequently, the emergency response plan during the construction would focus on procedures and facilities to deal with work accidents and accidental fires to minimize injuries and loss of lives, damage to properties, and construction delay.The emergency response plan will be a part of the OSH system. Facilities to be provided on site will contain at minimum the following: fully equipped first aid station, fire-fighting equipment, arranged access to emergency services of the local hospital, and direct communication link with local fire brigades and other relevant government authorities and the local police station.

6.6 ARRANGEMENTS FOR OPERATING THE EMS

6.6.1 Responsibilities

There are three key groups with responsibility for environmental management of the Project:

- Project Proponent or Project Owner who manages the Project through a Project Manager;
- Contractor as the party undertaking the construction; and
- MONREC through Environmental Conservation Department (ECD), Port Authorities, and other government agencies at the regional, township and community levels.

Responsibilities of each party in environmental management are as follows:

Project Proponent

The Project Proponent is legally responsible to MONREC and other line organizations responsible for specific environmental issues for environmental performance of the Project as prescribed as conditions in the ECC and other permits.

Specifically, the Project Proponent will have the following responsibilities:

- Supervise closely the Contractor in implementing the Contractor CEMP as an integral part of its project implementation management and construction supervision.
- Submit periodic monitoring reports to MONREC as required in the ESIA Procedure and Port Authorities.
- Notwithstanding the periodic monitoring reports to be submitted to MONREC and Port Authorities, keep MONREC, Port Authorities, and other concerned authorities informed of any serious environmental events and responses to the events.

- Conducting periodic audit of environmental and social performances of the Contractor.

Contractor

The Contractor, including its approved sub-contractors, is contractually responsible to the Project Proponent for environmental performance of the construction as prescribed in the construction Contract.

Specifically, the Contractor will have the following responsibilities:

- Prepare a detailed Contractor CEMP for review and approval by the Project Proponent. The Contractor CEMP should follow the outline prescribed by the Project Proponent as proposed in ***Appendix 6A***.
- Implement the mitigation measures during the construction through construction method statements and work instructions in strict conformance with environmental conducts prescribed in the Contract.
- Ensure that all process and environmental control equipment meet all technical specifications related to their environmental performance.
- Conduct periodic monitoring and reporting of its compliance with the environmental and social performance prescribed in the Contract.
- Ensure that its sub-contractors shall comply with the Contractor CEMP.
- Consistently update the Contractor CEMP and submit the updated version to the Project Proponent for approval.

MONREC and Port Authorities

MONREC is the key agency to monitor and evaluate environmental performance of the Project construction.Other agencies concerned will support MONREC in the monitoring and evaluation of environmental performance of the Project construction.

Other agencies concerned such as Port Authorities will cooperate with MONREC in the monitoring and evaluation of project implementation and environmental performance of the project during pre-construction and construction phases

Organizational Structure

As environmental management will be carried out as part of the Project management, it will be a functional unit in the project management organization. ***Figure 6.6-1*** shows a tentative organizational structure for Project construction consisting of an organizational structure of the Project Proponent and an organizational structure of the Contractor. The two organizational structures will need to be revised as appropriate as the Project moves from the planning stage to the design stage.

(1) Organizational Structure of the Project Proponent

The Project Proponent will establish a Project Management Office (PMO), headed by a Project Manager. The Project Manager will be responsible for the overall Project management to ensure that the Project construction will be completed on time and

fully meet the requirements on scope, quality, budget and environmental performance of the Project construction. The PMO will have seven functional units: (i) Contract management and administration; (ii) construction quality control (civil works); (iii) quality control (mechanical and electrical works); (iv) system performance control; (v) environmental, health and safety management; (vi) stakeholder management; and (vii) administrative support.

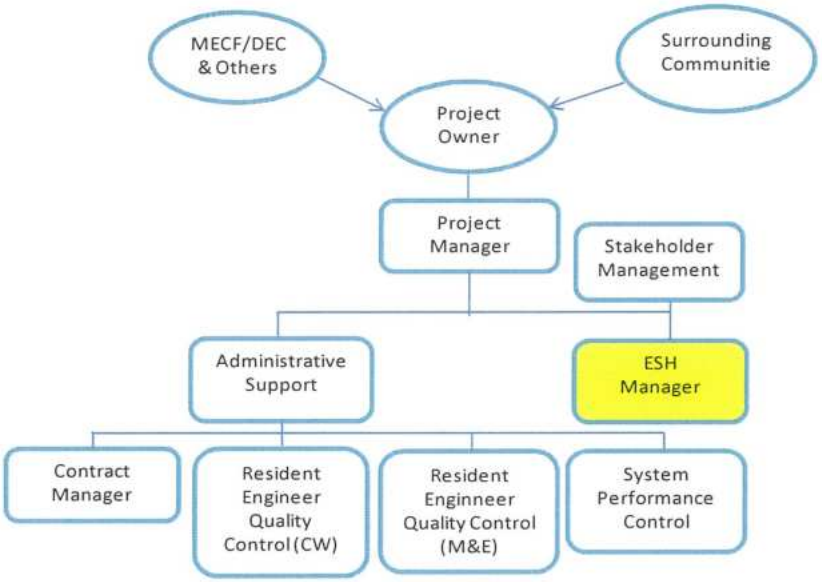
The EHS management and the stakeholder management functions are directly related to the implementation of the Project CEMP. The two functions cover the following tasks or activities:

EHS Management Function:

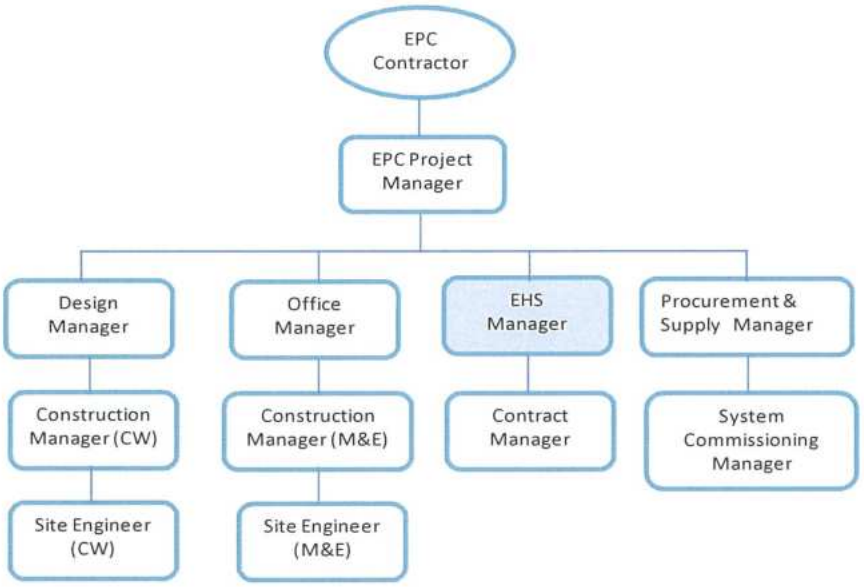
- Review the Contractor CEMP and environmentally-related construction method statements and work instructions prepared by the Contractor;
- Ensure that environmental monitoring activities of the Contractor are properly carried out and will generate reliable data;
- Inspect sites where environmental mitigation measures are implemented;
- Review periodic EHS reports submitted by the Contractor;
- Evaluate the Contractor's environmental performance;
- Prepare Project EHS performance reports;
- In consultation with the relevant quality control functional unit, prepare recommendations to the Project Manager on corrective actions related to environmental performance;
- Coordinating with MONREC/ECD, Port Authorities, and other government agencies concerned regarding monitoring environmental compliance of the Project; and
- Make arrangements to facilitate site inspection by MONREC/ECD, Port Authorities, and other agencies concerned.

Stakeholder Management Function:

- Design and implement an appropriate Corporate social responsibility (CSR) program for the Project;
- Process public complaints in accordance with the public grievance redress process;
- Carry out community and public relation activities to ensure acceptance of the Project by all key stakeholders of the Project; and
- Coordinate with the EHS Manager in making arrangements for site visit or inspection by the Project stakeholders.



PROJECT MANAGEMENT STRUCTURE



EPC CONTRACTOR'S PROJECT MANAGEMENT STRUCTURE

FIGURE 6.6-1 : ORGANIZATION FOR PROJECT CONSTRUCTION

(2) Organizational Structure of the Contractor

The Contractor will establish a Contractor Project Management Office (CPMO), headed by a Contractor Project Manager. The Contractor Project Manager will be responsible for the overall management of Project construction, testing and commissioning of the Small Port and associated facilities to ensure that the Project construction will be completed on time and fully meet the requirements on scope, quality, budget and environmental performance. The Contractor may have a certain organizational structure but the EHS function is required.

The construction management and the EHS management functions are directly related to the implementation of the Contract-specific or Contractor CEMP. The two functions cover the following tasks or activities:

(a) Construction Management Function

- Translate environmental mitigation measures into construction method statements and work instructions for engineers and foremen to carry out;
- Closely supervise construction activities with environmental impacts and implementation of mitigation measures to ensure residual environmental impacts will be within permissible limits;
- Ensure full compliance with all environmental management covenants in the Contract; and
- Coordinate and facilitate environmental monitoring activities of the EHS personnel.

(b) EHS Management Function:

- Review the Project CEMP and prepare a Contract specific CEMP;
- Update the Contractor-specific CEMP as needed to reflect the latest changes in construction plan or schedules;
- Prepare environmentally-related construction method statements and work instructions in consultation with the construction management functional unit;
- Carry out environmental monitoring of construction activities as prescribed in the monitoring schedules in the Contract-specific CEMP;
- Closely supervise the implementation of environmental mitigation measures in collaboration with the construction management functional unit;
- Prepare periodic EHS performance reports for submitting to the Project Proponent;
- Coordinate with the EHS management functional unit of the Project Proponent to facilitate site inspection or visits of officials from MOCEAF/ECD, other government agencies, and representatives of communities in the vicinities;
- Cooperate with the Project Proponent in investigations related to public complaints;

- In consultation with the construction management functional unit, prepare recommendations to the Contractor Project Manager on corrective actions related to environmental performance; and
- Carry out environmental monitoring during the commissioning of Small Port system and prepare an environmental performance report of the Small Port.

It should be noted that environmental management during the system commissioning will be included in the OEMP. The Small Port operation and maintenance team will participate in the commissioning and will take over the Small Port and associated facilities once the technical and environmental performance of the Small Port is accepted.

The Project Management team will support the Small Port O&M team during the transition phase between construction and operational phases. In particular, the Project Management team is responsible for the sign off construction and post construction resource consent and designation conditions, handover of environmental monitoring data and reports and compliance and audit reports before the Project is handed to the O&M team.

6.6.2 Documentation

All documents generated in environmental management and references used will be systematically filed and maintained as part of the Project documentation system. The Contractor is required to design and establish an appropriate documentation system for environmental management as an element of its project documentation system which is an integral element of its project management information system. The documentation system will include an appropriate document control procedure.

The Contractor will ensure that the Project Proponent will have a convenient access to its documentation system for environmental management. The documentation system will provide information for environmental audit of the Contractor. Details on the access to the documentation system and documentation control related to the Project Proponent will be worked out by the Contractor and presented in its CEMP.

6.6.3 Communication Plan

Environmental management of the Project construction will involve communication, both internally and externally. Clear, concise and timely communications are important to the achievement of the objectives of environmental management.

Internal communication will involve: (i) communications within PMO; and (ii) communications within CPMO; and (iii) communications between PMO and CPMO. External communication will involve communications between PMO and stakeholders and the public. Communications between CPMO and stakeholders will need to receive prior concurrence of PMO.

Communications relevant to environmental management of the Project construction will clearly be a part of the project communication.

(1) Objectives of Communication

Internal Communication

The objective of internal communication within PMO and CPMO is to ensure efficiency of environmental management of the Project construction.

The objective of internal communication between PMO and CPMO is to ensure efficiency in monitoring and control environmental management performance of the Contractor, which leads to efficient environmental management of the Project construction.

External Communication

The objective of external communication between PMO and MONREC Port Authorities, and other concerned government authorities is to comply with the reporting requirements prescribed in the ESIA Procedure.

The objectives of external communication between PMO and communities around the Project site as well as mass media and Non-Governmental Organizations (NGOs), if any, are to: (i) ensure adequate and correct understanding of environmental impacts of the Project; and (ii) keep the stakeholders closely informed of the Project's efforts in environmental management and environmental performance of the Project construction. The bottom line is to create trust among the stakeholders in the Project's determination and commitment to environmental management to enable the Project to exist in harmony with the environment and communities.

(2) Topics of Communication

Major topics of communication include:

- Scope of construction;
- Construction schedule;
- Environmental impacts and mitigation measures;
- Environmental policy, objectives, and targets;
- Environmental management roles and responsibilities;
- Legal requirements and environmental quality standards;
- OCEMP;
- CCEMP;
- Results of environmental monitoring and performance evaluation;
- Hazards and emergency situation; and
- Mechanisms for grievance redress, queries, comments, or complaints from stakeholders

As communication involves providing information, information requirements related to the above communication topics for various communicating parties will need to be identified. Internal and external communications will have different information requirements as they have different objectives. ***Table 6.6-1*** presents a tentative information requirements for the internal and external communications.

TABLE 6.6-1

INFORMATION REQUIREMENTS FOR INTERNAL AND EXTERNAL COMMUNICATIONS IN ENVIRONMENTAL MANAGEMENT DURING CONSTRUCTION

Information	Communications	
	Internal	External
Basic Information		
Corporate's environmental policy on project construction	√	√
ESIA Report	√	√
Owner-CEMP	√	√
MONREC's EHS requirements or conditions attached to the issuance of ECC	√	√
Contractor-CEMP	√	√
EHS's specification and clauses in the EPC contract	√	
Construction schedule	√	√
Project EMS	√	
Project management organization-Owner	√	√
Construction management organization-Contractor	√	√
Information Generated in EHS Management		
Daily, weekly and monthly site inspection reports	√	
Environmental monitoring results	√	
Minutes of project review meetings-EHS	√	
Monthly monitoring reports	√	
Minutes of Tripartite Committee's meetings	√	√
Complaints register and response	√	√
Reports on visits by media and stakeholders for environmental purposes	√	
Environmental incident reports	√	√
Corrective action reports	√	√
Biannual monitoring reports submitted to MONREC and Port Authorities	√	

(3) Methods of Communication

The internal communication will use informal communication, formal communication through meetings, and formal correspondence in writing through e-mail or letters, notice boards, and formal notifications or instructions. The methods of communication will follow the methods of project communication.

The external communication will use a variety of methods depending on the purpose of communication and the stakeholders. The methods of communication will follow the methods of project communication.

(4) Responsibilities

Project Proponent

The EMS Manager of the Project Proponent is responsible for:

- Communicating the Project's environmental policy, commitments and procedures to all project management staff;
- Communicating roles and responsibilities for environmental management and the results of monitoring activities carried out by the Contractor;
- External communications with stakeholders under the supervision of the Project Manager;
- Preparing a list of information to be provided in external communication and persons with authority to release the information;
- Recording the external communication on an External Communication Log and tracking any pending matters; and
- Supporting the Project's public relation activities through providing environmentally related information.

The Contractor

The EMS Manager of the Contractor has the following responsibilities:

- Communicating the Project's environmental policy, commitments and procedures to all project management and construction personnel;
- Communicating roles and responsibilities for environmental management and the results of monitoring activities to all personnel;
- Providing information support to the Project Proponent's EMS Manager for use in external communication with stakeholders as well as in internal communication.

(5) Management Review

This CEMP will be consistently reviewed and updated by the EMS Manager or the Project Manager to ensure that it adequately responds to the construction progress and changes in the construction schedule and methods, if any.

6.7 PUBLIC CONSULTATION AND DISCLOSURE

6.7.1 Organization for Public Consultation

The CEMP proposes a tripartite committee as the main mechanism for public consultation and disclosure. The components and responsibilities of the tripartite committee are defined. A grievance redress process is proposed as mechanism for ensuring that public complaints and concerns related to the construction will be effectively addressed as soon as possible.

The tripartite committee established during the construction phase should be maintained. However, its role would be more on providing advice in the implementation of the community support plan. The components and responsibilities of the tripartite committee are defined. A grievance redress process is proposed as mechanism for ensuring that public complaints and concerns related to the small port operation will be effectively addressed as quick as possible.

6.7.2 Information Disclosure

Information to be disclosed during the Project construction phase will be monitoring reports as required in Article 110 of the ESIA Procedure shown below.

Within ten (10) days of completing a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, the Project Proponent shall make such report (except as may relate to National Security concerns) publicly available on the Project's website, at public meeting places (e.g. libraries, community halls) and at the Project offices. Any organization or person may request a digital copy of a monitoring report and the Project shall, within ten (10) days of receiving such request, submit a digital copy via email or as may otherwise be agreed upon with the requestor.

The Owner PMO will make arrangements for the disclosure of monitoring reports in compliance with the above legal requirements. In addition, information on environmental management will be disclosed to the proposed tripartite committee.

6.7.3 Grievance Redress

A grievance redress process will be established and implemented as part of project management by the PMO. The process is shown in a diagram in ***Figure 6.7-1.*** Each step of the process is clearly explained in the diagram. The process will enable efficient management of grievance redress or response to complaints related to EHS of the Project construction.

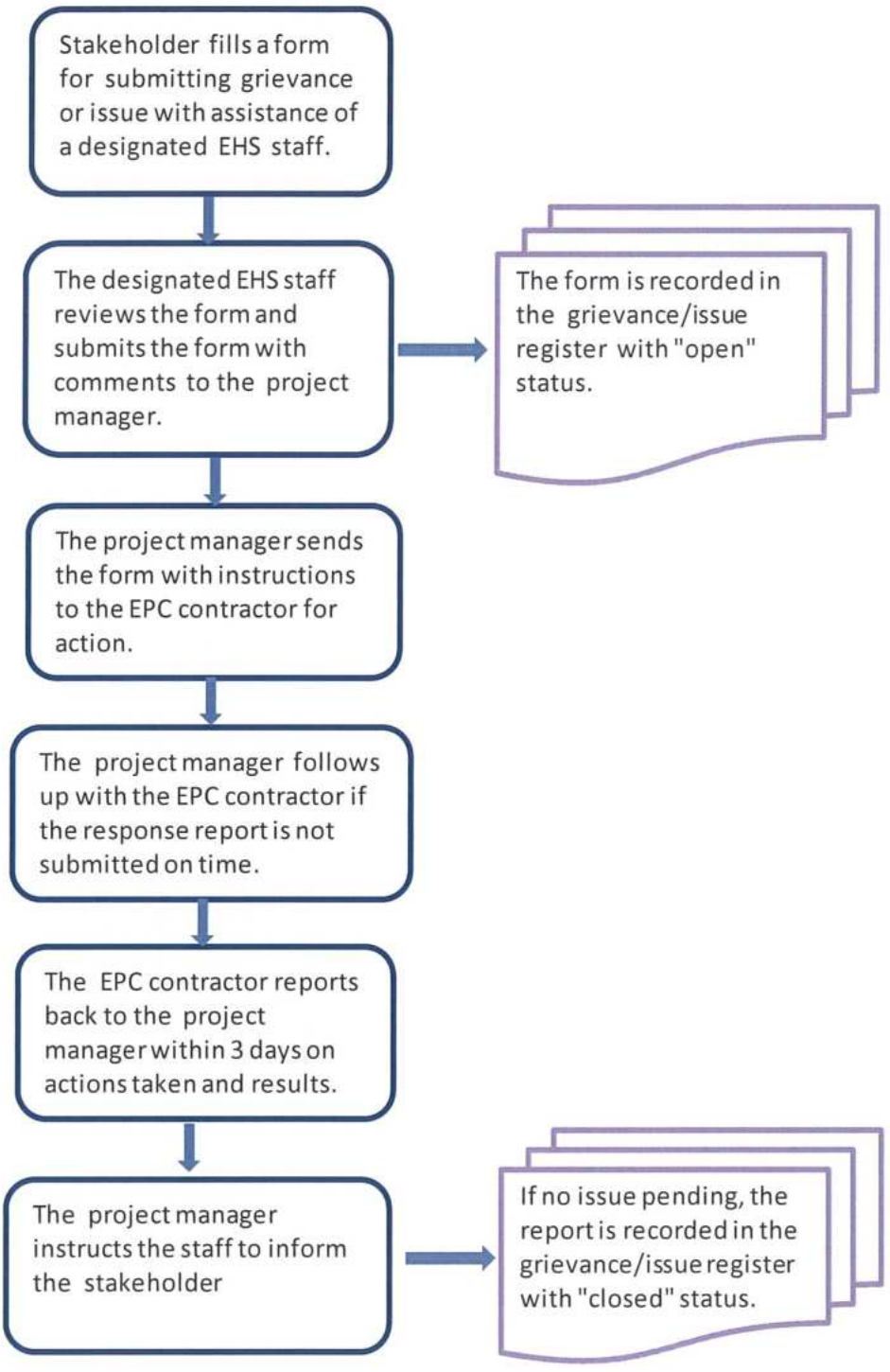


FIGURE 6.7-1 : GRIEVANCE MANAGEMENT PROCESS

6.8 ENVIRONMENTAL RISK MANAGEMENT

Environmental risk management is to be carried out as part of the Project risk management. ***Section 6.6*** on environmental risk assessment identifies and assesses environmental risks during the construction phase. Each major environmental risk will be documented in an Environmental Risk Register (ERR). The ERR is to be maintained and regularly updated and reassessed to allow all significant aspects to be identified. The Risk Register will allow the Project team to monitor risk factors, update the risk assessment, and make changes to the risk mitigation measures and controls accordingly to ensure efficient risk management. It should be noted that an emergency plan is essentially a risk mitigation measure.

6.9 AUDIT

An audit is proposed at the end of the first year of operation and thereafter, if necessary.

CHAPTER 7

OPERATIONAL PHASE EMP

CHAPTER 7

OPERATIONAL PHASE EMP

7.1 OBJECTIVES OF THE OEMP

Environmental management in the operational phase will be carried out by an Operation and Maintenance (O&M) organization to be established by the Project Developer. The objective of environmental management of Project operation is to ensure that O&M of the Small Port and its associated facilities will not create significant impacts and will meet all applicable standards and guidelines and requirements prescribed as conditions for issuing an Environmental Compliance Certificate (ECC) and the operation permit.

The key objective of the Operation EMP (OEMP) presented in this section is to establish a clear operational framework for environmental management during the operational phase of the Project. The Engineering Procurement Construction (EPC) Contractor will then use this OEMP to prepare a more detailed OEMP which will be based on the detailed designs of the Small Port, results of the commissioning, and O&M details. The detailed OEMP will be reviewed and revised as appropriate by the Small Port O&M team to reflect actual conditions during commercial operation.

7.2 MITIGATION MEASURES AND PLANS

The ESIA study (***Volume 1 - ESIA Report*** in ***Chapter 6***) confirms that O&M of the Small Port and its associated facilities will not create any significant environmental impacts. Environmental management is presented in ***Appendix7A***.

The sub-plans will be working documents and as such they will be reviewed and amended or updated as deemed necessary.

7.3 ENVIRONMENTAL RISK MANAGEMENT

Environmental risk management is to be carried out as part of the Small Port risk management. ***Section 6.7*** on environmental risk assessment identifies and assesses environmental risks during the operational phase. Each major environmental risk will be documented in an Environmental Risk Register (ERR). The ERR is to be maintained and regularly updated and reassessed to allow all significant aspects to be identified. The Risk Register will allow the Environmental, Health and Safety (EHS) Manager to monitor risk factors, update the risk assessment, and make changes to the risk mitigation measures and controls accordingly to ensure efficient environmental risk management. It should be noted that an emergency plan is essentially a risk mitigation measure.

7.4 ENVIRONMENTAL INCIDENTS

1. Definition of an Environmental Incident

In addition to scheduled environmental monitoring, the monitoring will also cover environmental incidents. An environmental incident during Project operation is an occurrence which has (or potentially could have had) a negative or adverse effect on the environment. An adverse effect is something that causes (or could have caused) environmental harm. An environmental incident can also be a deviation from a requirement or practice prescribed in this OEMP. This means there has been a failure to follow the established process or procedures that help the Project achieve best practice (e.g. failure to report a spill). Some environmental incident could create an emergency, i.e. its impact is so serious that it has to be promptly dealt with. Potential environmental incidents and emergencies are identified in the environmental risk assessment for the construction phase in ***Chapter 5***.

2. Environmental Incident Form

An environmental incident, once noted, has to be recorded in an Environmental Incident Form (EIF). A standard Environmental Incident Form (EIF) template will be used for all site specific activities throughout the construction of the Project.

3. Environmental Incident Register

The Project Manager will input all data from completed EIFs as soon as possible to generate an Environmental Incident Register (EIR). A standard Environmental Incident Register (EIR) will be controlled by the EHS Manager. It will contain all environmental incidents occurring on the sites of the small port and project costal road during operation phase. The EIR will be discussed regularly at the project environmental performance review meetings. These meetings will discuss the corrective actions taken, and the preventative measures that have been put in place.

7.5 MONITORING, EVALUATING AND REPORTING

The MER will include scheduled monitoring of noise, air quality, coastal water and marine ecology, continue monitor on mangrove management, shoreline erosion, navigation.

Air Quality monitoring will conduct least twice a year during 1^{st}-5^{th} year of operation phase and 1 time per year throughout operation phase at project site and Villages (closest sensitive receptor).

Coastal water and marine ecology will be conducted twice a year throughout operation phase during dredging activities and after complete maintenance

Continue monitor on mangrove management will be conducted twice a year during 1^{st}-10^{th} year of operation phases to check types and quantity of flora and fauna in mangrove rehabilitation area.

Shoreline erosion monitoring will be conducted twice a year monitor on beach profile and bathymetric survey and everyday checking shoreline erosion at 1 km north and south of beach along the port development

Navigation monitor will be conducted every day in term of accident situation at Access Channel of Small Port.

Project developer should be continue attitude survey at Villages about new fishing ground and boat yard area to ensure the villagers can use natural resource in the new alternative area. The monitoring will be conducted 2 time per year during 1^{st}-5^{th} year and once a year during 6^{th}-10^{th} year of operation phases

The sampling and analysis requirements will be similar to those of the surveys conducted before the commissioning. Annual environmental reports will be prepared for submission to MONREC and other concerned authorities such as Port Authorities Department.

7.6 CORRECTIVE ACTIONS

Corrective actions are described as part of the management of the implementation of the community support. The process is discussed in the sub-plans.

7.7 ORGANIZATION

As environmental management will be carried out as part of the Small Port management, it is a functional unit in the Small Port management organization.***Figure 7.7-1*** shows a tentative organizational structure for Small Port management, including the EHS unit. The organizational structure will be revised as appropriate in due course by the Project developer before the commissioning.

7.8 PUBLIC CONSULTATION AND DISCLOSURE

The tripartite committee established during the construction phase should be maintained. However, its role would be more on providing advice in the implementation of the community support plan. The components and responsibilities of the tripartite committee are defined. A grievance redress process is proposed as mechanism for ensuring that public complaints and concerns related to the Small Port operation will be effectively addressed as quick as possible.

7.9 AUDIT

An audit is proposed at the end of the first year of operation and every year thereafter, if necessary.

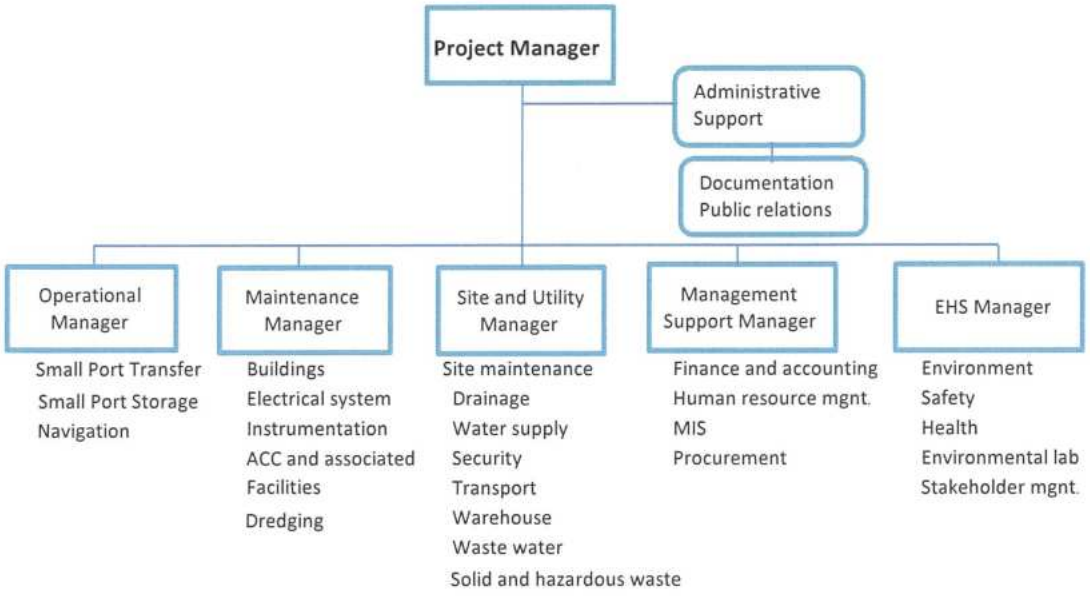


FIGURE 7.7-1 : TENTATIVE ORGANIZATION FOR SMALL PORT O&M AND ENVIRONMENTAL MANAGEMENT

7.10 GRIEVANCE REDRESS PROCESS

A grievance redress process is proposed as mechanism for ensuring that public complaints and concerns related to the LNG Terminal operation will be effectively addressed as quick as possible. The process is shown in a diagram in ***Figure 7.10-1***.

7.11 EMP DURING DECOMMISSION PHASE

The EMP during decommission phase depended on decision of the Concerned Authorities confirm to remove of all components at the end of concession.

Assuming that the Project will be decommissioned after the end of concession, the decommissioning will be carried out in the next 50 years. Apparently, it would not be practical to prepare a decommissioning plan at this ESIA stage considering changes in technologies and environmental legislation that would have taken place in the next 50 years. At this ESIA stage, only a generic decommissioning plan could only be made.

The recommended management plan during decommission phase include:

- Air Quality Management Plan;
- Noise Management Plan;
- Coastal Water and Marine Ecology Management plan (in case of demolition of offshore structure);
- Waste Management Plan and;
- Land Reclamation Management Plan.

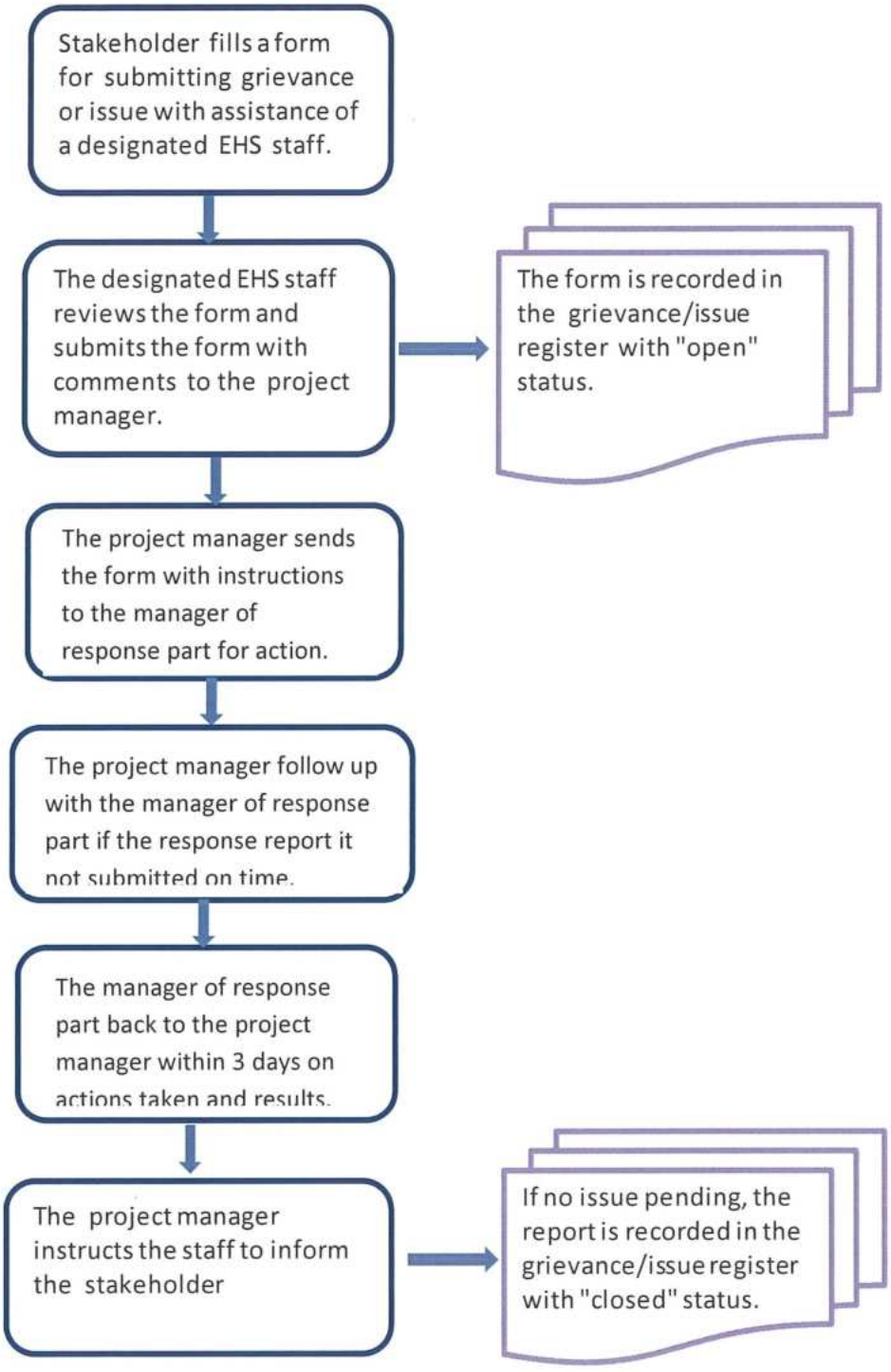


FIGURE 7.10-1: GRIEVANCE MANAGEMENT PROCESS DURING OPERATION PHASES

CHAPTER 8

EMERGENCY PLAN

CHAPTER 8

EMERGENCY PLAN

According to impact and risk assessment in ***Chapter 6*** of ESIA Report, the emergency plan for flood, cyclone, tsunami and contingency plan must be prepared to protect and minimize impact in case of ship collision and any kind of risk will appear. The detail of each plan are described as follow:

8.1 EMERGENCY PLAN FOR TSUNAMI AND CYCLONE

Even through the tsunami and cyclone situation have not ever found in the project area, Seismic Hazard Map from Meteorological and Hydrological Department, Myanmar, indicate that the Small Port area is classified as a moderate seismic zone, so impacts from this issue may be low or moderate (Probable range of ground acceleration = 0.1-0.15 g).

With the location near Indian Ocean, the tsunami may occur again similar to the situation in 2004 caused by earthquake in Indian Ocean.

The recommendation about emergency and contingency plan for the Small Port in case of cyclone and tsunami protection include:

- Prepare the detail design of Small Port to withstand the cyclone and tsunami.
- Establish and regularly monitor the warning system for tsunami.
- Set the safety zone for evacuation of staff and people in case of tsunami and cyclone.
- Set up the evacuation plan for tsunami and cyclone and train all staff in Small Port.

Refer to the Tsunami Emergency Planning in Australia, 2010, Tsunami emergency plans should cover strategies to be used in preparedness, response and the initiation of recovery for tsunami.

Table 8.1-1 described the concept details of content considerations which may be included in tsunami and cyclone emergency plans. This concept will be required for Project Proponent and Contractor to prepare an emergency response plan to efficiently and effectively cope with accidents and emergencies which may occur in case of Tsunami Situation.

For flood situation, flash flood or normal flood will be minimized through detailed design on drainage system of project site, to handle with all kinds of flood.

TABLE 8.1-1

CONCEPT DETAILS FOR TSUNAMI AND CYCLONE EMERGENCY PLANS

Phase	Content
Preparedness	• Review of Plans • Establishment and review of tsunami risk assessment / intelligence • Conduct of community education • Establishment and/or maintenance of warning systems
Response	• Control and coordination arrangements • Outline of operational divisions / sectors • Location of operations centres • Warning at-risk communities • Evacuation of at-risk affected communities; including the identification of suitables evacuation routes and shelters • Provision of welfare relief • Pre-deployment of resources to staging areas outside the impact area • Protection of emergency land and marine resources by removing them from likely impact areas • Restriction of access and security of evacuated areas • Reconnaissance / monitoring of potentially affected areas and the undertaking of rapid impact assessments • Rescue of trapped and injured people • Care for sick and injured persons • Disaster victim registration • Disaster victim identification • Establishment of a public enquiry system • Issue of 'all clear'
Recovery	• Initiation of recovery • Recovery coordination • Conduct of after action reviews / debriefs
General	• Description of the risk within the scope of the Plan

Source: Tsunami Emergency Planning in Australia, 2010.

8.2 EMERGENCY CONTINGENCY PLAN FOR SHIP COLLISION

In the event of a collision many of the actions to take will depend upon the seriousness of the damage inflicted to either or both of the vessels involved. For example the collision may only involve a glancing blow where the structural damage is superficial, or it might be more serious and followed by a fire, explosion, and serious pollution, stranding or foundering, with the possibility of crew overboard, seriously injured or even killed.

The recommendation about emergency and contingency plan for the Small Port in case of ship collision include:

- Submit a detailed plan of navigation route to Small Port carrier.
- Organize and conduct training of the offshore operational team to be nominated by the Project Proponent in the operation and maintenance and risk management of the Small Port. The training will use the work procedures prepared by the EPC contractor. After the training, the EPC contractor will conduct a rigorous test of the trainees to evaluate their technical competencies required for efficient and safe operation and maintenance of the project.

In addition to the insurance, the Project Proponent should require the EPC contractor to prepare an emergency response plan to enable the Small Port operational team to promptly cope with the consequences if the operational risk events occur. The content of such plan should include, but be limited to the following:

- Background and Purpose of the Emergency Response Plan
- Types, Nature and Locations of Emergencies (on-site and off-site)
- Emergency Response Organization
- Emergency Response Process and Work Procedures
- Notification Procedures and Communication Systems
- Damage Assessment Process
- Process and Procedures for Returning to Normal Operations
- Emergency Equipment and Facilities Available
- Training, Simulation and Mock-Drills
- Regular Tests of Emergency Organization and Procedures
- Review of Plans and Updates

Examples of concept of Emergency Contingency Plan for Ship Collision can be retrieved from http://www.liquefiedgascarrier.com/collision-accident.html.

8.3 IMPLEMENTATION ARRANGEMENTS

(1) Responsible Persons and Organization

Environmental management on emergency plan needs to be an integral element of environmental management and risk management of the operational phase. Therefore, the organization for environmental management proposed in the CEMP will also be responsible for environmental risk management.

However, the proposed measures for managing the operational risks will need to be implemented by project management team during the design and construction phase and by the small port management team starting from the testing and commissioning through the operational phase.

The Small Port management organization should have an emergency plan committee to be chaired by the manager and participated by the operational manager and the EHS manager. Other members of the safety management committee would be head of various units of sections of the Small Port. These unit heads will be responsible for the operation and maintenance of the units in strict adherence to the applicable work procedures. The risk committee will be involved in operational and environmental risks, including safety aspect. The risk committee will consistently review and evaluate the operational risks of the small port, and recommend necessary improvements of the work procedures to ensure the risks are minimized or avoided. ***Figure 8.3-1*** shows the tentative organization chart of emergency responsible team for Small Port Project.

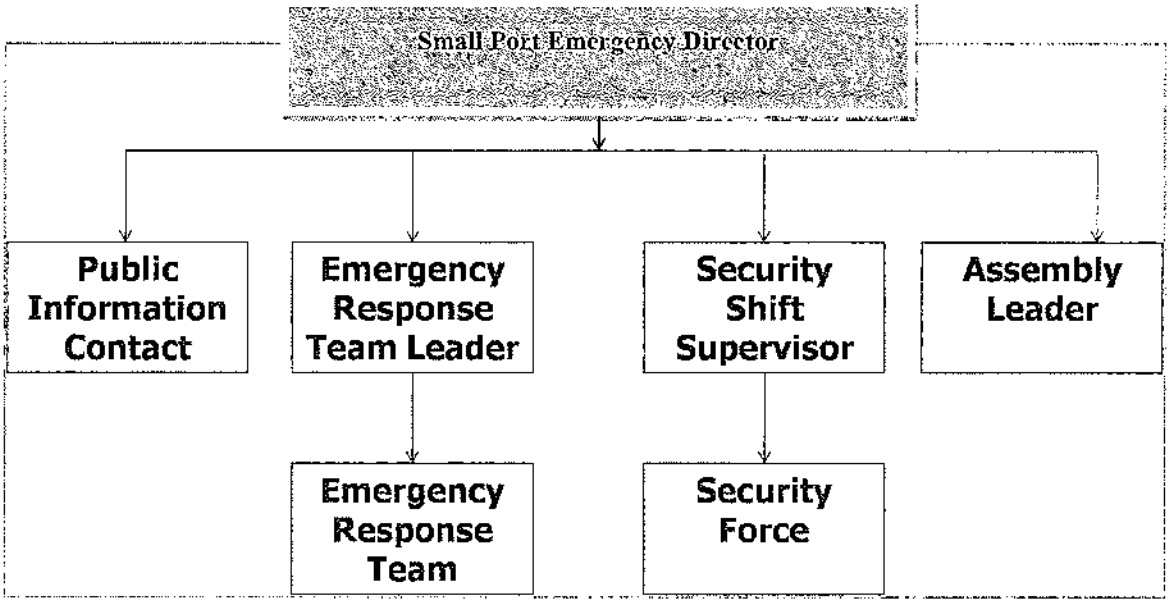


FIGURE 8.3-1 : THE TENTATIVE ORGANIZATION CHART OF EMERGENCY RESPONSIBLE TEAM FOR SMALL PORT PROJECT

(2) Risk Monitoring and Evaluation

For the operational risks, the following risk triggers should be considered for routine monitoring and evaluation:

- Number of reported incidents of ship collision, and its trend;
- Response time to address the reported ship collision and its trend; and
- Number of reported incidents of non-conformance with the work procedures and its trend.

CHAPTER 9

IMPLEMENTATION BUDGET AND SCHEDULE

CHAPTER 9

IMPLEMENTATION BUDGET AND SCHEDULE

9.1 BUDGET

9.1.1 Mitigation Measures

Construction Phase

All mitigation measures to be implemented in the construction will be included in the contract cost. As most mitigation measures are operational control measures, it is not possible to estimate their costs.

Operational Phase

All mitigation measures to be implemented in the operation will be included in the contract cost. As most mitigation measures are operational control measures, it is not possible to estimate their costs.

9.1.2 Monitoring

During the construction phase, a budget of about 512,050 US$ (include 10% contingency) will be allocated for monitoring and evaluation of the Project's environmental and social performance over the construction period of 15 months.

During operation phase, budget for monitoring and evaluation will be allocated for 2 period separation. The first period will be for the five first year after commissioning and another one for the 6th year throughout the project life (total operation period approx. 75 years). Therefore an annual budget of 394,350 US$ equivalent (include 10% contingency) will be allocated for the five first year, and an annual budget of 3,398,450 US$ (include 10% contingency) will be allocated from the 6th year throughout the project life. Therefore, total cost during operation phase approx. 3,792,800 US$ (include 10% contingency). The cost detail and schedule are described in ***Appendix 9A***. In addition, the monitoring cost will be adjusted depended on situation and suitability of the project.

9.2 SCHEDULE

The schedule for implementing the Construction EMP (CEMP) and Operation EMP (OEMP) will be linked to the project schedule. After the Contractor completes the detailed designs and detailed construction plan and schedule, the Contractor should prepare a detailed CEMP within one month.

The Contractor should prepare a detailed OEMP within two weeks after commissioning of the Small Port and its associated facilities.

APPENDIX 6A

SUB-PLANS FOR CEMP

APPENDIX 6A

SUB-PLANS FOR CEMP

APPENDIX 6A-1

GENERAL-CONSTRUCTION

Element	Content
Objective	• Manage construction in accordance with the Construction Environmental Management Plan (CEMP) and CEMP sub-plans to avoid or minimize adverse impacts on the environment and the community.
Performance Criteria	• Worksites prepared in accordance with designs providing for the management and mitigation of construction impacts. • Construction works (civil engineering and mechanical works) are managed to avoid, or mitigate and manage impacts on the amenity and environmental conditions prevailing in the vicinity of the worksites. • Non-compliance with guidelines and standards established in this CEMP are avoided or minimized. • Maintain safe and efficient access near worksites for emergency vehicles. • Take reasonable measures to minimize potential construction risks to construction workers, to the general public in adjacent areas and to the environment.
Mitigation Measures	**Hours of work:** • Works (civil engineering and mechanical works) which may generate excessive levels of noise, vibration, dust or traffic movements should only be undertaken between 6.30 am and 6.30 pm Monday to Saturday and at no time on Sundays or Public Holidays except for special circumstances where the works should be conducted outside these days and hours. • In case of urgent situation, exceeding the hours of work, information dissemination should be conducted prior to commence construction activities. • Special circumstances include works on transport of heavy and large process equipment to the construction sites, transport of materials for site filling, and transport of large construction equipment to the construction sites (on land and by shipment logistics). • Collection, loading and haulage of spoil from construction worksites by truck/ship would be undertaken between 6.30 am Mondays and 6.30 pm Saturdays. If this is taken place out of the hours of work and it is really or emergent to be done at that time, a request/information should be done prior to the action of collection, loading and haulage. • Notify local communities of duration and timing of works to be conducted outside of usual working hours. **Construction worksites:** • To be designed and constructed for the minimization, management and mitigation of construction impacts; • The main construction site will include foundation work, dredging work, placement of sand/rock material in the dredged area for small port

Element	Content
	construction, other infrastructures and routinely utilities/facilities, such as canteen with adequate space and facilities for eating and washing, decent worker accommodation, adequate number of hygienic toilets and baths, adequate clean piped water supply, drainage, wastewater disposal facilities, solid waste disposal facilities, material storage, equipment sheds, vehicle washing areas and project management offices. • Small port structure: construct the main structural components including wharf, berth, quay, pier, jetty, dock, mole, breakwater and dock basin. • Civil engineering and mechanical materials, for Small Port, should be transported by shipment and lorry trucks appropriately in accordance with national regulations and acts. • Dredging work for navigation channel/turning circle/berthing area/seawall and breakwater and filling the reclamation area with sand/rock material and suitable fill material: shall be done during the hours of work (between 6.30 am and 6.30 pm Monday to Saturday). Also, turbidity will be measured and controlled, to ensure the least adverse impact on aquatic ecology. • To conduct spoil handling, storage and loading at all times within enclosures designed and constructed to achieve environmental objectives and performance criteria for noise and air quality as set out in the CEMP; • To have night lighting, including security lighting and avoid light spill onto adjoining premises, in excess of 8 lux measured at the common boundary; • To include fencing to worksite boundaries to ensure site security and public safety (onshore and offshore restricted area).
Monitoring	• Site inspections will be conducted as outlined in this CEMP.
Reporting	• Results of site inspections will be included in the environmental monitoring reports.
Area	• Onshore and offshore areas within the project site.
Responsible Agency	• Project developer and construction contractor.
Estimate Cost	• Include on pre-construction and construction cost

APPENDIX 6A-2

MANGROVE MANAGEMENT PLAN

Element	Content
Objectives	• To reduce impacts on loss mangrove forest area from the Project. • To rehabilitate mangrove forest resources
Performance Indicator	• Types and number of flora species in disturbed mangrove forest area that clearance for proposed project site • Types and number of flora species in reforestation area
Mitigation Measures	• Survey and record flora species in the proposed project site before construction (biological survey). • Select appropriate mangrove species for rehabilitation area. • Prepared and design mangrove rehabilitation program and monitoring with concerned authorities such as MONREC and Forest Department. • The mangrove rehabilitation program should also include mangrove reforestation to expand mangrove area which serves as natural sanctuaries for marine ecological resources. • Mangrove rehabilitation program should be involve local villagers participates in site selection. • Developer should be create a green buffer zone around the Project port boundaries. • In case of conservation plant species will be found, the plant will be transferred to growth in green buffer zone, mangrove reforestation or other areas. • Cutting and clearance must done only on specific area designated in the term of reference. • Prohibit workers to cut tree outside project boundary. Also, prohibit and control workers not to hunt wildlife in all area (restricted area). • Give a brief orientation for collectors/visitors (for educational and recreational purposes) about mangrove forest and other relevant topics for rehabilitation plan.
Monitoring	• Monitor flora and fauna species before project clearance - Frequency : 1 time before site clearance. • Monitor project site clearance to ensure that it is strictly carried out in accordance with proper equipment as specified in contract and ensure strictly conducted only within the project site - Frequency : 1 time/month during pre-construction/construction phase

Element	Content
	• Consider and monitor on mangrove rehabilitation area due to clearance activities for proposed project site - Frequency : 2 times/month during pre-construction/construction phase
Reporting	• Results of site inspections will be included in the environmental monitoring reports and submitted to MONREC and Port Authorities Department.
Area	• Mangrove rehabilitation area (investigating for the appropriate area).
Responsible Agency	• Project developer
Estimate Cost	• Approx. 6,000 USD Lumpsump for Flora and Fauna species investigate before land clearance

APPENDIX 6A-3

AIR QUALITY MANAGEMENT PLAN

<table>
<tr><th>Element</th><th>Content</th></tr>
<tr><td>Objectives</td><td>• Ambient air quality in the construction sites and at the identified sensitive receptors meets the prescribed standards throughout the construction period.
• Community concerns and complaints about air quality are addressed quickly and effectively.</td></tr>
<tr><td>Performance Indicators</td><td>• Number of complaints filed through the complaint response channel.
• Number of times that the local ambient air quality is below the prescribed standards related to dust and exhaust emissions.</td></tr>
<tr><td>Sources</td><td>The construction could adversely affect local air quality in and near the construction sites. The issues will be:
• Fugitive dust generated in soil compaction (site development work-removal of vegetation, top soil and engineered filling and compaction of raise the level of project area), and vehicle movements in the construction sites and along the transport routes;
• Exhaust emissions from ships, trucks and heavy construction equipment and materials powered by diesel engines and other kinds of fuel.</td></tr>
<tr><td>Applicable Standards</td><td>Applicable ambient air quality standards related to fugitive dust and exhaust emissions are as follows:
Table 1 – Construction Air Quality Goals<table><tr><th>Pollutant</th><th>Not to be Exceeded</th></tr><tr><td>Particulate as PM_{10}</td><td>150 $\mu g/m^3$ (24 hr average)</td></tr><tr><td></td><td>50 $\mu g/m^3$ (annual average)</td></tr><tr><td>Total Solid Particulates (TSP)</td><td>230 $\mu g/m^3$ (24 hr average)</td></tr></table></td></tr>
<tr><td>Mitigation Measures</td><td>The Contractor will conduct air quality surveys at the construction sites (non-mobile pollutant source) and trucks (mobile pollutant source) to identify sensitive receptors and update the baseline data established in the Final ESIA Report.

Fugitive Dust Control
• Enforce speed limit for trucks not to exceed 40 km/hr when passing the communities.
• Cover construction materials by canvas during transportation, materials should be dampened, if necessary, before transportation.
• Establish a vehicle washing facilities to minimize the quantity of material deposition on public roads.
• Establish a checkpoint at project gate to ensure the vehicles leaving the project site are following the measures prescribed to reduce dust emissions.</td></tr>
</table>

Element	Content
	Gaseous Emissions • Adopt procedures to avoid construction vehicles idling for excessive periods (e.g. more than 5 minutes) if required to queue to enter the construction sites; • Maintain all construction equipment in proper working conditions according to the manufacturer's specifications. The engines of the construction equipment fleet must be routinely maintained by qualified mechanics to ensure their proper conditions during construction phase. • Provide adequate training to the equipment operators in the proper use of equipment. • Use the proper size of equipment for the job. • Use the equipment fitted engines with latest low emission technologies (repowered engines, electric drive trains). For example, the diesel generator set to be used must be equipped with modern pollution control equipment. • Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines). • Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes. • Take measures to manage the movement of construction vehicles entering and leaving the construction sites to avoid, or mitigate and manage the potential for vehicle emissions impacting on adjacent properties, except where such residential or sensitive activities front an arterial road to be used for access to or from the construction site. Measures for construction fleet management are to be provided in the construction vehicle management plan and the construction traffic management plan. Such measures may include avoiding or minimizing queuing on streets approaching the worksites or adjacent to other sensitive activities; • For stationary plant and equipment powered by diesel motors, take measures to avoid or mitigate and manage the potential impacts of exhaust emissions on adjacent residential or other sensitive activities. For example, ensure all construction vehicles and stationary plant and equipment powered by diesel motors are fitted with emission control measures, and are regularly maintained to manufacturers' specifications. **Vessel** • Regularly maintain engines in good conditions. • Use low sulfur diesel fuel

Element	Content
Monitoring	**Ambient Air Quality** • Undertake local, 1 time per three months monitoring of ambient air quality in the vicinity of construction sites and Villages situated near the project site (closest sensitive receptors include Nga Pitat and Sakhanthit Villages) for the duration of construction works, and in response to complaints, based on the following parameters: - Total suspended particulates (TSP) - Particulates (PM 10) • Monitor and manage the incidence of dust deposition and manage construction vehicle emissions in relation to ambient air quality. **Dust** • Monitor 1 time per three months or more frequently if weather conditions required, construction sites, stockpiles, vehicles and roads leaving the construction sites for evidence of dust generation or loose, unstable material with potential for dust. • Monitor regularly (weekly minimum) by inspection or other effective sampling: • The performance of dust filtration systems on construction shed ventilation systems; • Spillage or deposition of loose material on roads leaving a construction site. • Monitor performance of mitigation measures in relation to the construction air quality goals in the above table.
Reporting	• Twice a year. If more than one complaint is received in the preceding more frequently. • Twice a year reports for submission to MONREC and Port Authorities Department.
Area	• Project sites. • Closest villages (sensitive receptors include Nga Pitat and Sakhanthit Villages).
Responsible Agency	• Project developer. • Air quality monitoring agency • Construction contractor.
Estimate Cost	• 800 USD/station/time

APPENDIX 6A-4

NOISE MANAGEMENT PLAN

<table>
<tr><th>Element</th><th>Content</th></tr>
<tr><td>Objectives</td><td>• To minimize noise level of construction activities.
• To ensure that the noise level at the identified sensitive receptors will not exceed the maximum limits prescribed by MONREC as a condition of the ECC and will be acceptable to the sensitive receptors.</td></tr>
<tr><td>Performance Indicators</td><td>• The incremental increases in noise level during the construction works compared to the targets.
• Net ambient noise level compared to the applicable ambient noise standards.</td></tr>
<tr><td>Sources</td><td>Noise (vehicles, trucks, cars, civil engineering and mechanical works and etc.) will be managed at the project site. The Small Port construction site will be where construction activities causing noise will be most intensive and concentrated.
Construction activities creating noise at the project site are shown in the table below:
<table>
<tr><th>Construction Activities</th><th>Small Port</th></tr>
<tr><td>Site Development</td><td>Removal of vegetation, top soil, engineered filling, site compaction, mechanical works and dredging work.</td></tr>
<tr><td>Erection and installation of equipment (only noise) – civil and mechanical works</td><td>Materials and equipment and various kinds of vehicle will be generating disturbance noises in wide range within the project area (onshore and offshore activities)</td></tr>
</table></td></tr>
<tr><td>Applicable Standards</td><td>Noise performance will be evaluated against the following standards:
National Ambient Noise Level Standards:
- Ambient noise level standard, Myanmar National Environment Quality (Emission) Guidelines, Final Draft (December 2015).
Noise Standards: World Health Organization (WHO), 1999
- Guidelines for Community Noise, World Health Organization (WHO), 1999
Standard
Noise impacts should not exceed the levels presented in Table below, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site
<table>
<tr><th></th><th colspan="2">One Hour L_{Aeq} (dBA)</th></tr>
<tr><th>Receptor Daytime</th><th>Daytime
07:00 - 22:00</th><th>Nighttime
22:00 - 07:00</th></tr>
<tr><td>Residential; institutional; educational</td><td>55</td><td>45</td></tr>
<tr><td>Industrial; commercial</td><td>70</td><td>70</td></tr>
</table></td></tr>
</table>

Element	Content
	U.S. EPA Standard: Noise level not higher than 70 dB(A) $L_{eq\text{-}24\ hour}$
Mitigation Measures	**Design** • The Contract will require the Contractor and his sub-contractors to use construction equipment that generate low levels of noise and vibrations. The Contractor will present alternative construction equipment to demonstrate that the selected equipment adopts best available technologies to minimize noise level. • Before commencing the construction, the Contractor will conduct a noise and vibration survey covering the identified sensitive receptors to update the existing baseline data in the Final EIA Report. The noise survey will be manually conducted using a sound level meter following Noise Standard stated on Environmental, Health, and Safety Guidelines : Noise Management (April 30, 2007). • Demonstrate through predictive modelling of the proposed construction techniques and monitoring ambient noise and vibration readings prior to construction to establish pre-disturbance levels, the likely levels of noise due to construction works throughout the construction phase. **Construction Noise** • Major construction activities which generate loud noise should be limited to only during the day time. Activities that are necessary to be carried out at night time will need approval of the site engineers, and will need to have adequate noise control equipment or measures. • Speeds of vehicles in the construction site will not be more than 40 km/hr. • Noise performance requirements of construction equipment will need to be clearly stated in contract specifications. • Temporary sound barriers or shielding should be installed for non-mobile equipment. • The contractor will be required to regularly monitor ambient noise levels at the receptors, particularly during the noise generation period. • The construction environmental management plan needs to include an efficient complaints redress procedure and an efficient corrective action procedure to address the none compliance of noise performance.
Monitoring	• Undertake local, 1 time per three months monitoring of noise level in the vicinity of construction sites and Villages (closest sensitive receptors include Nga Pitat and Sakhanthit Villages) for the duration of construction works, and in response to complaints, based on the following parameters: - L_{max}, - $L_{eq\ 1\ hr}$,

Element	Content
	- $L_{eq\ 24\ hr}$, - L_{dn} and, - L_{90} • Monitor and manage the incidence of noise level and manage construction vehicle noise level. • The Contractor is to implement measures to receive and respond to complaints about construction noise and vibration made at any time during the construction phase of the Project. Such measures may include a complaints management and correction action system developed and incorporated in this CEMP. Key requirements for the system include: - On receipt of a complaint, implement a complaint response procedure for tracking and responding to the issue(s) and the complaint; - Identify the relevant construction activity at which the complaint is directed; - As soon as practicable, investigate and measure the level of noise from that activity; - Respond to the complainant as soon as practicable upon completion of the investigation and describe the corrective action taken; and - Report to the Proponent on the complaint, the activity, the corrective action and the response.
Reporting	• Twice a year reporting on noise performance and complaints. • Twice a year reports for submission to MONREC and Port Authorities Department.
Area	• Project sites. • Closest villages (sensitive receptors include Nga Pitat and Sakhanthit Villages).
Responsible Agency	• Project developer • Contractor • Sub-contractors
Estimate Cost	• 700 USD / station/time

APPENDIX 6A-5

DREDGING AND DISPOSAL MANAGEMENT PLAN

Element	Content
Objective	To ensure that dredging activities do not create or minimize impact to both coastal water and marine ecology.
Performance Indicators	Qualities of the coastal water during dredging activities compared with the applicable coastal water quality standards.
Sources	• Dredged material (about 5.2 million cu.m.).
Applicable Standards	**Coastal Water Quality Standard:** • Marine water quality criteria for the ASEAN Region for aquatic life protection, 2008 - DO = >4 mg/L - Suspended solid = < 50 mg/L - Nitrate-Nitrogen = <60 µg/L
Mitigation Measures	**Design Concept** The Contractor will prepare detailed design of dredging and disposal activities. The proposed design concept is based on the principle dredging and disposal activities of as briefly described below: • **Vessel for Dredging Activities** • Disposal vessels should be equipped with accurate positioning systems, e.g. with AIS (Automatic Identification System), which shall be switched on during disposal operations. Disposal vessels and operations should be inspected regularly to ensure that the conditions of the disposal permit are being complied with, and that the crews are aware of their responsibilities under the permit. Ships' records and automatic monitoring and display devices (e.g. black-boxes), where these have been fitted, should be inspected to ensure that the disposal is taking place at the specified site. • The following typical methods are available to reduce plume generation when dredging with a HD (Hopper Dredger): - Optimize trailing velocity, suction mouth and pump discharge rates. This results in less spillage from the drag head. - Limit overflow and/hopper filling. This is sometimes imposed on dredging operations but slows the dredging process, and increases costs significantly. - Reduce intake water. This results in more in-situ material being taken into the dredge. This increases costs as the fuel requirement per m^3 rises. The effect on the production rate is controlled by pumping at a higher rate. - Reduce air content in the overflow mixture. • The following typical methods are available to reduce plume generation when dredging with a CSD (Cutting Suction

Element	Content
	Dredger): - Optimize cutter speed, swing velocity and suction discharge. This reduces the spill rates at the cutter head, as more in situ material is taken up at the cutter head. This method will also optimize production rates and it should be the most cost effective method of dredging with a CSD. - Optimize cutter head design. This method requires a high level of detail of the soil characteristics to be removed. The method also optimizes production rates and it should be the most cost effective method of dredging with a CSD. • **Dredging** • Use techniques to minimize adverse impacts on aquatic life from the re-suspension of sediments; • Contractor must establish the baseline coastal water quality around the dredging and disposal area by conducting daily monitoring program at least 3 months prior to dredging activities. • The dredging activities must be stopped if total suspended solid exceeds 50 mg/L at any time. • Check and maintenance sediment transfer pipe daily to ensure proper condition and prevent pipe damage cause of sediment spill into sea. • In case of damage on sediment pipe, the dredging activities must be stopped. • Prepare wave gauge, tide gauge, and anemometer to establish long term environmental information in this project area. • Check and maintenance all machine and equipment to prevent oil leakage into sea. • Check and maintenance HD and CSD to ensure that no sediment overflow into the sea. • Project Engineering should strictly control and prohibit contractor to dispose sediment from dredging activities into the sea and outside designated disposal area. • The monitoring results on coastal water quality must be sent to all concerned agencies. • **Disposal** • Avoid off shore disposal activities to prevent impact on coastal water quality and marine ecology. • Use the dredged materials for on-land disposal within the Early Industrial to the maximum extent.

Element	Content
	• **Marine Ecology** ➢ Apply the same mitigation measures as recommended for coastal water quality. ➢ Provide information on the construction schedule and construction area to local fishermen living near the port. ➢ Coordinate with local authorities to protect coral and other marine resources.
Monitoring	• Once a month collection of 10 sampling stations of coastal water and marine ecology at location around access channel especially during dredging activities • Once a month collection of 10 sampling stations (same as for coastal water). The Parameter includes Plankton, Benthos, fishery and marine protected species
Reporting	• The results of monitoring will be presented in the monitoring reports. • Twice a year reporting on dredging and disposal management, and submit to MONREC and Port Authorities Department.
Area	• Project sites. • Closest villages (sensitive receptors).
Responsible Agency	• Project developer • Contractor • Sub-contractors
Estimate Cost	• 500 USD /station/time for coastal water quality measurement • 1,000 USD/station/time for marine ecology and protected species.

APPENDIX 6A-6

WASTE MANAGEMENT PLAN

Element	Content
Objective	To minimize all types of wastes generated at the construction sites, particularly the construction site, that will have to be disposed. To minimize environmental impacts of waste disposal.
Performance Indicators	Number of complaints related to waste disposal.
Sources	Wastes will be divided into three categories: • Construction, demolition, and land-clearing (CDL) waste: Includes all non-hazardous solid wastes resulting from site clearing, excavation, concrete works, steel works, piping works, installation of equipment, and construction of buildings. CDL wastes for this Project will consist of vegetation removed from the site before site preparation works, excavated materials particularly top soil, construction debris, remnants of steel bars and beams, packaging materials, broken roofing materials and tiles, and remnants of pipes, glasses, and other inert building materials. • Non-construction waste: Includes wastes generated in worker camps, canteens and offices such as paper, food and beverage containers, food wastes, and other domestic items.
Applicable Standards	Applicable guidelines and standards regarding the management and disposal of the three categories of wastes as prescribed by MONREC or enforced by the local government, whichever are more stringent.
Mitigation Measures	**Design and Planning before Commencing the Construction** • The Contractor will consult with the EHS Manager of the Project developer, ECD, SWB and the township governments the possibility of using existing waste disposal facilities managed by the regional or local governments. If this not possible, the Contractor will need to develop its own disposal facility preferably within the construction site, if possible. • The Contractor will ensure that the design and the proposed construction methods will generate the least amount of wastes. • Based on the construction plan, methods, and schedule, The Contractor will prepare estimates of the quantity of each waste category to be generated in each quarter of the construction period. The estimates will be monthly updated. • The Contractor will propose methods for waste reuse and recycling and prepare estimates of the remaining quantity of each waste category that will be disposed off. • The Contractor will propose methods of waste transport and disposal. • The Contractor will then prepare an action plan for waste

Element	Content
	management for the first quarter of the construction period containing all the above estimates and proposals. The action plan will be submitted to the EHS Manager of the Project developer not later than three weeks before commencing the construction. • The subsequent quarterly action plans will be prepared by updating or revising the preceding plans as appropriate to reflect cumulative results of the previous quarters. The next quarterly action plan will be submitted to the EHS Manager not later than two weeks before the end of the current quarter. • Consider using materials and products that have a recycled content wherever cost/performance competitive, and where environmentally preferable to the non-recycled alternative; • Arrangements with suppliers to return any unused construction materials; • Where possible, goods to be ordered in bulk to minimize packaging waste and packaging material returned to the supplier wherever practicable; and **During Construction** **Waste Segregation** • The Contractor will design and implement a waste segregation system and procedure and communicate it to all construction personnel to strictly adhere to the segregation procedure. • An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. Each waste category will be segregated into recycling, reuse and disposal sub-categories. **Waste Collection and Storage** • Daily collection and transport will be organized and carried out for each sub-category of segregated wastes. • A roofed storage area with adequate space will be provided for storing the segregated wastes waiting for the on-site or off-site reuse or recycling. • The storage area for hazardous waste will need to be specially designed to prevent spills or leaks onto the soil. **Waste Reuse and Recycling** • Chipping and mulching of vegetation cleared during construction and reuse of mulched material for landscaping purposes; • Reuse of excavated material as fill at approved fill sites; • Topsoil free of weeds to be stockpiled and stored for re-use,

Element	Content
	if possible; • Collection and return of packaging materials (e.g. pallets) to suppliers wherever practicable; • Use of recycled materials to the limits of design in concrete, road base, asphalt and other construction materials; • Remove any contamination inadvertently deposited in recyclable waste material containers. Provide cleanup of excessive contamination at recycling vendor locations when such contamination is not controlled at the project site. • Collection and recycling of used oils by a licensed contractor; • Collection by a licensed contractor of empty oil and fuel drums and other containers for return to recycling facilities; **Waste Disposal** • Disposal of the remaining wastes that are unable to be reused or recycled in the approved land fill site(s). • Preferably, inert wastes such as broken tiles, bricks, plastics should be used for filling the site in areas planned to be vacant space. • No burning of wastes will be allowed. • Non-construction wastes will be contracted to the existing municipal services, if possible. If not, they will need to be disposed of in a small sanitary land fill to be located within the small port site in designated green areas. • Decomposable wastes such as food wastes and vegetation may be disposed of by composting. **On-site Record Keeping** The Contractor will design and maintain record keeping procedures with provisions for: • Tracking collections of waste materials at the sites and deliveries to recycling, reuse, salvage, and landfill facilities. • Maintaining on-site logs that include for each load of materials removed from the site: type of material, load weight, recycling/hauling service, and date accepted by recycling service or landfill. • Accessibility to the EHS Manager of the Project developer for verification of construction waste recycling. Legible copies of on-site logs, manifests, weight tickets, and receipts. Manifests shall be from recycling and disposal site operators that can legally accept the materials for the purpose of recycling, reuse, salvage, or disposal.
Monitoring	Monitoring of the waste management performance will be carried out through quick daily site inspections and detailed

Element	Content
	weekly site inspections. Daily site inspections will include observation of the collection and storage of waste materials in the construction sites and waste disposal areas, and reviewing the daily records. This will be focused on efficiency of the collection, storage, and disposal; and on the quality of the records. The EHS Managers of the Project developer and the Contractor will jointly inspect the sites. In weekly site inspections, the EHS Manager will be participated by the Resident Engineer of the Project developer and the Construction Manager of the Contractor. The inspection will cover verification of the records, disposal activities, discussion on the performance of the past week, and identification of problems, if any, that affect the waste management performance.
Reporting	• Report immediately to the relevant authorities any incident where harmful waste material is accidentally released to the environment. • In the event of an environmental incident, take such corrective or remedial action as is required to render the area safe and avoid or minimize environmental harm. • Monthly reports on the waste management results as part of the monthly monitoring reports. • Twice a year reports for submission to MONREC and Port Authority Department.
Area	• Project sites.
Responsible Agency	• Project developer • Construction workers • Sub-contractors (waste management company)
Estimate Cost	• include on cost for pre-construction and construction

APPENDIX 6A-7

WASTEWATER MANAGEMENT PLAN

Element	Content
Objective	To ensure that all wastewaters generated during the construction will be adequately treated before discharging into the sea
Performance Indicators	Qualities of the treated effluent compared with the applicable effluent quality standards.
Sources	• Domestic wastewater generated by living activities of about 273 persons at peak of construction, estimated volume about 41 m^3/d. • Construction wastewater, estimated volume about 42 m^3/d. • Storm water with a return period of 5 years at small port approx. 84,218 m^3.
Applicable Standards	**Effluent quality standards:** • General Guideline of Site Runoff and Wastewater Discharges (construction phase), National Environmental Quality (Emission) Guidelines, 2015 • Environmental, Health, and Safety-General Guidelines Environmental Wastewater and Ambient Water Quality, April 30, 2007 (World Bank Group/IFC); Standard (both from Myanmar and World Bank Group/IFC Guidelines) - Oil and Grease = 10 mg/L - pH = 6-9 - Total Suspended Solid = 50 mg/L - BOD = 30 mg/L - Total Nitrogen = 10 mg/L
Mitigation Measures	**Design Concept** The Contractor will prepare detailed design of a wastewater management system for the Small Port construction site. The wastewater management system will consist of a collection system and a simple treatment system. The proposed design concept is based on the principle of wastewater segregation, treatment and reuse as briefly described below: • **Surface Runoff** - The site preparation activities, including land clearing and site filling and compaction, should be carried out during the dry season to avoid the problem of surface runoff with high turbidity discharging into the open sea or nearby drainage channels, if exist. - The construction site should be surrounded by temporary fences to limit the amount of sediment that could be washed from the construction area during the raining time into the sea. - To prevent contamination of the surface runoff, potential contamination sources will be covered with roof. The surface runoff would contain only suspended solids

Element	Content
	washed out from the open area. - Construct a temporary drainage system to collect the surfaced runoff from the construction area to avoid the discharge of surface runoff into the open sea. - The collected storm water will be drained into a retention pond for removal of suspended solids before discharging into the sea or a nearby drainage channel, if exist. After the construction, the retention pond will be retained and used for wastewater management during the operational phase. • **Domestic Wastewater** - Toilet wastes will be separated from grey water or salvage. - Kitchen and canteen waste water will be discharged into oil and grease trap tank before draining into a retention pond. - Toilet wastes will be discharged into a septic tank (or more than one septic tank) with a hydraulic retention time of about 5 days. - Grey water will be discharged into the retention pond. - The retention pond will be designed as an oxidation pond with a hydraulic retention time of about 7 days. • **Construction Wastewater** - Construction wastewater will be mainly wash water. It may contain oil and grease and chemicals. The wash water that contains oil will be treated in a simple oil removal tank before combining with wash water from other sources. The wash water will be discharged into the retention pond.
Monitoring	• Once a month collection of one water samples at Effluent from release point of temporary drainage system. The treatment performance of the drainage system will be assessed from the monitoring data.
Reporting	• The results of monitoring will be presented in the monitoring reports. • Twice a year reporting on wastewater performance, and submit to MONREC and Port Authorities Department.
Area	• Project sites.
Responsible Agency	• Project developer • Construction workers • Sub-contractors (wastewater management company)
Estimate Cost	• 600 USD/station/time

APPENDIX 6A-8

HAZARDOUS WASTE MANAGEMENT PLAN

Element	Content
Objectives	• To minimize all types of hazardous wastes generated at the construction sites, particularly the Small Port construction site, that will have to be disposed. • To minimize environmental impacts of waste disposal.
Performance Indicators	Number of complaints related to hazardous waste disposal.
Sources	Hazardous waste: Includes such wastes as spent lubricating oil, paints, and chemicals used in the construction. Most of the hazardous wastes are in liquid form.
Applicable Standards	Applicable guidelines and standards regarding the management and disposal of the three categories of hazardous wastes as prescribed by MONREC or enforced by the local government, whichever are more stringent.
Mitigation Measures	• Hazardous wastes will be handled by a licensed hazardous waste contractor. If this service is not available, the Contractor will need to find appropriate arrangements for incineration, safe permanent storage, or other appropriate methods of disposal. • A Hazardous Waste Management System covering waste classification, separation, collection, storage, transfer and disposal should be set up and operated. The waste management system will comply with applicable regulation of the government, if any.
Monitoring	Monitoring of the hazardous waste management performance will be carried out through quick daily site inspections and detailed weekly site inspections. Daily site inspections will include observation of the collection and storage of hazardous waste materials in the construction sites and hazardous waste disposal areas, and reviewing the daily records. This will be focused on efficiency of the collection, storage, and disposal; and on the quality of the records. The EHS Managers of the Project developer and the Contractor will jointly inspect the sites. In weekly site inspections, the EHS Manager will be participated by the Resident Engineer of the Project developer and the Construction Manager of the Contractor. The inspection will cover verification of the records, disposal activities, discussion on the performance of the past week, and identification of problems, if any, that affect the waste management performance.
Reporting	• Report immediately to the relevant authorities any incident where harmful waste material is accidentally released to the environment.

Element	Content
	• In the event of an environmental incident, take such corrective or remedial action as is required to render the area safe and avoid or minimize environmental harm. • Monthly reports on the waste management results as part of the monthly monitoring reports. • Twice a year reports for submission to MONREC and Port Authorities Department.
Area	• Project sites.
Responsible Agency	• Project developer • Construction workers • Contractor/Sub-contractors (waste management company)
Estimate Cost	• include on cost for pre-construction and construction

APPENDIX 6A-9

NAVIGATION MANAGEMENT PLAN

Element	Content
Objective	• To minimize potential impacts from navigation activities to the local fishermen during pre-construction/construction phases
Performance indicators	• Number of navigation accident in the identified impact areas • Number of vessels during the construction period.
Sources	• Navigation disturbances could be caused by haulage of construction materials, equipment, and dredging activities. • Potential impact area: - Small Port area
Management guidelines	• Take reasonable and practicable measures to avoid, or mitigate and manage the potential navigation impacts on navigation route of local fishermen near the worksites. • Minimize as far as reasonably practicable, potential navigation disruptions to the operation of the navigation route due to the transport of materials to and dredging activities.
Mitigation Measures	**Design Concept** **1) Vessel Traffic Management** A comprehensive Vessel Traffic System and Management Information System (VTS MIS) will be required for this port. This will include: □ computing hardware □ communications (voice and data) equipment □ surveillance technology □ technical support infrastructure such as power, environmental □ conditioning, security, and Human Machine Interfaces (HMI) □ the VTS MIS systems functionality, including command and control □ capability, COP generation and management, integrated sensor control, □ disaster recovery, and record and replay, both for training purposes and □ legislated incident analysis and reporting requirements All elements of port and landside logistics, security, and traffic management will be provided for through: □ detailing location and functionality of a central control room/tower □ sensor implementation, inclusive of radar, AIS, CCTV, telephone, radios, AIS AtoN's, and MetOcean equipment

Element	Content
	□ multi-sensor fusion VTS system to provide the Common Operating Picture □ Port Management Information System for logistics/scheduling and implementation and management of charging mechanisms □ associated IT infrastructure □ Integration as necessary with other tools such as Portable Pilotage Units, Laser Docking Systems, Mooring Management Systems, Quick Release Hooks, etc. **2) Sea Traffic** • Install signs and warning signs that can be clearly seen (200 meter from the construction area) to show the boundary of offshore construction areas. • All vessels operating in nighttime must receive special permits. • All concerned safety rules have to follow the laws related to transportation section of Myanmar. • Provide information on the boundaries of offshore construction areas to all fishing boat operators. • Train all concerned crew on navigation safety in the offshore construction areas. • Carry out routine check and maintenance of vessels to follow safety instructions. • Prepare and maintain readiness for implementing an emergency plan related to marine accidents.
Monitoring	• Monitor number of vessel and boat two times per year at small port area. • Monitor navigation accident situation related to the project every day at / or nearby the Small Port area.
Reporting	• Monthly report on navigation conditions, including any accidents. • Twice a year reporting on navigation performance, and submission to MONREC and Port Authorities Department.
Area	• Project sites (especially at the Small Port area)
Responsible Agency	• Project developer
Estimate Cost	• 500 USD/station/time for monitoring number of vessel and boat at small port area throughout pre-construction and construction phase • Cost for monitoring navigation accident situation related to the project include on cost for pre-construction and construction

APPENDIX 6A-10

TRAFFIC MANAGEMENT PLAN

Element	Content
Objective	• Manage construction traffic and transport issues to minimize potential impacts on the communities and the operation of the road network
Performance indicators	• Number of traffic accidents in the identified impact areas • Number of traffic on Road during the construction period.
Sources	• Traffic disturbances could be caused by haulage of spoil, fill materials, construction materials and plant equipment. • Potential impact areas: - Local roads
Management guidelines	• Take reasonable and practicable measures to avoid, or mitigate and manage the potential construction traffic impacts on communities near the worksites. • Minimize as far as reasonably practicable, potential traffic disruptions to the operation of the road network and the public transport network due to the transport of materials to and from the construction sites. • Maintain safe access near all project work areas for road users, including pedestrians and cyclists. In particular, develop local access strategies in consultation with stakeholder groups to maintain safe, convenient and efficient access to community facilities such as schools and monastery, if any. • Implement traffic management measures near worksites and other project works to avoid conflicts between construction traffic, and pedestrians and cyclists. • Take reasonable and practicable measures to inform the local and broader communities about the timing and scale of changes to traffic conditions on roads in the vicinity of worksites and construction works. • Monitor traffic flows near construction works and take corrective action in response to traffic impacts as a consequence of construction works.
Mitigation Measures	**Truck routes and construction site access** • In consultation with the concerned authorities at the regional, and township levels, develop and implement a Construction Traffic Management Plan to address the following issues: - Avoid haulage tasks during peak traffic periods as far as practicable. Where haulage in peak periods is unavoidable, such activities are to be managed in accordance with specific traffic management sub-plans provided to the relevant agencies in advance. - Control heavy vehicle movements on project related road to avoid interference with major events, if any; - Investigate the capacity of intersections on haulage routes to minimize impact on intersection operations by heavy vehicles

Element	Content
	servicing the construction worksites; - Prepare and implement a comprehensive construction traffic management plan to control truck movements to avoid, or mitigate and manage the impacts of heavy vehicle traffic on the road network. • Measures to manage the operation of the construction truck fleet for incorporation into a Construction Vehicle management sub-plan to include: - Monitoring of truck position, speed, route and performance in relation of traffic conditions and schedule requirements; - Management of truck speed and position to avoid queuing on the approaches to the spoil handling and loading facilities; - Management of traffic signals on nominated spoil haulage along the routes; - Maintain all vehicles transporting material to and from the construction sites to a high standard (ADR28/01) with regards noise emissions, exhaust emissions, traffic safety and operational safety; - Ensure all vehicles leaving a construction site pass over or through devices designed and maintained to remove soil and other materials. **Construction Traffic Hazards** • Heavy trailer trucks transporting heavy and large plant equipment will have to be directed by a traffic police car. **Local Traffic** • Implement management measures to avoid, or minimize increase in traffic caused by the project works in local streets as practicable; • Notify the local community about proposed changes to local traffic access arising from construction activities, and provide clear signage of changed traffic conditions and take other measures to ensure safe traffic movement; • Prepare and implement an employee parking policy for the construction worksites. **Traffic Management at the Intersection of Local Roads** • Provide a traffic police or relevant officers to control traffic at the intersection during the transport period. **Pedestrians and Cyclists** • Maintain safe pedestrian and cycle access near construction works (particularly for elderly and children), including to community facilities, such as schools, monastery, open space and particularly: • Notify the local community, and in particular, local schools, about changes to pedestrian and cycle access during construction near construction works;

Element	Content
	• Provide traffic controls designed for the safe movement of cyclists near the worksites.
Monitoring	• Monitor number of vehicles two times per year at 2 sampling stations include 1) small port area and 2) at Nga Pitat Village. • Monitor traffic accident situation related to the project every day at project access road.
Reporting	• Monthly report on local traffic conditions, including any accidents involving construction traffic. • Twice a year reporting on traffic performance, and submission to MONREC and Port Authorities Department.
Area	• Local roads (at Nga Pitat Village) and Small Port Site.
Responsible Agency	• Project developer • Relevant authorities (police)
Estimate Cost	• 500 USD/station/time for monitoring number of vehicles throughout pre-construction and construction phase • Cost for monitoring vehicles accident situation related to the project include on cost for pre-construction and construction

APPENDIX 6A-11
OHS MANAGEMENT PLAN

Element	Content
Objective	To establish best practicable OHS conditions to ensure work related health and safety of construction personnel.
Performance Indicators	• Total Recordable Injury Frequency Rate (TRIFR) • Lost Time Injury Frequency Rate (LTIFR) • Medical Treatment Injury Frequency Rate (MTIFR) • Duration rate • Incident rate
Sources	Public safety related to construction traffic will be managed in the traffic management plan. The issues of concern in this OHS plan are worker safety in construction site.
Applicable Standards	OHS guidelines and standards enforced by the Ministry of Health and proposed for this Project as follows: "To safeguard public health and to take necessary measure and respect of environmental health"
Mitigation Measures	**Design and Planning before Commencing the Construction** • The Contractor will prepare an OHS management plan and implementation procedures specific to this Project and in line with its corporate OHS policy and procedures. The OHS management plan and implementation procedures will be submitted not later than one month before commencing the construction for approval of the Project Manager of the Project developer and relevant authorities, if so required. • The Contractor will conduct necessary orientation and training to all construction personnel to ensure that the construction personnel clearly understand the OHS plan and implementation procedures. • The OHS management plan and implementation procedures will cover but not limited to the following subjects: - Organization and responsibilities of OHS management - Training plan - Communication plan - Contractor responsibilities - Job-specific work requirements - Compliance monitoring and evaluation plan - Audit plan - Reporting system - Documentation system • Develop and implement safety measures for the construction works including treatment strategies that address fire and chemical hazard, communications, access for emergency services, response coordination and

Element	Content
	management. • Develop emergency response procedures, and implement in the event of accidents and emergencies. • Provide fire and life safety measures, including ventilation, smoke extraction and firefighting systems for the duration of the construction phase. **During Construction** • The implementation of the OHS plan will be integrated with construction supervision. • The Contractor will implement the OHS plan and procedures as part of its construction supervision. The Contractor's site engineers and foremen will supervise the implementation of OHS procedures to comply with relevant requirements. • The Contractor's EHS Manager will monitor the OHS performance.
Monitoring	• Monitoring of OHS performance of the Contractor will be made through: - Daily informal inspections (walk through of the construction sites) - Weekly formal inspections of the work place. - Audits - Corrective Action Reports • The daily inspections will observe: (i) adherence of the construction workers to the OHS procedures such as wearing of protective equipment in high risk working areas; (ii) working conditions; (iii) readiness of fire and life safety systems as relevant; and (iv) potential new hazards. The daily inspections will be carried out by the Contractor's EHS Manager and Construction Manager, Site Managers, and relevant foremen. The Project EHS Manager will occasionally join the daily inspections. The Contractor's EHS Manager will prepare daily OHS inspection notes as part of the site inspection notes. • The weekly formal inspections will be carried out at weekly intervals and shall be documented using appropriate "Weekly OHS Inspection Checklists". The Contractor's Construction Manager, EHS Manager, and Site Engineers will carry out the weekly inspections. The Owner's EHS Manager will jointly undertake the weekly inspections. Subcontractors will also be required to participate in the weekly inspections. The weekly inspections will include plant, substances, equipment and temporary structures used by subcontractors. • Internal audits will be carried out annually or more frequent if the OHS performance is significantly below

Element	Content
	established targets. The internal auditor or team will be engaged by the Contractor with concurrence of the Project developer. • Monitoring results will be discussed in Project OHS monthly review meetings.
Reporting	• Monthly as part of the monthly monitoring reports except in case of an incident when reporting should occur immediately on completion of any investigation required to resolve the incident. • Twice a year reporting on OHS performance, and submission to MONREC and Port Authorities.
Area	• Project sites.
Responsible Agency	• Project developer • Construction workers • Sub-contractors (waste management)
Estimate Cost	• include on cost for pre-construction and construction

APPENDIX 6A-12

NATURAL RESOURCE USED MONITORING PLAN

Element	Content
Objective	To ensure that villagers (PAPs) can still utilize marine and coastal resources sufficient to their livelihoods.
Performance Indicators	Number of complaints related to resource management.
Sources	Loss of fishing ground cause of livelihood affect to Villagers
Applicable Standards	All complaints about construction about 15 months period
Mitigation Measures	**Pre-Construction** • The Project Proponent should design and implement a long term of livelihood restoration program (LRP) for the affected people in consultation with them and the concerned authorities. The LRP will provide training and initial supports to assist the affected people to enhance their income through increasing efficiency of their current economic activities or creating secondary sources of income through new economic activities. The scope of training may cover the following subjects: - Community forest and mangroves management - Coastal aquaculture within extensive system - Fish processing - Crop cultivation techniques - Product development and marketing - Food preparation and preservation **During Construction** • Continue restore livelihoods through provision of knowledge for strengthening occupation career as proposed during pre-construction phase
Monitoring	• Report community consultation's activities and on consultation. • Training and promotion household account record. • Survey to collect information on local concerns, issues, and problems of the communities at least 1 time per month.
Reporting	• Results of the resource management will be included in the monthly monitoring reports and the twice a year reports for submission to MONREC and Port Authorities. • Report immediately to the relevant authorities in case of complaint from villagers.
Area	• Project sites/fishing ground/villages/natural resources within the area nearby project site.
Responsible Agency	• Project developer
Estimate Cost	• 200,000 USD lump sump throughout pre-construction/construction phase

APPENDIX 6A-13

SOCIAL ENVIRONMENTAL MANAGEMENT PLAN

Element	Content
Objective	To avoid or mitigate and manage construction impacts on the social environment. *Note: The social environment includes residential and neighborhood amenity, connectivity, community health, community diversity, social infrastructure provision, livelihood and safety.*
Performance Indicators	• Number of grievances or complaints filed with the Project Management Office of the Project developer. • Number of complaints successfully responded.
Sources	Daily living of people in the surrounding communities may be disturbed or inconvenienced by environmental disturbances caused by the construction such as dust, traffic inconveniences (both land traffic and navigation), noise, coastal water, and workers' misconduct. The management of social environment will cover villages potentially to be affected by construction activities.
Applicable Standards	The target for the entire construction period of about 15 months in total for all phases is all complaints are responded by the EPC and filed with the Project Management Office.
Mitigation Measures	Mitigation measures for minimizing physical impacts on the social environment are prescribed in relevant sub-plans, such as air quality, noise, traffic, navigation and marine ecology. Mitigation measures in this sub-plan are community measures designed to support the implementation of the physical measures. The basic requirement is that the communities have access to the communication and complaints process to address and respond to their complaints related to the construction impacts on their daily living and properties. **Amenity and Community Life** • Liaise with key stakeholders and the community through a public consultation process to ensure insignificant impacts of the construction on community facilities, schools and monastery. • As soon as it is practicable after the completion of construction, the Contractor shall reinstate community facilities affected by the works, if any.

Element	Content
	Social Infrastructure • Consult with managers of community facilities in neighborhoods adjacent to work sites to develop effective mitigation strategies and maintain regular communication with these facility managers. **Complaints and Corrective Actions** • Develop an effective and responsive system for receiving, handling and responding to, complaints received during the construction of project works. • Ensure complaints are received and responded to on a 24-hour per day basis for the duration of the construction phase. • Provide reporting on complaints received, responses provided, timeliness of responses, and corrective actions taken on a monthly basis. • Raise community awareness of the complaints systems and procedures through public notifications and website facilities. **Early Consultation** • Initiate consultation with owners and occupants of directly affected properties and nearest neighbors to construction activities as soon as practicable before commencing the construction. • Conduct consultation and community information strategies in conjunction with the public or community consultation process. • Establish a tripartite committee to provide mechanism and channel for the committees to participate in the project environmental management. **Community Consultation Program** • Undertake and maintain a comprehensive community information program to inform residents, businesses, community groups and motorists of Project activities and potential impacts. Effective and accessible consultation measures are required including maintenance of a 24-hour contact line operated by a person with authority to stop works if goals and agreements with the community are not met. • Ensure medical facilities, community centers, monastery and schools in the area have access to construction updates and community education during the construction.

Element	Content
	Regional Communication • Monitor traffic volumes and traffic congestion affecting the district and township population during construction and if necessary adopt travel demand and signal stage management strategies.
Monitoring	• Evaluate effectiveness of consultation, liaison and mitigation outcomes. • Cases of conflicts between the construction workers and local people. • Survey and report on actual impacts of the construction on community amenities and infrastructure. • Report community consultation's activities and on consultation, liaison and environmental compliance and public transport access in work site neighborhoods.
Reporting	• Results of the social management will be included in the monthly monitoring reports and the twice a year reports for submission to MONREC. • Report immediately in case of a safety incident or complaint from a neighbor.
Area	• Villages
Responsible Agency	• Project developer
Estimate Cost	• Cost include in the budget for Natural Resources Used Monitoring Plan

APPENDIX 6A-14

LAND ACQUISITION MANAGEMENT PLAN

Element	Content
Objectives	• To obtain the land for development proposal. • To document and inform project stakeholders about how the land acquisition will be proceed and used for development purpose. • To address policy, process, regulatory, etc. related to land acquisition. • To ensure that all PAPs are fairly compensated for land expropriation.
Performance Indicator	• Number of land owners (understand about policy, process and regulatory) who legally follow the process of land acquisition.
Mitigation Measures	• All Project Affected Persons (PAPs) perceive and understand about land acquisition process. • All PAPs transfer their own land to the Project developer prior to construction phase. • All PAPs are fairly compensated based on government price of land.
Monitor	• Visit PAPs and question about land acquisition for project development. • Inspect all PAPs who transfer the land for project development, showing certificate, or transaction documents.
Reporting	• Results of inspections will be included in the environmental monitoring reports and submitted to MONREC and Local/Provincial Authorities Department (Land Department).
Area	• Land of PAPs.
Responsible Agency	• Project developer's representative (for operating land acquisition process). • Land Department and other related authorities.
Estimate Cost	• Follow to cost that recommend by Committees.

APPENDIX 6A-15

EMERGENCY MANAGEMENT PLAN (FLOOD, TSUNAMI AND CYCLONE)

Element	Content
Objectives	• To minimize impacts in case of emergency during construction phase. • To acknowledge and raise awareness of construction workers to evacuate, shelter or lockdown can save lives.
Performance Indicator	• Number of employees/workers/staff understand about emergent situation and know how to minimize/survive from the hostile situation (flood, tsunami and cyclone). • Conduct a test (pre-test and post-test) to evaluate their understanding.
Mitigation Measures	• Provide training program about emergency plan before commencing construction activities.
Monitor	• Results of pre-test and post-test of construction workers.
Reporting	• Results of pre-test and post-test directly reporting to project developer.
Area	• Project sites.
Responsible Agency	• Project developer • Construction workers
Estimate Cost	• Include cost for pre-construction and construction.

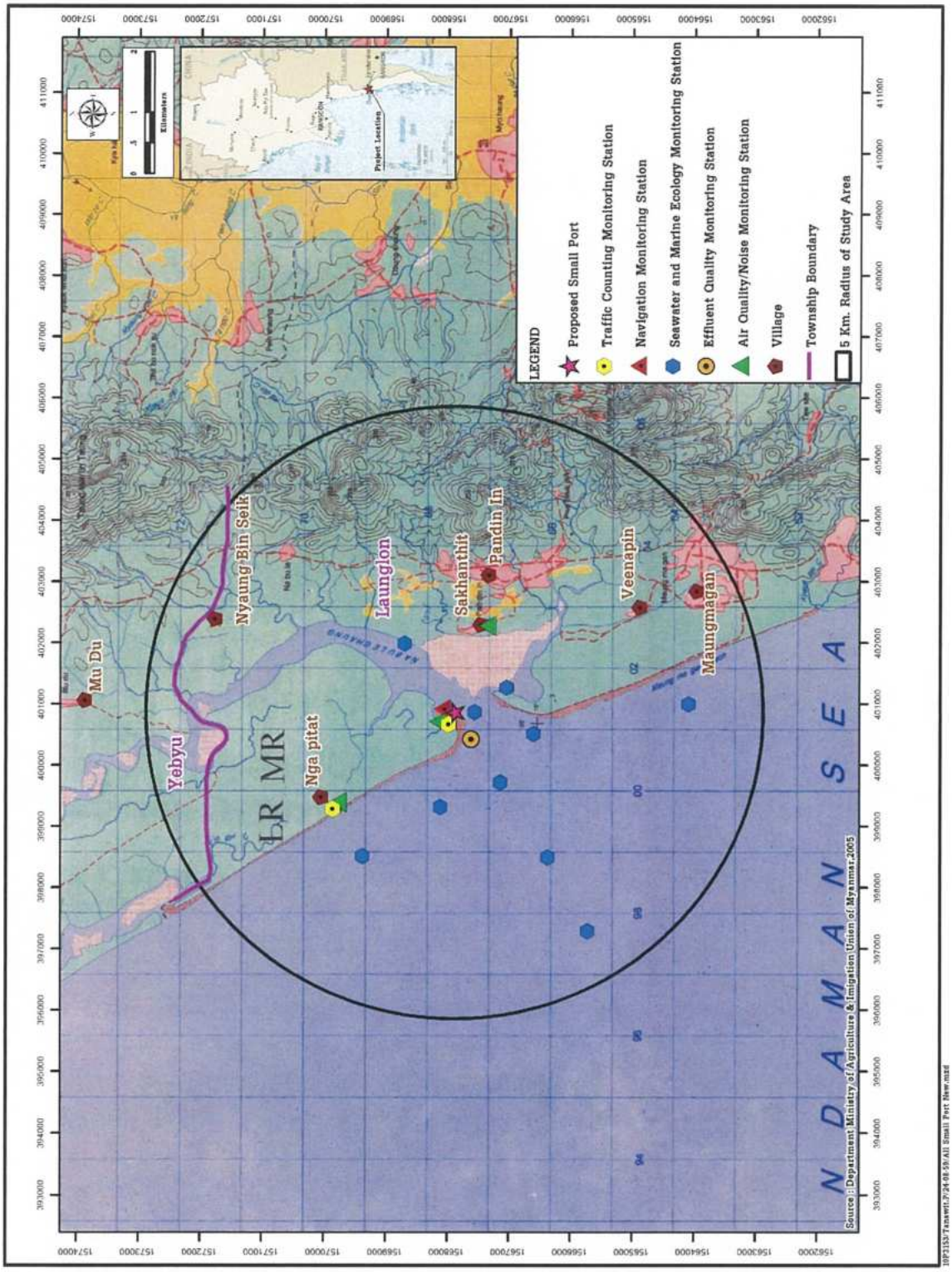


FIGURE 1 : MONITORING STATION DURING PRE-CONSTRUCTION / CONSTRUCTION PHASE

APPENDIX 7A

SUB-PLANS FOR OEMP

APPENDIX 7A

SUB-PLANS FOR OEMP

APPENDIX 7A-1

MANGROVE REHABILITATION MANAGEMENT PLAN

Element	Content
Objective	• To monitor the activities of rehabilitate mangrove forest resources • To conserve in existing mangrove forest around project area.
Performance Indicator	• Types and number of flora species in mangrove rehabilitation area
Mitigation Measures	• Planting, checking and evaluating fertilities in mangrove rehabilitation area and around project site. • Plant additional mangroves. • Mangrove rehabilitation program should be involve local villagers participates in prepare seeding, and maintain the areas. Developer should provide appropriate budget for this activity. • Give a brief orientation for collectors/visitors (for educational and recreational purposes) about mangrove forest and other relevant topics for rehabilitation plan. • Maintenance program for the rehabilitation area.
Monitoring	• Monitor on mangrove rehabilitation area and forest area around project site. - Frequency : 2 times/year during 1st-10th years of operation phases
Reporting	• Results of site inspections will be included in the environmental monitoring reports and submitted to MONREC and Port Authorities Department.
Area	• Mangrove rehabilitation area (investigating for the appropriate area).
Responsible Agency	• Project developer (CSR Team)
Estimate Cost	• Approx. 200,000 USD lump sump for planting and maintenance in reforestation area during 1st-10th of operation phases. • 1,500 USD / year for support local villagers (from Nga Pitat, Sakhanthit and Nyua Binseik Villages) in rehabilitation activities (during 1st-10th years during operation phase, total cost 15,000 USD)

APPENDIX 7A-2

AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN

<table>
<tr><th>Element</th><th>Content</th></tr>
<tr><td>Objectives</td><td>• Ambient air quality in the construction sites and at the identified sensitive receptors meets the prescribed standards throughout the construction period.
• Community concerns and complaints about air quality are addressed quickly and effectively.</td></tr>
<tr><td>Performance Indicators</td><td>• Number of complaints filed through the complaint response channel.
• Number of times that the local ambient air quality is below the prescribed standards related to dust and exhaust emissions.</td></tr>
<tr><td>Sources</td><td>The construction could adversely affect local air quality in and near the construction sites. The issues will be:
• Exhaust emissions from Small Port Carrier by diesel engines/vehicles.</td></tr>
<tr><td>Applicable Standards</td><td>Applicable ambient air quality standards related to exhaust emissions are as follows:
Table 1 –Air Quality Goals<table><tr><th>Pollutant</th><th>Not to be Exceeded</th></tr><tr><td rowspan="2">PM-10</td><td>150 $\mu g/m^3$ (24 hr average)</td></tr><tr><td>50 $\mu g/m^3$ (annual average)</td></tr><tr><td>SO_2</td><td>125 $\mu g/m^3$ (24 hr average)</td></tr><tr><td>NO_2</td><td>150 $\mu g/m^3$ (24 hr average)</td></tr><tr><td rowspan="2">CO</td><td>200 $\mu g/m^3$ (1 hr average)</td></tr><tr><td>43,200 $\mu g/m^3$ (1 hr average)</td></tr></table></td></tr>
<tr><td>Mitigation Measures</td><td>• Use low sulfur diesel fuel
• Check and maintenance vehicle regularly to minimize the exhaust emission.
• Speed reductions by vessels approaching a port can result in significant reductions in nitrogen oxide emissions.
• Control and formulate monitoring program on air quality throughout operation period.</td></tr>
<tr><td>Monitoring</td><td>Ambient Air Quality
• Undertake local, 2 times per year monitoring of ambient air quality in Villages (closest sensitive receptors include Nga Pitat and Sakhanthit villages) for the duration of 1st-5th year of operation works and 1 time per year throughout operation phase, and in response to complaints, based on the following parameters:
- Particulates (PM 10)
- Sulfur Dioxide (SO_2)
- Nitrogen Dioxide (NO_2)
- Carbon Monoxide (CO)</td></tr>
<tr><td>Reporting</td><td>• Twice a year reports for submission to MONREC and Port Authorities Department.</td></tr>
<tr><td>Area</td><td>• Closest sensitive receptors include Nga Pitat and Sakhanthit villages</td></tr>
<tr><td>Responsible Agency</td><td>• Project developer (Monitoring Team)</td></tr>
<tr><td>Estimate Cost</td><td>• 800 USD/station/time</td></tr>
</table>

APPENDIX 7A-3

NOISE MANAGEMENT PLAN

<table>
<tr><th>Element</th><th>Content</th></tr>
<tr><td>Objective</td><td>• To minimize noise level of operation phase.
• To ensure that the noise level at the identified sensitive receptors will not exceed the maximum limits prescribed by MONREC as a condition of the ECC and will be acceptable to the sensitive receptors.</td></tr>
<tr><td>Performance Indicators</td><td>• The incremental increases in noise level during the operation activities compared to the targets.
• Net ambient noise level compared to the applicable ambient noise standards.</td></tr>
<tr><td>Sources</td><td>Operation activities creating noise at the Small Port site are shown in the table below:
<table>
<tr><th>Operation Activities</th><th>Small Port</th></tr>
<tr><td>Operation of heavy operation equipment/materials/tools/ships/cargo boats</td><td>Transportation of equipment and materials for related projects in initial phase development.</td></tr>
</table></td></tr>
<tr><td>Applicable Standards</td><td>Noise performance will be evaluated the following standards:
National Ambient Noise Level Standards:
- Ambient noise level standard, Myanmar National Environment Quality (Emission) Guidelines, (December 2015).
Noise Standards: World Health Organization (WHO), 1999
- Guidelines for Community Noise, World Health Organization (WHO), 1999.
Standard
Noise impacts should not exceed the levels presented in Table below, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.
<table>
<tr><th></th><th colspan="2">One Hour L_{Aeq} (dBA)</th></tr>
<tr><td>Receptor Daytime</td><td>Daytime
07:00 - 22:00</td><td>Nighttime
22:00 - 07:00</td></tr>
<tr><td>Residential; institutional; educational</td><td>55</td><td>45</td></tr>
<tr><td>Industrial; commercial</td><td>70</td><td>70</td></tr>
</table>
U.S. EPA Standard:
Noise level not higher than 70 dB(A) $L_{eq\text{-}24\ hour}$</td></tr>
<tr><td>Mitigation Measures</td><td>Small Port
• Implemented to control noise level at lower than 85 dB (A) at 1 m from the noise sources and lower than 70 dB (A) at the port fence line.
Project Access Road/Navigation
• Limit speed of vehicles at the Project site at 40 km/hr. and speed of ships.
• Install temporary noise barriers, if necessary, to minimize noise impacts on sensitive areas
• Transportation shall be carried out only during the day time.
• Always maintain road surface in good condition.</td></tr>
</table>

Element	Content
Monitoring	• Undertake local, 2 time per year monitoring during 1st – 5th year of noise level in at Villages (closest sensitive receptors include Nga Pitat and Sakhanthit villages) for the duration of 1st-5th year of operation works and 1 time per year throughout operation phase and in response to complaints, based on the following parameters: - L_{max}, - $L_{eq\ 1\ hr}$, - $L_{eq\ 24\ hr}$, - L_{dn} and, - L_{90} • Monitor and manage the incidence of noise level and manage vehicle noise level. • The Developer is to implement measures to receive and respond to complaints about noise made at any time during the operation phase of the Project. Such measures may include a complaints management and correction action system developed and incorporated in this OEMP. Key requirements for the system include: - On receipt of a complaint, implement a complaint response procedure for tracking and responding to the issue(s) and the complaint; - Identify the relevant operation activities at which the complaint is directed; - As soon as practicable, investigate and measure the level of noise from that activity; - Respond to the complainant as soon as practicable upon completion of the investigation and describe the corrective action taken; and - Report to the project developer on the complaint, the activity, the corrective action and the response.
Reporting	• Twice a year reporting on noise performance and complaints. • Twice a year reports for submission to MONREC and Port Authorities Department.
Area	• Closest sensitive receptors include Nga Pitat and Sakhanthit villages
Responsible Agency	• Project developer (Monitoring Team)
Estimate Cost	• 700 USD/station/time.

APPENDIX 7A-4

MAINTENANCE DREDGING AND DISPOSAL MANAGEMENT PLAN

Element	Content
Objective	To ensure that maintenance dredging activities are not create or minimize impact to both coastal water and marine ecology.
Performance Indicators	Qualities of the coastal water during maintenance dredging activities compared with the applicable coastal water quality standards.
Sources	• Dredged material during maintenance period
Applicable Standards	**Coastal Water Quality Standard:** • Marine water quality criteria for the ASEAN Region for aquatic life protection, 2008 - DO = >4 mg/L - Suspended solid = < 50 mg/L - Nitrate-Nitrogen = <60 µg/L
Mitigation Measures	**Design Concept** The Developer will prepare detailed design of maintenance dredging and disposal activities. The proposed design concept is same as during operation phase as described below: • **Vessel for Dredging Activities** • Disposal vessels should be equipped with accurate positioning systems, e.g. with AIS (Automatic Identification System), which shall be switched on during disposal operations. Disposal vessels and operations should be inspected regularly to ensure that the conditions of the disposal permit are being complied with, and that the crews are aware of their responsibilities under the permit. Ships' records and automatic monitoring and display devices (e.g. black-boxes), where these have been fitted, should be inspected to ensure that the disposal is taking place at the specified site. • The following typical methods are available to reduce plume generation when dredging with a HD: - Optimize trailing velocity, suction mouth and pump discharge rates. This results in less spillage from the drag head. - Limit overflow and/hopper filling. This is sometimes imposed on dredging operations but slows the dredging process, and increases costs significantly. - Reduce intake water. This results in more in-situ material being taken into the dredge. This increases costs as the fuel requirement per m^3 rises. The effect on the production rate is controlled by pumping at a higher rate. - Reduce air content in the overflow mixture.

Element	Content
	• The following typical methods are available to reduce plume generation when dredging with a CSD: - Optimize cutter speed, swing velocity and suction discharge. This reduces the spill rates at the cutter head, as more in situ material is taken up at the cutter head. This method will also optimize production rates and it should be the most cost effective method of dredging with a CSD. - Optimize cutter head design. This method requires a high level of detail of the soil characteristics to be removed. The method also optimizes production rates and it should be the most cost effective method of dredging with a CSD. • The following typical methods are available to reduce plume generation when dredging with a Backhoe dredge. - Use of a visor over the bucket. This is a relatively cost effective method, but does reduce production rates and thus increase overall Project costs. - Use of a silt screen. Silt screen scan under certain conditions can be used to minimize the impact of spilled dredge materials. They need to be moved carefully, and can considerably slow down production rates. If they are not used correctly, they are ineffective. • **Dredging** • Use techniques to minimize adverse impacts on aquatic life from the re-suspension of sediments; • The project developer/contractor must establish the baseline coastal water quality around the dredging and disposal area by conducting daily monitoring program at least 3 months prior to dredging activities. • The dredging activities must be stopped if total suspended solid exceeds 50 mg/L at any time. • Check and maintenance sediment transfer pipe daily to ensure proper condition and prevent pipe damage cause of sediment spill into sea. • In case of damage on sediment pipe, the dredging activities must be stopped. • Prepare wave gauge, tide gauge, and anemometer to establish long term environmental information in this project area. • Check and maintenance all machine and equipment to prevent oil leakage into sea. • Check and maintenance HD and CSD to ensure that no sediment overflow into the sea.

Element	Content
	• Project Engineering should strictly control and prohibit contractor to dispose sediment from dredging activities into the sea and outside designated disposal area. • The monitoring results on coastal water quality must be sent to all concerned agencies. • **Disposal** • Avoid off shore disposal activities to prevent impact on coastal water quality and marine ecology. • Use the dredged materials for on-land disposal within the Early Industrial and for beach nourishment to the maximum extent. • **Marine Ecology** • Apply the same mitigation measures as recommended for coastal water quality. • Provide information on the operation schedule and area to local fishermen living near the small port. • Coordinate with local authorities to protect coral and other marine resources.
Monitoring	• Twice a year collection of 10 sampling stations of coastal water and marine ecology at location around access channel especially during maintenance dredging activities • Twice a year collection of 10 sampling stations (same as for coastal water). The Parameter include Plankton, Benthos, fishery and marine protected species
Reporting	• The results of monitoring will be presented in the monitoring reports. • Twice a year reporting on maintenance dredging and disposal, and submit to MONREC and Port Authorities Department.
Area	• Project site
Responsible Agency	• Project developer (maintenance Team)
Estimate Cost	• 500 USD /station/time for coastal water quality measurement • 1,000 USD/station/time for marine ecology and protected species.

APPENDIX 7A-5
WASTE MANAGEMENT PLAN

Element	Content
Objective	To minimize all types of wastes generated at the operation sites, that will have to be disposed. To minimize environmental impacts of waste disposal.
Performance Indicators	Number of complaints related to waste disposal/Environmental issue in relation to waste management.
Sources	• Operation waste: • Non-operation waste: Includes wastes generated in worker project site, canteens and offices such as paper, food and beverage containers, food wastes, and other domestic items.
Applicable Standards	Applicable guidelines and standards regarding the management and disposal of the three categories of wastes as prescribed by MONREC or enforced by the local government, whichever are more stringent.
Mitigation Measures	**Design and Planning before Commencing the Operation** • The Contractor will consult with the EHS Manager of the Project developer, ECD, SWB and the township governments the possibility of using existing waste disposal facilities managed by the regional or local governments. If this not possible, the Contractor will need to develop its own disposal facility preferably within the operation site, if possible. • The Contractor will ensure that the design and the proposed operation methods will generate the least amount of wastes. • Based on the operation plan, methods, and schedule, the project developer will prepare estimates of the quantity of each waste category to be generated in each quarter of the operation phase. The estimates will be monthly updated. • The project developer/contractor will propose methods for waste reuse and recycling and prepare estimates of the remaining quantity of each waste category that will be disposed off. • The project developer/contractor will propose methods of waste transport and disposal. • The project developer/contractor will then prepare an action plan for waste management for the first quarter of the operation phase containing all the above estimates and proposals. The action plan will be submitted to the EHS Manager of the Project developer not later than three weeks before commencing the operation. • The subsequent quarterly action plans will be prepared by updating or revising the preceding plans as appropriate to reflect cumulative results of the previous quarters. The next quarterly action plan will be submitted to the EHS Manager not later than two weeks before the end of the current quarter. • Consider using materials and products that have a recycled content wherever cost/performance competitive, and where environmentally preferable to the non-recycled alternative; • Arrangements with suppliers to return any unused operation materials; • Where possible, goods to be ordered in bulk to minimize packaging waste and packaging material returned to the supplier wherever practicable; and

Element	Content
	During Operation **Waste Segregation** • The project developer/contractor will design and implement a waste segregation system and procedure and communicate it to all operation personnel to strictly adhere to the segregation procedure. • An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. Each waste category will be segregated into recycling, reuse and disposal sub-categories. **Waste Collection and Storage** • Daily collection and transport will be organized and carried out for each sub-category of segregated wastes. • A roofed storage area with adequate space will be provided for storing the segregated wastes waiting for the on-site or off-site reuse or recycling. • The storage area for hazardous waste will need to be specially designed to prevent spills or leaks onto the soil. **Waste Reuse and Recycling** • Chipping and mulching of vegetation cleared during operation and reuse of mulched material for landscaping purposes; • Reuse of excavated material as fill at approved fill sites; • Topsoil free of weeds to be stockpiled and stored for re-use, if possible; • Collection and return of packaging materials (e.g. pallets) to suppliers wherever practicable; • Use of recycled materials to the limits of design in concrete, road base, asphalt and other operation materials; • Remove any contamination inadvertently deposited in recyclable waste material containers. Provide cleanup of excessive contamination at recycling vendor locations when such contamination is not controlled at the project site. • Collection and recycling of used oils by a licensed contractor; • Collection by a licensed contractor of empty oil and fuel drums and other containers for return to recycling facilities; **Waste Disposal** • Disposal of the remaining wastes that are unable to be reused or recycled in the approved land fill site(s). • Preferably, inert wastes such as broken tiles, bricks, plastics should be used for filling the site in areas planned to be vacant space. • No burning of wastes will be allowed. • Non-operation wastes will be contracted to the existing municipal services, if possible. If not, they will need to be disposed of in a small sanitary land fill to be located within the power plant site in designated green areas. • Decomposable wastes such as food wastes and vegetation may be disposed of by composting. **On-site Record Keeping** The project developer/contractor will design and maintain record keeping procedures with provisions for: • Tracking collections of waste materials at the sites and deliveries to recycling, reuse, salvage, and landfill facilities.

Element	Content
	• Maintaining on-site logs that include for each load of materials removed from the site: type of material, load weight, recycling/hauling service, and date accepted by recycling service or landfill. • Accessibility to the EHS Manager of the project developer for verification of operation waste recycling. Legible copies of on-site logs, manifests, weight tickets, and receipts. Manifests shall be from recycling and disposal site operators that can legally accept the materials for the purpose of recycling, reuse, salvage, or disposal.
Monitoring	Monitoring of the waste management performance will be carried out through quick daily site inspections and detailed weekly site inspections. Daily site inspections will include observation of the collection and storage of waste materials in the operation sites and waste disposal areas, and reviewing the daily records. The focus will be on efficiency of the collection, storage, and disposal; and on the quality of the records. The EHS Managers of the Project developer and the Contractor will jointly inspect the sites. In weekly site inspections, the EHS Manager will be participated by the Resident Engineer of the Project developer and the operation Manager of the Contractor. The inspection will cover verification of the records, disposal activities, discussion on the performance of the past week, and identification of problems, if any, that affect the waste management performance.
Reporting	• Report immediately to the relevant authorities any incident where harmful waste material is accidentally released to the environment. • In the event of an environmental incident, take such corrective or remedial action as is required to render the area safe and avoid or minimize environmental harm. • Monthly reports on the waste management results as part of the monthly monitoring reports. • Twice a year reports for submission to MONREC and Port Authority Department.
Area	• Project site
Responsible Agency	• Sub-contractor (Waste management company)
Estimate Cost	• Include of operation cost.

APPENDIX 7A-6

WASTEWATER (FROM ONSHORE AREA AND VESSELS) MANAGEMENT PLAN

Element	Content
Objective	To ensure that all wastewaters generated during the operation will be adequately treated before discharging into the sea
Performance Indicators	Qualities of the treated effluent compared with the applicable effluent quality standards.
Sources	• Domestic wastewater generated by living activities of about 20 persons at peak of operation, estimated volume about 2.4 m^3/d. • Storm water with a return period of 5 years at small port approx. 84,218 m^2.
Applicable Standards	**Effluent quality standards:** • General Guideline of Site Runoff and Wastewater Discharges (operation phase), National Environmental Quality (Emission) Guidelines (Final Draft), 2015 • Environmental, Health, and Safety-General Guidelines Environmental Wastewater and Ambient Water Quality, April 30, 2007 (World Bank Group/IFC); Standard (both from Myanmar and World Bank Group/IFC Guidelines) - Oil and Grease = 10 mg/L - pH = 6-9 - Total Suspended Solid = 50 mg/L - BOD = 30 mg/L - Total Nitrogen = 10 mg/L
Mitigation Measures	**Design Concept** The Contractor will prepare detailed design of a wastewater management system for the Small Port operation site. The wastewater management system will consist of a collection system and a simple treatment system. The proposed design concept is based on the principle of wastewater segregation, treatment and reuse as briefly described below: • **Surface Runoff** - The site preparation activities, including land clearing and site filling and compaction, should be carried out during the dry season to avoid the problem of surface runoff with high turbidity discharging into the open sea or nearby drainage channels, if exist. - The operation site should be surrounded by temporary fences to limit the amount of sediment that could be washed from the operation area during the raining time into the sea. - To prevent contamination of the surface runoff, potential contamination sources will be covered with roof. The surface runoff would contain only suspended solids washed out from the open area. - Construct a temporary drainage system to collect the surfaced runoff from the operation area to avoid the discharge of surface runoff into the open sea. - The collected storm water will be drained into a retention pond for removal of suspended solids before discharging into the sea or a nearby drainage channel, if exist. After the operation, the retention pond will be retained and used for wastewater management during the operational phase. • **Domestic Wastewater**

Element	Content
	- Toilet wastes will be separated from grey water or salvage. - Kitchen and canteen waste water will be discharged into oil and grease trap tank before draining into a retention pond. - Toilet wastes will be discharged into a septic tank (or more than one septic tank) with a hydraulic retention time of about 5 days. - Grey water will be discharged into the retention pond. - The retention pond will be designed as an oxidation pond with a hydraulic retention time of about 7 days. • **Operation Wastewater** - Operation wastewater will be mainly wash water. It may contain oil and grease and chemicals. The wash water that contains oil will be treated in a simple oil removal tank before combining with wash water from other sources. The wash water will be discharged into the retention pond. • **Ship Wastes** - The port operation office will need to enforce appropriate controls on the discharge of ship wastes in line with MARPOL. - In addition, the port operation office will need to prepare a contingency plan and establish an organization for implementing the plan including reporting system to effectively handle oil and chemical spillage incidents from ships.
Monitoring	• Twice a year collection of one water samples at Effluent from release point of temporary drainage system. The treatment performance of the drainage system will be assessed from the monitoring data.
Reporting	• The results of monitoring will be presented in the monitoring reports. • Twice a year reporting on wastewater performance, and submit to MONREC and Port Authorities Department.
Area	• Project site
Responsible Agency	• Sub-contractor (Waste management company)
Estimate Cost	• 600 USD/station/time

APPENDIX 7A-7

HAZARDOUS WASTE MANAGEMENT PLAN

Element	Content
Objectives	• To minimize all types of hazardous wastes generated at the operation sites, particularly the Small Port operation site that will have to be disposed. • To minimize environmental impacts of waste disposal.
Performance Indicators	Number of complaints related to hazardous waste disposal.
Sources	Hazardous waste: Includes such wastes as spent lubricating oil, paints, and chemicals used in the operation. Most of the hazardous wastes are in liquid form.
Applicable Standards	Applicable guidelines and standards regarding the management and disposal of the three categories of hazardous wastes as prescribed by MONREC or enforced by the local government, whichever are more stringent.
Mitigation Measures	• Hazardous wastes will be handled by a licensed hazardous waste contractor. If this service is not available, the Contractor will need to find appropriate arrangements for incineration, safe permanent storage, or other appropriate methods of disposal. • A Hazardous Waste Management System covering waste classification, separation, collection, storage, transfer and disposal should be set up and operated. The waste management system will comply with applicable regulation of the government, if any.
Monitoring	Monitoring of the hazardous waste management performance will be carried out through quick daily site inspections and detailed weekly site inspections. Daily site inspections will include observation of the collection and storage of hazardous waste materials in the operation sites and hazardous waste disposal areas, and reviewing the daily records. This will be focused on efficiency of the collection, storage, and disposal; and on the quality of the records. The EHS Managers of the Project developer and the Contractor will jointly inspect the sites. In weekly site inspections, the EHS Manager will be participated by the Resident Engineer of the Project developer and the operation Manager of the Contractor. The inspection will cover verification of the records, disposal activities, discussion on the performance of the past week, and identification of problems, if any, that affect the waste management performance.
Reporting	• Report immediately to the relevant authorities any incident where harmful waste material is accidentally released to the environment. • In the event of an environmental incident, take such corrective or remedial action as is required to render the area safe and

Element	Content
	avoid or minimize environmental harm. • Monthly reports on the waste management results as part of the monthly monitoring reports. • Twice a year reports for submission to MONREC and Port Authorities Department.
Area	• Project site
Responsible Agency	• Sub-contractor (Waste management company)
Estimate Cost	• include on operation cost

APPENDIX 7A-8

NAVIGATION MANAGEMENT PLAN

Element	Content
Objective	• To minimize potential impacts from navigation activities to the local fishermen during operation phase
Performance indicators	• Number of navigation accident in the identified impact areas • Number of vessels during the operation phase.
Sources	• Navigation disturbances could be caused by haulage of materials, equipment for related project in Early Industrial Phase, and maintenance dredging activities. • Potential impact areas: the area situated nearby small port
Management guidelines	• Take reasonable and practicable measures to avoid, or mitigate and manage the potential navigation impacts on navigation route of local fishermen near the worksites. • Minimize as far as reasonably practicable, potential navigation disruptions to the operation of the navigation route due to the transport of materials to and maintenance dredging activities.
Mitigation Measures	• The port will have a vessel traffic management system to ensure navigation safety and keep records of vessels calling at the port. • The navigation area will have adequate number of buoys and signs to clearly indicate the navigation channel and the port boundary.
Monitoring	• Monitor number of vessel and boat two time per year at small port area. • Monitor navigation accident situation related to the project every day at Small Port.
Reporting	• Monthly report on navigation conditions, including any accidents. • Twice a year reporting on navigation performance, and submission to MONREC and Port Authorities Department.
Area	• Project site (offshore area)
Responsible Agency	• Project developer
Estimate Cost	• 500 USD/station/time for monitoring number of vessel and boat at small port area throughout operation phase • Cost for monitoring navigation accident situation related to the project include on cost for operation.

APPENDIX 7A-9

TRAFFIC MANAGEMENT PLAN

Element	Content
Objective	• Manage operation traffic and transport issues to minimize potential impacts on the communities and the operation of the road network and navigation/shipping
Performance indicators	• Number of traffic accidents in the identified impact areas • Number of traffic on local roads during the Operation phase.
Sources	• Traffic disturbances could be caused by haulage of spoil, fill materials, operation materials and plant equipment. • Potential impact areas: local roads
Management guidelines	• Take reasonable and practicable measures to avoid, or mitigate and manage the potential traffic impacts on communities near the worksites. • Minimize as far as reasonably practicable, potential traffic disruptions to the operation of the road network and the public transport network due to the transport of materials to and from the Small Port sites. • Monitor traffic flows near project site and take corrective action in response to traffic impacts as a consequence of operation works.
Mitigation Measures	• Strictly enforce the traffic regulations (on drivers and pedestrians) to reduce road traffic accidents • Construction the bridge at Nga Pitat village for local villagers and children walk across the project coastal road. • Prepare and implement an improvement program for improving safety of the local road network/navigation/shipping to cope with expected increase in traffic volume during Small Port operations.
Monitoring	• Monitor number of vehicles two times per year at 2 sampling stations include 1) small port area and 2) at Nga Pitat Village. • Monitor traffic accident situation related to the project every day at project access road/ or even navigation.
Reporting	• Monthly report on local traffic conditions, including any accidents involving operation traffic. • Twice a year reporting on traffic performance, and submission to MONREC and Port Authorities Department.
Area	• Project site (Onshore) and Project Access Road (at Nga Pitat Village)
Responsible Agency	• Project developer
Estimate Cost	• 500 USD/station/time throughout operation phase • Cost for monitoring vehicle accident situation related to the project include on cost for operation.

APPENDIX 7A-10

SHORELINE EROSION

Element	Content
Objective	To minimize erosion and accretion impact on the beach along two breakwaters.
Performance Indicators	Erosion and accretion rate of beach along two breakwaters.
Mitigation Measures	• Recheck and reclaim sand (bleach nourishment) on the eroded beach on the shoreline of Project site every year. • Based on limited physical and environmental information available, as well as engineering judgment, Regular shoreline monitoring is recommended to gain the necessary information and prepare the setback line or beach erosion protection with hard structure such as groynes if high erosion on the shoreline.
Monitoring	• Twice a year monitor on beach profile and bathymetric survey at 1 km north and south of beach along the port development • Monthly checking shoreline erosion at 5 km of beach along the port development
Reporting	• The results of monitoring will be presented in the monitoring reports. • Twice a year reporting on beach erosion, and submit to MONREC and Port Authorities Department.
Area	• Project site (shoreline)
Responsible Agency	• Project developer
Estimate Cost	• 750,000 USD lump sump (approx. 10,000 USD / year) for shoreline erosion control throughout operation phase • 10,000 USD / time for beach profile monitor yearly throughout operation phase

APPENDIX 7A-11

OHS MANANGEMENT PALN

Element	Content
Objective	To establish best practicable OHS conditions to ensure work related health and safety of operational personnel.
Performance Indicators	• Total Recordable Injury Frequency Rate (TRIFR) • Lost Time Injury Frequency Rate (LTIFR) • Medical Treatment Injury Frequency Rate (MTIFR) • Duration rate • Incident rate
Sources	Issues of concern: excessive noise and temperature inside the power plant, fire and explosion risks.
Applicable Standards	OHS guidelines and standards enforced by the Ministry of Health and proposed for this Project as follows:
Mitigation Measures	**Design and Equipment Selection** (1) Incorporate in the EPC contract, all OHS requirements that the EPC contractor will in the design of the project and associated facilities, including equipment selection; give due consideration to, but not limited to, the following OHS requirements: (i) integrity of workplace structures; (ii) standard operating procedures for process shutdown, including emergency plan; (iii) work space and exit; (iv)fire precautions; (v) toilets and showers; (vi) potable water supply; (vii) clean eating area; (viii) lighting; (ix) safe access; (x) first aid; (xi) air supply and ventilation; (xii) work environment temperature; (xiii) noise and vibration; (xiv) electrical safety; (xv) fire and explosions; and (xvi) confined working space. (2) The EPC contractor will be required to prepare for consideration of the Project developer an OHS management plan and implementation procedures specific to the power plant of this Project and in line with the Owner's OHS policy and procedures. The OHS management plan and implementation procedures will be submitted not later than one month before commissioning of Small Port and associated facilities. (3) The OHS management plan and implementation procedures will cover but not limited to the following subjects: • Organization and responsibilities of OHS management • Training plan • Communication plan • Contractor responsibilities

Element	Content
	• Safety measures for the Small Port's O&M, including-safety in project operations, fire, explosion, and chemical hazards. • Emergency response procedures. • Task-specific work requirements Compliance monitoring and evaluation plan • Audit plan • Reporting system • Documentation system **During Project Commissioning** During project commissioning, the EPC contractor will be required to conduct necessary orientation and training to the Owner's Small Port operational team to ensure that the operational team clearly understands the OHS plan and implementation procedures. **During Operations** The Plant Manager will implement the OHS plan and procedures as part of his operational control and management. The EHS Manager will monitor the implementation of OHS procedures to comply with relevant requirements.
Monitoring	Monitoring of OHS performance of the Contractor will be made through: • Daily informal inspections (walk through of the construction sites) • Weekly formal inspections of the work place. • Monthly formal inspections of the work place. • Audits • Corrective Action Reports The daily inspections will observe: (i) adherence of the operational personnel to the OHS procedures such as wearing of protective equipment in high risk working areas; (ii) working conditions; (iii) readiness of fire and life safety systems as relevant; and (iv) potential new hazards. The daily inspections will be carried out by the EHS Manager, the Operational Manager, and relevant unit heads. The Manager will occasionally join the daily inspections. The EHS Manager

Element	Content
	will prepare daily OHS inspection notes as part of the site inspection notes. The weekly formal inspections will be carried out at weekly interval sand shall be documented using appropriate "Weekly OHS Inspection Checklists". The EHS Manager and the Operational Manager will carry out the weekly inspections. The weekly inspections will include the same issues as the daily inspections but will be in more details and quantitative. The monthly formal inspections will review the OHS performance of the month based on results of the weekly inspections. Progress in addressing issues or problems identified in the precedent weekly inspections will be evaluated. Internal audits will be carried out annually or more frequent if the OHS performance is significantly below established targets. The internal auditor or team will be engaged by the power plant company's Board of Directors. Monitoring results will be discussed in monthly review meetings on power plant performance.
Reporting	• Monthly as part of the monthly monitoring reports except in case of an incident when reporting should occur immediately on completion of any investigation required to resolve the incident. • Results of OHS monitoring will be reported: - Twice a year reports will be submitted to MONREC and Port Authorities in the first five year after commissioning. - Annually report will be submitted to MONREC and Port Authorities throughout the Project life.
Area	• Project site
Responsible Agency	• Project developer (OHS Team)
Estimate Cost	• include operation cost

APPENDIX 7A-12

SOCIAL ENVIRONMENTAL MANAGEMENT PLAN AND CSR PROGRAM

Element	Content
Objective	Avoid or mitigate and manage operation impacts on the social environment. *Note: The social environment includes residential and neighborhood amenity, connectivity, community health, community diversity, social infrastructure provision, livelihood and safety.*
Performance Indicators	• Number of grievances or complaints filed with the Project Management Office of the Project developer. • Number of complaints successfully responded.
Sources	Daily living of people in the surrounding communities may be disturbed or inconvenienced by environmental disturbances caused by the operation such as noise, air quality, navigation not satisfaction with marine resources utilization. The management of social environment will cover villages (sensitive receptors).
Applicable Standards	The target for the entire operation period of about 50 years is all complaints are responded by the EPC and filed with the Project Management Office.
Mitigation Measures	Mitigation measures for minimizing physical impacts on the social environment are prescribed in relevant sub-plans, such as noise, air quality and wastewater management. Mitigation measures in this sub-plan are community measures designed to support the implementation of the physical measures. The basic requirement is that the communities have access to the communication and complaints process to address and respond to their complaints related to the construction impacts on their daily living and properties. Establish the CSR Program to implement and support public relations and mitigation measures. **Amenity and Community Life** • Liaise with key stakeholders and the community through a public consultation process to ensure insignificant impacts of the construction on community facilities, schools and monastery. • As soon as it is practicable after the completion of construction, the Contractor shall reinstate community facilities affected by the works, if any.

Element	Content
	• Continue restore livelihoods through provision of knowledge for strengthening occupation career as proposed during construction phase • Conduct attitude survey to collect information on local concerns, issues, and problems of the communities in the new alternative fishing ground and boatyard area (should be all households in Villages). **Complaints and Corrective Actions** • Develop an effective and responsive system for receiving, handling and responding to complaints received during the construction of project works. • Ensure complaints are received and responded to on a 24-hour per day basis for the duration of the construction phase. • Provide reporting on complaints received, responses provided, timeliness of responses, and corrective actions taken on a monthly basis. • Raise community awareness of the complaints systems and procedures through public notifications and website facilities. **Community Consultation Program** • Undertake and maintain a comprehensive community information program to inform residents, businesses, community groups and motorists of Project activities and potential impacts. Effective and accessible consultation measures are required including maintenance of a 24-hour contact line operated by a person with authority to stop works if goals and agreements with the community are not met. • Ensure medical facilities, community centers, monastery and schools in the area have access to construction updates and community education during the construction. • Training and promotion household account record. • Support on development program such as electricity supply, improve on local road, education, health, religions, and occupation promotion in CSR Program
Monitoring	• Evaluate effectiveness of consultation, liaison and mitigation outcomes. • Survey and report on actual impacts of the operation on community amenities. • Report community consultation's activities and on consultation, liaison and environmental compliance and public transport access in work site neighborhoods.
Reporting	• Report immediately in case of complaint from a neighbor. • CSR Program will be reported: - Twice a year reports will be submitted to MONREC and Port

Element	Content
	Authorities in the first five year after commissioning. - Annually report will be submitted to MONREC and Port Authorities throughout the Project life.
Area	• Villagers (PAPs)
Responsible Agency	• Project developer
Estimate Cost	• 240,000 USD lump sump for group interview or village forum at 5 affected villages throughout operation phase • 2,000 USD / year for development fund during 1^{st}-5^{th} years of operation phase • 1000 USD / year for development fund during 6^{th}- throughout operation phase.

APPENDIX 7A-13

VESSEL TRAFFIC AND SAFETY MANAGEMENT SYSTEM

Element	Content
Objective	• To establish and develop a vessel traffic system, to build safe working condition of the environment and less effect on other vessel of traffic flow. • To prevent and minimize unexpected incidents/accident during operation phase of Small Port Project.
Performance Indicator	• Record of incidents/accidents.
Mitigation Measures	• Provide a training program/workshop.
Monitoring	• Monitor on traffic system (effectiveness and safety) within the small port and other vessel traffic system connected to the project area.
Reporting	• Results will be included in the environmental monitoring reports and submitted to MONREC and Port Authorities Department.
Area	• Within offshore area (project site and other vessel traffic system)
Responsible Agency	• Project developer (Navigation/traffic Team)
Estimate Cost	• include on operation cost

APPENDIX 7A-14

OPERATION STAFFMANAGEMENT PLAN

Element	Content
Objective	• To manage staff resources throughout the life of project. • To ensure that sufficient staff processing the correct skill sets and experience to ensure a successful project completion.
Performance Indicator	• Operation staff meet the target/goal of proposed plan (percentage). • Results/products meet the standard requirement used for the Small Port Project.
Mitigation Measures	• Provide a training program for operational staff. • Incentive idea for achieving goals.
Monitoring	Set Key Performance Indicators (KPIs) for operation staff (individual staff or department).
Reporting	• Results will be included in the environmental monitoring reports and submitted to MONREC and Port Authorities Department.
Area	• Project site/or outside.
Responsible Agency	• Project developer (HR Team)
Estimate Cost	• include on operation cost

APPENDIX 7A-15

EMERGENCY MANAGEMENT PLAN

(FLOOD, TSUNAMI AND CYCLONE)

Element	Content
Objectives	• To minimize impacts in case of emergency during operation phase. • To acknowledge and raise awareness of operation staff to evacuate, shelter or lockdown can save lives.
Performance Indicator	• Number of staff understand about emergent situation and know how to minimize/survive from the hostile situation (flood, tsunami and cyclone). • Conduct a test (pre-test and post-test) to evaluate their understanding.
Mitigation Measures	• Provide training program about emergency plan in orientation program. • Practice emergency plan every year taught by experts.
Monitor	• Results of pre-test and post-test of construction workers (understanding and application of knowledge).
Reporting	• Results of pre-test and post-test/yearly emergency practice, directly reporting to project developer.
Area	• Project sites (onshore and offshore).
Responsible Agency	• Project developer • Operation staff
Estimate Cost	• include on operation cost

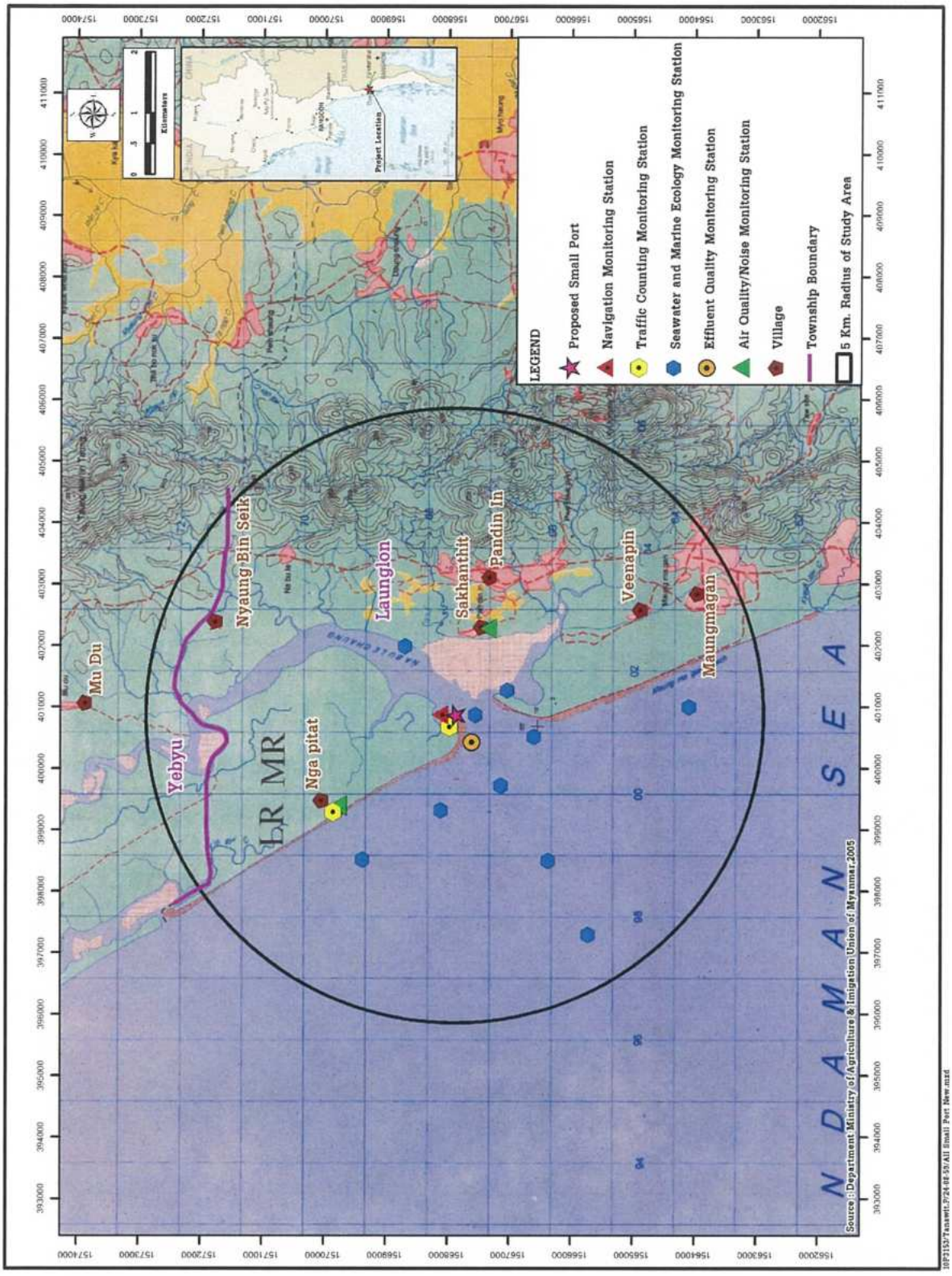


FIGURE 1 : MONITORING STATION DURING OPERATION PHASE

APPENDIX 9A

PRELIMINARY ENVIRONMENTAL AND SOCIAL COST ESTIMATION

APPENDIX 9A

PRELIMINARY ENVIRONMENTAL AND SOCIAL COST ESTIMATIOIN

A. Annual Budget during 15 months of Pre-construction and Constrution Phase

No.	COST ITEMS	Unit Cost		Frequency	Sampling Station	Total Cost (US$)
		US$	Units			
1	Environmental monitoring during the pre- construction/ construction period					
	air quality (3 stations)	800	Station	1 time/three months (5 time during pre-construction/construction Phase)	3 stations at project site, Nga Pitat and Sakhanthit Village	12,000
	noise measurement (3 stations)	700	Station	1 time/three months (5 time during pre-construction/construction Phase)	3 stations at project site, Nga Pitat and Sakhanthit Village	10,500
	coastal water measurement (10 stations)	500	Station	1 time/ months (15 time during pre-construction/construction Phase)	10 stations at proposed approach channel and 1 km radius	75,000
	marine ecology measurement (10 stations)	1,000	Station	1 time/ months (15 time during pre-construction/construction Phase)	10 stations at proposed approach channel and 1 km radius	150,000
	wastewater measurement (1 station)	600	Station	1 time/ months (15 time during pre-construction/construction Phase)	1 stations at discharge point	9,000
	traffic flows measurement (1 stations)	500	Station	2 times per year during pre-construction/operation phase	2 station at project access road near Nga Pitat Village and Small Port Area	2,000
	navigation flows measurement (1 stations)	500	Station	2 times per year during pre-construction/operation phase	1 station at access channel	1,000
	flora and fauna field survey	6,000	Lumpsum	1 time before site clearance	100 acre of proposed project site and 42 acres at Project Access Road	6,000
2	OHS Management Plan	-	Include Construction Cost	Every day	Construction Site and Surrounding Area	a
3	For natural resource used management and Village Forum	200,000	Lumpsum	Every day	At 5 affected villages	200,000
	TOTAL					465,500
	CONTINGENCY (APPROX. 10%)					46,550
	GRAND TOTAL					512,050

Remark : a = include on construction cost prepared by sub-contracter

APPENDIX 9A

PRELIMINARY ENVIRONMENTAL AND SOCIAL COST ESTIMATIOIN (CONT'D)

B. Annual Budget during Operation Phase (75 years, 50 years operation plus 25 years extensions)

No.	COST ITEMS	Unit Cost		Frequency	Sampling Station	Annual Budget During Operation Phase (US$)	
		US$	Units			From year 1 to year 5 of operaiton	From year 6 and throughout operation (total 70 years)
1	Environmental monitoring during the operation period						
	air quality (2 stations)	800	Station	twice a year during 1st-5th year of operation phase and 1 time per year throughtout operation phase	at Nga Pitat Village near Project Access Road and at Sakhanthit near Small Port Project	16,000	112,000
	noise quality (2 station)	700	Station	twice a year during 1st-5th year of operation phase and 1 time per year throughtout operation phase	at Nga Pitat Village near Project Access Road and at Sakhanthit near Small Port Project	14,000	98,000
	wastewater measurement (1 stations)	600	Station	twice a year during 1st-5th year of operation phase and 1 time per year throughtout operation phase	1 stations at discharge point	6,000	42,000
	coastal water measurement (10 stations)	500	Station	twice a year throughtout operation phase during dredging activities and after complete maintenance	10 stations at proposed approach channel and 1 km radius	5,000	70,000
	marine ecology measurement (10 stations)	1,000	Station	twice a year throughtout operation phase during dredging activities and after complete maintenance	10 stations at proposed approach channel and 1 km radius	10,000	140,000
	navigation flows measurement (1 stations)	500	Station	twice a year throughtout operation phase	1 station at access channel	5,000	70,000
	traffic measurement (2 stations)	500	Station	twice a year throughtout operation phase	2 station at project access road near Nga Pitat Village and Small Port	5,000	70,000
	mangrove reforestation rehabilitation and maintenance program (10 year	200,000	Lumpsump	during 1st-10th year of operation phase	at reforestation area	100,000	100,000
	support local villagers in rehabilitation activities (10 years)	1,500	time	during 1st-10th year of operation phase	at reforestation area	7,500	7,500
	Shoreline Erosion	750,000	Lumpsump	everyday	5 km of breakwater	50,000	700,000
	Beach Profile	10,000	time	Monthly	beach in front of project site and 5 km of breakwater	100,000	1,400,000
2	OSH Management Plan	-	Include Operation Cost	Everyday	Project Site	b	b
3	Social development and livelihood support for PAPs						
3.1	Development Fund during 1st-5th year	2,000	time	During 1st-5th of opration phase	at five affected village	10,000	-
3.2	Development Fund during 6th to throughout operation phase	1,000	time	During 6th-throughout opration phase	at five affected village	-	70,000
3.3	Village forum	3,000	Lumpsum	2 times per year during 1st-5th of opration phase and once a year throughout operation	at five affected village	30,000	210,000
	TOTAL					358,500	3,089,500
	CONTINGENCY (APPROX. 10%)					35,850	308,950
	GRAND TOTAL					**394,350**	**3,398,450**
							3,792,800

Remark : b = include operation cost prepared by project proponent