



Brighter Energy

Petroleum Terminal and Storage Project, Thilawa, Myanmar

Environmental Impact Assessment
Report

31 January 2024 (Revised)

Resource and Environment Myanmar Company Limited



Resource and Environment Myanmar Ltd.
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DECLARATIONS

DECLARATION - EIA Experts

Resource & Environment Myanmar Co., Ltd. (REM); a local environmental consultant firm, conducted environmental impact assessment and prepared Environmental and Social Impact Assessment report for “**Petroleum Terminal and Storage Project, Thilawa, Myanmar by Brighter Energy Co., Ltd**” in compliance with EIA Procedure (December 2015) and other relevant laws/rules and formally submitted to the Environmental Conservation Department (ECD) for final approval.

We do state, to the best of our knowledge at the time of report preparation, that

- To our knowledge, all information contained in this report is accurate and a truthful representation of all findings as relating to the project, and ;
- The ESIA Report has been prepared in strict compliance with all applicable laws, rules regulations and procedure in force.

We also consulted to the **Brighter Energy Co., Ltd** to undertake that; the **Brighter Energy Co., Ltd** in respect of the “**Petroleum Terminal and Storage Project, Thilawa, Myanmar**” which is referred as the “**Project**” herein)” will at all times comply fully with

(1) any and all commitments and obligations as set forth in the Environmental and Social Impact Assessment Report which has been reviewed by Review Team, and

(2) any and all plans and the various components thereof, including without limitation, impact avoidance, mitigation, and remediation measures, and with respect to such commitments, obligations, plans and measures related to the development, construction, commissioning, operation and maintenance of the project, and any circumstance in which work done or to be done, or services performed or to be performed, in connection with the project’s development.



Win Naing Tun

Team Leader

Resource & Environment Myanmar Co., Ltd. (REM)

Date:31st January 2024



Brighter Energy
Company Limited

Letter No. BE 129/2024

Date: 27th February 2024

To:

Director General

Environmental Conservation Department

Ministry of Natural Resource and Environmental Conservation Nay Pyi Taw,

The Republic of the Union of Myanmar

Subject: Commitment Letter for comply and follow the Environmental Management Plan that mentioned in the EIA report that prepared for the Project " Petroleum Terminal and Storage Project, Thilawa, Kyauktan Township, Yangon Region, Myanmar".

Dear Sir,

We refer to the captioned EIA report, which has been prepared and finalized by Resource and Environment Myanmar Co., Ltd in compliance with EIA procedure (December 2015) and other relevant law/rules and formally submitted to the Environmental Conservation Department.

We believe, to the best of our knowledge at the time of writing, that;

The EIA report is accurate and complete, and;

The EIA report has been prepared in strict compliance with applicable laws, rules, regulations, and procedures in force.

We hereby undertake that;

Brighter Energy Company Limited, Myanmar, In respect of the "" Petroleum Terminal and Storage Project will at all times comply fully with (i) any and all commitments and obligations as set forth in the ESIA report which has been reviewed by Review Ream of MONREC, and (ii) any and all plans and the various components thereof, including without limitation, impacts avoidance, mitigation, and remediation measures, and with respect to both (i) and (ii), including but not limited to such commitments, obligations, plans and measures related to the construction, operation and decommission phase of the project.

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Brighter Energy
Company Limited

During operation of the Project, "Petroleum Terminal and Storage Project, Thilawa, Kyauktan Township, Yangon Region" Myanmar will comply and follow the Environmental Management Plan that mentioned in the EIA report that prepared by Resource and Environment Myanmar Co., Ltd. Besides, Petroleum Terminal and Storage Project, Thilawa, Kyauktan Township, Yangon Region, Myanmar will submit the Environmental Monitoring Report during operation of the Project to Environmental Conservation Department, Ministry of Natural Resource and Environmental Conservation.

With best regards,

Kaung San (Mr.)

Director

Brighter Energy Company Limited

Initial findings and comments for Petroleum Terminal and Storage Project of Brighter Energy in Thilawa (December 2021) and responds and actions from ERM/ REM

No.	Findings	ECD Comments	Response
1.	Executive Summary		
a	At section 1.7, only name of sub-plans are described. Managements actions of those sub-plans – that are to be carried out are not included in summary.	- At executive summary section 1.7, not only the names of sub-plans, but also management actions – that are to be carried out are to be included in summary.	- Summary of management actions of sub-plans included in Table 1-5 Management actions to their respective management plans.
2.	Introduction		
a	At page 26, there is “BE company registration document is attached in Error! Reference source not found.”	- To fix this.	- Updated as BE company registration document is attached in page 383.
3.	Policy, Law and Regulations		

No.	Findings	ECD Comments	Response
a	Project proponent's environmental and social policies are not included.	<ul style="list-style-type: none"> - To include project proponent's environmental and social policies if there is any. 	<ul style="list-style-type: none"> - BE's E&S policy is attached in Appendix J.
b	<p>At section 3.2.5, among guidelines of <i>World Bank Group (WBG) Environmental, Health and Safety (EHS) guidelines (General Guidelines, EHS Guideline for Crude Oil and Petroleum Product Terminals (2007), EHS Guideline for Ports, Harbors and Terminals (2017), EHS Guideline for Ports, Harbors and Terminals (2017))</i>, there is no description of which items/points from this guidelines that the project will follow.</p>	<ul style="list-style-type: none"> - To include the items/points from these guidelines that the project will follow. - 	<ul style="list-style-type: none"> - Updated.
4. Project Description and Alternatives			

No.	Findings	ECD Comments	Response
a	Section 4.1, summary of project and its components locations are included.	<ul style="list-style-type: none"> - Detailed description of Project Location (coordinate locations, ward, and street) are to be included. - Project background, the reason to implement the project and objective of project are to be included. 	<ul style="list-style-type: none"> - The project location is “MEC Compound, Thidar Myaing Ward, Kyauk Tan Township, Yangon” and the Kyaik kauk road headed to the Project area.
b	No description of required raw materials, resources (water, energy) and their types and quantities for construction and operation.	<ul style="list-style-type: none"> - To include descriptions of required raw materials, resources (water, energy) and their types and quantities for construction and operation. 	<ul style="list-style-type: none"> - BE: Please include the types of raw materials such as aggregate, sand, water, power etc and its usage volume. (both construction and operation phases)
c	Page 54, section 4.1, Tank design, tank technology and tank spacing information are not included.	<ul style="list-style-type: none"> - To include tank design, tank technology and tank spacing information. 	<ul style="list-style-type: none"> - Tank design and technology will be referred to the document BE-CPP-101-EG-DB-0001 Rev.B - Tank drawing attached in appendix.
d	Page 61, section 4.4.1: reason for selection of Jetty Design and the selected design and drawing photos are not included.	<ul style="list-style-type: none"> - To include reason for section of Jetty Design and selected design and drawing photos. 	<ul style="list-style-type: none"> - The jetty terminal is designed for up to 25,000 DWT (deadweight tonnage) tankers and 2,000 DWT barges. There will be a working platform with four (4) mooring dolphins, which will be connected to the shore through a 9 m x 249.5 m trestle. A retaining wall (revetment) will be built along the shore for

No.	Findings	ECD Comments	Response
			coastal protection. The water depth at the jetty and the turning basin will be approximately -10.7 m chart datum.
e	Page 73, section 4.4.4 described that “General construction waste will comprise of surplus or off-specification materials. A Waste Management Plan will be implemented during the construction phase” but type, volume and disposal methods for waste generated from project are not included.	<ul style="list-style-type: none"> - To include type, volume and disposal methods for waste generated from project. 	<ul style="list-style-type: none"> - Answered is attached in Appendix.
f	Details of hazardous materials usage, storage, handling and generated amount are not designated, described or included.	<ul style="list-style-type: none"> - To describe if there will be hazardous materials usage, storage and handling or not. - If yes, the type, amount, storage and handling methodology are to be included. 	<ul style="list-style-type: none"> - The project will use, store and handling hazardous materials during construction and operational phases and the handling of hazardous materials included in Safety, Security, Health and Environmental Management Plan. - Large releases of hazardous materials from equipment and storage are rare because those are designed and built specifically to prevent release applying the most advanced technology.

No.	Findings	ECD Comments	Response
g	No description that the project will use Chemicals or not.	<ul style="list-style-type: none"> - To describe if project will use Chemicals or not. - If yes, the usage amount, storage and handling methods are to be included. 	<ul style="list-style-type: none"> - The project will use, store and handling hazardous materials during construction and operational phases and the handling of hazardous materials included in Safety, Security, Health and Environmental Management Plan. - Large releases of hazardous materials from equipment and storage are rare because those are designed and built specifically to prevent release applying the most advanced technology.
h	Dredging volume information was provided in page 61, section 4.4.1 and page 73, section 4.5.1 and it is described that dredging waste will be disposed at MPA approved location. To described if there will be Maintenance Dredging or not. If yes, times per year and dredging waste volume are to be included.	<ul style="list-style-type: none"> - To described if there will be Maintenance Dredging or not. - If yes, times per year and dredging waste volume are to be included. - To include the request status report for disposal of dredging waste at MPA approval location. 	<ul style="list-style-type: none"> - Appendix J - the maintenance dredging will be taken placed every two years as described in section 4.5.1. - Every two frequency and waste volume are expected about 1,100 M³ per time and f waste disposal at the place which has confirmed by MPA.

No.	Findings	ECD Comments	Response
i	Page 73, section 4.4.3 described Waste Water Management but effluent's type, volume, disposal location and methods are not included.	<ul style="list-style-type: none"> - To include effluent's type, volume, disposal location and methods. 	<ul style="list-style-type: none"> - Black and grey water will arise from the construction work force and facilities serving site workers.
j	Project Implementation Schedule is described in page 60, figure 4.5 but print page size is small and cannot view, revise with bigger paper size for clear view.	<ul style="list-style-type: none"> - To revise with bigger paper size for clear view for Project Implementation Schedule. 	<ul style="list-style-type: none"> - Print out in A3 size
k	Page 57, figure 4.2: Layout Map/ Plan is small and unclear that cannot view. To replace with more clear Layout Map.	<ul style="list-style-type: none"> - To fix this. 	<ul style="list-style-type: none"> - Print out in A3 size
l	Page 75, section 4.7 described that the Project considered Project location and	<ul style="list-style-type: none"> - To include "if no project situation". - Comparison of Project Location Alternatives and reasons for choosing. 	<ul style="list-style-type: none"> - consideration of project alternatives is a fundamental requirement in the planning of any project as a means of avoiding or reducing adverse environmental impacts and maximizing or enhancing project benefits.

No.	Findings	ECD Comments	Response
	<p>Jetty design for Project alternative. However there is</p> <p>(1) No description of “if no project situation”</p> <p>(2) No comparison with other project location alternatives</p> <p>(3) No comparison with other jetty design alternatives and reasons for choosing the design</p> <p>(4) No comparison with Petroleum Storage Tank Design alternatives and reasons for choosing the design.</p>	<ul style="list-style-type: none"> - Comparison of Jetty Design for Jetty Design Alternatives and reasons for choosing. - Comparison of Tank Design for Petroleum Storage Tank Design Alternatives and reasons for choosing. 	<ul style="list-style-type: none"> - Project Site Location – the proposed Project Site is located away from nearly village settlements. This option reduces the potential environmental and social impacts to nearby communities. In addition, the Project Site is located near existing road networks, which would reduce the requirements of temporary access road and permanent road construction and therefore reduce the associated potential environmental and social impacts on such construction. - Jetty Terminal Design – the jetty terminal will be a piled deck structure instead of formed by reclamation. The use of piled structure will reduce obstruction of river flow compared to a reclaimed area. In addition, unlike reclamation, piling will not require any filling works to be undertaken in the river, therefore reducing the potential water quality impacts related to the dispersal of suspended solids.
5.	Description of Surrounding Environment		
a	<p>At section 5.2, Study Area is 20 km, Area of Influence (AOI) is 5 km. Reasons of deciding</p>	<ul style="list-style-type: none"> - To include reasons for decision of Study Area as 20 km, Area of Influence (AOI) as 5 km. 	<ul style="list-style-type: none"> - Updated.

No.	Findings	ECD Comments	Response
	these radius is not included.		
b	<i>Air Quality, Surface Water Quality, Underground Water Quality, Noise and Vibration, Soil are sampled and assessed but Sediment Sampling is not done yet and only fish species survey are done for Aquatic Ecology.</i>	<p>There will be piling, dredging as well as jetty construction in project, therefore please undertake the following:</p> <ul style="list-style-type: none"> - To collect Sediment Sample and to survey Aquatic Ecology - To assess potential impact and - To develop mitigations measures and management plans. 	<ul style="list-style-type: none"> - ERM collected Sediment and Benthos samples and sent to the labs. But, not discussed about them in the report. Updated.
c	Table (5.2.1), Table (5.2.2), Table (5.2.3), Table (5.2.4), Table (5.2.5), Table (5.2.7) - <i>plants, Mammals, Fishes, Birds, Amphibians and Reptiles</i> are only compared with IUCN status but not compared with locally protected species.	<ul style="list-style-type: none"> - To compare with locally protected species and check if there are triggers. 	<ul style="list-style-type: none"> - BE will check in Monitoring stage.

No.	Findings	ECD Comments	Response
d	Section 5.8.9, No socio-economic data collection due to COVID-19, project affected persons are not measured and designated.	<ul style="list-style-type: none"> - To carryout primary socioeconomic data collection. - To investigate about land acquisition/ claiming and project affected persons are to be measured and designated. 	<ul style="list-style-type: none"> - REM conducted the socio-economic survey and added Social Assessment. - Please see 9.7 (page 306/351 to 373) - Land compensation is not necessary because BE company already finished the compensation process.
6. Impact Assessment and Mitigation Measures			
a	<p>Construction Phase Impact Assessment and Operation Phase Impact Assessment are included.</p> <p>Only land acquisition aspect is assessed at pre-construction phase.</p> <p>No assessment for Decommission Phase Impact.</p>	<ul style="list-style-type: none"> - To carry out additional assessment for Pre-Construction Phase Impact Assessment not only from Land acquisition aspect and for Other Project Pre-construction activities. - To assess and include Decommission Phase Impact Assessment. 	<ul style="list-style-type: none"> - BE will assess Decommission Phase Impact Assessment later on monitoring stage.
b	Pre-Construction Phase Impact Assessment at section 6.3.1 and at Section 6.4.7 -	<ul style="list-style-type: none"> - To carry out the primary socio-economic data collection. - To investigate about that there is land claiming or not. 	<ul style="list-style-type: none"> - Initially Updated by ERM. - REM already conducted the primary data (socio-economic survey) - REM added Social Assessment. - Please see 9.7 (page 306/351 to 373)

No.	Findings	ECD Comments	Response
	<p>Construction Phase Impact Assessment, it says there will be impact to Economy and Livelihood due to land acquisition by project and socio-economic data collection was not able to done due to COVID-19.</p> <p>Not included for primary socio-economic data collection, no information that there will be land claiming or not, not measured and designated for Project Affected Person due to land claiming so that these are to be find out, assessed and compensation plans are to be developed.</p>	<ul style="list-style-type: none"> - If yes, measure and designate Project Affected Persons and to assess the amount of impact and to develop compensation plans. 	
c	<p>At section 6.4.5 - Impacts to Aquatic Flora and Fauna, it says</p>	<ul style="list-style-type: none"> - Due to piling, dredging and construction of Jetty, not only fish species but also 	<ul style="list-style-type: none"> - The activities are already finished when REM take over the report from ERM. BE shall consider baseline data collection in monitoring stage.

No.	Findings	ECD Comments	Response
	<p>impact significant is Minor since there are only 19 fish species found. This is not applicable.</p> <p>Due to piling, dredging and construction of Jetty, not only fish species but also Aquatic Ecology will be impacted so that those impacts are need to be assessed.</p>	<p>Aquatic Ecology will be impacted so that those impacts are need to be assessed.</p>	
d	<p>At page (238) O.65 ??, this says that <i>“The Project will prepare and implement Risk Assessment Procedure in order to identify and mitigate any potential impact during the construction and operation phases”</i> but project did not included Risk Assessment</p>	<ul style="list-style-type: none"> - Risk Assessment Method, Risk Identification, Risk Possibility and Mitigation Measures are to be developed and assessed accordingly. 	<ul style="list-style-type: none"> - BE has already prepared Risk Assessment Procedure but failed to attach it in appendix.

No.	Findings	ECD Comments	Response
e	At Section 6.4 and 6.5, impact assessments Petroleum Storage Constructions and Jetty Constructions are mixed.	<ul style="list-style-type: none"> - Petroleum Storage Constructions and Jetty Constructions Impact Assessments and EMP are to be separated under each different title. 	<ul style="list-style-type: none"> - BE considered that although these are two different facilities, the impacts will remain on soil, surface/ground water quality, and aquatic biodiversity. It should be acceptable if it discusses separately with sub-headings under the relevant main impact discussions.
f	At section 7.1, Methodology and approach are included but it says that <i>“At this time, there is limited information on the other planned projects for the area and, as such, the cumulative impacts from subsequent projects should be considered as and when their development is confirmed. BE is committed to undertake the cumulative impact assessment should information of nearby projects become publicly available”</i> .	<ul style="list-style-type: none"> - To add in commitment table that cumulative impact assessment will be carried out. 	<ul style="list-style-type: none"> - Updated.
7. Environmental Management Plan and Monitoring Plan			

No.	Findings	ECD Comments	Response
a	<p>At table (8.3.8.4), only below items are included for piling, dredging and Jetty construction activities EMP and mitigations measures. Detailed Environmental Management Actions are required to be included.</p> <ul style="list-style-type: none"> - Survey the water depth and consider the requirement of dredging, - rather than the fixed schedule, Limit the dredging activities and its volume to its lowest as far as possible, - Dispose the dredged 	<ul style="list-style-type: none"> - Detailed Environmental Management Actions and Environmental Management Plan are to be developed for piling, dredging and Jetty construction activities impacts and to be included in this EIA report as Sub-management Plan. - As stated, dredged materials will be disposed only at MPA approved location, so to include that location, transportation methods, and current status of requesting MPA for approval for this location are to be included. 	<ul style="list-style-type: none"> - BE will follow MPA's approval of the dredging material disposal site location and transportation methods to send materials.

No.	Findings	ECD Comments	Response
	<p>materials only at location approved by the MPA</p> <ul style="list-style-type: none"> - Limit the dredging activities as far as possible 		
b	<p>At page (223) C3.7 says <i>"A flood control system will be set up and the constructed land will be placed above the flood line."</i> but in the report, what is Flood Line/Level of the project location, what is Flood Line/Level of constructed land and how it should be constructed and how flood control system will be constructed are not described.</p>	<ul style="list-style-type: none"> - In EIA report, what is Flood Line/Level of the project location, what is Flood Line/Level of constructed land and how it should be constructed and such suggestions are to be included and also flood control system to be constructed is need to be included. 	<ul style="list-style-type: none"> - BE needs to inform later.

No.	Findings	ECD Comments	Response
c	At section 8.3, it says <i>Monitoring of impacts (per year during the construction phase) is estimated to be approximately 100,000-200,000 USD</i> but at table 8.1/ 8.2/ 8.3 – for each Mitigations Actions’ estimated budget is not calculated.	<ul style="list-style-type: none"> - To calculate and include estimated budget for each Mitigations Actions in table 8.1, 8.2, 8.3. 	<ul style="list-style-type: none"> - the break down estimated budget for each mitigation action is expressed in Appendix J
d	At sections 8.4.1.4/ 8.4.2.4/ 8.4.3.4/ 8.4.4.4/ 8.4.5.4 – There are Error! Reference source not found.	<ul style="list-style-type: none"> - To fix these errors. 	<ul style="list-style-type: none"> - Fixed.
e	At section 8.4.5, Potential Project Affected Stakeholders are not designated and described. Also tentative schedule for Stakeholder engagement and Detailed Disclosure	<ul style="list-style-type: none"> - To update Stakeholder Engagement Plan with Detailed Management Actions such as tentative schedule for Stakeholder engagement and Detailed Disclosure Plan for Public Information Disclosure. 	<ul style="list-style-type: none"> - REM already done and added Stakeholder Meeting (Public Consultation Meeting and Disclosure) and engagement plan. - Please see 9.8 (page 328/374 to 381) - Land compensation is not necessary because BE company already finished the compensation process.

No.	Findings	ECD Comments	Response
	Plan for Public Information Disclosure are not described.		
f	At section 8.4.6, There are Error! Reference source not found.	- To fix this errors.	- Fixed.
g	At section 8.4.1, Waste types, volumes and disposal method are not included in Waste Management Plan.	- To include Waste types, volumes and disposal method.	- Included in Appendix J
h	There is no Risk Assessment Procedure included as Appendix this report although it says at page (255), <i>The Project will prepare and implement Risk Assessment Procedure in order to identify and mitigate any potential impact during the construction and operation phases.</i>	- To include Risk Assessment Procedure in this EIA report as appendix.	- Updated.

No.	Findings	ECD Comments	Response
i	At table 8.5, Responsibilities column, to remove term third party and replace with responsible person assigned by project proposal person. To include agreement between Brighter Energy and EPC Contractor about their role and responsibilities for implementation of Monitoring Programme for the Project (Construction Phase).	<ul style="list-style-type: none"> - At responsibilities column of Monitoring Programme for the Project (Construction Phase), to replace “Third Party” term with Project Proposal Person. - To include agreement between Brighter Energy and EPC Contractor about their role and responsibilities for implementation of Monitoring Programme for the Project (Construction Phase). - As it says EPC Contactor will carry out the Monitoring Programme for the Project (Construction Phase) tasks, their signed commitment for this is need to be included in the report or as appendix. 	<ul style="list-style-type: none"> - The agreement between Brighter Energy and EPC Contractor will make for implementation of Monitoring Programme for the Project (Construction Phase) based on their role and responsibilities. - BE has to be submitted the reference that EPC is committed to do the monitoring program of construction phase.
j	At table 8.5, Number of Monitoring Locations are described but Monitoring Location Coordinates are not included.	<ul style="list-style-type: none"> - To include Monitoring Location Coordinates for Table (8.5) Monitoring Programme for the Project (Construction Phase) 	<ul style="list-style-type: none"> - BE will submit the monitoring location coordinates if it is implemented.
k	At table 8.6, for monitoring plans for <i>Air Quality, Water Quality,</i>	<ul style="list-style-type: none"> - To include number of Monitoring Locations and Monitoring Point Coordinates for <i>Air Quality, Water</i> 	<ul style="list-style-type: none"> - BE will submit the monitoring location coordinates

No.	Findings	ECD Comments	Response
	<p><i>Surface Water, Underground Water, Noise and Vibration, Soil Quality,</i></p> <p>Number of Monitoring Locations and Monitoring Point Coordinates are not included.</p>	<p><i>Quality, Surface Water, Underground Water, Noise and Vibration, Soil Quality.</i></p>	
1	<p>At table 8.2/ 8.3/ 8.4/ 8.5/ 8.6/ 8.7 – responsibilities part, information about the responsible persons, organization, structure, position hierarchy and duties of Brighter Energy’s side is not included.</p>	<ul style="list-style-type: none"> - To include information about the responsible persons, organization, structure, position hierarchy and duties of Brighter Energy’s side who will be implementing EMP and Monitoring Programs. 	<ul style="list-style-type: none"> - The information is include in Appendix J.
m	<p>At section 9.6, there is Error! Reference source not found.</p>	<ul style="list-style-type: none"> - To fix this errors. - To include Grievance Mechanism Implementer Persons’ names, contacts, position hierarchy and structure. 	<ul style="list-style-type: none"> - Fixed - BE has to submit the Grievance Mechanism Implementer Persons’ names, contacts, position hierarchy and structure.
8.	Public Consultations and Disclosure		

No.	Findings	ECD Comments	Response
a	At page (276), there is Error! Reference source not found.	<ul style="list-style-type: none"> - To fix this errors. 	<ul style="list-style-type: none"> - Fixed
b	At table 9.4, Scoping phase Public Consultation (virtual online meetings) are included. For EIA, Public Consultation and socio-economic surveys were not able carry out due to COVID-19 and other situations.	<ul style="list-style-type: none"> - To hold Public Consultation and socio-economic surveys accordingly with <i>“Guidelines for Environmental and Social Data Collection for Environmental Impact Assessment Report during COVID-19 Pandemic”</i> and <i>“Guidelines for Public Consultations for ongoing projects during COVID-19 Pandemic”</i> announced by ECD and the results from these are need to be assessed, discussed and included in the report. 	<ul style="list-style-type: none"> - REM already done the Public Consultation Meeting. - REM added Public Consultations and Disclosure. - Please see 9.8 (page 329/374 to 381)
c	To include Plans for disclosure to local public about Project Stat-up time, Project Activities Timeline, Project Duration information in disclosure section.	<ul style="list-style-type: none"> - To include Plans for disclosure to local public about Project Stat-up time, Project Activities Timeline, Project Duration information in disclosure section. 	<ul style="list-style-type: none"> - Already done
9.	General		

No.	Findings	ECD Comments	Response
a	There are Error! Reference source not found in every chapter. To fix these all.		- Updated all referencing errors.
b	To include and update the conclusion and recommendations section with difficulties encountered at EIA reporting data collection and analysis, results of assessments, potential difficulties to be encountered by project proponent and such information.		

Document details	
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Date	31 January 2023
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Author	Resource and Environment Myanmar Company Limited (ERM's previous works are updated by REM)
Client Name	Brighter Energy Company, Ltd.

Petroleum Terminal and Storage Project, Thilawa, Myanmar

Environmental Impact Assessment Report

CONTENTS

1	EXECUTIVE SUMMARY	1
1.1	Introduction	1
1.2	Policy, Legal and Institutional Framework.....	1
1.3	Project Description and Alternatives	2
1.1.1	Petroleum Terminal and Storage Project Overview	2
1.1.2	Project Alternatives	5
1.4	Description of the Environment.....	5
1.1.3	Legally Protected National, Regional or State Areas	8
1.1.4	Physical Environment Baseline.....	8
1.1.5	Biological Environment Baseline.....	10
1.1.6	Social Baseline	13
1.5	Key Potential Impact and Mitigation Measures	14
1.6	Cumulative Impact Assessment.....	21
1.7	Environmental Management Plan	21
1.8	Public Consultation and Disclosure	31
2	INTRODUCTION	33
2.1	Overview.....	33
2.2	Presentation of the Project proponent	36
1.2	Presentation of the EIA Experts.....	36
2.3	REM EIA EXPERT TEAM.....	40
3	POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK.....	41
3.1	Corporate Environmental and Social Policies	41
3.2	Policy and Legal Framework.....	41
3.2.1	Myanmar EIA Procedure.....	41
3.2.2	Myanmar Legislation Relevant to the Project.....	43
3.2.3	Policies and Strategies relevant to the Project.....	55
3.2.4	International Agreements and Conventions	57
3.2.5	Good International Industry Practice Guidelines	58
3.3	Contractual and Other Commitments	59
3.4	Institutional Framework.....	60
3.5	Projects Environmental and Social Standards	61
3.5.1	General Guidelines	61
3.5.2	Industry-Specific Guidelines (Energy Sector Development)	64
4	PROJECT DESCRIPTION AND ALTERNATIVES.....	65
4.1	Project Location	65
1.3	Project Key Components	65
4.1.1	Jetty Terminal	65
4.1.2	Tank Farm (Diesel, Gasoline, LPG).....	67
4.1.3	Interconnecting Pipelines and Advanced Utilities.....	70
1.4	Pre-construction Phase.....	72
1.5	Construction Phase	72
4.1.4	Jetty Terminal	77
4.1.5	Construction Workforce	85
4.1.6	Wastewater Management	89
4.1.7	Waste Management.....	89
1.6	Operation Phase	91
4.1.8	Operational Overview	91
4.1.9	Operation Work Force.....	92
4.2	Decommissioning Phase	93

4.3	Project Alternatives.....	93
5	DESCRIPTION OF THE ENVIRONMENT	94
5.1	Introduction	94
5.2	Setting the Study Limits	94
5.3	Methodology and Approach	97
5.3.1	Environmental Baseline	97
5.3.2	Social Baseline	113
5.4	Public Administration and Planning	113
1.7	Legally Protected National, Regional or State Areas	114
5.4.1	Key Biodiversity Areas	117
5.4.2	Alliance for Zero Extinction Sites	117
5.4.3	Important Bird and Biodiversity Areas.....	117
5.4.4	World Heritage Areas.....	117
5.4.5	RAMSAR Sites.....	117
5.4.6	Endemic Bird Areas	117
5.5	Physical Characteristics.....	118
5.5.1	Ambient Air Quality	118
5.5.2	Ambient Noise.....	119
5.5.3	Geology, Topography and Soils.....	120
5.5.4	Climate.....	124
5.5.5	Natural Hazards	125
5.5.6	Water Resources	127
5.5.7	Traffic.....	133
5.5.8	Desktop Assessment Results	135
5.5.9	Field Survey Findings	137
5.6	Socio-Economic Components.....	154
5.6.1	Overview of Townships within the Study Area	154
5.6.2	Overview of Villages in Study Area	155
5.6.3	Demographic Conditions.....	157
5.6.4	Education	158
5.6.5	Public Health.....	159
5.6.6	Traffic and Transport.....	160
5.6.7	Living Conditions and Public Services	162
5.6.8	Income and Livelihood of the Study Area	167
5.6.9	Land Acquisition.....	168
5.7	Cultural Characteristics.....	168
5.8	Visual Characteristics	169
5.9	Summary	169
6	KEY POTENTIAL IMPACT AND MITIGATION MEASURES.....	172
6.1	Impact Assessment Methodology	172
6.1.1	Prediction of Impacts	173
6.1.2	Evaluation of Impacts.....	173
6.1.3	Impact Magnitude, Receptor/Resource Sensitivity and Impact Significance....	174
6.1.4	Identification of Mitigation and Enhancement Measures	183
6.1.5	Residual Impact Evaluation	184
6.1.6	Management and Monitoring	184
6.2	Identification of Impacts	184
6.2.1	Scoped Out Impacts	188
6.2.2	Scoped-In Impacts.....	188
6.3	Pre-Construction Phase Impact Assessment.....	191
6.3.1	Impacts to Economy and Livelihood	191
6.4	Construction Phase Impact Assessment	194

6.4.1	Impacts to Ambient Air Quality	194
6.4.2	Impacts to Ambient Noise	197
6.4.3	Impacts to Surface Water and Groundwater Quality	199
6.4.4	Impacts to Soil Quality and Topography	204
6.4.5	Impacts to Aquatic Flora and Fauna	206
6.4.6	Impacts to Community Health and Safety	208
6.4.7	Impacts to Economy and Livelihood	210
6.4.8	Impacts to Occupational Health and Safety	211
6.4.9	Impacts to Infrastructure Services.....	213
6.5	Operational Phase Impact Assessment.....	215
6.5.1	Impacts to Ambient Air Quality.....	215
6.5.2	Impacts to Ambient Noise	216
6.5.3	Impacts to Surface Water and Groundwater Quality	218
6.5.4	Impacts to Soil Quality	220
6.5.5	Impacts to Aquatic Flora and Fauna	221
6.5.6	Impacts to Community Health and Safety.....	222
6.5.7	Impacts to Landscape and Visual Character	224
6.5.8	Impacts to Economy and Livelihood	226
6.5.9	Impacts to Occupational Health and Safety	226
6.5.10	Impacts to Infrastructure Services.....	228
6.6	Unplanned / Accidental Events	229
6.6.1	Impacts from Spills and Leaks	229
6.6.2	Impacts from Vehicle Collision	233
6.6.3	Fire and Explosion	235
7	CUMULATIVE IMPACT ASSESSMENT.....	238
7.1	Methodology and Approach	238
7.2	Cumulative Impact Assessment.....	238
8	ENVIRONMENTAL MANAGEMENT PLAN	239
8.1	Project Description.....	239
8.2	Summary of Impacts and Mitigation Measures	239
8.3	Overall Budget for Implementing the EMP.....	268
8.4	Management and Monitoring Sub-Plans.....	268
8.4.1	Waste Management Plan (Operational).....	268
8.4.2	Safety, Security, Health and Environmental Management Plan.....	270
8.4.3	Emergency Response Plan	272
8.4.4	Spill Prevention and Response Plan.....	275
8.4.5	Stakeholder Engagement Plan	277
8.4.6	Environmental Monitoring Plan	278
9	PUBLIC CONSULTATION AND DISCLOSURE	286
9.1	Methodology and Approach	286
9.1.1	Purpose of the Consultation.....	286
9.1.2	Stakeholder Engagement Principles	286
9.1.3	Identification of Relevant Stakeholders and Potential Issues.....	287
9.1.4	Stakeholder Mapping Matrix	292
9.1.5	Key Engagement Activities	293
9.1.6	Overall Approach and Scope	293
9.1.7	National Level	296
9.1.8	Regional Level	296
9.1.9	Township Level.....	296
9.2	Summary of Consultation and Activities Undertaken	297
9.3	Results of Consultation	299
9.4	Further Ongoing Consultations	301
9.5	Disclosure	302

9.6	Feedback Process and Grievance Mechanism.....	304
9.6.1	Feedback Process during EIA Stage	304
9.6.2	Operations Phase	304
9.6.3	Community Grievance Mechanism	304
9.7	Social Impact Assessment.....	306
9.7.1	Project Background.....	306
9.7.2	Jetty Terminal	306
9.7.3	Tank farm (diesel, Gasoline, LPG).....	306
9.7.4	Interconnecting Pipelines and advanced utilities	306
9.7.5	Social Impact Assessment and Mitigation.....	306
9.7.6	Social Environment.....	307
9.7.7	Social Profile.....	313
9.8	Public Consultations and Disclosure.....	329
9.8.1	Introduction	329
9.8.2	Methodology and Approach.....	329
9.8.3	Consultations during Project Scoping and EIA Stages	330
9.9	Summary of Public Consultation Meeting (PCM) at the Scoping and EIA stages.....	330
9.9.1	Summary of Public Consultation Meeting (PCM) at the Scoping	330
9.9.2	Scoping Stage Public Consultation	330
9.9.3	EIA Stage Public Consultation	333
9.10	Results of Consultation Meeting for Petroleum Terminal and Storage Project, Thilawa, Myanmar.....	333
9.10.1	Meeting of Minutes at Kyauktan Township, Yangon Region.....	333
9.11	Further ongoing Consultations.....	336
9.12	Disclosure.....	336

List of Tables

Table 1-1	Key Sensitivities of the Study Area	5
Table 1-2	Protected Area, Endemic Bird Area, and Key Biodiversity Areas within 50 km of the Project Site	8
Table 1-3	Reserved Trees Recorded in Survey Area	11
Table 1-4	Summary of Impact Significance and Mitigation Measures	15
Table 1-5	Management actions to their respective management plans.	22
Table 1-6	Monitoring Programme for the Project (Summary)	30
Table 1-7	Scoping Consultation Activities Undertaken	31
Table 2-1	Project Details	33
Table 2-2	Key Environmental and Social Consultants for the Project	37
Table 3-1	Myanmar Legislation Relating to the Project	43
Table 3-2	Relevant Policies and Strategies	55
Table 3-3	International Conventions relevant to the Project.....	57
Table 3-4	Key Ministries and Agencies.....	60
Table 3-5	EQEG Air Emissions (General; Section 1.1 of the EQEG) – Construction Phase	61
Table 3-6	Noise Levels (General; Section 1.3 of the EQEG) – Construction Phase	63
Table 3-7	Site Runoff and Wastewater Discharges (Construction Phase)	63
Table 3-8	Effluent Levels – Operational Phase	64
Table 4-1	Tank Specifications	67
Table 4-2	Gasoline Tank (ULR 91)	67
Table 4-3	Gasoline Tank (ULG95)	68
Table 4-4	Diesel Tank (HSD)	68
Table 4-5	Diesel Tank (PD).....	69
Table 4-6	LPG Sphere Tank	69
Table 4-7	Fire Water Tank	70

Table 4-8	Dimensions and Type of Truck Loading Shed.....	71
Table 4-9	Dimensions and Type of Pump Shed	71
Table 4-10	Dimensions and Type of Utilities Buildings.....	72
Table 4-11	Construction Progress of Jetty Terminal.....	78
Table 4-12	Progress against the planned date	79
Table 4-13	List of PME to be deployed for the Construction Phase	80
Table 4-14	Construction Progress for Tank Farm.....	83
Table 4-15	Construction Progress for Building and Advanced Utilities	84
Table 4-16	Manpower Development Schedule.....	86
Table 5-1	Coordinate Points of Project Site, Study Area and Area of Influence.....	94
Table 5-2	Summary of Sampling Plan	97
Table 5-3	Locations of Environmental Baseline Survey	98
Table 5-4	Locations of Traffic Survey Points	113
Table 5-5	Survey Periods for Traffic Survey	113
Table 5-6	Townships in the Study Area with Population and Area.....	114
Table 5-7	Protected Area, Endemic Bird Area, and Key Biodiversity Areas within 50 km of the Project Site	114
Table 5-8	Ambient Air Quality Survey Results (NO ₂ , CO and SO ₂) (2020).....	118
Table 5-9	Ambient Air Quality Survey Results (PM _{2.5} and PM ₁₀) (2020)	119
Table 5-10	Ambient Noise Survey Results (2020).....	120
Table 5-11	Description of Soil Sampling Locations	122
Table 5-12	Soil Quality Survey Results (2020)	123
Table 5-13	Description of Ground Water Sampling Locations.....	128
Table 5-14	Groundwater Quality Survey Results (2020)	129
Table 5-15	Description of Surface Water Sampling Locations	130
Table 5-16	Surface Water Quality Survey Results (2021)	131
Table 5-17	Classification of vehicle types.....	133
Table 5-18	Vehicle Traffic Volume	133
Table 5-19	Invasive Species in Myanmar	135
Table 5-20	Number of Species Record during Field Survey.....	137
Table 5-21	Mammals Species Recorded during Field Survey.....	138
Table 5-22	Bird Species Recorded during Field Survey	139
Table 5-23	Fish Species Recorded during Field Survey.....	141
Table 5-24	Reptiles Species Recorded during Surveys	144
Table 5-25	Butterflies Recorded during Field Survey	146
Table 5-26	Land Class Description	148
Table 5-27	Floral Species Recorded during Field Survey	151
Table 5-28	Distances between the Project and Villages within Study Area	155
Table 5-29	Overview of Population and Demographics in Kyauktan, Kawhmu and Dala Townships 157	
Table 5-30	Ethnicity in Kyauktan, Kawhmu and Dala Township.....	157
Table 5-31	Religion in Kyauktan, Kawhmu and Dala Township	158
Table 5-32	Number of Schools within the Townships in the Study Area	158
Table 5-33	Public Health Facilities within the Townships in the Study Area	159
Table 5-34	Health Professional-to-Patient Ratios within the Townships in the Study Area	160
Table 5-35	Traffic Survey Record	161
Table 5-36	Overview of Livelihood of the Study Area.....	167
Table 5-37	Labor Force Participation Rate in the Study Area	167
Table 5-38	Cultural Heritage from Townships in the Study Area.....	168
Table 6-1	Impact Characteristic Terminology	173
Table 6-2	Impact Type Definitions	173
Table 6-3	Definitions for Likelihood Designations.....	174
Table 6-4	Impact Magnitude for Air Quality and GHG emissions	175

Table 6-5	Impact Magnitude for Ambient Noise.....	175
Table 6-6	Impact Magnitude for Water Quality	176
Table 6-7	Impact Magnitude for Soil Quality	176
Table 6-8	Impact Magnitude for Landscape and Visual Character.....	176
Table 6-9	Impact Magnitude for Terrestrial and Aquatic Habitats.....	177
Table 6-10	Impact Magnitude for Terrestrial and Aquatic Species	177
Table 6-11	Impact Magnitude for Local Communities	177
Table 6-12	Impact Magnitude for Labourers	178
Table 6-13	Impact Magnitude for Infrastructure Services	178
Table 6-14	Impact Magnitude for Cultural Heritage	178
Table 6-15	Receptor Sensitivity for Air Quality and GHG emissions	179
Table 6-16	Receptor Sensitivity for Ambient Noise	179
Table 6-17	Receptor Sensitivity for Water Quality	179
Table 6-18	Receptor Sensitivity for Soil Quality.....	180
Table 6-19	Receptor Sensitivity for Landscape and Visual Character	180
Table 6-20	Receptor Sensitivity for Habitats.....	180
Table 6-21	Receptor Sensitivity for Species	180
Table 6-22	Receptor Sensitivity for Local Communities	181
Table 6-23	Receptor Sensitivity for Labourers.....	181
Table 6-24	Receptor Sensitivity for Infrastructure Services.....	181
Table 6-25	Receptor Sensitivity for Cultural Heritage.....	181
Table 6-26	Impact Significance	182
Table 6-27	Potential Interactions and Significance of Impacts to Receptors / Receivers	185
Table 6-28	Scoped-out Analysis	188
Table 6-29	The number of people who received additional compensation and their respective ownerships	192
Table 6-30	Impact Assessment for Economy and Livelihood during Pre-Construction Phase	193
Table 6-31	Potential Impacts of Combustion Emissions and Greenhouse Gases	195
Table 6-32	Fuel Consumption of Project.....	195
Table 6-33	Impact Assessment for Air Quality - Construction Phase	197
Table 6-34	Impact Assessment for Ambient Noise - Construction Phase	199
Table 6-35	Impact Assessment for Surface Water and Groundwater quality - Construction Phase 202	
Table 6-36	Impact Assessment for Soil Quality - Construction Phase	206
Table 6-37	Impact Assessment for Aquatic Flora and Fauna - Construction Phase	208
Table 6-38	Impact Assessment for Community Health and Safety -Construction Phase	210
Table 6-39	Impact Assessment for Occupational Health and Safety - Construction Phase.....	212
Table 6-40	Impact Assessment on Infrastructure Services: Construction Phase.....	214
Table 6-41	Impact Assessment for Air Quality: Operational Phase.....	216
Table 6-42	Impact Assessment for Ambient Noise: Operational Phase	217
Table 6-43	Impact Assessment for Surface Water and Groundwater quality: Operational Phase	219
Table 6-44	Impact Assessment for Soil Quality - Operation Phase.....	221
Table 6-45	Impact Assessment for Aquatic Flora and Fauna - Operation Phase	222
Table 6-46	Impact Assessment for Community Health and Safety: Operational Phase	224
Table 6-47	Impact Assessment for Landscape and Visual Character: Operational phase	225
Table 6-48	Impact Assessment for Occupational Health and Safety: Operational phase	227
Table 6-49	Impact Assessment on Infrastructure Services: Operation Phase	229
Table 6-50	Impact Assessment from Accidental Spills and Leaks during Construction and Operation Phases	231
Table 6-51	Impact Assessment of Vehicle Collision during Construction and Operation Phases.	234
Table 6-52	Impact Assessment of Fire and Explosion during Construction and Operation Phases 236	
Table 8-1	Summary of Impacts and Mitigation Measures.....	239

Table 8-2	Summary of Mitigation Measures (Commitment Table) – Construction Phase.....	241
Table 8-3	Summary of Mitigation Measures (Commitment Table) – Operational Phase	254
Table 8-4	Summary of Mitigation Measures (Commitment Table) – Unplanned Events (All Phases)	261
Table 8-5	Monitoring Programme for the Project (Construction Phase).....	279
Table 8-6	Monitoring Programme for the Project (Operational Phase)	282
Table 8-7	Reporting Requirements to Myanmar Authorities (as per EIA Procedure).....	283
Table 9-1	List of Townships and Villages Engaged for the Project.....	289
Table 9-2	Initial Public Consultation Engagement Schedule	294
Table 9-3	Stakeholder Groups Consulted/planned to Consult.....	297
Table 9-4	Scoping Consultation Activities Undertaken	297
Table 9-5	Key Questions Raised During Scoping Public Consultation.....	300
Table 9-6	Stakeholder Communication and Notification.....	301
Table 9-7	Social Impact Assessment Team.....	307
Table 9-8	Area and Administrative Unit by Region and State of Myanmar	308
Table 9-9	Study Limits, Indicators and Survey Methods.....	312
Table 9-10	Population and Annual Average Growth Rate in Census Years	314
Table 9-11	Population Distribution among Regions/States	314
Table 9-12	Total Population of Affected Townships along the project site	315
Table 9-13	Affected Townships of House, Household and Total Population.....	315
Table 9-14	Demographic Profile of Affected Townships.....	316
Table 9-15	Houses, Households, Wards, Average Household Size, Ward and Villages by Urban and Rural Areas.....	316
Table 9-16	Household Size of the respondents.....	316
Table 9-17	Social Networks Communities in Affected Townships.....	317
Table 9-18	Number of University and Schools in affected Townships	318
Table 9-19	Population in conventional households 15 years old and above Literacy Rate in affected Township	318
Table 9-20	Education Level of respondents (%).....	318
Table 9-21	Ethnic group of affected townships along with the project site	319
Table 9-22	Production rate of main crops	320
Table 9-23	Labour Force in Each Occupation	320
Table 9-24	Occupational Status of Affected Townships	321
Table 9-25	Type of occupation of respondents (%).....	321
Table 9-26	Annual Income per Person for affected Township.....	322
Table 9-27	Health condition of Affected Townships.....	322
Table 9-28	Number of Hospital and Number of Beds in Affected Townships.....	323
Table 9-29	Number of Doctors, Nurses, Health Assistants and Related Ratios in Affected Township	323
Table 9-30	Drinking Water Distribution	324
Table 9-31	Public Access Railway Station, Roads, Bridges	325
Table 9-32	Concerns and opinions of the respondents	327
Table 9-33	Requirements of Community Development for the village tracts.....	327
Table 9-34	Religious buildings in affected Township along with the project site	328
Table 9-35	Type and number of Historic buildings in affected townships.....	328
Table 9-36	Scoping Consultation Activities Undertaken	331
Table 9-37	EIA Consultation Activities Undertaken	332
Table 9-38	Main Discussion Points at Kyauktan Township	333

List of Figures

Figure 1.1	Overview of Petroleum Terminal and Storage Project.....	4
Figure 1.3	Project Site and Study Area.....	7

Figure 1.4	Habitat Map of the Study Area.....	12
Figure 2.1	Overview of Petroleum Terminal and Storage Project.....	35
Figure 3.1	EIA Process in Myanmar	42
Figure 4.1	Project Boundary and Future Development Area	66
Figure 4.2	Project Site Layout.....	73
Figure 4.3	Construction Plot Plan	74
Figure 4.4	Project Site Road Map	75
Figure 4.5	Construction Schedule of Project.....	76
Figure 4.6	Project Operation Concept.....	92
Figure 4.7	Operation Manpower Schedule	93
Figure 5.1	Project Site and Surrounding Area	96
Figure 5.2	Environmental Baseline Survey Locations	101
Figure 5.3	Air Quality Monitoring.....	102
Figure 5.4	Noise Level Monitoring	103
Figure 5.5	Soil Quality Sampling.....	104
Figure 5.6	Traffic Survey	105
Figure 5.7	Ground Water Quality Sampling	106
Figure 5.8	Surface Water Quality Sampling.....	107
Figure 5.9	River Sediment Quality Sampling	108
Figure 5.10	Biodiversity Survey	109
Figure 5.11	Key Biodiversity Area, Endemic Bird Areas and Protected Areas.....	116
Figure 5.12	Soil Map of Yangon.....	121
Figure 5.13	Average Monthly Temperature and Rainfall Chart of Yangon, Myanmar.....	124
Figure 5.14	Historic Earthquakes in Yangon.....	126
Figure 5.15	Vehicle Traffic Volume	134
Figure 5.16	Java Mongoose.....	138
Figure 5.17	Bird Species Recorded During Field Survey	141
Figure 5.18	Fish Species Recorded During Field Survey	143
Figure 5.19	Garden Lizard (<i>Calotes versicolor</i>)	145
Figure 5.20	Chequered Keelback Water Snake (<i>Xenochrophis piscator</i>)	145
Figure 5.21	Common Jezebel (<i>Delias eucharis</i>)	146
Figure 5.22	Common Emigrant (<i>Catopsilia Pomona</i>)	147
Figure 5.23	Habitat Map of the Study Area.....	150
Figure 5.24	Observed Flora Species during Field Survey	153
Figure 5.25	Villages in the Study Area.....	156
Figure 5.26	Demographic Characteristics of the Study Area.....	158
Figure 5.27	Literacy Rate at Union, Region and Township Level.....	159
Figure 5.28	Township Hospital in the Study Area (Dala Township).....	160
Figure 5.29	Vehicle Traffic Volume	162
Figure 5.30	% of Households using Different Energy Sources for Lighting in the Study Area	163
Figure 5.31	% of Households using Different Energy Sources for Cooking in the Study Area	163
Figure 5.32	% of Households using Different Sources for Drinking Water in the Study Area	164
Figure 5.33	% of Households using Different Water Sources for Domestic Usage in the Study Area 165	
Figure 5.34	% of Households using Different Kinds of Transportation in the Study Area	166
Figure 5.35	Numbers of households those have access to different kinds of communication gadgets 166	
Figure 5.36	Labor Force Participation Rate of Townships within the Study Area.....	168
Figure 6.1	Impact Assessment Process.....	172
Figure 9.1	Location of Townships and Village Tracts near the Project.....	290
Figure 9.2	Stakeholder Mapping Matrix	292
Figure 9.3	Engagement at Three Levels with Key Stakeholders	294
Figure 9.4	Photos from Consultation Meetings	299

Figure 9.6	Signboard used for Public Consultation Meetings	302
Figure 9.7	English version of the Public Consultation advertisement published on Global New Light of Myanmar newspaper.....	303
Figure 9.8	Myanmar version of the Public Consultation advertisement published on The Mirror newspaper	304
Figure 9.9	BE's Grievance Redress Mechanism Procedure.....	305

Acronyms and Abbreviations

Name	Description
Aol	Area of Influence
BE	Brighter Energy Company, Ltd
CD	Chart datum
CEDAW	Convention on Elimination of All Forms of Discrimination against Women
CNG	Compressed Natural Gas
CR	Critically Endangered
DOC	Dissolved Organic Carbon
DWIR	Directorate of Water Resources and Improvement of River Systems
DWOS	Myanmar National Drinking Water Quality Standards
DWT	Deadweight tonnage
EBA	Endemic Bird Area
ECC	Environmental Compliance Certificate
ECD	Environmental Conservation Department
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EN	Endangered
EPAS	Environmental Perimeter Air Station
EQEG	Environmental Quality (Emissions) Guidelines
ERM	Environmental Resources Management (ERM) Hong Kong Limited
GIIP	Good International Industry Practice
GPS	Global Positioning System
IBAT	Integrated Biodiversity Assessment Tool
IEE	Initial Environmental Examination
IFC	International Finance Corporation
ITCZ	Inter-Tropical Convergence Zone
IUCN	International Union for Conservation of Nature
LPG	Liquefied Petroleum Gas
MEC	Myanmar Economic Corporation
MIC	Myanmar Investment Commission
MOALI	Ministry of Agriculture, Livestock and Irrigation
MOC	Ministry of Construction
MOEE	Ministry of Electricity and Energy
MOGE	Myanma Oil and Gas Enterprise
MONREC	Ministry of Environmental Conservation and Natural Resources
MOPFI	Ministry of Planning, Finance and Industry
MOTC	Ministry of Transport and Communication
MPA	Myanmar Port Authority

Name	Description
MT	Metric tons
REM	Resources and Environment Myanmar
TDS	Total dissolved solid
UNDHR	Universal Declaration of Human Rights
UNFCCC	United Nations Framework Convention on Climate Change
VU	Vulnerable
WBG	World Bank Group
WHO	World Health Organisation
YCDC	Yangon City Development Committee
YCDC	Yangon City Development Committee
YRG	Yangon Region Government

1 EXECUTIVE SUMMARY

1.1 Introduction

Brighter Energy Company, Ltd. (BE) is developing the Petroleum Terminal and Storage Project in Thilawa of Myanmar (“the Project”). The Project Site is located in Kyauktan Township in Yangon which covers an area of approximately 112.5 acres which includes the jetty terminal area of 13.5 acres and land area of 99 acres. The Project is composed of three (3) key components as follows:

- Jetty terminal;
- Tank Farm (Diesel, Gasoline, LPG); and
- Interconnecting pipelines and advanced utilities.

Environmental Resources Management (ERM)-Hong Kong, Limited (ERM) has been commissioned by BE to undertake an Environmental Impact Assessment (EIA) for this Project. This EIA identifies issues to be considered and addressed in the design, construction, and operation of the Project, and presents measures to prevent and mitigate potential the impacts. The outcomes of the assessment will be submitted as an EIA to Ministry of Natural Resources and Environmental Conservation (MONREC) in order to inform the decision to award an Environmental Compliance Certificate (ECC).

Unfortunately, **ERM** could not be completed the entire EIA study and terminated EIA consulting service with BE due to Covid-19 pandemic and current situation of Myanmar. **Resource and Environment Myanmar Company Limited (REM)** has been commissioned by BE to undertake EIA for this project. REM received third party approval from Environmental Conservation Department (ECD) on 29th July 2022 for this project. REM received this project’s previous EIA study report which is done by ERM and related documents from BE and ERM. REM has been studying existing EIA tasks base on ECD’s comments and responsible for outstanding tasks.

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1.2 Policy, Legal and Institutional Framework

Pursuant to *Section 7 of the Environmental Conservation Law and Articles 52 and 53* of the Environmental Conservation Rules of the Republic of the Union of Myanmar, the Project is required to undertake an EIA in order to obtain an ECC as per the decision of the MONREC.

The Project will be undertaken in line with national regulations and international standards. Local laws relating to this EIA include, but are not limited to:

- Environmental Conservation Law (2012);
- Environmental Conservation Rules (2014);
- National Environmental Quality (Emission) Guidelines (2015); and
- Environmental Impact Assessment (EIA) Procedure (2015).

Additionally, applicable guidelines considered in preparing this EIA have included:

- International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability (2012); and

- World Bank Group (WBG) Environmental, Health and Safety (EHS) guidelines (2007).

BE confirm the following (as per Article 62 of the EIA Procedure);

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

1.3 Project Description and Alternatives

1.1.1 Petroleum Terminal and Storage Project Overview

The Project Site is located at the semi-urban in the Kyauktan Township to the south of Yangon. Kyauktan Township borders Thanlyin Township to the North, Thongwa to the East, Gulf of Mottama Gulf of Martaban to the South and Yangon River to the West (Figure 1.1). The Project Site covers an area of 112.5 acres which includes the jetty terminal area of 13.5 acres and land area of 99 acres.

The Project include the following key components:

- Jetty terminal;
- Tank farm (Diesel, Gasoline, LPG); and,
- Interconnecting pipelines and advanced utilities.

1.1.1.1 Jetty Terminal

The jetty terminal is designed for up to 25,000 DWT (deadweight tonnage) tankers and 2,000 DWT barges. There will be a working platform with four (4) mooring dolphins, which will be connected to the shore through a 9 m x 249.5 m trestle. A retaining wall (revetment) will be built along the shore for coastal protection. The water depth at the jetty and the turning basin will be approximately -10.7 m chart datum (CD).

1.1.1.2 Tank Farm (Diesel, Gasoline, LPG)

The tank farm is allocated along the southern side of the Project Site. There will a total of six (6) gasoline tanks with a total storage capacity of 25.68 million gallons, six (6) diesel tanks with a total storage capacity of 22.59 million gallons and three (3) LPG tanks with a total storage capacity of 4,500 metric tons (MT). There will also be a fire water tank with a capacity of ~ 1.585 million gallons.

1.1.1.3 Interconnecting Pipelines and Advanced Utilities

With the Project Site, there will be interconnecting pipelines for materials transfer and advanced utilities; e.g. drainage system and fire protection system to support Project operation. The pipelines will be mainly above ground on pipe racks.

The truck loading sheds are located next to the tank farm area for loading petroleum products for further distribution.

The pump sheds for the petroleum products and fire water are located next to the respective storage tanks.

The utilities buildings supporting daily operation of the Project are mainly located on the north eastern portion of the Project Site near the Liquefied Petroleum Gas (LPG) sphere tanks.

A green belt area for landscape purpose will be established around the utilities buildings area.

An underground oily water separate unit will be constructed next to the area between the gasoline tank area and the revetment for treatment of oily wastewater to meet the EQEG standards before discharge. Drainage will also be built around the Project Site to direct the storm water runoff, which will be discharge off-site after removal of silt to meeting EQEQ standards by silt removal equipment.

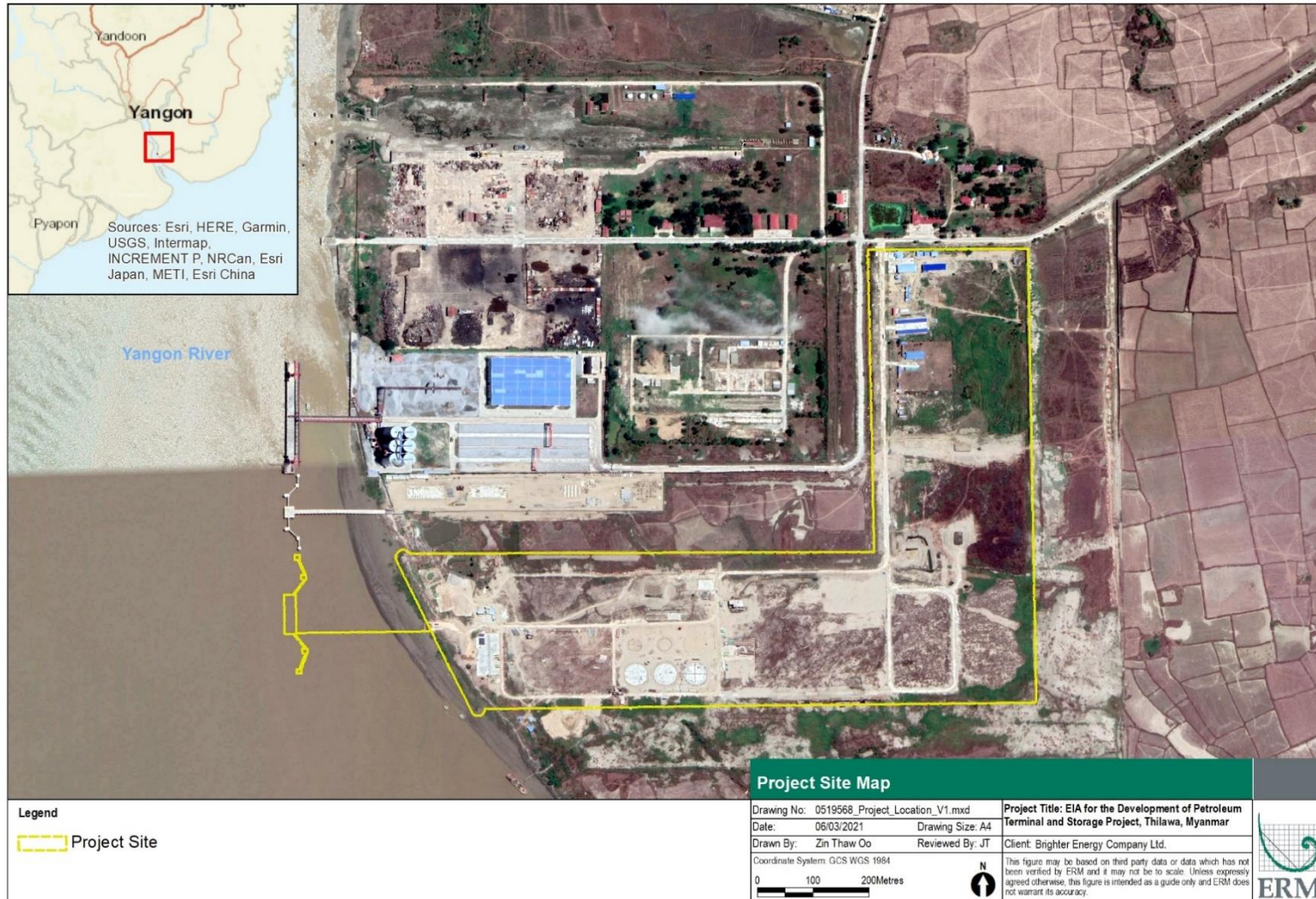


Figure 1.1 Overview of Petroleum Terminal and Storage Project

1.1.2 Project Alternatives

Consideration of project alternatives is a fundamental requirement in the planning of any project as a means of avoiding or reducing adverse environmental impacts and maximising or enhancing project benefits. Several options that have been considered for the Project include the following:

- **Project Site Location** – the proposed Project Site is located away from nearby village settlements. This option reduces the potential environmental and social impacts to nearby communities. In addition, the Project Site is located near existing road networks, which would reduce the requirements of temporary access road and permanent road construction and therefore reduce the associated potential environmental and social impacts on such construction.
- **Jetty Terminal Design** – the jetty terminal will be a piled deck structure instead of formed by reclamation. The use of piled structure will reduce obstruction of river flow compared to a reclaimed area. In addition, unlike reclamation, piling will not require any filling works to be undertaken in the river, therefore reducing the potential water quality impacts related to the dispersal of suspended solids.

1.4 Description of the Environment

The **Project Site** is defined as the location of the jetty terminal, tank farm as well as the interconnecting pipelines and advanced utilities. The Project components will be located in Kyauktan Township in Yangon Region.

The **Study Area** is defined as the wider area in which the environmental and social conditions are evaluated with the sources of risk, in order to determine interactions and the magnitude and significance of potential impacts resulting from the Project. For this Project, the Study Area is defined as a 20 km buffer around the Project Site, encompassing the Township of Kyauktan.

The '**Area of Influence**' (**Aoi**) is defined as area in which Project impacts are likely to occur. For this Project, a buffer of 5 km has been included to encompass the Potential Aoi including the Kyauktan, Kawhmu, and Dala Townships.

Table 1-1 Key Sensitivities of the Study Area

Receptor	Sensitivity
Terrestrial biodiversity	The Project Site and its vicinity is an industrial area with modified habitats which appears to have low ecological value. Further baseline surveys are undertaken to confirm the ecological value of the terrestrial habitat. Impacts from the Project on terrestrial habitat will be considered in EIA Report.
Aquatic biodiversity	The Project Site is located alongside the Yangon River. According to the in-house database of ERM, Yangon River was highly turbid. There are no reported accounts of cetaceans within the Yangon River. Aquatic habitat in the vicinity of the Project Site appears to have low ecological value. Further baseline surveys are undertaken to confirm the ecological value of the aquatic habitat. Impacts from the Project on aquatic habitat will be considered in the EIA Report.
Ambient air quality	The air quality is considered to be worse in the dry season as elevated particulate matter is recorded due to dust from neighbouring roads. Impacts of air from construction and operation of the Project will need to be considered in the EIA Report.
Ambient noise	There is no data currently available for ambient noise in the Study Area. It is located near to other existing industrial compounds. Impacts of noise from

Receptor	Sensitivity
	construction and operation of the Project will need to be considered in the EIA Report.
Community and livelihood	The Project is located in Kyauktan Township. Impacts to livelihoods of the neighbouring communities will need to be considered.
Water resources and drainage	The Project Site is located alongside and on the Yangon River. Ground water in the study area is affected by salt water intrusion being located near coastal area. Water resources for the Project will need to be considered in the EIA Report.
Transportation	The Project may have impact on the current traffic in Kyauktan. Impacts to the traffic will be considered in the EIA Report.
Cultural heritage	There are known pagodas and monasteries within the Study Area which need to be considered in the EIA Report.

The Project Site and the Study Area are shown in Figure 1.2.

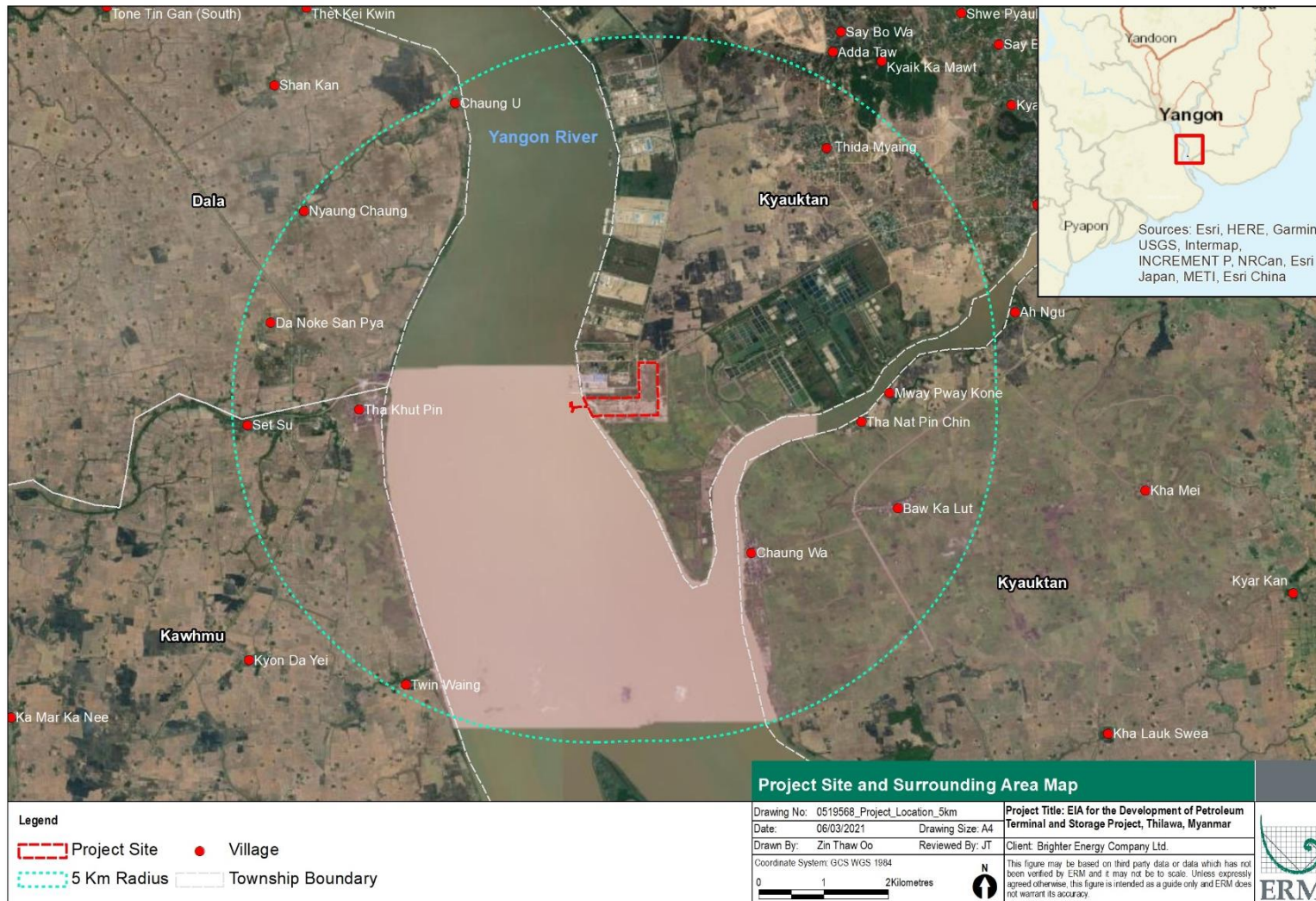


Figure 1.2 Project Site and Study Area

1.1.3 Legally Protected National, Regional or State Areas

There are no protected or sensitive areas within the Project Site or Study Area (i.e., within 20 km of the Project). Within a 50 km radius of the Project Site, there is one national protected area (Hlawga National Wildlife Park), one Endemic Bird Area (EBA) and three key biodiversity areas (KBAs). The closest KBA is Hlawga Reservoir KBA located 36 km to the north. Information on these areas is provided in Table 1-2.

Table 1-2 Protected Area, Endemic Bird Area, and Key Biodiversity Areas within 50 km of the Project Site

Protected Area	Details and Key Species	Nearest Distance from the Project Site
Hlawga National Wildlife Park	<ul style="list-style-type: none"> ■ Area: 6km² ■ Year Designated: 2012 ■ <i>Columba punicea</i> (Pale-capped pigeon) (VU) 	42 km
Hlawga Reservoir KBA	<ul style="list-style-type: none"> ■ Area: 23 km² ■ Year Designated: 2012 ■ <i>Dalbergia cultrata</i> (Yin-daik) (EN), <i>Dipterocarpus alatus</i> (Kanyin-byu) (EN), <i>Hopea odorata</i> (Thingan) (VU). 	36 km
Payagyi Terrestrial KBA	<ul style="list-style-type: none"> ■ Area: 2 km² ■ Year Designated: 2012 ■ <i>Grus Antigone</i> (Sarus crane) (VU), Congregatory waterbirds 	39 km
Maletto Inn fresh water KBA	<ul style="list-style-type: none"> ■ Area: 386 km² ■ Year Designated: 2012 ■ <i>Grus Antigone</i> (Sarus crane) (VU), <i>Emberiza aureola</i> (Yellow-breasted Bunting) (EN), Congregatory waterbirds 	37 km
Ayeyarwady Plains	<ul style="list-style-type: none"> ■ Area: 160,000 km² ■ Year Designated: 1991 ■ <i>Crypsirina cucullata</i> (Hooded Treepie) (NT), <i>Chatarrhaea gularis</i> (White-throated Babbler) 	28 km

Note: IUCN Red List Designations: LC – Least Concern, EN – Endangered, VU – Vulnerable, NT – Near Threatened, IUCN category IV- Habitat/Species Management Area that aim to protect particular species or habitats and management reflects this priority (IUCN, 2019).

1.1.4 Physical Environment Baseline

Primary data collection was conducted for this EIA and is presented below.

1.1.4.1 Climatic Conditions

The weather and climate of Myanmar are primarily influenced by the northeast and the southwest monsoons and the short transitional periods between them. The southwest monsoon (June to September) is characterised by extensive cloud cover, light rain almost daily, interspersed with rainsqualls or thunderstorms. The northeast monsoon (December to April) brings less cloud, scant rainfall, mild temperatures and lower humidity during winter (Suwannathatsa, et al, 2012).

Yangon, as with Myanmar in general, has less rainfall in summer. The average maximum temperature is 29°C while average annual rainfall is 2,378 mm. The driest month is January, with 3 mm of rainfall and June is the wettest month with an average of 516 mm. The warmest month is April, with an average temperature of 30°C. January has the lowest average temperature of the year; 25°C. During the year, the average temperatures vary by 5.5°C (Climate Data Website, 2021).

1.1.4.2 Ambient Air Quality

NO₂, CO and SO₂, and PM_{2.5} and PM₁₀ were sampled in four locations in the Study Area. For ambient air quality, none of the values for NO₂ and CO exceeded the World Health Organisation (WHO) guidelines for human health and EQEG. SO₂ exceeded both guidelines value at A-1, the main road (from Kyauktan to ship breaking compound) is located 350 m north of this station. Possible emission sources are from nearby industries, power plant, vehicles, and ships in Yangon River.

For PM_{2.5} and PM₁₀, the data were compared to the WHO standards for Human Health. There were exceedances of PM₁₀ in all of the locations surveyed except at A-4 which is the furthest from the Project and main road among other locations. The increase of coarse particle PM₁₀ could result from the dust along the traffic at main road and construction activities around the site. It is also recorded that fine particles PM_{2.5} is within the WHO standards.

1.1.4.3 Ambient Noise

Noise levels were sampled in the Study Area. The survey indicated that ambient noise levels at N-2 and N-3 locations at night time slightly exceeded the IFC noise level guidelines (for residents). Those two locations are the located next to the rivers and it is likely that this noise was generated from private generators and ships/boats from the rivers.

1.1.4.4 Soil Quality

Out of four sampling locations, none of the locations has parameters exceeded the Food and Agriculture Organization of the United Nations (FAO) Soil Bulletin 65 and the Dutch Standard.

1.1.4.5 Water Resources

Groundwater quality was sampled at four locations in the Study Area (i.e., wells at project site and in local villages). The results analysis was compared to the WHO Drinking Water Standards (i.e., seven parameters (pH, nitrate (as N), arsenic, chromium, copper, cyanide and mercury)) and Myanmar National Drinking Water Quality Standards (DWQS) (i.e., eight parameters (pH, ammonia (as N), nitrate (as N), arsenic, chromium, copper, mercury, and cyanide)).

Sample result at GW-1 which is located at the Project Site shown that ammonia values and cyanide were outside the recommended range of DWQS, and both DWQS and WHO standard, respectively. Ammonia can be oxidized from nitrate, a common element of fertilizer that may have been on local farm land; or ammonia can enter groundwater through sewage effluent and runoff from the farm land where manure has been applied or stored. Cyanide can be occasionally found in water, primarily as a concern of industrial contamination. The remaining parameters do not exceed the standard values of both WHO and DWQS.

Surface water was sampled in three locations in Yangon River (upstream and downstream of the Project Site, and at the Project Site). The results were compared to the WHO Drinking Water Standards (i.e., seven parameters (pH, nitrate (as N), arsenic, chromium, copper, cyanide and mercury)) and DWQS (i.e., eight parameters (pH, ammonia (as N), nitrate (as N), arsenic, chromium, copper, mercury, and cyanide)).

None of the parameters at locations exceed WHO Drinking Water Standards and Myanmar National Drinking Water Quality Standards.

1.1.4.6 Natural Hazards

Myanmar is exposed to multiple natural hazards including cyclones, earthquakes, and flooding. These events should be considered in the design of the Project to reduce the potential for environmental and social impacts.

Storms and Cyclones

Gale force winds (17.2 ms^{-1} or over) are mainly associated with local rainsqualls and with severe tropical storms or cyclones. The central region receives the worst buffeting during the summer monsoon. The threat of cyclones with winds above 32.7 ms^{-1} affects different areas at different times of the year affecting all areas, though the major tracks do not pass over the Andaman Sea (OCHA, 2011). Cyclones are most frequent from mid-May to early December.

Flooding

Areas within project site are prone to flooding due to the low elevation relative to its surroundings. Pluvial flood can occur due to runoff to low lying areas with limited drainage capacity. Fluvial flooding can occur when the surroundings are lower than the water in the surrounding rivers or canals (Royal Haskoning DHV, 2019).

The average tidal range of the Yangon River is about 6 m at spring tide and 3 m at neap tide. Modelling of the discharge of Yangon River indicates discharges ranging from $<500 \text{ m}^3/\text{s}$ in April to approximately $7,000 \text{ m}^3/\text{s}$ in August, with tidal water level variations of around 1 to 6 m based on water level measurements at Monkey Point located downstream of the Study Area (De Koning and Janssen, 2015). In the Ayeyarwady Delta, which includes the Yangon River, drainage, salt intrusion, and flood protection are key concerns (EO Earth Website, 2016).

Two main forces dominate the Yangon River system that can result in fluvial floods (Royal Haskoning DHV, 2019):

- Increased water levels from the sea: there is a strong tide from the Gulf of Martaban. The spring tide range is approximately 5.4 m in the Hlaing River, and the neap tide range is approximately 2 m. In addition, storm surges can increase offshore water levels.
- Increased discharges during the monsoon period: the Ayeyarwady River feeds the Yangon River with rainfall from the Irrawaddy River Basin and water levels increase by approximately 0.7 m during the monsoon period.

Earthquake Risk

A review of available literature has shown that Myanmar is seismologically unstable and vulnerable to earthquakes due to its location in the active Alpide seismo-tectonic belt and the young Alpine Himalayan-Sumatran orogenic belt (Willige et al., 2009). Historic records show that at least 15 major earthquakes with magnitudes $M \geq 7.0$ Richter scale (RS) have occurred in Myanmar in the last hundred years. These earthquakes occurred within Myanmar in the last century, in Yangon Region, these include on 27 March, 16 May, and 21 May 1931 and in 1970.

1.1.5 Biological Environment Baseline

1.1.5.1 Fauna

A biodiversity survey was conducted that covered a range of fauna species, including mammals, birds, fish, reptiles and amphibians and butterflies. The fauna survey was conducted via direct observation in the field, observation of tracks and signs such as footprints and feeding signs in their natural habitats, and interview surveys with local communities.

Two mammal species were recorded; all of which are classified as Least Concern on the International Union for Conservation of Nature (IUCN) red list.

A total of 30 bird species were recorded during the survey. All species classified as least concerned on the IUCN Red List 2020. One endemic species “White throated Babbler” was observed in the Survey Area. There was no threatened species. Among 30 bird species recorded, 10 species are classified as migratory birds as according to Bird Life international 2020.

A total of 19 species distributed amongst 14 family groups were identified during the survey. The most common species are *Puntius ticto* and *Channa orientalis*. The dominant Family is Cyprinidae (carp). According to the IUCN Red List of threatened species, all species were least concerned and/or not evaluated; there are no species of conservation concern.

A total of 6 reptile species was identified during the survey. According to IUCN Red List of threatened species, there was no threatened species and endemic species in this area.

A total of 8 species of butterflies under the order Lepidoptera were recorded. According to the IUCN Red List of (2020), one species, *Junonia almana* is classified as Least Concern and there are no threatened species.

1.1.5.2 Flora

Of the 44 floral species identified during the surveys, two (2) species are listed as Endangered, 19 species were classified as Least Concern, two (2) as Data Deficient, and 21 as Not Yet Assessed on the IUCN Red List. Endemic/ restricted range floral species (Living International Treasures, 2020) were not observed during field survey (Living International Treasures, 2020). There are also two reserved species under the Forest Law notification (identified in Table 1-3). These species are not allowed to be cut; however they are located outside of the Project Site and not in the footprint of the Project.

Table 1-3 Reserved Trees Recorded in Survey Area

No	Common Name	Family Name	Scientific Name	IUCN ¹	Endemic / Restricted Range ^{2/} Reserved ³
1	Kyun	Verbenaceae	<i>Tectona grandis</i>	NE	Reserved
2	Padauk	Fabaceae	<i>Pterocarpus macrocarpus</i>	EN	Reserved

¹ = IUCN (2019): EN = Endangered, LC = Least Concerned, NE = Not Evaluated,

² = Living International Treasure (2020)

³ = Reserved Trees under the Forest Law (2019)

1.1.5.3 Habitat Mapping

Satellite imagery was used to map the land classes identified within the Project Site. These land classes were verified during the field investigations. Project Site three major habitat types were observed in the Study Area namely; (1) some extent of trees in mangrove area, (2) agricultural land, and (3) Shrub land (green area). The habitat map of the proposed Project Site was shown in Figure 1.3.

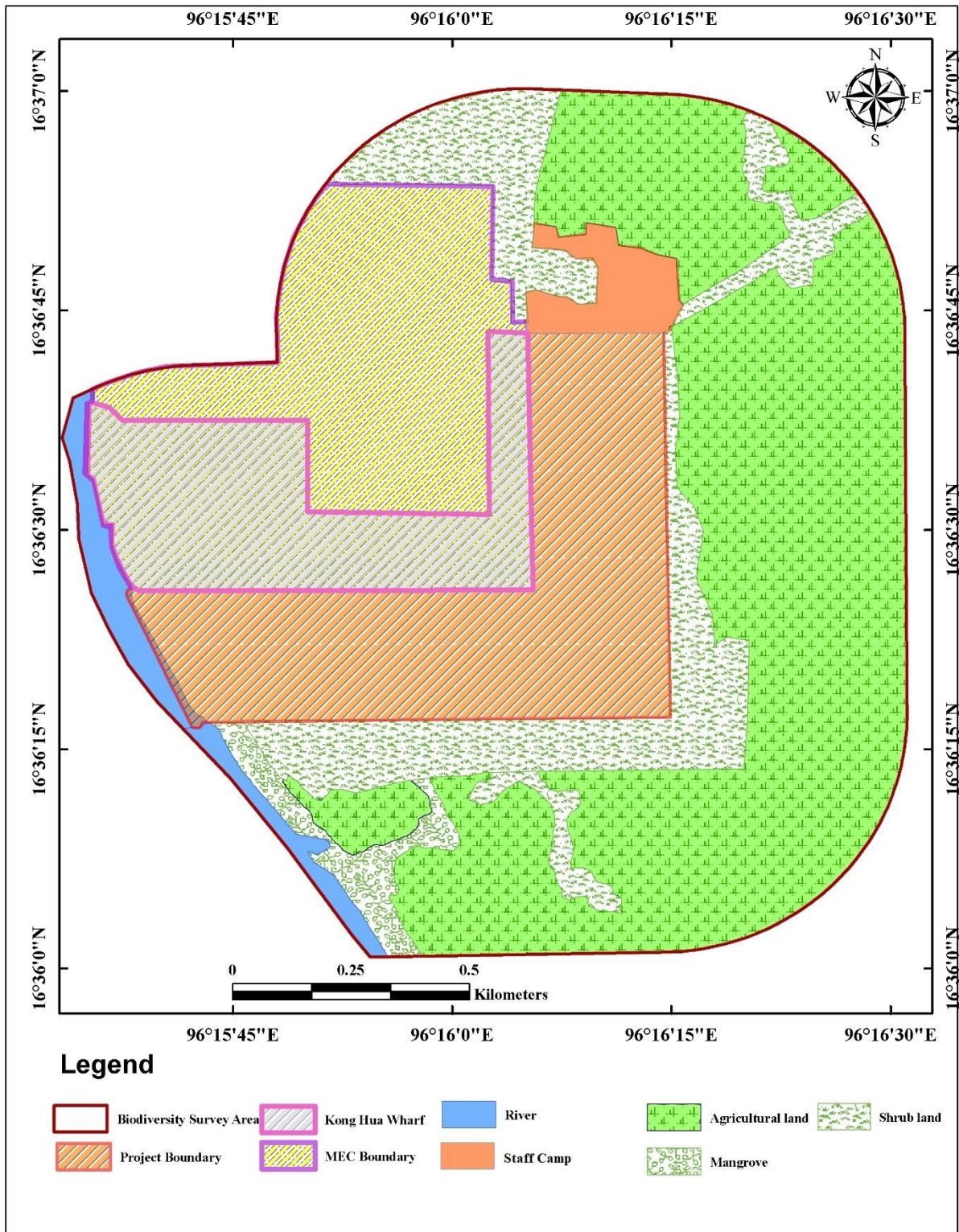


Figure 1.3 Habitat Map of the Study Area

1.1.6 Social Baseline

Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation is quite challenging. Public consultation was conducted in Kyauktan township on 6th October 2022 and consultation meeting with Kawhmu township GAD on September 2022. And primary socio-economic data collection for EIA investigation were conducted in Thida Myaing Ward and Chaung Wa Village, Kyauktan township and Setsu village and Thakhtupin village in Kawhmu township on first week of October 2022. Public participation meeting was organized relevant stakeholders whom affected by the Project. The EIA Report was updated with the public consultation and primary socio-economic data collection in this version.

Except Dala Township, the majority of the population in Kyauktan and Kawhmu is living in rural areas. The highest population density is observed in Dala Township, with 739 inhabitants per square kilometre (inh/km²). This is, however, significantly lower than the average population density of Yangon's urban area (2,844 inh/km²). The lowest population density within the Study Area is Kyauktan, with 201 inh/km². In all townships of the Study Area there are slightly more women than men.

In all townships, the main ethnicity is Burmese where Karen is the second major ethnicity. Most of the population practise Buddhism followed by other major religions where Dala has more people practising Islam and Hindu than the other two townships.

There are 374 education facilities in the Study Area and Kyauktan has the most schools, while Dala has the least. Although Dala has a higher population than Kawhmu, it has 50% fewer schools. Kyauktan has good educational services and the rate of students who passed the matriculation exam is highest (30.6%) in the Study Area. In terms of literacy rate, all the townships have literacy rates higher than the Union Average (89.5%). Kyauktan has the most schools and also the lowest gender gap in literacy. Dala has the highest gender gap in literacy rate.

There are 81 healthcare facilities in the Study Area. Kyauktan has the largest number of healthcare facilities with 58%. The most common diseases in the Study Area are diabetes, hypertension, stroke, pneumonia, tuberculosis, pneumonia and diarrhoea (especially in Under Age 5).

Among four types of vehicles, two-wheel vehicle were the highest as most local people mostly motorbikes for transportation. The volume of four-wheeled light vehicles is also higher than heavy vehicles at all survey points.

Kyauktan and Kawhmu have less access to electricity for lighting than the Union average even though these areas are in Yangon Region which has about 69.3% coverage in general. More than 50% of households depend on kerosene, candle, and battery for lighting. Dala has better access to electricity than the other Townships in the Study Area although it is lower than the Regional Average.

86% of households in Dala use ponds and lake water for domestic use where 76% in Kyauktan and 41% in Kawhmu. Kawhmu has almost no municipality water distribution system. Groundwater usage in Dala is almost zero (3%) while 49% of households in Kawhmu use groundwater and 18% in Kyauktan.

Although the Study Area is located in Yangon, the most developed region in Myanmar, the use of car or truck is much lower than Union average. People mainly use motorcycles and bicycles to commute (50%). The local community still use bullock carts to transport agricultural products and sometimes to commute nearby villages. People from Kawhmu and Kyauktan often use boats to cross Yangon River and to access Yangon (even though there are roads routes available) as it is.

All the townships in the Study Area use different kinds of communication devices in which Kyauktan and Dala have more mobile phone usage. Regarding access to computer and internet, Kawhmu is proportionately lower than its peers, only 3.5% of households get access to these gadgets.

Kyauktan Township is one of the commercial townships in Yangon Region and the main income sources are from agriculture, fishing and employment at government departments. In Kawhmu Township, most of the employees work in the agricultural, forestry and fishery industry followed by elementary

occupations. In Dala Township, the highest proportion of employees work in the industry of wholesale and retail trade, repair of motor vehicles and motorcycles.

The labour force participation rate of Kyauktan and Dala Townships within the Study Area is around 60 % and there is 80% in Kawhmu Township. There is a significant gender gap in Kyauktan and Dala Townships, with fewer women joining the labour force. The difference between male and female labour force participation rate in Kyauktan Township is 50% and Dala Township is 46%. In Kawmhu Township, there is not much difference between female and male labour force participation rate, 17.3 %.

There are 18 Pagodas, 342 Shrines, 415 Monasteries, 62 Nunneries, 250 Buddhist ordination Halls, 12 Churches, 13 Mosques, 48 Hindu Temples and 1 Chinese Temples in the Study Area. Kyaikhmawwun Yele Pagoda (6.3 km from Project Site), located on a small island in Hmaw Wun Creek, is well-known Buddhist religious site. However, it is unlikely to be affected by the Project due to the distance. This is the closest cultural heritage site to the Project.

The Project Site and its surrounding area are flat plains and typical rural landscapes of urban neighbourhood. The Thilawa Special Economic Zone is located just next to Project Site. There may be visual impacts from the Project on local communities in Kyauktan and across the river in Dala.

1.5 Key Potential Impact and Mitigation Measures

This EIA Report focuses on the potential impacts associated with the construction and operation of the Project. This EIA Report has assessed in detail the potential impacts and provided appropriate mitigation measures. These potential impacts and mitigations are summarised in Table 1-4.

Table 1-4 Summary of Impact Significance and Mitigation Measures

Potential Impact/Issue	Significance of Impact	Significance of Residual Impact	Summary of Mitigation Measures
Pre-Construction Phase			
Impacts to Economy and Livelihood	Minor	Minor	<ul style="list-style-type: none"> ■ The land used for the project is owned by the Myanmar Economic Corporation. The land was acquired by Myanmar Economic Corporation (MEC) a few decades ago with certain amount of compensation and the farmers were already relocated in Thida Myaing Ward. ■ Due to Covid-19 pandemic and current situation of Myanmar, local people are facing with economy and livelihood problems. Actually, this problem is national-wide impact and not to be focused as local issues. ■ The situation should improve soon as the covid-19 disease is now under control. At that time, the economy and livelihood of the local people will improve. ■ The project may cause difficulties for some local fishermen by losing their fishing plots. The project owner has to follow statutory regulation; thought Follow the laws and coordinate with the fisheries department and local fishermen in order to fulfil their loss.
Construction Phase			
Impacts to Ambient Air Quality	Minor	Minor	<ul style="list-style-type: none"> ■ All air emissions will comply with EQEG Air Emissions (General; Section 1.2 of the EQEG); ■ Establish and implement a Grievance Mechanism; ■ Ensure stockpiles are located as far as possible from receptors; ■ Cover and/or water stockpiles of friable/dusty materials such as excavated spoils, dredged materials, filling materials to avoid fugitive dust. Enclose any skip hoist for material transport with impervious sheeting; and ■ Use low sulphur fuels in heavy good vehicles (HGVs) and diesel powered equipment in collaboration with best management practices for construction phase.
Impacts to Ambient Noise	Minor	Minor	<ul style="list-style-type: none"> ■ Noise levels will comply to EQEG Noise Levels (General; Section 1.4 of the EQEG); ■ Select equipment with lower Sound Power Levels (SPL) that comply to EQEG Noise Levels (General; Section 1.4 of the EQEG) where possible; ■ Where necessary, install acoustic enclosures / mufflers for equipment casing radiating noise; ■ Ensure equipment is maintained as per operating standards; ■ Locate noisy equipment (such as hydraulic hammer and lorry mounted concrete pump) as far away from receptors whenever possible;

Potential Impact/Issue	Significance of Impact	Significance of Residual Impact	Summary of Mitigation Measures
			<ul style="list-style-type: none"> ■ Silencers, mufflers, or acoustic enclosures shall be installed to reduce sound power level of noisy equipment if deemed necessary; ■ Normal working hours of the contractor should be in line with Myanmar legal requirements; and ■ Noise barriers such as berms and vegetation shall be installed to limit noise at plant boundary, if deemed necessary following noise modelling.
Impacts to Surface Water and Groundwater Quality	Major	Minor	<ul style="list-style-type: none"> ■ All discharges will be in compliance with Wastewater, storm Water Runoff, Effluent and Sanitary Discharges (General; Section 1.2 of the EQEG) and EQEG Site Runoff and Effluent Levels (for Roads; Section 2.7.8 of the EQEG); ■ Earthworks to form the final surfaces should be followed up with surface protection and drainage works to prevent erosion caused by rainstorms; ■ All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly; and ■ Recommended additional mitigation measures are to develop and implement a Surface Water and Groundwater Management Plan. ■ Construction Waste Management Plan is developed and the Project will be implemented as per the measures include in the Plan.
Impacts to Soil Quality and Topography	Minor	Minor	<ul style="list-style-type: none"> ■ Reuse of topsoil as backfill where ever possible; ■ Schedule activities (as far as possible) to avoid extreme weather event such as heavy rainfall and high winds; ■ Re-vegetate areas with temporary land use, conducting progressive rehabilitation; ■ Restrict the height of topsoil stockpiles to minimise compaction, restricted to 2 m. ■ Store chemicals, fuel, and oil in adequately sheltered and impervious bund as per international best practices; and ■ Potential impacts to soil will also be mitigated under the Construction Waste Management Plan. ■ Surface Water and Groundwater Management Plan will be prepared and implemented for the Project.
Impacts to Aquatic Flora & Fauna	Minor	Minor	<ul style="list-style-type: none"> ■ Undertake sampling to determine the physical and chemical properties of material to be dredged to ensure the appropriate type dredge is used; ■ Limit the dredging activities as far as possible; ■ Seek the opportunities of beneficial use of dredged material as a resource, either on-site or off-site (e.g. agricultural use, industrial/commercial use or recreational use) as per the guidelines of MPA depending on the contamination of the dredged material; and

Potential Impact/Issue	Significance of Impact	Significance of Residual Impact	Summary of Mitigation Measures
			<ul style="list-style-type: none"> The excess dredged materials from the working platform will be disposed at Myanmar Port Authority (MPA)'s approved location.
Impacts to Community Health & Safety	Moderate	Minor	<ul style="list-style-type: none"> All workers, except those based in Project Site, will be accommodated in the labour camp during construction and transport will be provided for workers; Provide training on the most common communicable diseases to all workers to raise awareness of the likely diseases, symptoms, preventative measures, transmission routes, and treatment; Ensuring health check-ups of all labourers employed to screen pre-existing communicable diseases; Community grievances in relation to the conduct of security personnel and safety issues or activities should be addressed in accordance with the Project established Grievance Procedure; Develop and implement a Surface Water and Groundwater Management Plan. Implement Construction Waste Management Plan; and Traffic Management Plan is developed and the Project will be implemented as per the mitigation described in the Management Plan.
Impacts to Economy & Livelihood	Minor	Minor	<ul style="list-style-type: none"> Some fishermen may lose their fishing ground temporarily due to construction activities and vessels going around fishing ground area. The project requires labors for short terms and long terms so many employments may be created for local people. There is positive impact on economy and livelihood for local people. The Yangon River is more than 2 kilometers wide at this point, and fishermen have enough space to fish elsewhere. This area is adjacent to the Thilawa Special Economic Zone, so there are also impacts from other projects. Timely discussion with fishermen for this particular issue may need, if any. Traffic Management Plan is developed and the Project will be implemented as per the mitigation described in the Management Plan.
Impacts to Occupational Health & Safety	Moderate	Minor	<ul style="list-style-type: none"> The project will comply with Myanmar labour laws; All staff will have medical check-ups prior to commencing work, where required; Create and implement an environmental management system for the project; Provide workers with the required and appropriate personal protective equipment (PPE) such as eye protection, work gloves and protective boots to undertake site activities; and The Project will develop and implement an Occupation Safety, Security, Health and Environment Management Plan.

Potential Impact/Issue	Significance of Impact	Significance of Residual Impact	Summary of Mitigation Measures
Impacts to Infrastructure Services	Moderate	Minor	<ul style="list-style-type: none"> Reuse topsoil and dredged materials wherever possible and reduce the amount of dredge to be disposed; Dispose of the waste generated by the Project at licensed landfill sites by registered and licensed waste management vendor; Traffic Management Plan is developed and the Project will be implemented as per the mitigation described in the Management Plan Develop and implement Construction Waste Management Plan that promote good international industry practices such as waste avoidance, reduction, segregation and recycling when possible; and Record complaints under the Grievance Mechanism process and follow up by identifying the causes and responding appropriately within 48 hours of receiving the complaint to mitigate the disturbance.
Operation Phase			
Impacts to Ambient Air Quality	Negligible	Negligible	<ul style="list-style-type: none"> Maintain road side vegetation barriers; and All air emissions will comply with EQEG Air Emissions (General; Section 1.2 of the EQEG).
Impacts to Ambient Noise	Negligible	Negligible	<ul style="list-style-type: none"> Noise levels will comply to EQEG Noise Levels (General; Section 1.4 of the EQEG); Install noise barriers when possible; Record complaints under the Grievance Mechanism process and follow up by identifying the causes and responding appropriately within 48 hours of receiving the complaint to mitigate the disturbance; and Speed limits to its lowest at possible in local roads.
Impacts to Surface Water and Groundwater Quality	Minor	Minor	<ul style="list-style-type: none"> All discharges will be in compliance with Wastewater, storm Water Runoff, Effluent and Sanitary Discharges (General; Section 1.2 of the EQEG) and EQEG Site Runoff and Effluent Levels (for Roads; Section 2.7.8 of the EQEG); Prepare and implement Operational Waste Management Plan; and Collect any contaminated water on the vessels when possible, and send to certified contractor for disposal, to reduce potential contaminated water discharge into the Yangon River.
Impacts to Soil Quality	Negligible	Negligible	<ul style="list-style-type: none"> Use of spill control kits to contain and clean small spills and leaks; Appropriate management, storage and disposal of waste as per good international industry practices; and All the waste will be segregated depending on their recyclability, hazard and biodegradability, and will dispose only at the municipal permitted locations.

Potential Impact/Issue	Significance of Impact	Significance of Residual Impact	Summary of Mitigation Measures
Impacts to Aquatic Flora and Fauna	Minor	Minor	<ul style="list-style-type: none"> Similar to mitigation measures for operation phase Impacts to Surface Water, Groundwater and Soil Quality.
Impacts to Community Health and Safety	Minor	Minor	<ul style="list-style-type: none"> Provide access to workers to healthcare services (facilities) and medical care; Community grievances in relation to the conduct of security personnel and safety issues or activities should be addressed in accordance with the Project's established Grievance Procedure; Implement Traffic Management Plan; and Prepare and implement Operational Waste Management Plan;
Impacts to Landscape and Visual Character	Minor	Minor	<ul style="list-style-type: none"> Include green buffers in the Project Site; and Minimise overall lighting use and manage lighting on site to consider minimisation of light pollution and horizon glow.
Impacts to Economy and Livelihood	Minor	Minor	<ul style="list-style-type: none"> The project requires labors for short terms and long terms so many employments may be created for local people. There is positive impact on economy and livelihood for local people. Some fishermen may lose their fishing plots permanently due to long time project due to activities such as vessels going around fishing ground area. But the space for fishing area is enough for fishermen because the river is wider than 2 km. Moreover, the impact is not only by BE alone but also by nearby project such as Thilawa SEZ projects. Vocational Training Program for livelihood restoration shall include in environmental management plan. Traffic Management Plan shall implement throughout the project. The Project will be implemented as per the mitigation described in the Management Plan.
Impacts to Occupational Health and Safety	Moderate	Minor	<ul style="list-style-type: none"> The project will comply with Myanmar labour laws, EQEG standards, International Labour Organization (ILO) standards and good international industry practices; All staff will have medical check-ups prior to commencing work, where required; and Provide workers with the required and appropriate personal protective equipment (PPE) such as eye protection, work gloves, protective boots, helmet and reflective safety vest to undertake site activities.
Impacts to Infrastructure and Services	Negligible	Negligible	<ul style="list-style-type: none"> The underground water will be used only after tested and approved by local authority, for only washing. Drinking water will be purchased from qualified drinking water provider; Prepare and implement Operational Waste Management Plan; and Implement Traffic Management Plan.

Potential Impact/Issue	Significance of Impact	Significance of Residual Impact	Summary of Mitigation Measures
Accidental / Unplanned Events			
Spills and Leaks	Moderate	Minor	<ul style="list-style-type: none"> ■ Transferring, maintenance and refuelling of equipment and vehicles should be carried out in designated areas on hardstand to prevent seepage of any spillages to ground. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hard standing; ■ Use of spill control kits to contain and clean small spills and leaks. Spill control kits should be available on site at all time; ■ Store chemicals, fuel, oil and hazardous waste in adequately bunded impervious areas, as per good international industry practices in order to minimise the potential for damage or contamination of materials; ■ A Spill Response Plan will be developed and implemented for the construction and operational phases of the Project; ■ Development of an Emergency Response Plan for spill. Procedures for response to chemical spills will be included in the emergency response plan. This will include locations of spill containment and recovery equipment; and ■ A detailed Operational Waste Management Plan (WMP) with types, volumes and disposal of wastes identified will be developed.
Vehicle Collision	Moderate	Minor	<ul style="list-style-type: none"> ■ Inform workers of sensitive traffic areas, e.g., location of schools, shrines, temples, mosques, health clinics, hospitals etc. Reduce speed limits for these areas; ■ Avoid haulage tasks during peak traffic periods and school drop-off and pick-up times; ■ A Traffic Management Plan is developed and the Project will be implemented as per the mitigation described in the Management Plan. ■ An Emergency Response Plan will set out the management procedures to be put in place by the Project Administrator and contractor to prevent and mitigate the potential impacts due to transportation accidents. It will also include the medical procedures for the injured.
Explosion	Moderate	Minor	<ul style="list-style-type: none"> ■ Provide training for local communities on the danger of explosion and fire; ■ Provide instructions and procedures about safety precautions and emergency evacuations for local communities; ■ Provide workers with helmets and other PPE such as eye protection, work gloves and protective boots. Ensure all staff wear appropriate PPE; ■ An Emergency Response Plan is developed to reduce the likelihood of explosions or fire and to ensure response actions are implemented in the event of an incident.

1.6 Cumulative Impact Assessment

At this time, there is limited information on the other planned projects for the area and, as such, the cumulative impacts from subsequent projects should be considered as and when their development is confirmed. Any cumulative impacts discussed at this stage would be speculative and based on hearsay of projects that are yet to be confirmed by the relevant authorities. Such impacts might be expected to be similar in nature as the ones discussed in this Environmental Impact Assessment report. Likewise, the mitigation measures, including the planned environmental and social management procedures associated with the Project, are expected to contribute to mitigating the Project's contribution to potential cumulative impacts. Nevertheless, BE is committed to undertake the cumulative impact assessment should information of nearby projects become publicly available.

1.7 Environmental Management Plan

A Project-specific, dedicated Environmental and Social Management System (ESMS) will be developed to manage impacts associated with the Project and ensure legislative compliance and standards of good practice during the construction and operation of the proposed Project.

The Project will prepare the following Management Plans covering the Construction and Operational Phases and their respective management actions are presented in Table:

- Waste Management Plan (Operation Phase);
- Safety, Security, Health and Environmental Management Plan;
- Emergency Response Plan;
- Spill Prevention and Response Plan;
- Stakeholder Engagement Plan; and
- Environmental Monitoring Plan.

The management plans will include a schedule and designation of responsibility for the implementation of mitigation measures presented in Table 1-4.

Monitoring will be conducted to ensure compliance with regulatory requirements as well as to evaluate the effectiveness of operational controls and other measures intended to mitigate potential impacts. The Environmental Monitoring Plan is provided in Table 1-6. An Environmental Monitoring Report will be submitted to the ECD on a six-monthly basis during the Construction and Operational Phase to report monitoring findings and environmental performance of the Project.

Table 1-5 Management actions to their respective management plans.

Management Plan	Management Actions to be taken
Waste Management Plan (Operation Phase)	<ul style="list-style-type: none"> ■ Good housekeeping practices for waste storage and handling referencing GIIP; ■ A waste inventory developed in the planning stage, in discussion with the engineers, to establish the types of wastes (hazardous and non-hazardous) expected to identify appropriate disposal routes; ■ Materials should be managed in a way to avoid over-ordering, poor storage and maintenance, mishandling as well as improper operation procedures; ■ Wastes should be separated into reusable items and materials to be disposed of or recycled whenever possible; ■ Waste suitable for reuse should be stored on site and reintroduced to the construction process as and when required; ■ The WMP should identify disposal routes (including transport options and disposal sites) for all wastes generated; ■ A hazardous waste management system covering waste classification (including hazardous chemical waste), separation, collection, storage, transfer and disposal should be set up and operated. The waste management system should comply with applicable regulation of the government, if any, or in its absence, GIIP; ■ Hazardous waste should be stored in such a way as to prevent and control accidental release to the environment (e.g. secondary containment, sealed containers); ■ Waste should be collected regularly by reputable waste collectors; ■ Recyclables such as scrap steel, metals, plastics, and paper items should be collected for recycling wherever possible; ■ Disposal of waste in or off the construction site / Project facilities should be prohibited; ■ Waste segregation should be practiced at the labour camp and Operation and Maintenance Building with an emphasis placed on reducing, reusing and recycling of waste streams as appropriate; and ■ Chain of custody documents should be used for all wastes to monitor disposal. BE should record the waste type, volume and disposal method, which should be reported in the Environmental Monitoring Report to be submitted to MONREC every six months.
Safety, Security, Health and Environmental Management Plan	<ul style="list-style-type: none"> ■ The project will comply with Myanmar labour laws and EQEG standards; ■ All staff will have medical check-ups prior to commencing work, where required; ■ Create and implement an environmental management system for the project. It will include mandatory health and safety training courses for all workers and contractors, including handling of hazardous material. This training will take place prior to work starting on

Management Plan	Management Actions to be taken
	<p>operation. Training course attendance will be recorded and monitored by the Project. The plan shall be issued and approved prior to start any construction activity;</p> <ul style="list-style-type: none"> ■ Provide workers with the required and appropriate personal protective equipment (PPE) such as eye protection, work gloves and protective boots to undertake site activities; ■ The Project will develop and implement a Safety, Security, Health and Environmental Management Plan which will be a subset of the overall EMP system, tailored to the needs of the project. This plan will set standards that will be met by all contractors and subcontractors; ■ Monitoring, recording and reporting of Health, Safety and Environmental (HSE) matters as per good international industry practice shall be done on a monthly basis; ■ Ensure activities are supervised by trained personnel; ■ Suitable training is required for all employees who work at height. Employees should be trained in working on different pieces of equipment and surfaces, such as how to work safely on scaffolding, ladders, and roofs; ■ Minimise the consequences of a fall when applicable, for example by providing a safety net; ■ Avoid working at height where possible. (e.g., assemblage on ground level); ■ Provide walkways that are clearly designated as walkways, having good conditions underfoot, and being well lit; ■ Implement good housekeeping practice as such keeping work and storage areas tidy and designating specific areas for waste collection; ■ Cordless tools should be used where possible. If this is not possible, cables should be run at high levels; ■ If a surface is slippery with mud, it should be treated with stone. Any areas that are slippery should be signposted, and footwear with a good grip should be worn; ■ Construction workers should be given appropriate protection when using vibrating tools, and equipment should be well maintained; ■ Where duties involve manual handling, adequate training must be provided; ■ Consider the kind of support that is best suited for the trench, ensure the trench is fully secure and regularly inspect the trench both before and during the work shift;

Management Plan	Management Actions to be taken
	<ul style="list-style-type: none"> ■ Reversing movements of vehicles and mobile plant should be minimized by providing, where possible, drive through circulation routes. Where reversing is unavoidable, turning heads should be provided and banksmen should be deployed to guide reversing vehicles and plant where necessary; and steps should be taken to ensure that banksmen wear high-visibility safety vests and use walkie-talkie or similar equipment for effective communication; ■ Safety reversing devices such as reversing video device (RVD), cross view mirror, parking sensor, and reversing alarm and warning light shall be used when applicable; ■ Ensure height and stock pile location are in line with good international industry practices; ■ Ensure excavation of trenches are undertaken as per good international industry practices; ■ Ensure loading and unloading of material is undertaken as per good international industry practices; ■ The Project will prepare and implement Risk Assessment Procedure in order to identify and mitigate any potential impact during the construction and operation phases; and ■ Waste will be segregated on site and only the recyclable wastes will be transferred to designated waste collection points while non-recyclable and hazardous wastes will be handed over to an authorised waste collector.
Emergency Response Plan	<ul style="list-style-type: none"> ■ Inform workers of sensitive traffic areas, e.g., location of schools, shrines, temples, mosques, health clinics, hospitals etc. Reduce speed limits for these areas; ■ Avoid haulage tasks during peak traffic periods and school drop-off and pick-up times; ■ Maintain pedestrian access wherever possible, including access to any settlements and other facilities; ■ Notify the local communities about proposed changes to local traffic access due to construction/ maintenance activities and providing clear signage of changed traffic conditions; ■ Use only licensed and experienced drivers and transport companies; ■ Implement “No Night Driving Policy” (10pm-7am; and 10pm-10am for public holidays) for construction vehicles (during construction phase) when possible; ■ All Project vehicles shall use designated roads only, and avoid traveling off roads;

Management Plan	Management Actions to be taken
	<ul style="list-style-type: none"> ■ Maintain pedestrian access wherever possible, including access to any settlements and other facilities; ■ Maintenance and refuelling of equipment and vehicles should be carried out in designated areas on hardstand to prevent seepage of any spillages to ground. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hard standing; ■ Use of spill control kits to contain and clean small spills and leaks. Spill control kits should be available on site at all time; ■ Store chemicals, fuel, oil and hazardous waste in adequately bunded impervious areas, as per good international industry practices in order to minimise the potential for damage or contamination of materials; ■ Implement a training program to familiarise staff with emergency procedures and best practices; ■ Oils, fuels and chemicals should only be used and stored in designated areas, which have pollution prevention facilities. The bund should be drained of rainwater after a rain event; ■ The oil contaminated water will be collected and handled by local licensed waste water sub-contractors (if available, to be determined at the later stage); ■ On site oil-water separators and holding facilities should be installed to accommodate and unanticipated releases of oily water; ■ Proper guidelines and procedures should be developed for immediate clean-up actions following any spillages of oil, fuel or chemicals; ■ Standard operating procedures (SOPs) will be prepared to manage any chemical spills, leaks and/or seepages. SOPs will cover transport, handling, storage, use and disposal of chemicals. Operating personnel will be trained on the SOPs and monitored in their use on a daily basis; ■ Surface run-off from bunded areas should pass through oil/water separators prior to discharge to the storm water system; and ■ All employees will have the appropriate training, qualification and certification to undertake the tasks required during the construction and maintenance of the bridges. ■ Install bund/ dike around chemical storage area to contain the chemicals in case of chemicals in case of leakage or spill. The capacity of bund/ dike should be sufficient to contain 110% of the chemicals from the largest tank; ■ Ensure that there is sufficient and appropriate spill response supplies in the Project Area; ■ Do not store chemicals in unsuitable containers or containers made of incompatible material;

Management Plan	Management Actions to be taken
	<ul style="list-style-type: none"> ■ Provide dedicated storage areas for construction materials to minimise the potential for damage or contamination of the materials; ■ Waste storage areas will be equipped with secondary containment and spill control measures; ■ Liquid wastes such as waste oil, etc. will be collected and stored for recycling in cemented areas; ■ All drainage/tanks, etc. will be positioned on concrete hard standing to prevent any seepage into ground or surface water; ■ Disposal sites to be designed for hazardous and non-hazardous waste, including sludge disposal; ■ Hazardous waste storage areas will comply with good international industry practices; ■ Keep a register for all hazardous substances on site and relevant Material Safety Data Sheets (MSDSs) readily accessible for reference; ■ Store and handle all hazardous substances in accordance with their MSDS. ■ Chemical storage areas will be sited on sealed areas and provided with locks to prevent unauthorized entry; ■ Provide enough space to allow for inspection between waste containers so as to identify any leaks or spills; ■ Prepare safety procedures for loading/ unloading of chemicals; ■ When not in use, fuel plant / equipment must be stored in a sheltered place and on a protected ground; ■ Provide training for local communities on the danger of explosion and fire; ■ Provide instructions and procedures about safety precautions and emergency evacuations for local communities; ■ Provide workers with helmets and other PPE such as eye protection, work gloves and protective boots. Ensure all staff wear appropriate PPE; ■ Carry out emergency drills; ■ Fuel tank area should be bunded and set up away from the construction site offices, labour camps and residential areas, as per good international industry practice. ■ Provide medic, first aid kit and first aid room; ■ Pre-communicate and coordinate with local firefighting brigade/station; ■ Restrict smoking to controlled areas only;

Management Plan	Management Actions to be taken
	<ul style="list-style-type: none"> ■ Conduct fire training and response drills; ■ Apply for any applicable permit relating to the importation, transportation, storage and handling of explosives from the Myanmar Ministry of Energy and Myanmar Fire Services Department; ■ Implement all required safety and management requirements relating to the transportation, storage and handling of explosives; ■ Fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. Establishment of secondary containment for fuel storage and hazardous materials, which have pollution prevention facilities. The bund should be drained of rainwater after a rain event. ■ Fire protection / fighting system will be installed; and ■ Induction training for personnel is recommended to include a mandatory segment on fire safety and actions in the event of a fire.
Spill Prevention and Response Plan	<ul style="list-style-type: none"> ■ The Project will follow the Petroleum Products Regulatory Department (PPRD)'s framework and regulation to prevent oil pollution; ■ Transferring, maintenance and refuelling of equipment and vehicles should be carried out in designated areas on hardstand to prevent seepage of any spillages to ground and water. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hard standing; ■ Use of spill control kits to contain and clean small spills and leaks. Spill control kits should be available on site at all time; ■ Store chemicals, fuel, oil and hazardous waste in adequately banded impervious areas, as per good international industry practices in order to minimise the potential for damage or contamination of materials; ■ Implement a training program to familiarise staff with emergency procedures and best practices; ■ Oils, fuels and chemicals should only be used and stored in designated areas, which have pollution prevention facilities. The bund should be drained of rainwater after a rain event; ■ The oil contaminated water will be collected and treated through oily water separator. Oily wastewater separator is designed to treat the oily water from the tank farms and loading bays. The treated water will drain to public drains near the Project Site after treatment to meet the EQEQ standards; ■ Proper guidelines and procedures should be developed for immediate clean-up actions following any spillages of oil, fuel or chemicals;

Management Plan	Management Actions to be taken
	<ul style="list-style-type: none"> ■ Standard operating procedures (SOPs) will be prepared to manage any chemical spills, leaks and/or seepages. SOPs will cover transport, handling, storage, use and disposal of chemicals. Operating personnel will be trained on the SOPs and monitored in their use on a daily basis; ■ Storm water, industrial wastewater, sewage water and surface run-off will be collected and treated prior to discharge. Drains from all equipment containment drainage, spills, floor wash downs and fire protection discharges will be led to oil-water separator; ■ Sanitary wastewater will be treated by a package of sewage treatment units; ■ All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly; ■ All employees will have the appropriate training, qualification and certification to undertake the tasks required during the construction and operation phases. ■ The Project will prepare and implement Risk Assessment Procedure in order to identify and mitigate any potential impact during the construction and operation phases; ■ A Spill Prevention and Response Plan will be developed and implemented for the construction and operational phases of the Project. ■ Development of an Emergency Response Plan for spills and leakages. Procedures for response to chemical spills will be included in the emergency response plan. This will include locations of spill containment and recovery equipment ■ A detailed Operational Waste Management Plan (WMP) with types, volumes and disposal of wastes identified will be developed; ■ Install bund/ dike around chemical storage area to contain the chemicals in case of chemicals in case of leakage or spill. The capacity of bund/ dike should be sufficient to contain 110% of the chemicals from the largest tank; ■ Ensure that there is sufficient and appropriate spill response supplies in the Project Site; ■ Do not store chemicals in unsuitable containers or containers made of incompatible material; ■ Provide dedicated storage areas for construction materials to minimise the potential for damage or contamination of the materials; ■ Waste storage areas will be equipped with secondary containment and spill control measures; ■ Liquid wastes such as waste oil, etc. will be collected and stored for recycling in cemented areas;

Management Plan	Management Actions to be taken
	<ul style="list-style-type: none"> ■ All drainage/tanks, etc. will be positioned on concrete hard standing to prevent any seepage into ground or surface water; ■ Disposal sites to be designed for hazardous and non-hazardous waste, including sludge disposal; ■ Hazardous waste storage areas will comply with good international industry practices; ■ Keep a register for all hazardous substances on site and relevant Material Safety Data Sheets (MSDSs) readily accessible for reference; ■ Store and handle all hazardous substances in accordance with their MSDS; ■ Chemical storage areas will be sited on sealed areas and provided with locks to prevent unauthorized entry; ■ Provide enough space to allow for inspection between waste containers so as to identify any leaks or spills; and ■ Prepare safety procedures for loading/ unloading of petroleum and LPG.
Stakeholder Engagement Plan	<ul style="list-style-type: none"> ■ Conduct further disclosure of Project information and EIA Report, including opportunities to provide feedback; ■ Engagement with relevant regional officials/authorities and government organizations on the outcomes of the EIA; and ■ Ongoing communications with interested and potentially affected stakeholders during the construction and operation. While impacts on local communities, ongoing project information will be provided to local areas.

Table 1-6 Monitoring Programme for the Project (Summary)

Environmental Aspect	Monitoring Standards and Rationale	Monitoring Duration (over Project Lifecycle)	Responsibility
Construction Phase Monitoring for <ul style="list-style-type: none"> ■ Air Quality ■ Noise ■ Surface Water ■ Ground Water ■ Soil 	Compared to the Environmental Quality (Emissions) Guidelines (EQEG) Standards to ensure compliance of Construction Activities with the emissions and discharge limits.	Monthly monitoring. Frequency to be reviewed after six months.	Third Party
Construction Phase Monitoring for <ul style="list-style-type: none"> ■ Hazardous and Non-hazardous waste ■ Audit of Mitigation and Management Measures ■ Occupational Health and Safety ■ Social ■ Environmental breaches 	This data will be used to assess the compliance of the Project with the EIA Report. Any grievances or environmental breaches will be reported.	Monthly checks	EPC Contractor / BE
Operational Phase Monitoring for <ul style="list-style-type: none"> ■ Hazardous and Non-hazardous waste ■ Audit of Mitigation and Management Measures ■ Occupational Health and Safety ■ Social ■ Environmental breaches 	This data will be used to assess the compliance of the Project with the EIA Report. Any grievances or environmental breaches will be reported.	Monthly checks	BE

1.8 Public Consultation and Disclosure

During February and November 2020, consultation meetings were held with various relevant stakeholders at Yangon regional level and township levels. The purpose of the scoping consultations was to present information of the Project, gather information on potentially affected people, and gather information on the potential data gaps. Scoping consultation involved face-to-face and virtual meetings with a range of stakeholders including a representative for the Chief Minister of Yangon, Regional level ECD and GAD, Members of Yangon Region Hluttaw, Member of Pyithu Hluttaw, and Township GADs from the Project Area.

Scoping consultation at the township level was not conducted physically due to COVID measures and stay home practices in Yangon. However, BE and ERM held virtual meetings with Kyauktan and Kawhmu Townships in October and November 2020 in line with ECD guidance for public consultation meetings of the project during COVID-19 pandemic. The consultation helped the Project to gather information on potentially affected community, and on potential data gaps and how these can be closed out in the EIA Report. Scoping consultation involved virtual online meetings with a range of stakeholders including local communities, ward administrators, regional parliament representatives and other related government departments. The meetings were attended and consisting of local communities, GADs, other representatives from related departments.

Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation is not yet conducted. Public consultation and primary socio-economic data collection for EIA investigation will be conducted after situation allowed in order to have better participation by stakeholders, including land owner and land users affected by land acquisition of the Project. The EIA Report will be updated once the public consultation and primary socio-economic data collection for EIA investigation is done.

The date, stakeholder and location and purpose of engagement of each meeting is summarised in **Table 1-7**.

Table 1-7 Scoping Consultation Activities Undertaken

Date	Stakeholder / Location	Purpose of Engagement
25 th February, 2020 (Tuesday)	Chief Minister Office Meeting	<ul style="list-style-type: none"> ■ Present information on the Project; ■ Get approval for township/ward and village level meetings; and ■ Gather concerns and suggestions from stakeholders.
28 th October, 2020 (Wednesday)	Kawhmu Township GAD, Regional Parliament Representative, Township Land Registration and Statistics, Tha Khut Pin VT Leader (Virtual Meeting)	<ul style="list-style-type: none"> ■ Present Project information to local government, ward administrators, local communities and other interested parties; ■ Gather concerns and suggestions from stakeholders
4 th November, 2020 (Wednesday)	Thidar Myaing Ward Leader, 100 Household Leader and Ward Patrons (Virtual Meeting)	<ul style="list-style-type: none"> ■ Present Project information to local government, ward administrators, local communities and other interested parties; ■ Gather concerns and suggestions from stakeholders

Below points summarise the key questions and concerns raised in previous scoping public consultation meetings.

- **Project Information and Environment**
 - The company should allow construction vehicles to park within the Project boundary.
 - The company should consider influx of construction workers and consider having food canteen/centre as one of their facilities during construction.
- **Grievance Mechanism**
 - The company to include details of the grievance mechanism.
- **Livelihoods**
 - Concerns on the impact of fishing in Tha Kut Pin Village.
- **Waste Management**
 - How wastes will be managed and if there will be any disposal into the river.

As per the requirements Article 50 of the EIA Procedure, BE will disclose information on the Project in two newspapers (one in English and one in Myanmar). Project information will be available on BE's website and signboards will be posted at the site office. The advertisements for the scoping stage were announced in The Global New Light of Myanmar (English) and The Mirror (Burmese) and EIA stage will be announced after the submission of the EIA report to ECD.

30 January 2023

၁. အကျဉ်းချုပ်အစီရင်ခံစာ..... 2

၁.၁ နိဒါန်း..... 2

၁.၂ မူဝါဒ နှင့် ဥပဒေဆိုင်ရာ မူဘောင် 2

၁.၃ စီမံကိန်းအကြောင်းအရာဖော်ပြချက်နှင့် အခြားဆောင်ရွက်နိုင်သောနည်းလမ်းများ..... 3

 ၁.၃.၁ ရေနံအဆောက်အအုံနှင့်သိုလှောင်ရုံ စီမံကိန်း ခြုံငုံသုံးသပ်ချက် 3

 ၁.၃.၁.၁ ဆိပ်ခံတံတား..... 3

 ၁.၃.၁.၂ သိုလှောင်ကန် (ဒီဇယ်၊ ဓာတ်ဆီ၊ ရေနံဓာတ်ငွေ့ရည်) 4

 ၁.၃.၁.၃ ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများ..... 4

 ၁.၃.၂ အခြားနည်းလမ်းရွေးချယ်ခြင်း..... 6

၁.၄ အနီးပတ်ဝန်းကျင်အကြောင်းအရာ ဖော်ပြချက် 6

 ၁.၄.၁ တရားဝင်ကာကွယ်ထိန်းသိမ်းထားသော အမျိုးသားဒေသတွင်း/ပြည်နယ်တွင်းဧရိယာများ..... 10

 ၁.၄.၂ ရုပ်ပိုင်းဆိုင်ရာပတ်ဝန်းကျင်အခြေခံအချက်အလက်များ..... 11

 ၁.၄.၂.၁ ရာသီဥတုအခြေအနေများ..... 11

 ၁.၄.၂.၂ လေအရည်အသွေးအပေါ်သက်ရောက်မှု 11

 ၁.၄.၂.၃ ဆူညံသံသက်ရောက်မှု..... 12

 ၁.၄.၂.၄ မြေအရည်အသွေး..... 12

 ၁.၄.၂.၅ ရေအရင်းအမြစ်များ..... 12

 ၁.၄.၂.၆ သဘာဝဘေးအန္တရာယ်များ..... 12

 မှန်တိုင်းနှင့်ဆိုင်ကလုန်းများ..... 12

 ရေကြီးခြင်း..... 13

 မြေငလျင်အန္တရာယ်..... 13

 ၁.၄.၃ ဇီဝပတ်ဝန်းကျင်အခြေခံအချက်အလက်..... 13

 ၁.၄.၃.၁ သက်ရှိများ..... 13

 ၁.၄.၃.၂ အပင်များ..... 14

 ၁.၄.၃.၃ သက်ရှိတည်နေရာများအပေါ်ဆန်းစစ်ခြင်း..... 14

 ၁.၄.၄ လူမှုရေးဆိုင်ရာအခြေခံအချက်အလက်များ..... 16

၁.၅ အဓိက ဖြစ်ပေါ်လာနိုင်သည့်သက်ရောက်မှုများ နှင့် လျှော့ချရေးအစီအမံများ..... 17

၁.၆ ဆက်စပ်သက်ရောက်မှုဆန်းစစ်ခြင်း..... 28

၁.၇ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် 28

၁.၈ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် ထုတ်ဖော်တင်ပြခြင်း..... 30

၁. အကျဉ်းချုပ်အစီရင်ခံစာ

၁.၁ နိဒါန်း

Brighter Energy Company, Ltd. (BE) သည် ရေနံအဆောက်အအုံနှင့်သိုလှောင်ရုံ စီမံကိန်း (စီမံကိန်း) အား သီလဝါမြန်မာတွင် အကောင်အထည်ဖော်ဆောင်ရွက်လျက် ရှိပါသည်။ စီမံကိန်းသည် ရန်ကုန်တိုင်းဒေသကြီး ကျောက်တန်း မြို့နယ်တွင် တည်ရှိပြီး စုစုပေါင်း ၁၂.၅ ဧက မြေနေရာအကျယ်အဝန်းပေါ်တွင် ဆိပ်ခံတံတား (၁၃.၅ ဧက) နှင့် မြေနေရာ (၉၉ ဧက) တို့ ပါဝင်ပါသည်။ စီမံကိန်းကို အောက်ဖော်ပြပါ အဓိက အစိတ်အပိုင်းများဖြင့် ဖွဲ့စည်းထားပါသည်။

- ဆိပ်ခံတံတား၊
- သိုလှောင်ကန် (ဒီဇယ်၊ ဓာတ်ဆီ၊ ရေနံခါတ်ငွေ့ရည်) နှင့်၊
- ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများ။

Brighter Energy Company, Ltd. (BE) သည် စီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) ကို ဆောင်ရွက်ရန် Environmental Resources Management (ERM)-Hong Kong, Limited (ERM) အား ပထမတာဝန်ပေးအပ်ခဲ့ပါသည်။ ERM သည် EIA လေ့လာမှုတစ်ခုလုံးကို မပြီးမြောက်နိုင်ခဲ့ဘဲ Covid-19 ကူးစက်ရောဂါနှင့် မြန်မာနိုင်ငံ၏ လက်ရှိအခြေအနေကြောင့် EIA အတိုင်ပင်ခံဝန်ဆောင်မှုကို ရပ်ဆိုင်းခဲ့သည်။ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး မြန်မာကုမ္ပဏီလီမိတက် (REM) ကို ဤစီမံကိန်းအတွက် EIA ဆောင်ရွက်ရန် BE မှ တာဝန်ပေးအပ်ထားသည်။ REM သည် ဤပရောဂျက်အတွက် 2022 ခုနှစ် ဇူလိုင်လ 29 ရက်နေ့တွင် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဌာန (ECD) မှ တတိယအဖွဲ့အစည်း၏ ခွင့်ပြုချက်ကို ရရှိခဲ့ပါသည်။ REM သည် ERM နှင့် BE နှင့် ERM တို့မှ လုပ်ဆောင်သော ဤပရောဂျက်၏ ယခင် EIA လေ့လာမှုအစီရင်ခံစာကို လက်ခံရရှိခဲ့ပါသည်။ REM သည် ECD ၏ မှတ်ချက်များအပေါ် အခြေခံ၍ ကျန်ရှိနေသော EIA လုပ်ငန်းများကို ဆက်လက်လေ့လာ၍ အစီရင်ခံစာအပြီးသတ်တင်ပြရန် တာဝန်ယူပါသည်။

ထို့ကြောင့် Brighter Energy Company, Ltd. (BE) သည် စီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) ကို ဆက်လက်ဆောင်ရွက်ရန် Resources and Environment Myanmar Co., Ltd. (REM) အား ပြောင်းလဲတာဝန်ပေးအပ်ခဲ့ပါသည်။ REM သည် ERM ဆောင်ရွက်ပြီးစီးခဲ့သော လေ့လာမှုကို အခြေခံ၍ လုပ်ဆောင်ရန်ကျန်ရှိနေသောလေ့လာမှုများကို ဆောင်ရွက်ခဲ့ပါသည်။ ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းသည် စီမံကိန်း၏ ဒီဇိုင်းအပိုင်း၊ တည်ဆောက်ရေးနှင့် လုပ်ငန်းလည်ပတ်ရေးကိစ္စရပ်များအပေါ် ထည့်သွင်းစဉ်းစား လုပ်ဆောင်ရမည့် အချက်များ နှင့် ဖြစ်နိုင်ချေရှိသောသက်ရောက်နိုင်မှုများကို လျော့ချနိုင်မည့်နည်းလမ်းများနှင့် ကာကွယ်နိုင်မှုများ ပါဝင်ပါသည်။ ရရှိလာသောဆန်းစစ်ခြင်းရလဒ်များဖြစ်သည့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိန်း သိမ်းရေးဆိုင်ရာ လိုက်နာဆောင်ရွက်မှု သက်သေခံလက်မှတ် (ECC) ချမှတ်ပေးနိုင်မှုအား ဆုံးဖြတ်ပေးနိုင်ရန်အတွက် သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန (MONREC) သို့ တင်ပြသွားမည် ဖြစ်ပါသည်။

Brighter Energy Company, Ltd. (BE) ထံဆက်သွယ်နိုင်သည့် လိပ်စာမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။
ဆက်သွယ်နိုင်သည့်ပုဂ္ဂိုလ် - Mr. Rathapon Phakdeewong (COO) / Sai Aye Chan (Technical Director)
လိပ်စာ - အမှတ် ၃၃၇၊ ပြည်လမ်း၊ မုန့်လက်ဆောင်းကုန်းရပ်ကွက် (တောင်)၊ စမ်းချောင်းမြို့နယ်၊ ရန်ကုန်၊ မြန်မာ
တယ်လီဖုန်း - +၉၅ ၉ ၈၉၉၅၂၀၉၅၉ ၊ +၉၅ ၉ ၅၀၀၃၁၈၃
အီးမေးလ် - rathapon.p@brighterenergymm.com / saiayechan@brighterenergymm.com

၁.၂ မူဝါဒ နှင့် ဥပဒေဆိုင်ရာ မူဘောင်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံ၏ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၏ ပုဒ်မ ၇ နှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေ၏ ပုဒ်မ ၅၂ နှင့် ၅၃ တို့အရ စီမံကိန်းသည် သယံဇာတ နှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာန

(MONREC) ၏ ဆုံးဖြတ်ချက်နှင့်အညီ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာလိုက်နာဆောင်ရွက်မှု သက်သေခံလက်မှတ် (ECC) ကို ရရှိရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) ကို ပြုလုပ်ဆောင်ရွက်ရန် လိုအပ်ပါသည်။

စီမံကိန်းကို အောက်ဖော်ပြပါ ဥပဒေများအပြင်၊ အမျိုးသားနှင့်ဒေသတွင်းဆိုင်ရာအပြင် နိုင်ငံတကာစံချိန်စံညွှန်းများ၊ ဥပဒေများနှင့်အညီ လိုက်နာဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် အောက်ပါ ဥပဒေများအပါအဝင် အခြားဒေသတွင်းဆိုင်ရာ ဥပဒေများအား ထည့်သွင်းရေးသားထားပါသည်။

- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂)၊
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေ (၂၀၁၄)၊
- အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး(ထုတ်လွှင့်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) (NEQ လမ်းညွှန်ချက် များ) နှင့်
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း (၂၀၁၅)။

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းကို ပြုစုရေးသားရာတွင် ထည့်သွင်းစဉ်းစားသွားမည့် သက်ဆိုင်ရာလမ်းညွှန်ချက်များ တွင် အောက်ပါတို့ပါဝင်သည်။

- သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုဘဝရေရှည်ဖွံ့ဖြိုးတိုးတက်ရေးနှင့်ပတ်သက်၍ အပြည်ပြည်ဆိုင်ရာ ဘဏ္ဍာရေး ကော်ပိုရေးရှင်း (IFC) ၏ လုပ်ဆောင်မှုဆိုင်ရာ စံသတ်မှတ်ချက်များ (၂၀၁၂)၊
- ကမ္ဘာ့ဘဏ် ၏ ပတ်ဝန်းကျင်၊ ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး (EHS) လမ်းညွှန်ချက်များ (၂၀၀၇)၊

BE မှ အောက်ပါတို့ကို အတည်ပြုလိုက်နာဆောင်ရွက်သွားပါမည်။ (ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၏ ပုဒ်မ ၆၂ အရ)

- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း၏ တိကျမှုနှင့် ပြည့်စုံမှုရှိကြောင်း၊
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းကို လုပ်ထုံးလုပ်နည်းများအပါအဝင် သက်ဆိုင်ရာဥပဒေများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်ရန် လုပ်ငန်းတာဝန်များနှင့်ညီ တိကျစွာလိုက်နာပြုစုကြောင်း၊
- စီမံကိန်းက ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ချက်အစီရင်ခံစာပါ ကတိကဝတ်၊ ပတ်ဝန်းကျင်ထိခိုက်မှု လျှော့ချရေးလုပ်ငန်းများနှင့် အစီအစဉ်များကို အပြည့်အဝအစဉ်အမြဲလိုက်နာ ဆောင်ရွက်မည်ဖြစ်ကြောင်း၊

၁.၃ စီမံကိန်းအကြောင်းအရာဖော်ပြချက်နှင့် အခြားဆောင်ရွက်နိုင်သောနည်းလမ်းများ

၁.၃.၁ ရေနံအဆောက်အအုံနှင့်သိုလှောင်ရုံ စီမံကိန်း ခြုံငုံသုံးသပ်ချက်

ရေနံအဆောက်အအုံနှင့်သိုလှောင်ရုံ စီမံကိန်းသည် ရန်ကုန်မြို့တောင်ဘက် ကျောက်တန်းမြို့နယ်ရှိ မြို့ပြ တစ်စိတ်တစ်ဒေသ (semi-urban) တွင်တည်ရှိပြီး မြောက်ဘက်တွင် သန်လျင်မြို့နယ်၊ အရှေ့ဘက်တွင် သုံးခွမြို့နယ်၊ တောင်ဘက်တွင် မုတ္တမကွေ့ နှင့် အနောက်ဘက်တွင် ရန်ကုန်မြစ်တို့ တည်ရှိပါသည် (ပုံ ၁.၁)။ စီမံကိန်းဧရိယာသည် ပျမ်းမျှ ၁၁၂.၅ ဧက ကျယ်ဝန်းပြီး ဆိပ်ခံတံတား (၁၃.၅ ဧက) နှင့် စီမံကိန်းမြေနေရာ (၉၉ ဧက) တို့ ပါဝင်ပါသည်။

စီမံကိန်းကို အောက်ဖော်ပြပါ အဓိကအစိတ်အပိုင်းများဖြင့်ဖွဲ့စည်းထားပါသည်။

- ဆိပ်ခံတံတား
- သိုလှောင်ကန် (ဒီဇယ်၊ ဓာတ်ဆီ၊ ရေနံခါတ်ငွေ့ရည်) နှင့်
- ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများ။

၁.၃.၁.၁ ဆိပ်ခံတံတား

ဆိပ်ခံတံတားကို သင်္ဘောကုန်တင်တန်ချိန် ၂၅,၀၀၀ အထိရှိသော ရေနံတင်သင်္ဘောများနှင့် ၂,၀၀၀ တန်ချိန်ထိရှိသော သမ္ဗန်များအတွက် ရည်ရွယ်၍တည်ဆောက်ပါသည်။ ဆိပ်ခံပုံလုံတိုင် (mooring dolphin) ၄ခုပါရှိမည့် လုပ်ငန်းသုံး စကြာရန် တစ်ခုပါဝင်ပြီး ၎င်းသည် ကမ်းဖက်သို့ ၉ မီတာ x ၂၄၉.၅ မီတာ အရှည်ကျယ်ရှိသော ဆိပ်ကမ်းထောက်တန်းများဖြင့် ချိတ်ဆက်ထားမည်ဖြစ်ပါသည်။ ကမ်းရိုးတန်းတလျှောက်ကို ကာကွယ်နိုင်ရန်အတွက်

မြေထိန်းနံရံများကိုတည်ဆောက်သွားပါမည်။ ဆိပ်ခံတံတားနှင့် သင်္ဘောလှည့်ကွင်းနေရာတို့ရှိ ရေအနက်မှာ သတ်မှတ်ရေဆူးအနက် ၁၀.၇ မီတာ ခန့်အထိရှိပါသည်။

၁.၃.၁.၂ သိုလှောင်ကန် (ဒီဇယ်၊ ဓာတ်ဆီ၊ ရေနံဓာတ်ငွေ့ရှည်)

သိုလှောင်ကန်ကို စီမံကိန်းဆိုင်ရာတောင်ဘက်အခြမ်းတွင်ထားရှိပါသည်။ ၎င်းတွင် စုစုပေါင်း ဂါလံ ၂၅.၆၈ သန်းဆုံသော ဓာတ်ဆီသိုလှောင်ကန် ၆ခု၊ ဂါလံ ၂၂.၅၉ သန်းဆုံသော ဒီဇယ်သိုလှောင်ကန် ၆ခုနှင့် ၄၅၀၀ မက်ထရစ်တန် (metric ton) ဆုံသော ရေနံဓာတ်ငွေ့ရှည်သိုလှောင်ကန် ၃ခုတို့ ပါဝင်ကြပါသည်။ ထို့အပြင် ဂါလံ ၁.၅၈၅ သန်းဆုံသော မီးသတ်ရေကန်ကိုလည်း ထားရှိထားမည်ဖြစ်ပါသည်။

၁.၃.၁.၃ ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများ

စီမံကိန်းဆိုင်ရာအတူ ပစ္စည်းများရွှေ့ပြောင်းနိုင်ရန်အတွက်ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများ ပါဝင်ပါသည်။ ဥပမာ - စီမံကိန်းလည်ပတ်ရာတွင် အထောက်အပံ့ဖြစ်ရန် ရေဆင်းစနစ်နှင့်မီးဘေးကာကွယ်ရေးစနစ်များ ဖြစ်ပါသည်။ ပိုက်လိုင်းများကို မြေပေါ်ရှိ စင်များတွင် အဓိက ထားရှိမည်ဖြစ်ပါသည်။

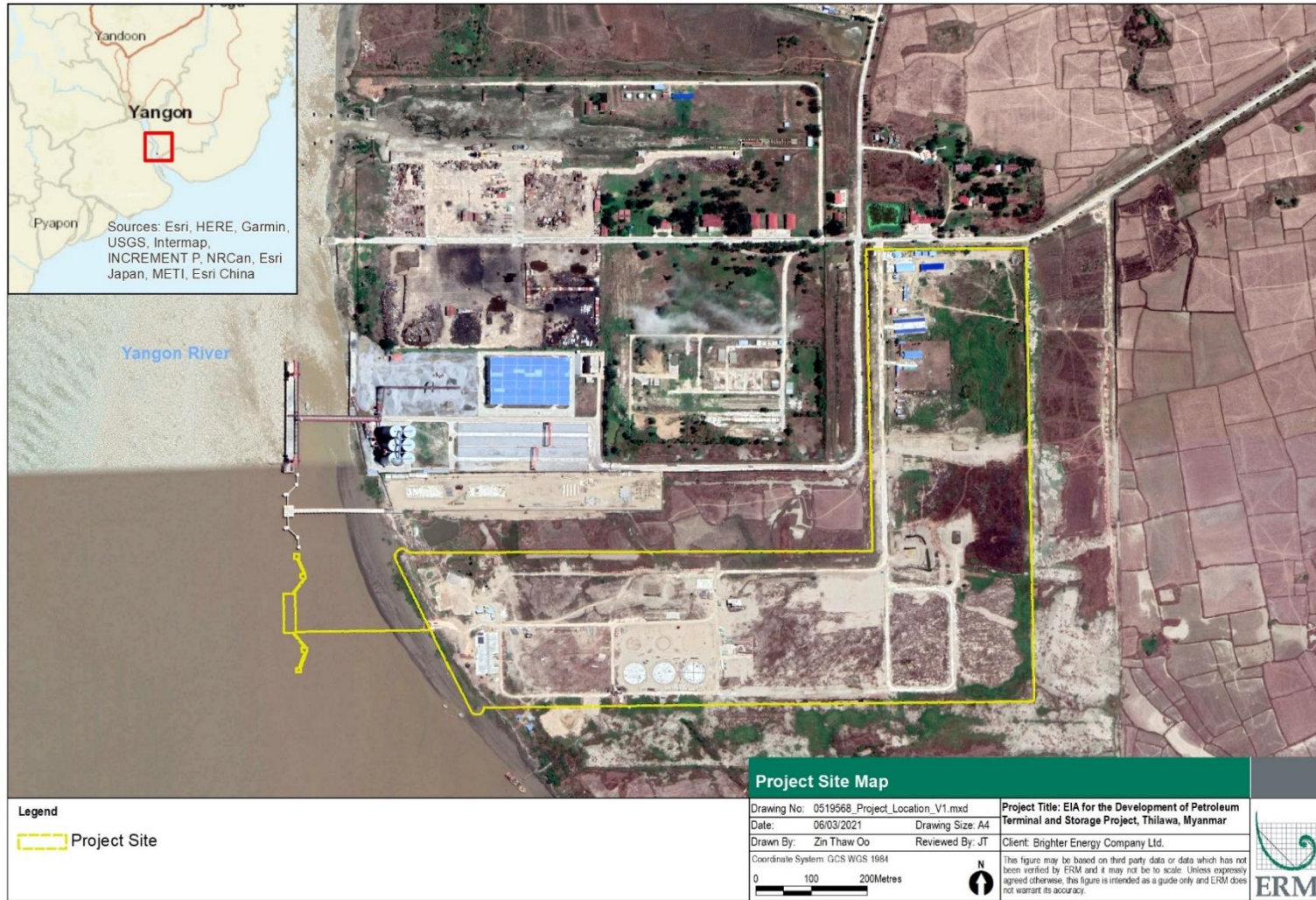
ရေနံထွက်ကုန်စည်များဖြန့်ဖြူးရန် ကုန်တင်ကားများ ကုန်တင်မည့်နေရာအား သိုလှောင်ကန်၏ကပ်ရပ်အနီးဘက်တွင် ထားရှိမည်ဖြစ်ပါသည်။

ရေနံထွက်ကုန်များနှင့် မီးသတ်ရေများ အတွက် ပန့်စက်များထားရှိရာရုံကို သက်ဆိုင်ရာသိုလှောင် ကန်များ၏ အနီးတွင်ထားရှိပါသည်။

စီမံကိန်း၏နေ့စဉ်လုပ်ငန်းလည်ပတ်ရေးအတွက် လိုအပ်သည့်ထောက်ပံ့ရေးအစိတ်အပိုင်းများရှိရာအဆောက်အအုံများအား စီမံကိန်း၏ အရှေ့မြောက်ဘက်ရှိ ရေနံဓာတ်ငွေ့ရှည် သိုလှောင်ကန်များအနီးတွင်ထားရှိပါသည်။

အခြားအရေးပါသော အဆောက်အအုံများရှိသည့်ဧရိယာအနီးတဝိုက်တွင် ရှုခင်းများအတွက် သဘာဝအတိုင်းရှိသည့် နယ်မြေဧရိယာ များကို ထားရှိသွားမည်ဖြစ်ပါသည်။

ဆီရေ ခွဲခြားမည့် မြေအောက်အဆောင်အား ဓာတ်ဆီကန်ဧရိယာနှင့် ဆီစွန့်ပစ်ရေအား စွန့်ပစ်ခြင်းမပြုလုပ်မီ EQEG စံချိန်စံနှုန်းများနှင့်အညီ သန့်စင်သည့် မြေထိန်း အကာများ အကြားတွင် တည်ဆောက်သွားမည် ဖြစ်ပါသည်။ စီမံကိန်းအနီးတဝိုက်တွင် မိုးရေစီးဆင်းမှုအတွက်ရေနုတ်မြောင်းစနစ်ကို တည်ဆောက်သွားမည် ဖြစ်ပြီး နှုန်းဖယ်ရှားသော ကိရိယာများဖြင့် EQEG စံချိန်စံနှုန်းများနှင့်အညီ နှုန်းများအား ဖယ်ရှားပြီးစွန့်ပစ်မှုများ ကိုဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။



ပုံ ၁.၁ ရေနံအဆောက်အအုံနှင့်သိုလှောင်ခြင်းဖွံ့ဖြိုးမှုစီမံကိန်းတည်နေရာ

၁.၃.၂ အခြားနည်းလမ်းရွေးချယ်ခြင်း

စီမံကိန်းရွေးချယ်မှုများနှင့် အခြားဆောင်ရွက်နိုင်သောနည်းလမ်းများကို ထည့်သွင်းစဉ်းစားခြင်းသည် မည်သည့်စီမံကိန်း ဖော်ဆောင်ရာတွင်မဆို အခြေခံကျသောလိုအပ်ချက်ဖြစ်ပြီး စီမံကိန်း၏အကျိုးကျေးဇူးများရရှိရန် သို့မဟုတ် တိုးမြှင့်ရန် နှင့် ပတ်ဝန်းကျင်နှင့်လူမှုဝန်းကျင်အပေါ်သက်ရောက်မှုများကို လျှော့ချနိုင်ရန် သို့မဟုတ် ရှောင်ကျဉ်နိုင် ရန်အတွက် ဆောင်ရွက်ခြင်းဖြစ်ပါသည်။ စီမံကိန်းအတွက် အောက်ပါအတိုင်း အမျိုးမျိုးသောရွေးချယ်မှုများကို ထည့် သွင်းစဉ်းစား ထားပါသည်။

- စီမံကိန်းလုပ်ငန်းတည်နေရာ - အဆိုပြုစီမံကိန်းလုပ်ငန်းသည် ကျေးရွာများအခြေချနေထိုင်မှုများ၏အဝေးတွင် တည်ရှိပါသည်။ ထိုရွေးချယ်ထားမှုသည် ပြည်သူလူထုအပေါ် ဖြစ်ပေါ်လာနိုင်သော ပတ်ဝန်းကျင်နှင့်လူမှုဝန်းကျင် ဆိုင်ရာ သက်ရောက်မှုများကို လျှော့ချရန်ဖြစ်သည်။ ထို့အပြင် စီမံကိန်းသည် ရှိရင်းဆွဲချိတ်ဆက်လမ်းမကြီးများတွင် တည်ရှိပြီး ၎င်းသည် ယာယီလမ်းလိုအပ်ချက်များနှင့် လမ်းတည်ဆောက်ရန် လိုအပ်ချက်များကို လျှော့ချစေနိုင်ပြီး ၎င်းတည်ဆောက်ရေးများအပေါ်တွင်လည်း ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများကို လျှော့ချ နိုင်သည်ဖြစ်သည်။
- ဆိပ်ခံတံတားပုံစံ - ဆိပ်ခံတံတားကို မြေဖော်ပုံစံလောင်း၍ တည်ဆောက်မည့်အစား ပိုင်တိုင်များရိုက်၍ တည်ဆောက်သွားမည်ဖြစ်သည်။ ထို ပိုင်တိုင်များဖြင့်တည်ဆောက်ခြင်းသည် မြေဖော်တည်ဆောက်ခြင်းနှင့် နှိုင်းယှဉ်လျှင် မြစ်ရေစီးဆင်းနှုန်းဟန့်တားခြင်းကို ပိုမိုလျှော့ချနိုင်သည်ဖြစ်သည်။ ထို့အပြင် ပိုင်တိုင်များဖြင့် တည်ဆောက်ခြင်းသည် မြေဖော်တည်ဆောက်ခြင်းနှင့်မတူခြင်းမှာ မြစ်အတွင်းသို့ မြေများပြန်လည်ဖြည့် တင်းရခြင်းမျိုး မလိုအပ်တော့သောကြောင့် မြေဆီလွှာပျက်စီးခြင်းများနှင့်အတူ ရေအရည်အသွေးအပေါ် သက် ရောက်နိုင်မှုများပါ လျှော့ချနိုင်ပြီးသားဖြစ်ပါသည်။

၁.၄ အနီးပတ်ဝန်းကျင်အကြောင်းအရာ ဖော်ပြချက်

စီမံကိန်းတည်နေရာတွင် ဆိပ်ခံတံတား၊ သိုလှောင်ကန်၊ ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများပါဝင်ပြီး ရန်ကုန်တိုင်းဒေသကြီး ကျောက်တန်းမြို့နယ်အတွင်းတွင် တည်ရှိပါသည်။

လေ့လာမှုနယ်မြေဧရိယာသည် ပတ်ဝန်းကျင်နှင့်လူမှုဝန်းကျင်နယ်ပယ်များမှ သက်ရောက်မှုရင်းမြစ်များကိုအခြေခံ၍ စီမံကိန်းမှ ယင်းသက်ရောက်နိုင်မှုအတိုင်းအတာပမာဏနှင့် သက်ရောက်မှု၏အရေးပါမှုတို့ကို သတ်မှတ်ဖော်ထုတ် တင်ပြ ခြင်းဖြစ်ပါသည်။ ထိုစီမံကိန်း၏ လေ့လာမှုနယ်မြေဧရိယာကို စီမံကိန်းမှ ကျောက်တန်းမြို့၏ ၂၀ကီလိုမီတာ ပတ်လည် အကွာအဝေးထားရှိ၍ လေ့လာပါသည်။

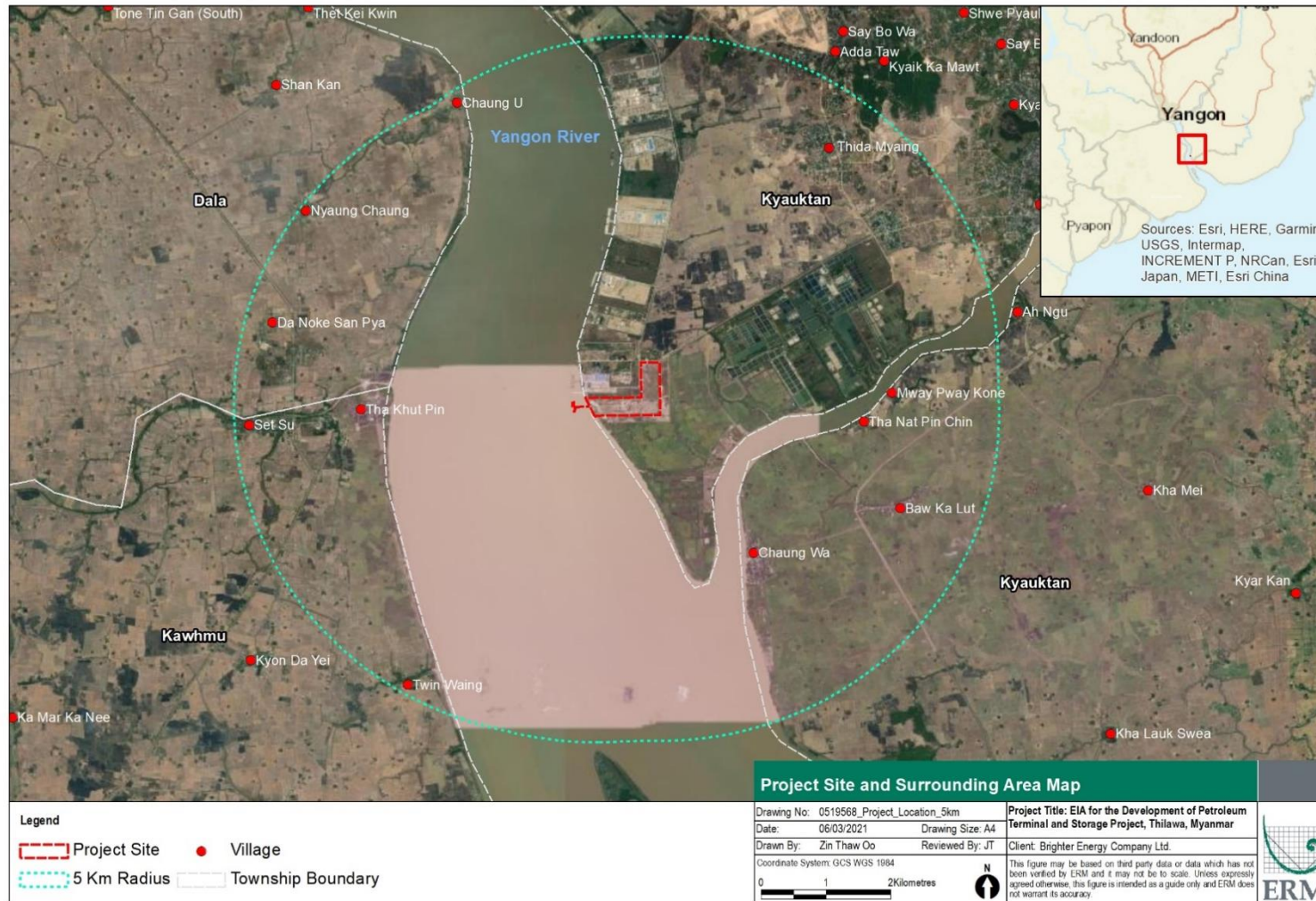
သက်ရောက်နိုင်မှုနယ်မြေဧရိယာကို စီမံကိန်း၏သက်ရောက်မှု ဖြစ်ပွားနိုင်မှုအပေါ်မူတည်၍ သတ်မှတ်ပါသည်။ ထိုစီမံကိန်းအတွက် ကြားခံ ၅ကီလိုမီတာ ပတ်လည်အကွာအဝေးထားရှိ၍ လေ့လာခဲ့ပြီး ကျောက်တန်း၊ ကော့မှူးနှင့် ဒလမြို့နယ်များ ပါဝင်ပါသည်။

ဇယား ၁.၁ လေ့လာမှုနယ်မြေဧရိယာ၏ အဓိကထိခိုက်လွယ်မှုများ

ပတ်ဝန်းကျင်နေရာ	ထိခိုက်လွယ်မှု
ကုန်းနေ ဇီဝမျိုးစုံမျိုးကွဲများ	<p>စီမံကိန်းနယ်မြေဧရိယာ နှင့် အနီးဝန်းကျင်သည် စက်မှုဇုန်ဧရိယာဖြစ်ပြီး ဒေသမျိုးရင်းမဟုတ်သော မျိုးစိတ်များသာရှိသည့်အတွက် ဂေဟဗေဒရှုထောင့်အရ နိမ့်ကျသည့် ဟုယူဆပါသည်။ ကုန်းနေ ဇီဝမျိုးစုံမျိုးကွဲများ၏ ဂေဟဗေဒဆိုင်ရာ အရည်အသွေးများကိုအတည်ပြုနိုင်ရန်အတွက် အခြေခံအချက်အလက်များစစ်တမ်းများကောက်ယူခြင်းကို ဆက်လက်ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။ စီမံကိန်းမှ ကုန်းနေ ဇီဝမျိုးစုံမျိုးကွဲများ အပေါ်သက်ရောက်မှုများကိုပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားမည်ဖြစ်ပါသည်။</p>
ရေနေ ဇီဝမျိုးစုံမျိုးကွဲများ	<p>စီမံကိန်းနယ်မြေဧရိယာ ရန်ကုန်မြစ်ကမ်းပေါ်တွင်တည်ရှိပါသည်။ ERM ၏ အရင်ကောက်ယူထားသည့် ဒေတာအချက်အလက်များအရ ရန်ကုန်မြစ်ရေသည် အနည်များ/နောက်ကျိုမှု မြင့်မားပါသည်။ ရေနေနို့တိုက်သတ္တဝါများဖြစ်သည့် လင်းပိုင်များ (cetaceans) တွေ့ရှိသည့်အထောက်အထားများမတွေ့ရပါ။ ထို့ကြောင့် စီမံကိန်းနယ်မြေဧရိယာ နှင့် အနီးဝန်းကျင်ရှိ ရေနေဇီဝမျိုးစုံမျိုးကွဲများ၏ ဂေဟဗေဒ အရည်အသွေးကို နည်းပါးသည်ဟုယူဆပါသည်။ စီမံကိန်းမှ ကုန်းနေ ဇီဝမျိုးစုံမျိုးကွဲများ အပေါ်သက်ရောက်မှုများကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားမည်ဖြစ်ပါသည်။</p>
ပတ်ဝန်းကျင်လေထု အရည်အသွေး	<p>လက်ရှိအနေအထားတွင် ပတ်ဝန်းကျင်လေထု အရည်အသွေးအတွက် လိုအပ်သောအချက်အလက်များ မရရှိပါ။ စီမံကိန်း၏ တည်ဆောက်ရေး နှင့် လည်ပတ်ရေးတို့မှ လေထုအရည်အသွေးသက်ရောက်မှုများကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားရန် လိုအပ်သွားမည် ဖြစ်ပါသည်။</p>
ဝန်းကျင်ဆူညံသံ	<p>လက်ရှိအနေအထားတွင် အနီးဝန်းကျင်ဆူညံသံနှင့် ပတ်သက်သည့် အချက်အလက်များမရရှိပါ။ စီမံကိန်း၏ တည်ဆောက်ရေး နှင့် လည်ပတ်ရေးတို့မှ ဆူညံသံသက်ရောက်မှုများကို ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားရန် လိုအပ်သွားမည် ဖြစ်ပါသည်။</p>
ရပ်ရွာလူထု နှင့် အသက်မွေးဝမ်းကျောင်းများ	<p>စီမံကိန်းသည် ကျောက်တန်း မြို့နယ်အတွင်း တည်ရှိပါသည်။ စီမံကိန်းမှ အနီးအနားရှိရပ်ရွာများ၏ အသက်မွေးဝမ်းကျောင်း အပေါ်သက်ရောက်မှုများကို ထည့်သွင်းစဉ်းစားသွားရန် လိုအပ်ပါသည်။</p>

ပတ်ဝန်းကျင်နေရာ	ထိခိုက်လွယ်မှု
ရေအရင်းအမြစ်များ နှင့် ရေနှုတ်မြောင်း စနစ်	စီမံကိန်းနယ်မြေဧရိယာ ရန်ကုန်မြစ်ကမ်းပေါ်တွင်တည်ရှိပါသည်။ စီမံကိန်းအတွက် ရေအရင်းအမြစ်များကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားသွားရန် လိုအပ်ပါသည်။
သယ်ယူပို့ဆောင်ရေး	စီမံကိန်းကြောင့် ကျောက်တန်းမြို့နယ်တို့တွင် လက်ရှိယာဉ်အသွားအလာပမာဏထက် ပိုမိုတိုးပွားလာနိုင်ပါသည်။ ယာဉ်အသွား အလာအပေါ် သက်ရောက်မှုများကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားရန် လိုအပ်ပါသည်။
ယဉ်ကျေးမှု အမွေအနှစ်	ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားရန် လိုအပ်သည့် လေ့လာမှုနယ်မြေဧရိယာအတွင်း၌ ထင်ရှားသော ဘုရားများ နှင့် ဘုန်းကြီးကျောင်းများလည်းရှိပါသည်။

စီမံကိန်းတည်နေရာနှင့် လေ့လာမှုနယ်မြေဧရိယာများကို ပုံ ၁.၂ တွင် ဖော်ပြထားပါသည်။



ပုံ ၁.၂ စီမံကိန်းတည်နေရာနှင့်လေ့လာမှုနယ်မြေဧရိယာပြမြေပုံ

၁.၄.၁ တရားဝင်ကာကွယ်ထိန်းသိမ်းထားသော အမျိုးသားဒေသတွင်း/ပြည်နယ်တွင်းဧရိယာများ

စီမံကိန်းအနီး သို့မဟုတ် လေ့လာမှုနယ်မြေဧရိယာအနီးတွင် (စီမံကိန်းမှ ၂၀ကီလိုမီတာအနီးဝန်းကျင်) ကာကွယ် ထိန်းသိမ်းထားသော (သို့) ထိခိုက်လွယ်နိုင်သောဧရိယာများ မရှိပါ။ စီမံကိန်းမှ ၅၀ကီလိုမီတာအချင်းဝက် အကွာအဝေး တွင် အမျိုးသားကာကွယ်ထိန်းသိမ်းတောဧရိယာ (လှော်ကား အမျိုးသားတောရိုင်းတိရိစ္ဆာန်ဥယျာဉ်)၊ ဒေသရင်း ငှက်မျိုးစိတ်ဧရိယာ (EBA) ၁ခုနှင့် အဓိကဇီဝထိန်းသိမ်းကာကွယ်တော ၃ခု (KBA) တို့ တည်ရှိပါသည်။ အနီး ဆုံးကာကွယ်ထိန်းသိမ်းတောဖြစ်သည့် လှော်ကားဥယျာဉ်ကန်သည် မြောက်ဘက် ၃၆ကီလိုမီတာအကွာတွင် တည်ရှိ ပါသည်။ ၎င်းဧရိယာများ၏ အချက်အလက်များကို ဇယား ၁.၂ တွင် ဖော်ပြထားပါသည်။

ဇယား ၁.၂ စီမံကိန်းမှ ၅၀ကီလိုမီတာအကွာတွင်ရှိသော ကာကွယ်ထိန်းသိမ်းတောဧရိယာ၊ ဒေသရင်းငှက်မျိုးစိတ်ဧရိယာနှင့် အဓိကဇီဝထိန်းသိမ်းကာကွယ်တောဧရိယာများ

ကာကွယ်ထိန်းသိမ်းဧရိယာ	အချက်အလက်နှင့် အဓိကမျိုးစိတ်များ	စီမံကိန်းမှ အနီးဆုံးအကွာအဝေး
လှော်ကား အမျိုးသား တောရိုင်းတိရိစ္ဆာန်ဥယျာဉ်	<ul style="list-style-type: none"> ဧရိယာ - ၆ စတုရန်းကီလိုမီတာ စတင်သတ်မှတ်သည့်ခုနှစ် - ၂၀၁၂ Columba punicea (Pale-capped pigeon) (VU) 	၄၂ ကီလိုမီတာ
လှော်ကားဥယျာဉ်ကန်	<ul style="list-style-type: none"> ဧရိယာ - ၂၃ စတုရန်းကီလိုမီတာ စတင်သတ်မှတ်သည့်ခုနှစ် - ၂၀၁၂ Dalbergia cultrata (Yin-daik) (EN), Dipterocarpus alatus (Kanyin-byu) (EN), Hopea odorata (Thingan) (VU). 	၃၆ ကီလိုမီတာ
ဘုရားကြီး ကုန်းတွင်းသက်ရှိ ကာကွယ်ထိန်းသိမ်းတောဧရိယာ	<ul style="list-style-type: none"> ဧရိယာ - ၂ စတုရန်းကီလိုမီတာ စတင်သတ်မှတ်သည့်ခုနှစ် - ၂၀၁၂ Grus Antigone (Sarus crane) (VU), Congregatory waterbirds 	၃၉ ကီလိုမီတာ
မလက်တိုအင်း ရေချို ကာကွယ်ထိန်းသိမ်းတောဧရိယာ	<ul style="list-style-type: none"> ဧရိယာ - ၃၈၆ စတုရန်းကီလိုမီတာ စတင်သတ်မှတ်သည့်ခုနှစ် - ၂၀၁၂ Grus Antigone (Sarus crane) (VU), Emberiza aureola (Yellow-breasted Bunting) (EN), Congregatory waterbirds 	၃၇ ကီလိုမီတာ
ဧရာဝတီမြစ်ဝှမ်းဒေသ	<ul style="list-style-type: none"> ဧရိယာ - ၁၆၀,၀၀၀ စတုရန်းကီလိုမီတာ စတင်သတ်မှတ်သည့်ခုနှစ် - ၁၉၉၁ 	၂၈ ကီလိုမီတာ

	<ul style="list-style-type: none"> ■ <i>Crypsirina cucullata</i> (Hooded Treepie) (NT), <i>Chatarrahae gularis</i> (White-throated Babbler) 	
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မှတ်ချက်: IUCN မှ ထုတ်ပြန်သတ်မှတ်ထားချက်များ: LC - မျိုးသုဉ်းရန်အန္တရာယ်နည်းပါးသည့်မျိုးစိတ်, EN - မျိုးသုဉ်းရန်အန္တရာယ်ရှိသောမျိုးစိတ်, VU - မျိုးသုဉ်းရန်အန္တရာယ်ကျရောက်နိုင်သောမျိုးစိတ်, NT - မျိုးသုဉ်းရန်အန္တရာယ် ကျရောက် လုနီးပါးမျိုးစိတ်။ IUCN မှ အမျိုးအစား (၄) အပင်နှင့်သက်ရှိ စီမံခန့်ခွဲမှုဧရိယာ ဟူသည် အပင်နှင့်သက်ရှိသတ္တဝါများကို အဓိကထားပြီးကာကွယ်ထိန်းသိမ်းသွားရန်ဖြစ်သည်။ (IUCN, ၂၀၁၉)

၁.၄.၂ ရုပ်ပိုင်းဆိုင်ရာပတ်ဝန်းကျင်အခြေခံအချက်အလက်များ

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအတွက် အဓိကအခြေခံအချက်အလက်များ ကောက်ယူစုဆောင်းထားမှုကို အောက် ပါ များတွင်ဖော်ပြထားပါသည်။

၁.၄.၂.၁ ရာသီဥတုအခြေအနေများ

မြန်မာနိုင်ငံ၏ ရာသီဥတုသွင်ပြင်အနေအထားသည် အဓိကအားဖြင့် အရှေ့မြောက်နှင့်အနောက်တောင် မုတ်သုံရာသီဥတု များဖုံးလွှမ်းလျက်ရှိပြီး ၎င်းရာသီနှစ်ခုအကြား ကာလတိုဖြင့်ကူးပြောင်းလျက်ရှိပါသည်။ အနောက်တောင်မုတ်သုံရာသီ ဥတု (ဇွန်လ မှ စက်တင်ဘာလအထိ) သည် မိုးတိမ်များကျယ်ပြန့်များပြားပြီး များသောအားဖြင့် နေ့စဉ်မိုးရွာသွန်းမှုများနှင့် မိုးကြိုးမုန်တိုင်းများဖြစ်ပေါ်လျက်ရှိပါသည်။ အရှေ့မြောက်မုတ်သုံ (ဒီဇင်ဘာလ မှ ဧပြီလအထိ)သည် မိုးတိမ်များနည်းပါးပြီး မိုးကျကာလနှင့်အပူချိန်အတော်သင့်ဖြစ်ပြီး ဆိုထိုင်းဆနည်းပါးကာ ဆောင်းဝင်ကာလဖြစ်ပါသည်။ (Suwannathatsa, et al, ၂၀၁၂)။

မြန်မာနိုင်ငံရှိ ရန်ကုန်တိုင်းဒေသကြီးသည် ယေဘုယျအားဖြင့် နွေရာသီတွင် မိုးရွာသွန်းမှုနည်းပါးပါသည်။ ပျမ်းမျှအမြင့်ဆုံး အပူချိန်မှာ ၂၉° စင်တီဂရိတ်ဖြစ်ပြီး ပျမ်းမှန်စဉ်မိုးရေချိန်မှာ ၂,၃၇၈ မီလီမီတာဖြစ်ပါသည်။ အခြောက်သွေဆုံးကာလမှာ ဇန်နဝါရီလဖြစ်ပါသည်။ ဇွန်လတွင်မိုးရေချိန်အမှတ် ၃ မီလီမီတာရှိကာ စိုစွတ်ကာလဖြစ်ပြီး ပျမ်းမျှမှာ ၅၁၆ မီလီမီတာ အထိ ရှိပါသည်။ ဇန်နဝါရီလသည် နှစ်တစ်နှစ်၏ အနိမ့်ဆုံးအပူချိန်ရှိသောကာလဖြစ်ပြီး ၂၅° စင်တီဂရိတ်ဖြစ်ပါသည်။ နှစ်အလိုက်အပူချိန်ပြောင်းလဲမှုမှာ ၅.၅° စင်တီဂရိတ်ရှိပါသည်။ (Climate Data ဝဘ်ဆိုဒ်, ၂၀၂၁)။

၁.၄.၂.၂ လေအရည်အသွေးအပေါ်သက်ရောက်မှု

NO₂, CO နှင့် SO₂ အပြင် PM_{2.5} နှင့် PM₁₀ တို့ကို စီမံကိန်းအနီးလေ့လာမှုဧရိယာများရှိ ၄ နေရာတွင် ကောက်ယူလေ့လာခဲ့ပါသည်။ လေအရည်အသွေးအပေါ်သက်ရောက်ရာတွင် NO₂ နှင့် CO တို့၏တန်ဖိုးများသည် ကမ္ဘာ့ကျန်းမာရေးအဖွဲ့အစည်း (WHO) မှ လူသားကျန်းမာရေးအတွက်ထုတ်ပြန်ထားသော လမ်းညွှန်ချက်များနှင့် ထုတ်လွှတ်မှုစံချိန်စံညွှန်းများကို ကျော်လွန်နေခြင်းမရှိပါ။ နေရာအမှတ် A-1 သည် စီမံကိန်းမှ ၃၅၀ မီတာအကွာ အဓိကမိန်းလမ်းမကြီးပေါ်တွင်တည်ရှိပါသည်။ ၎င်းထံမှ SO₂ ရလဒ်တန်ဖိုးသည် စံချိန်စံညွှန်းများနှစ်ခုလုံးကို ကျော်လွန် လျက်ရှိပါသည်။ ၎င်းအနီးတွင် ဖြစ်နိုင်ချေရှိသော အခြားထုတ်လွှတ်ရင်းမြစ်များမှာ စက်ရုံများ၊ လျှပ်စစ်ဓာတ်အား စက်ရုံများ၊ စက်တပ်ယာဉ်များနှင့် ရန်ကုန်မြစ်အတွင်းရှိ သင်္ဘောများထံမှဖြစ်ပါသည်။

PM_{2.5} နှင့် PM₁₀ ၏အချက်အလက်များကို (WHO) မှ လူသားကျန်းမာရေးအတွက် ထုတ်ပြန်ထားသောလမ်းညွှန်ချက် များနှင့် နှိုင်းယှဉ်လေ့လာပါသည်။ ၎င်းရှိ PM₁₀ ရလဒ်တန်ဖိုးသည် A-4 နေရာမှလွဲ၍ကျန်ရှိနေရာများတွင် ကျော်လွန်လျက် ရှိပြီး စီမံကိန်းမှအဝေးဆုံး မိန်းလမ်းမကြီးများအကြားတွင် တည်ရှိပါသည်။ PM₁₀ တန်ဖိုးမြင့်တက်နေခြင်းမှာ မိန်းလမ်းမကြီးများတွင် ယာဉ်သွားလာမှုများနှင့် ဆိုဒ်များရှိတည်ဆောက်ရေးလုပ်ငန်းများမှာ ဖြစ်ပေါ်လာသော ဖုန်မှုန့်များကြောင့်ဖြစ်ပါသည်။ PM_{2.5} ရလဒ်များမှာ WHO ၏စံချိန်စံညွှန်းများနှင့်အညီ ကိုက်ညီမှုရှိပါသည်။

၁.၄.၂.၃ ဆူညံသံသက်ရောက်မှု

စီမံကိန်း၏လေ့လာမှုဧရိယာတွင် ဆူညံသံအရည်အသွေးကို တိုင်းတာခဲ့ပါသည်။ နေရာအမှတ် N-2 နှင့် N-3 များမှ ညအချိန်ရှိရလဒ်တန်ဖိုးများသည် IFC ဆူညံသံအရည်အသွေးလမ်းညွှန်ချက်များအရ (လူနေအိမ်ခြေများအတွက်) ကျော်လွန်လျက်ရှိပါသည်။ ထိုနေရာ ၂ခုသည် မြစ်အနီးတွင်တည်ရှိပြီး ကိုယ်ပိုင်သုံးမီးစက်များနှင့် လေ့/သင်္ဘောများမှ ဖြစ်ပေါ်လာသော ဆူညံသံများကြောင့်ဖြစ်ပါသည်။

၁.၄.၂.၄ မြေအရည်အသွေး

မြေမူနာများကို ၄ နေရာတွင် ကောက်ယူခဲ့ပြီး တစ်ခုမျှ FAO နှင့် Dutch တို့မှထုတ်ပြန်ထားသော စံချိန်စံညွှန်းများကို ကျော်လွန်နေခြင်းမရှိပါ။

၁.၄.၂.၅ ရေအရင်းအမြစ်များ

မြေအောက်ရေမူနာများကို လေ့လာမှုဧရိယာအတွင်းရှိ ၄ နေရာတွင် ကောက်ယူခဲ့ပါသည် (စီမံကိန်းဆိုင်ရာအတွင်းနှင့် အနီးရွာများရှိ ရေတွင်းများမှ)။ ရလဒ်များကို WHO ၏ သောက်သုံးရေစံချိန်စံညွှန်းများ (ပါရာမီတာဂုဇု - pH, nitrate, arsenic, chromium, copper, cyanide နှင့် mercury) နှင့် မြန်မာနိုင်ငံသောက်သုံးရေအရည်အသွေးစံချိန်စံညွှန်းများ (DWQS) (eight parameters - pH, ammonia (as N), nitrate (as N), arsenic, chromium, copper, mercury နှင့် cyanide) တို့ဖြင့်နှိုင်းယှဉ်လေ့လာပါသည်။

စီမံကိန်းဆိုင်ရာ နေရာအမှတ် GW-1 မှ ရလဒ်သည် အမိုးနီးယားတန်ဖိုးကိုဖော်ပြနေပြီး ဆိုင်ယမ်နိုဒ်တန်ဖိုးသည် DWQS နှင့် WHO တို့၏သတ်မှတ်နှုန်းအပြင်ဘက်သို့ရောက်ရှိနေပါသည်။ အမိုးနီးယားသည် နိုက်ထရိုဂျင်မှဓာတ်ပြုဖြစ် ပေါ်လာခြင်း ဖြစ်ပြီး စိုက်ပျိုးမြေတွင်သုံးသောဓာတ်မြေဩဇာများမှပါဝင်သော ဒြပ်စင်ဖြစ်နေခြင်း သို့မဟုတ် စွန့် ပစ်မှုများမှ အမိုးနီးယားသည် မြေအောက်အတွင်းသို့ စိမ့်ဝင်ခြင်းတို့မှ မြေအောက်ရေ ထဲတွင်သို့လှောင်နေ ခြင်းများဖြစ်ပေါ်လာခြင်းဖြစ်ပါသည်။ ရေအတွင်းဆိုင်ယမ်နိုဒ်ပါဝင်နေခြင်းမှာ အဓိကအားဖြင့် စက်မှုဇုန်များမှ စွန့်ထုတ်မှုများကြောင့် ဖြစ်နိုင်ချေရှိ ပါသည်။ ကျန်ရှိသောတိုင်းတာလေ့လာသည့်ဓာတ်များမှာ WHO နှင့် DWQS တို့၏ စံချိန်စံညွှန်းများကို ကျော်လွန်ခြင်း မရှိပါ။

မျက်နှာပြင်ရေအရည်အသွေးကို ရန်ကုန်မြစ်အတွင်းရှိ ၃ နေရာ (စီမံကိန်းတည်နေရာမှ ရေညှာအထက်နှင့် ရေစုန်အောက် ဘက်)တွင် နမူနာကောက်ယူခဲ့ပါသည်။ ရလဒ်များကို WHO ၏ သောက်သုံးရေစံချိန်စံညွှန်းများ (ပါရာမီတာဂုဇု - pH, nitrate, arsenic, chromium, copper, cyanide နှင့် mercury) နှင့် မြန်မာနိုင်ငံ သောက်သုံးရေအရည်အသွေး စံချိန်စံညွှန်းများ (DWQS) (eight parameters - pH, ammonia (as N), nitrate (as N), arsenic, chromium, copper, mercury နှင့် cyanide) တို့ဖြင့်နှိုင်းယှဉ်လေ့လာပါသည်။

တိုင်းတာလေ့လာသည့်ဓာတ်များမှာ WHO ၏ သောက်သုံးရေစံချိန်စံညွှန်းများနှင့် မြန်မာနိုင်ငံ သောက်သုံးရေ အရည်အသွေးစံချိန်စံညွှန်းများကို ကျော်လွန်နေခြင်းမရှိပါ။

၁.၄.၂.၆ သဘာဝဘေးအန္တရာယ်များ

မြန်မာနိုင်ငံသည် သဘာဝဘေးအန္တရာယ်များအရ ဆိုင်ကလုန်း၊ မြေငလျင်နှင့် ရေကြီးရေလျှံသက်ရောက်ခံရမှုများ ရှိပါသည်။ စီမံကိန်းသည် ဒီဇိုင်းတည်ဆောက်မှုများကို ဖြစ်နိုင်ချေရှိသော ပတ်ဝန်းကျင်နှင့်လူမှုဝန်းကျင်သက်ရောက် မှုများ ကို လျော့ချနိုင်ရန် ထည့်သွင်းစဉ်းစားကာဆောက်ရွက်သွားပါမည်။

မုန်တိုင်းနှင့်ဆိုင်ကလုန်းများ

လေပြင်းမုန်တိုင်း (၁ စက္ကန့်လျင် ၁၇.၂ မီတာနှုန်း (သို့) ပို၍) သည် အဓိကအားဖြင့် မိုးရွာသွန်းမှုကြီးချိန်တွင်ဖြစ်ပေါ်ပြီး မုန်တိုင်း (သို့) ဆိုင်ကလုန်းများပါ ဖြစ်ပေါ်ပါသည်။ အလယ်ပိုင်းဧရာသီမုတ်သုံကာလတွင်မူ အဆိုးဆုံးကာလအဖြစ် ရှိပါသည်။ ဆိုင်ကလုန်း၏ လေတိုက်နှုန်းမှာ ပျမ်းမျှအားဖြင့် ၁ စက္ကန့်လျင် ၃၂.၇ မီတာနှုန်း သက်ရောက်ပြီး နှစ်အလိုက် နေရာအလိုက် ကွဲပြားမှုများရှိပြီး အက်ဒမန်ပင်လယ်အတွင်းရှိ အဓိကနှုန်းထက်ကျော်လွန်ခြင်းမရှိပါ။ ဆိုင်ကလုန်းများ မှာ ပုံမှန် မေလအလယ်မှ ဒီဇင်ဘာလအစောပိုင်းကာလအထိအကြားတွင် ဖြစ်ပေါ်လျက်ရှိပါသည်။

ရေကြီးခြင်း

စီမံကိန်းဧရိယာသည် အနီးပတ်ဝန်းကျင်မှာ မြေမျက်နှာသွင်ပြင်နိမ့်မှုကြောင့် ရေကြီးရေလျှံမှုများဖြစ်လေ့ရှိနိုင်ပါသည်။ မိုးရေကြီးမှုများနှင့် ရေစီးဆင်းကန်သတ်မှုများကြောင့် ရေကြီးရေလျှံမှုများဖြစ်ပေါ်လာနိုင်ပါသည်။ အနီးပတ်ဝန်းကျင်သွင်ပြင်မှ မြစ်နှင့်တူးမြောင်းများနိမ့်ကျနေမှုကြောင့် မြစ်ရေကြီးမှုများဖြစ်ပေါ်လာနိုင်ပါသည်။ (Royal Haskoning DHV, ၂၀၁၉).

ရန်ကုန်မြစ်ရှိ ပျမ်းမျှဒီရေအတက်အကျတန်ဖိုးမှာ ရေတက် ၆ မီတာ နှင့် ရေကျ ၃မီတာ ဖြစ်ပါသည်။ ရန်ကုန်မြစ်ရေ၏စွန့်ပစ်ထုတ်မှုများမှာ နှုန်းများအရ ဧပြီလတွင် ၁စက္ကန့်လျှင် ၅၀၀ကုဗမီတာအောက်တွင်ရှိပြီး ဩဂုတ်လတွင် ၁စက္ကန့်လျှင် ၇,၀၀၀ ကုဗမီတာအနီးရှိကာ လေ့လာမှုဧရိယာ ရေစုန်အောက်ဘက်တွင် ဒီရေအတက်အကျအမြင့် ပြောင်းလဲမှု ရေတိုင်းအမှတ် ၁ မှ ၆ မီတာ အထိရှိပါသည်။ ဧရာဝတီမြစ်ဝကျွန်းပေါ်တွင် ရန်ကုန်မြစ်အပါအဝင် ရေစီးဆင်းမှုများ၊ ရေငန်ဝင်ရောက်မှုများနှင့် ရေကြီးရေလျှံကာကွယ်မှုများမှာ အဓိကစိုးရိမ်မှု များဖြစ် ပါသည်။ (EO Earth Website, ၂၀၁၆).

ရန်ကုန်မြစ်အတွင်းရှိ အဓိက မြစ်ရေကြီးရေလျှံမှုဖြစ်ပေါ်ခြင်းကိစ္စရပ် ၂ခုမှာ - (Royal Haskoning DHV, ၂၀၁၉):

- ပင်လယ်ရေမြင့်တက်လာမှု - မုတ္တမပင်လယ်အော်အတွင်း ဒီရေမြင့်တက်လာမှုများ။ လှိုင်မြစ်အတွင်း မိုးကြောင့် ဖြစ်သော ဒီရေအမြင့်မှာ ၅.၄မီတာ ဝန်းကျင်အထိရှိပြီး ရေသေကာလ ဒီရေအမြင့်မှာ ၂မီတာ ဝန်းကျင်ဖြစ်ပါသည်။ ထို့ပြင် မုန်တိုင်းများကြောင့် ကမ်းလွန်ပင်လယ်ရေမြင့်တက်မှုများကြောင့်လည်းဖြစ်ပေါ်နိုင်ပါသည်။
- မုတ်သုံရာသီတွင် ရေစွန့်ထုတ်မှုများပြားလာမှု - ဧရာဝတီကမ်းရိုးတန်းဘက်မှ ဧရာဝတီမြစ်ရေများသည် ရန်ကုန်မြစ်အတွင်းသို့တိုးဝင်စီးဆင်းလာခြင်း ရေမြင့်တက်မှုများဖြစ်ပေါ်လာပြီး မိုးရာသီကာလတွင် ၀.၇မီတာ ဝန်းကျင်အထိ မြင့်တက်လျက်ရှိပါသည်။

မြေငလျင်အန္တရာယ်

ထုတ်ပြန်ထားသောစာတမ်းများအရ မြန်မာနိုင်ငံသည် မြေငလျင်အားဖြင့်မတည်ငြိမ်ခြင်းနှင့် မြေငလျင်လှုပ်ခတ်ခြင်း များ ဖြစ်ပေါ်စေနိုင်ခြင်း၊ ၎င်းတွင် Alpine seism tectonic belt နှင့် Alpine Himalayan-Sumatran orogenic belt တို့ တည်ရှိနေပါသည်။ သမိုင်းမှတ်တမ်းများအရ မြန်မာနိုင်ငံတွင်း လွန်ခဲ့သောနှစ်၁၀၀ကျော်အတွင်း ရပ်ချိတာစကေး ၇.၀ အထက် လှုပ်ခတ်ခဲ့သောမြေငလျင်အမျိုးအစား အနည်းဆုံး ၁၅ခုခန့်ရှိခဲ့ပါသည်။ ထိုငလျင်များသည် လွန်ခဲ့သောရာစုနှစ် အတွင်းတွင်ဖြစ်ပေါ်ခဲ့ပြီး ရန်ကုန်တွင် ၁၉၃၁ခုနှစ် မတ်လ ၂၇ရက် နှင့် မေလ ၁၆ရက်၊ ၁၉၇၀ခုနှစ် မေလ ၂၁ရက်တွင် ဖြစ်ပေါ်ခဲ့ပါသည်။

၁.၄.၃ ဇီဝပတ်ဝန်းကျင်အခြေခံအချက်အလက်

၁.၄.၃.၁ သက်ရှိများ

ဇီဝဆိုင်ရာစစ်တမ်းကောက်ယူမှုများပြုလုပ်ခဲ့ပြီး သက်ရှိမျိုးစိတ်များ နို့တိုက်သတ္တဝါများအပါအဝင် ငှက်များ၊ ငါး၊ လိပ်များ၊ ကုန်းနေရေနေသတ္တဝါများနှင့် လိပ်ပြာများကို လေ့လာခဲ့ပါသည်။ သက်ရှိများလေ့လာမှုများကို တိုက်ရိုက် မြေပြင် ကွင်းဆင်းလေ့လာမှုများဖြင့်ဆောင်ရွက်ခဲ့ပြီး သဘာဝသက်ရှိများ၏ သင်္ကေတများ ဥပမာ ခြေရာများနှင့်စား ကျက်များ အပြင် ဒေသခံပြည်သူများအား စစ်တမ်းကောက်ယူမေးမြန်းခဲ့ပါသည်။

နို့တိုက်သတ္တဝါ ၂မျိုးကို တွေ့ရှိခဲ့ပြီး ၎င်းတို့မှာ IUCN မှ ထုတ်ပြန်သတ်မှတ်ထားချက်များမှ မျိုးသုဉ်းရန်အန္တရာယ် နည်းပါးသည့်မျိုးစိတ်အဖြစ် တည်ရှိပါသည်။

ငှက်မျိုးစိတ် ၃၀ကိုလည်း တွေ့ရှိခဲ့ပြီး အားလုံးမှာမျိုးသုဉ်းရန်အန္တရာယ် နည်းပါးသည့်မျိုးစိတ်များဖြစ်ပါသည်။ နေရင်းဒေသငှက်မျိုးစိတ် တစ်မျိုး White throated Babbler ကိုလည်း လေ့လာမှုဧရိယာတွင် တွေ့ရှိခဲ့ပါသည်။ မျိုးသုဉ်းရန်အန္တရာယ်ကျရောက်နေသောမျိုးစိတ်များမတွေ့ရှိပါ။ ငှက်မျိုးစိတ် ၃၀ မှ ၁၀မျိုးသည် Bird Life International ၂၀၂၀ အရ ရွှေ့ပြောင်းငှက်အမျိုးအစားများဖြစ်ပါသည်။

စုစုပေါင်းငှက်မျိုးစိတ် ၁၉မျိုးသည် မျိုးရင်းအုပ်စု ၁၄ခုမှဖြစ်ကြပါသည်။ အဓိကမျိုးစိတ်များမှာ Puntius ticto နှင့် Channa orientalis တို့ဖြစ်ပြီး မိသားစုမျိုးရင်းမှာ Cyprinidae (carp) ဖြစ်သည်။ IUCN မှ ထုတ်ပြန်ထားချက်များအရ မျိုးသုဉ်းရန်အန္တရာယ်နည်းပါးသည့်မျိုးစိတ်များသာ တည်ရှိနေသောကြောင့် မျိုးစိတ်ထိန်းသိမ်းမှုစိုးရိမ်ရန် သက်ရှိအမျိုးစားများမရှိပါ။

လိပ်မျိုးစိတ် ၆မျိုးကိုတွေ့ရှိခဲ့ပြီး IUCN မှ ထုတ်ပြန်ထားချက်များအရ မျိုးသုဉ်းရန်အန္တရာယ်နည်းပါးသည့်မျိုးစိတ် များနှင့် နေရင်းဒေသမျိုးစိတ်များမရှိပါ။

လိပ်ပြာမျိုးစိတ် ၈မျိုးကိုတွေ့ရှိခဲ့ပြီး Lepidoptera မျိုးစိတ်များကိုတွေ့ရှိခဲ့ပါသည်။ IUCN မှ ထုတ်ပြန်ထား ချက်များအရ မျိုးစိတ်တစ်ခုဖြစ်သော Junonia almanac မျိုးသုဉ်းရန်အန္တရာယ်နည်းပါးသည့်မျိုးစိတ်ကိုသာ တွေ့ရှိပြီး မျိုးသုဉ်းရန်အန္တရာယ်ရှိသည့်မျိုးစိတ်များကိုမတွေ့ရှိပါ။

၁.၄.၃.၂ အပင်များ

အပင်မျိုးစိတ် ၄၄ မျိုးကိုတွေ့ခဲ့ပြီး ၂မျိုးမှာ မျိုးသုဉ်းရန်အန္တရာယ်ရှိသောမျိုးစိတ်၊ ၁၉မျိုးမှာ မျိုးသုဉ်းရန်အန္တရာယ်နည်းပါးသည့်မျိုးစိတ်၊ ၂မျိုးမှာ အချက်အလက်မဲ့နှင့် ကျန် ၂၁မျိုးမှာ IUCN စာရင်းတွင် မပါဝင်သောမျိုးစိတ်များ ဖြစ်ပါသည်။ နေရင်းဒေသမျိုးစိတ်/ကန်သတ်အပင်မျိုးစိတ်များ (Living International Treasures, ၂၀၂၀) ကို စစ်တမ်းကောက်ယူစဉ်တွင် မတွေ့ရှိခဲ့ပါ။ သစ်တောဥပဒေအရ ထိန်းသိမ်းထားသောမျိုးစိတ် ၂မျိုးကို တွေ့ရှိခဲ့ပြီး ဇယား ၁.၃ တွင် ဖော်ပြထားပါသည်။ ထိုမျိုးစိတ်များကို ခုတ်လှဲခြင်းခွင့်မပြုထားသော်လည်း ၎င်းသည်စီမံကိန်း၏အပြင်ဘက်တွင်တည်ရှိကာ စီမံကိန်း၏သက်ရောက်မှုနယ်မြေတွင်မရှိပါ။

ဇယား ၁.၃ လေ့လာမှုဧရိယာအတွင်းတွင်ရှိသော ထိန်းသိမ်းကာကွယ်ရမည့်အပင်များ

စဉ်	အမည်	မျိုးရင်းအမည်	သိပ္ပံအမည်	IUCN 1	ရှားပါး / နယ်မြေကန်သတ်ထား 2 / ထိန်းသိမ်းထား 3
၁	ကျွန်း	Verbenaceae	<i>Tectona grandis</i>	NE	Reserved
၂	ပိတောက်	Fabaceae	<i>Pterocarpus macrocarpus</i>	EN	Reserved

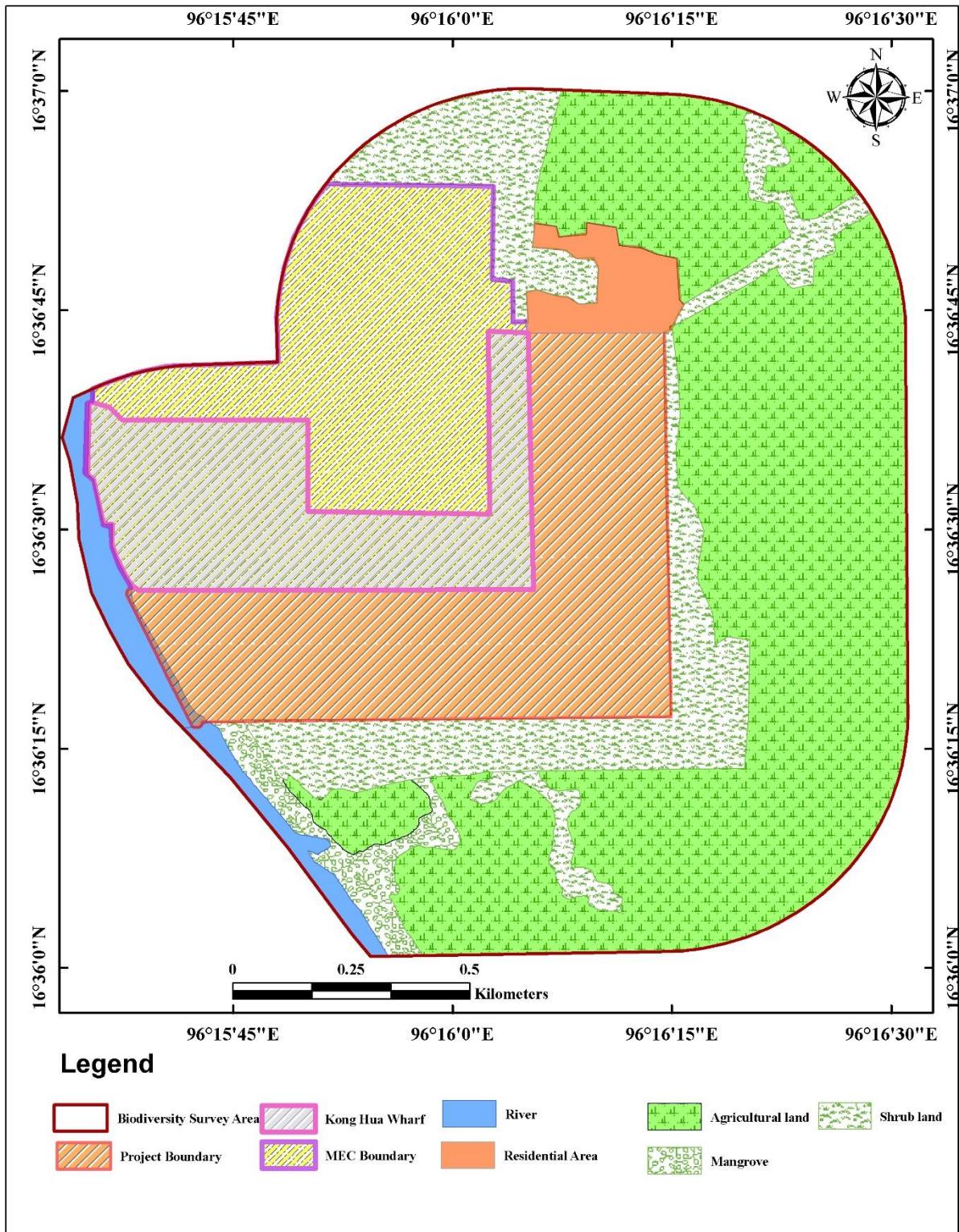
1 = IUCN (၂၀၁၉): EN = မျိုးသုဉ်းရန်အန္တရာယ်ရှိသောမျိုးစိတ်, LC = မျိုးသုဉ်းရန်အန္တရာယ်နည်းပါးသည့်မျိုးစိတ်, NE = တွက်ချက်ထားခြင်းမရှိသောမျိုးစိတ်,

2 = Living International Treasure (၂၀၂၀)

3 = သစ်တောဥပဒေအရထိန်းသိမ်းထားသောသစ်ပင်များ (၂၀၁၉)

၁.၄.၃.၃ သက်ရှိတည်နေရာများအပေါ်ဆန်းစစ်ခြင်း

ကောင်းကင်ပြိုင်တုဓာတ်ပုံများအရ စီမံကိန်းအနီးရှိ မြေအမျိုးအစားများကို ခွဲခြားခဲ့ပါသည်။ ထိုမြေအမျိုးအစားများကို မြေပုံစံအမျိုးအစားခွဲခြားရာတွင်ဖော်ပြနိုင်ပါသည်။ စီမံကိန်းဧရိယာရှိလေ့လာမှုဧရိယာတွင် အဓိကမြေအမျိုးအစား ၃မျိုးကို တွေ့ရှိခဲ့ပြီး (၁) ဒီရေတောဧရိယာတွင်းရှိ သစ်ပင်များ (၂) စိုက်ပျိုးမြေ နှင့် (၃) ခြံစားကျက်မြေဧရိယာ များဖြစ်ကြပါသည်။ အဆိုပြုစီမံကိန်း၏သက်ရှိတည်နေရာများပြမြေပုံကို ပုံ ၁.၃ တွင် ဖော်ပြထားပါသည်။



ပုံ ၁.၃ လေ့လာမှုဧရိယာရှိ အသုံးချစားကျတ်မြေနေရာများပြမြေပုံ

၁.၄.၄ လူမှုရေးဆိုင်ရာအခြေခံအချက်အလက်များ

COVID-19 ကမ္ဘာ့ ကပ်ဘေးရောဂါ နှင့် လက်ရှိမြန်မာနိုင်ငံ၏ အခြေအနေများကြောင့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအတွက် လူထုတွေ့ဆုံဆွေးနွေးပွဲပြုလုပ်ခြင်းနှင့် အခြေခံ လူမှုစီးပွားဆိုင်ရာ အချက်အလက်များ ကောက်ယူခြင်းအား ပြုလုပ်နိုင်ခြင်း မရှိသေးပါ။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအတွက် လူထုတွေ့ဆုံဆွေးနွေးပွဲ ပြုလုပ်ခြင်းနှင့် အခြေခံ လူမှုစီးပွား အချက်အလက်များကောက်ယူခြင်းများအား အများပြည်သူ ပါဝင်မှု ကောင်းမွန်စွာ ရရှိနိုင်ရန် အခြေအနေပေးသည်နှင့် ကျင်းပပြုလုပ်သွားမည် ဖြစ်ပါသည်။ ။ ထိုတွေ့ဆုံပွဲများနှင့် အချက်အလက် ကောက်ယူမှုများတွင် စီမံကိန်းမြေနေရာ သိမ်းဆည်းမှုကြောင့် ထိခိုက်ခံရသော မြေပိုင်ရှင်များနှင့် မြေအသုံးချသူများအား ပါဝင်စေပါမည်။ ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းအတွက် လူထုတွေ့ဆုံဆွေးနွေးပွဲ ပြုလုပ်ခြင်းနှင့် အခြေခံ လူမှုစီးပွား အချက်အလက်များ ကောက်ယူခြင်းများပြုလုပ်ပြီးပါက ဤပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် ဖြည့်စွက် ထည့်သွင်းတင် ပြသွားပါမည်။

ဒလမြို့နယ်မှလွဲ၍ ကျောက်တန်းမြို့နယ်နှင့် ကော့မှူးမြို့နယ်တို့ရှိ အဓိကလူဦးရေနေထိုင်မှုသည် မြို့ပြလူနေမှုပုံစံဧရိယာ များတွင်ဖြစ်သည်။ လူဦးရေနေထိုင်မှု သိပ်သည်းဆအများဆုံးကို ဒလမြို့နယ်တွင်တွေ့ရပြီး ၁ စတုရန်းကီလိုမီတာတွင် ၇၃၉ ဦးနှုန်းဖြင့် နေထိုင်သူများရှိပါသည်။ သို့သော် ရန်ကုန်မြို့၏ပျမ်းမျှ မြို့ပြလူနေမှုဦးရေသိပ်သည်းဆ ၁ စတုရန်းကီလိုမီတာတွင် ၂,၈၄၄ ဦးနှုန်းအောက်နည်းပါးပါသည်။ လူဦးရေနေထိုင်မှု အနိမ့်ဆုံးသိပ်သည်းဆရှိသည့် ကျောက်တန်းမြို့နယ်တွင် ၁ စတုရန်းကီလိုမီတာတွင် ၂၀၁ ဦးနှုန်းသာရှိပါသည်။ လေ့လာမှုနယ်မြေဧရိယာတွင် ပါဝင်နေ သည့် မြို့နယ်များအားလုံးတွင် အမျိုးသားလူဦးရေထက် အမျိုးသမီးလူဦးရေက အနည်းငယ်ပိုများနေသည်ကို တွေ့ရှိရပါသည်။

မြို့နယ်များအားလုံးတွင် အဓိကအားဖြင့် ဗမာလူမျိုးအများစုနေထိုင်ကြပြီး ကရင်လူမျိုးမှာ ဒုတိယအများဆုံးဖြစ်သည်။ လူဦးရေအများစုသည် ဗုဒ္ဓဘာသာကိုးကွယ်ကြပြီး ဒလမြို့နယ်ရှိလူဦးရေသည် အခြားမြို့နယ်ထက် အစွလမ်ဘာသာနှင့် ဟိန္ဒူဘာသာကို ပိုမိုကိုးကွယ်မှုများရှိကြသည်။

လေ့လာမှုနယ်မြေဧရိယာအတွင်းတွင် ပညာရေးအဆောက်အအုံ ၃၇၄ ခုရှိပြီး ကျောက်တန်းမြို့နယ်တွင် စာသင်ကျောင်း အများဆုံးရှိပြီး ဒလမြို့နယ်တွင် အနည်းဆုံးဖြစ်သည်။ ဒလမြို့နယ်သည် ကော့မှူးမြို့နယ်ထက် လူဦးရေများပြား သော်လည်း စာသင်ကျောင်းများမှာ ၅၀% ခန့်ပိုမိုနည်းပါးပါသည်။ လေ့လာမှုနယ်မြေဧရိယာအတွင်းတွင် ကျောက်တန်းမြို့နယ်သည် ပညာရေးစနစ်ကောင်းမွန်လျက်ရှိပြီး တက္ကသိုလ်ဝင်စာမေးပွဲအောင်ချက်ရာခိုင်နှုန်း အမြင့်ဆုံး တွင်ရှိကာ ၃၀.၆% ရှိပါသည်။ မြို့နယ်အားလုံးရှိစာတတ်မြောက်မှုနှုန်းသည် တစ်နိုင်ငံလုံးစာတတ်မြောက်မှုနှုန်း ၈၉.၅% ထက်ပိုမိုလျက်ရှိပါသည်။ ကျောက်တန်းမြို့နယ်သည် စာသင်ကျောင်းအများဆုံးရှိပြီး ကျား/မစာတတ်မြောက်နှုန်း ကွာဟမှု အနိမ့်ဆုံးတွင်လည်းရှိပါသည်။ ဒလမြို့နယ်တွင်မူ ကျား/မစာတတ်မြောက်နှုန်းကွာဟမှု အမြင့်ဆုံးတွင် ရှိပါသည်။

လေ့လာမှုနယ်မြေဧရိယာအတွင်းတွင် ကျန်းမာရေးအစောင့်အရှောက် ၈၁ ခုရှိပါသည်။ ကျောက်တန်းမြို့နယ်တွင် အများဆုံးဖြစ်ပြီး ကျန်းမာရေးစောင့်ရှောက်မှု ၅၈% ရှိပါသည်။ လေ့လာမှုနယ်မြေဧရိယာအတွင်းတွင် ဖြစ်ပွားမှု အများဆုံး ရောဂါများမှာ ဆီးချိုရောဂါ၊ သွေးတိုးရောဂါ၊ ဦးနှောက်သွေးကြောရောဂါ၊ အဆုတ်ရောင်ရောဂါ၊ တီဘီ ရောဂါနှင့် ဝမ်းပျက်ဝမ်းလျှောရောဂါ (အသက် ၅နှစ်အောက်)တို့ ဖြစ်ကြပါသည်။

စက်တပ်ယာဉ်အမျိုးအစား ၄မျိုးကို တွေ့ရှိရပြီး အများစုမှာ ဘီး ၂ဘီးတပ်စက်တပ်ယာဉ်ဖြစ်သော မော်တော်ဆိုင်ကယ် များကို ဒေသခံများမှ သယ်ယူပို့ဆောင်သွားလာရေးအတွက် အသုံးပြုကြပါသည်။ ဘီး၄ဘီးတပ် စက်တပ်ယာဉ် အသေးစား များမှာယာဉ်ကြီးများထက် ပိုမိုများပြားလျက်ရှိသည်ကို စစ်တမ်းကောက်ယူခဲ့သော နေရာအမှတ်အား လုံးတိုင်းတွင် တွေ့ရှိခဲ့ပါသည်။

ကျောက်တန်းမြို့နယ်နှင့် ကော့မှူးမြို့နယ်တို့ရှိ လျှပ်စစ်မီးအလင်းရရှိမှုမှာ တစ်နိုင်ငံလုံးအတိုင်းအတာနှင့် နှိုင်းယှဉ်လျှင် နည်းပါးလျက်ရှိပြီး ယေဘုယျအားဖြင့် ရန်ကုန်မြို့နယ်၏ ၆၉.၃% တွင် လွှမ်းခြုံလျက်ရှိပါသည်။ အိမ်ထောင်စု ၅၀% ကျော် မှာ ရေနံဆီ၊ ဖယောင်းတိုင်နှင့် ဘက်ထရီတို့ကို မီးအလင်းအတွက်အသုံးပြုလျက်ရှိကြသည်။ ဒလမြို့နယ်သည် အခြားမြို့နယ်များထက် လျှပ်စစ်မီးရရှိမှုပိုမိုကောင်းမွန်လျက်ရှိပြီး တိုင်းဒေသကြီးအလိုက်ရရှိမှုနှုန်းထက်နိမ့်၍ ရှိနေပါ သည်။

ဒလမြို့နယ်၏အိမ်ထောင်စု ၈၆% မှာ ရေကန်နှင့်သိုလှောင်ကန်များမှရေများကို အိမ်သုံးအတွက်သုံးစွဲလျက်ရှိပြီး ကျောက်တန်းမြို့နယ်တွင် ၇၆% နှင့် ကော့မှူးမြို့နယ်တွင် ၄၁% ရှိကြပါသည်။ ကော့မှူးမြို့နယ်တွင် စည်ပင်သာယာရေးမှ ရေပေးဝေမှုစနစ်ရှိပါသည်။ ဒလမြို့နယ်တွင် မြေအောက်ရေသုံးစွဲမှုမှာ မရှိသလောက်နည်းပါးလျက်ရှိပြီး (၃%) ကော့မှူးမြို့နယ်တွင် ၄၉% နှင့် ကျောက်တန်းမြို့နယ်တွင် ၁၈% ရှိကြပါသည်။

လေ့လာမှုနယ်မြေဧရိယာသည် မြန်မာနိုင်ငံ၏ ဖွံ့ဖြိုးတိုးတက်လျက်ရှိသော ရန်ကုန်တိုင်းဒေသကြီးအတွင်းတွင်တည်ရှိ သော်လည်း ကားနှင့်ထရပ်ကားသုံးစွဲမှုမှာ တစ်နိုင်ငံလုံးအတိုင်းအတာနှင့်ယှဉ်လျှင် နည်းပါးလျက်ရှိပါသည်။ လူအများစု ၅၀%မှာ သက်သာချောင်ချိနိုင်ရန်အတွက် မော်တော်ဆိုင်ကယ်နှင့် စက်ဘီးတို့ကိုသာအသုံးပြုလျက်ရှိပါသည်။ ဒေသခံ ပြည်သူအချို့မှာ နွားလှည်းများကိုအသုံးပြုလျက်ရှိနေဆဲဖြစ်ပြီး စိုက်ပျိုးရေးထွက်ကုန်များသယ်ယူပို့ဆောင်ရေးနှင့် အနီးအနားရွာများထံ သွားလာရေးတို့အတွက် အသုံးပြုလျက်ရှိကြပါသည်။ ကော့မှူးမြို့နယ်နှင့် ကျောက်တန်းမြို့နယ်ရှိ ဒေသခံအချို့မှာ ရန်ကုန်တစ်ဖက်ကမ်းသို့သွားလာနိုင်ရန်အတွက် ရန်ကုန်မြစ်အတွင်း စက်လှေများကိုအသုံးပြုလျက် (ကားလမ်းရှိသော်လည်း) ရှိပါသည်။

လေ့လာမှုနယ်မြေဧရိယာအတွင်းရှိ မြို့နယ်များအားလုံးတွင် ဆက်သွယ်ရေးနည်းစနစ်မျိုးစုံသုံးစွဲလျက်ရှိပြီး ကျောက်တန်းနှင့်ဒလမြို့နယ်တို့တွင် မိုဘိုင်းလ်ဖုန်းသုံးစွဲမှုပိုမိုလျက်ရှိပါသည်။ ကော့မှူးမြို့နယ်တွင် ကွန်ပျူတာနှင့် အင်တာနက်စနစ်ကို သုံးစွဲမှုနှုန်းမှာနည်းပါးလျက်ရှိပြီး အိမ်ထောင်စု ၃.၅% သာ ထိုစနစ်ကိုသုံးစွဲရန်တတ်နိုင်ပါသည်။

ကျောက်တန်းမြို့နယ်သည် ရန်ကုန်တိုင်းဒေသကြီး၏ စီးပွားရေးမြို့နယ်တစ်ခုဖြစ်ပြီး အဓိကဝင်ငွေများမှာ စိုက်ပျိုးရေး၊ ငါးလုပ်ငန်းနှင့် အစိုးရဌာနဆိုင်ရာဝန်ထမ်းအလုပ်များမှဖြစ်ပါသည်။ ကော့မှူးမြို့နယ်တွင် အလုပ်လုပ်ကိုင်မှုများမှာ စိုက်ပျိုးရေး၊ သစ်တောလုပ်ငန်း၊ ငါးမွေးမြူရေးလုပ်ငန်းများတွင် အသီးသီးလုပ်ကိုင်လျက်ရှိကြပါသည်။ ဒလမြို့နယ်တွင် အလုပ်သမားအများစုမှာ စက်ရုံအလုပ်ရုံများ ကုန်သွယ်ရေးအလုပ်များတွင်ဖြစ်ပြီး ကားပြင်စက်ပြင် နှင့်မော်တော် ဆိုင်ကယ်ပြင်ခြင်းများ လုပ်ကိုင်ကြပါသည်။

ကျောက်တန်းနှင့်ဒလမြို့နယ်တို့ရှိ အလုပ်သမားအင်အားစုရာခိုင်နှုန်းမှာ လေ့လာမှုနယ်မြေဧရိယာ၏ ၆၀% ရှိပြီး ကော့မှူးမြို့နယ်တွင် ၈၀% ရှိကြပါသည်။ ကျောက်တန်းနှင့်ဒလမြို့နယ်တို့ရှိ ကျား/မအလုပ်သမားကွာဟမှုအချိုးမှာ သိသာထင်ရှားလျက်ရှိပြီး အမျိုးသမီးအလုပ်သမားအင်အားစုမှာနည်းပါးလျက်ရှိပါသည်။ ကျား/မအလုပ်သမားကွာဟမှု အချိုးရာခိုင်နှုန်းများမှာ ကျောက်တန်းမြို့နယ်တွင် ၅၀% နှင့် ဒလမြို့နယ်တွင် ၄၆% ဖြစ်ကြပါသည်။ ကော့မှူး မြို့နယ်တွင်မူ ကျား/မအလုပ်သမားကွာဟမှုအချိုးနည်းပါးလျက်ရှိပြီး ၁၇.၃% သာရှိပါသည်။

လေ့လာမှုနယ်မြေဧရိယာအတွင်းတွင် ဘုရား ၁၈ ဆူ၊ စေတီ ၃၄၂ ဆူ၊ ဘုန်းကြီးကျောင်း ၄၁၅ ကျောင်း၊ သီလရှင်ကျောင်း ၆၂ ကျောင်း၊ ဓမ္မာရုံ ၂၅၀ ရုံ၊ ချက်ရုံကျောင်း ၁၂ ကျောင်း၊ ဗလီ ၁၃ ခု၊ ဟိန္ဒူဘုရားကျောင်း ၄၈ ကျောင်းနှင့် တရုတ်ဘုရားကျောင်း ၁ ကျောင်း တို့တည်ရှိပါသည်။ အထင်ကရဖြစ်သော ဗုဒ္ဓဘာသာရေးအဆောက်အအုံဖြစ်သည့် ကျိုက်မှော်ဝန်းရေလယ်ဘုရားသည် (စီမံကိန်းမှ ၆.၃ ကီလိုမီတာ) မှော်ဝန်းချောင်းအလယ်ရှိ ကျွန်းငယ်ပေါ်တွင် တည်ထားကိုးကွယ်လျက်ရှိပါသည်။ သို့ရာတွင် ၎င်းသည်အကွာအဝေးကွာဟမှုကြောင့် စီမံကိန်းမှသက်ရောက်မှုများ ရှိနိုင်မည်မဟုတ်ပါ။ ထိုစေတီသည် စီမံကိန်းမှအနီးဆုံးဖြစ်သော ရှေးဟောင်းယဉ်ကျေးမှုအမွေအနှစ်ဖြစ်ပါသည်။

စီမံကိန်းလုပ်ငန်းခွင်နှင့် အနီးပတ်ဝန်းကျင်ဧရိယာတို့သည် လွင်ပြင်ညီဒေသမျိုးဖြစ်ပြီး မြို့ပြရှုခင်းအနီးအနားတွင် တည်ရှိခြင်းဖြစ်ပါသည်။ သီလဝါအထူးစီးပွားရေးဇုန်သည် စီမံကိန်း၏အနီးအနားတွင်တည်ရှိပါသည်။ စီမံကိန်းလုပ် ငန်းခွင်ကြောင့် ကျောက်တန်းမြို့နှင့် မြစ်တစ်ဖက်ကမ်းရှိ ဒလမြို့နယ်များမှ ဒေသခံပြည်သူများအပေါ် ရှုခင်းမြင်ကွင်း ဆိုင်ရာ သက်ရောက်မှုများ ရှိနေနိုင်မည်ဖြစ်ပါသည်။

၁.၅ အဓိက ဖြစ်ပေါ်လာနိုင်သည့်သက်ရောက်မှုများ နှင့် လျော့ချရေးအစီအမံများ

ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာသည် စီမံကိန်း၏ တည်ဆောက်ရေးနှင့်လုပ်ငန်းလည်ပတ်ရေးများ အပေါ် အဓိကထားလေ့လာ၍ရေးသားပါသည်။ ထိုအစီရင်ခံစာသည် ဖြစ်နိုင်ချေရှိသောသက်ရောက်မှုများနှင့် သင့်လျော် သော လျော့ချနိုင်မှုနည်းလမ်းများကို သတ်မှတ်ဖော်ထုတ်ရေးသားထားပါသည်။ ၎င်းဖြစ်နိုင်ချေရှိသောသက် ရောက်မှုများ နှင့် လျော့ချနိုင်မှုအစီအမံများကို ဇယား ၁.၄ တွင်ဖော်ပြထားပါသည်။

ဇယား ၁.၄ သက်ရောက်နိုင်မှုများ၏အရေးပါမှု နှင့် လျှော့ချရေးအစီအမံများအကျဉ်းချုပ်

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျှော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
အကြိုတည်ဆောက်ရေးကာလ			
စီးပွားရေးနှင့်သက်မွေးဝမ်းကြောင်း လုပ်ငန်းများအပေါ်သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ■ စီမံကိန်းအတွက် အသုံးပြုသော မြေနေရာသည် မြန်မာ့စီးပွားရေးကော်ပိုရေးရှင်းပိုင်ဆိုင်သော မြေနေရာဖြစ်ပါသည်။ အဆိုပါမြေများကို မြန်မာ့စီးပွားရေးကော်ပိုရေးရှင်း (MEC) မှ လျော်ကြေးငွေအချို့ဖြင့် လွန်ခဲ့သောဆယ်စုနှစ်အနည်းငယ်က ရယူခဲ့ပြီး သီတာမြိုင်ရပ်ကွက်တွင် လယ်သမားများကို ပြောင်းရွှေ့ပေးနေပြီဖြစ်ပါသည်။ ■ မြန်မာနိုင်ငံတွင် လက်ရှိဖြစ်ပေါ်နေသော Covid-19 ကပ်ရောဂါကြောင့် ဒေသခံပြည်သူများမှာ စီးပွားရေးနှင့် စားဝတ်နေရေး အခက်အခဲများနှင့် ရင်ဆိုင်နေရပါသည်။ တကယ်တော့ အဆိုပါအခက်အခဲသည် တနိုင်ငံလုံးအတိုင်းအတာနဲ့ သက်ရောက်မှုရှိပြီး ဒေသဆိုင်ရာ ပြဿနာအဖြစ် အာရုံမစိုက်သင့်ပါ။ ■ COVID-19 ရောဂါကို ထိန်းချုပ်နိုင်ပြီဖြစ်သောကြောင့် မကြာမီ အခြေအနေ ပိုမိုကောင်းမွန်လာမည် ဖြစ်ပါသည်။ ထိုအချိန်တွင် ဒေသခံပြည်သူများ၏ စီးပွားရေးနှင့် စားဝတ်နေရေး တိုးတက်လာမည်ဖြစ်ပါသည်။ ■ စီမံကိန်းကြောင့် ဒေသခံငါးဖမ်းသမားအချို့အတွက် ငါးဖမ်းကွက်များဆုံးရှုံးကာ အခက်အခဲများ ရှိနိုင်ပါသည်။ ပြဌာန်းထားသော စည်းမျဉ်း၊ စည်းကမ်း၊ ဥပဒေများကို လိုက်နာကာ ငါးလုပ်ငန်းဦးစီးဌာနနှင့် ဒေသခံငါးဖမ်းသမားများနှင့် ညှိနှိုင်းဆောင်ရွက်သွားရန်။
တည်ဆောက်ရေးကာလ			
ပတ်ဝန်းကျင် လေထုအရည်အသွေးအပေါ် သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ■ လေထုထဲသို့ ထုတ်လွှတ်မှုအားလုံးအား အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (EQEG) အတိုင်းဆောင်ရွက်သွားရန် (အထွေထွေ - EQEG ၏ အခန်း ၁.၂)။ ■ နစ်နာမှုတိုင်ကြားချက် ယန္တရားလမ်းစဉ်အား စတင် အကောင်အထည်ဖော်ရန်။ ■ ပစ္စည်းအစုအပုံများအား သက်ရောက်မှုခံရနိုင်သည့်သူများနှင့် တက်နိုင်သမျှ အဝေးဆုံးတွင် ထားရှိရန် ■ ဖုန်မှုန့်များပြန့်နှံ့ခြင်းအား ရှောင်ကျဉ်ရန် မြေတူးလုပ်ငန်းများမှ ထွက်ရှိလာသော ဖုန်ထွက်နိုင်သည့် တူးဖော်ထားသောမြေစာများ၊ သောင်တူးထားသည့် ပစ္စည်းများ၊ ပြန်ဖြည့်သည့်မြေ အစုအပုံများအား ရေဖြန်းရန် (သို့/ နှင့်) ဖုံးအုပ်ရန်။ မည်သည့် သယ်ယူပို့ဆောင်ခြင်းအတွက်မဆို အမိုးဖွင့် သယ်ယူ ပို့ဆောင်ခြင်းမပြုလုပ်ပဲ ဖုံးအုပ်သယ်ဆောင်ရန်နှင့်

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျှော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
			<ul style="list-style-type: none"> တည်ဆောက်ရေးကာလအတွင်း အသုံးပြုမည့် ယာဉ်များတွင် ဆာလဖာပါဝင်မှုနည်းသော လောင်စာဆီများသာ အသုံးပြုရန် နှင့် ဒီဇယ်သုံး မောင်းနှင်ရသည့် စက်ကိရိယာအား အကောင်းဆုံးစီမံခန့်ခွဲမှု အလေ့အကျင့်များဖြင့် ပူးတွဲဆောင်ရွက်ရန်။
ပတ်ဝန်းကျင်ဆူညံမှုအပေါ် သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ဆူညံသံအဆင့် (Level) များအား EQEG ဆူညံမှုတိုင်းတာသည့်စံနှုန်းများဖြင့် တိုင်းတာဆောင်ရွက်ရန် (အထွေထွေ - EQEG ၏ အခန်း ၁.၄)။ အသံတိုးညှင်စွာထွက်သော (SPL) စက်ကိရိယာများ (လိုအပ်သော နေရာများတွင်)အား EQEG ဆူညံမှုတိုင်းတာသည့် စံနှုန်းများနှင့်ကိုက်ညီရန် (အထွေထွေ-အခန်း ၁.၄)အတွက် ရွေးချယ် အသုံးပြုရန်။ လိုအပ်သောနေရာများတွင် အလုံပိတ်အခန်းများပြုလုပ်ခြင်း၊ ဆူညံသံထွက်သည့် ကိရိယာများအား အသံလုံစေသည့် အဖုံးအအုပ်များဖြင့် ဖုံးအုပ်တပ်ဆင်ရန်။ ပစ္စည်းကိရိယာများအား သုံးစွဲသူလမ်းညွှန် စံနှုန်းများအတိုင်း သေချာစွာ ပြုပြင်ထိန်းသိမ်းရန်။ ဆူညံနိုင်သည့်စက်ပစ္စည်းများ (ဥပမာ ဟိုက်ဒရောလစ် ရိုက်တူကြီးများ၊ ကွန်ကရစ်ပန့်မောင်းတင်သည့် စက်ကြီးများ) ကို သက်ရောက်ခံရနိုင်သည့်နေရာများတွင် ဝေးသထက်ဝေးသောနေရာများတွင် ထားရှိဆောင်ရွက်ရန်။ ဆူညံသံထွက်ရှိနိုင်သော စက်ပစ္စည်းများအတွက် အသံနှုန်းလျှော့ချနိုင်ရန်အသံတိတ်ကိရိယာများ သို့မဟုတ် အသံထိန်းကိရိယာများကို တပ်ဆင်ထားရှိသွားရန်။ မြန်မာနိုင်ငံဥပဒေစည်းမျဉ်းစည်းကမ်းများနှင့်အညီ ကန်ထရိုက်တာများ၏ အလုပ်လုပ်ချိန်များကို ပုံမှန်ထားရှိသွားရန် နှင့် ဆူညံသံဖြစ်ပေါ်နိုင်သည့်စက်ရုံတိုက်တွင် တောင်ကုန်းများနှင့် အပင်စိုက်ထားရှိမှုများကဲ့သို့သော ဆူညံသံအကာအကွယ်များကို ထားရှိသွားရန်၊ လိုအပ်သည်ဟု ယူဆပါက ဆူညံသံ modelling အတိုင်းလိုက်နာ ဆောင်ရွက်သွားရန်။
မြေပေါ်ရေနှင့် မြေအောက်ရေ အရည်အသွေးအပေါ်သက်ရောက်မှု	မြင့်မား	အနည်းငယ်	<ul style="list-style-type: none"> စွန့်ထုတ်ရေ၊ မိုးရေ၊ စီးဆင်းရေ နှင့် မိလ္လာရေအညစ်အကြေးစွန့်ထုတ်မှုအားလုံးအား (EQEG ၏ အထွေထွေအခန်း ၁.၂) ပါအတိုင်း စွန့်ထုတ်ရန် နှင့် လုပ်ငန်းခွင် စီးဆင်းရေနှင့် စွန့်ပစ်ရေများအား (EQEG ၏ လမ်းအတွက် သတ်မှတ်ထားသည့် အခန်း ၂.၇.၈) အတိုင်း လိုက်နာဆောင်ရွက်ရန်။ နောက်ဆုံးအချောသတ်လုပ်ကိုင်ထားသည့် မြေမျက်နှာပြင်များအား မိုးရေကြောင့် မြေဆီလွှာ တိုက်စားခြင်းများမဖြစ်စေရန် ရေနုတ်မြောင်းထားရှိပေးခြင်း၊ မြေမျက်နှာပြင်အား အကာအကွယ်ဖြင့် ဖုန်းအုပ်ပေးခြင်းများဖြင့် ဆောင်ရွက်ရန်။

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျှော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
			<ul style="list-style-type: none"> ■ မိုးကြီးမှုနှင့် လုပ်ငန်းလည်ပတ်မှုအချိန်တိုင်းတွင် ပုံမှန်အနေအထားနှင့်ထိန်းသိမ်းထားရှိမှုများ ပြုလုပ်နိုင်စေရန်အတွက် ရေနုတ်မြောင်းစနစ်နှင့် နန်းတင်အနည်ကျထိန်းသိမ်းစနစ်များကို ထားရှိသွားရန်။ သဲအထိုင်ကျခြင်းနှင့်ချော်ခြင်းများမဖြစ်စေရန် ပုံမှန်ရှင်းလင်းရေးများပြုလုပ်ရန်။ ■ အခြားသော ကောင်းမွန်သည့် လျှော့ချရေးအစီအမံများအား အသုံးပြုပြီး မြေပေါ်မြေအောက်ရေ စီမံခန့်ခွဲမှုအစီအစဉ်များ ပြုစု ဆောင်ရွက်ရန်နှင့် ■ တည်ဆောက်ရေးကာလတွင်း စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ်များ ပြုစုပြီးဖြစ်ပါ၍ စီမံကိန်းသည် အစီအစဉ်တွင်ပါဝင်သော နည်းလမ်းအတိုင်း အကောင်အထည်ဖော် ဆောင်ရွက်ရန်။
မြေသားထုအရည်အသွေးနှင့် မြေမျက်နှာသွင်ပြင်အပေါ် သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ■ တူးထုတ်လိုက်သော အပေါ်ယံမြေအား ဖြစ်နိုင်သော နေရာတွင် ပြန်ဖြည့်အသုံးပြုရန်။ ■ မိုးကြီး၊ လေထန်ခြင်းများကဲ့သို့သော ရာသီဥတုဆိုးရွားသော ကိစ္စရပ်များအား (ဝေးနိုင်သမျှဝေးအောင်) ရှောင်နိုင်ရန် လုပ်ငန်းများအား အစီအစဉ်ချမှတ်ရေးဆွဲရန်။ ■ ယာယီအသုံးပြုခဲ့သော မြေနေရာတွင် အပင်ပြန်စိုက်ပေးခြင်း၊ ပြန်လည်ကောင်းမွန်အောင် ဆောင်ရွက်ပေးရန်။ ■ မြေကျစ်လစ်မှုများလျှော့ချနိုင်ရန်အတွက် မြေများအားတနေရာထဲတွင်အစုအပုံလိုက်ထားရှိခြင်းကို ကန့်သတ်ရန် နှင့် ၂မီတာ အမြင့်ထိသာထားရှိရန်။ ■ ဓာတုပစ္စည်းများ၊ လောင်စာများနှင့် ဆီများကို ကောင်းမွန်သောနိုင်ငံတကာအလေ့အကျင့်များနှင့်အညီ အမိုးအကာများဖြင့်ထားရှိ၍ စီမံခန့်ခွဲနိုင်အောင် ထိန်းသိမ်းသွားရန်။ ■ မြေသားထုအပေါ်သက်ရောက်နိုင်မှုများအား တည်ဆောက်ရေးကာလတွင်း စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှု အစီအစဉ်များ အတိုင်းလျှော့ချလုပ်ဆောင်သွားရန်နှင့် ■ စီမံကိန်းအတွက် မြေပေါ်မြေအောက်ရေ စီမံခန့်ခွဲမှုအစီအစဉ်များ ပြုစု အကောင်အထည်ဖော် ဆောင်ရွက်ရန်။
ရေနေသတ္တဝါများနှင့် ဒေသပေါက်ပင်များအပေါ် သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ■ ရုပ်ပိုင်းနှင့်ဓာတုပိုင်းဆိုင်ရာသတ်မှတ်နိုင်မှုများ ပြုလုပ်နိုင်ရန်အတွက် နမူနာကောက်ယူမှုများကို သင့်လျော်သည့် သောင်အမျိုးအစားများတွင်ကောက်ယူသွားရန်။ ■ သောင်တူးခြင်းဆောင်ရွက်မှုများကိုလည်း တတ်နိုင်သလောက် ကန့်သတ်ဆောင်ရွက်သွားရန်။ ■ သောင်ထူထပ်ညစ်ညမ်းမှုဖြစ်ပေါ်လာခြင်းများအပေါ်မူတည်၍ မြန်မာဆိပ်ကမ်းအာဏာပိုင်မှ ထုတ်ပြန်ထားသောလမ်းညွှန်ချက်များအတိုင်း လုပ်ငန်းဆိုင်ရာအတွင်းနှင့်ပြင်ပများမှ

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
			<p>သင့်တော်၍အကျိုးရှိသော သောင်အရင်းအမြစ်များကိုတူးဖော်ခြင်း (ဥပမာ - စိုက်ပျိုးရေးအတွက်သုံးခြင်း၊ စက်ရုံသုံး/စီးပွားဖြစ်သုံးနှင့် ဖန်တီးမှုအသုံးပြုခြင်းများ) နှင့်</p> <ul style="list-style-type: none"> ■ အလုပ်လုပ်သည့်နေရာမှ သောင်တူးဖော်ရရှိသည့်အပိုအလျှံများကို မြန်မာဆိပ်ကမ်းအာဏာပိုင်၏ ခွင့်ပြုထားသောနေရာများတွင်သာ စုပုံထားရှိရန်။
ဒေသခံလူထု ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအပေါ် သက်ရောက်မှု	အတန်အသင့်	အနည်းငယ်	<ul style="list-style-type: none"> ■ စီမံကိန်းဧရိယာအတွင်း နေထိုင်သော လုပ်သားများမှအပ အခြားလုပ်သားအားလုံးအား လုပ်သားစခန်းတွင်ထားရှိ၍ လုပ်ငန်းခွင်နှင့် ကြို/ပို့အစီအစဉ်များ ပံ့ပိုးပေးသွားရန်၊ ■ လုပ်သားအားလုံးအား အဓိကအဖြစ်အများဆုံး ကူးစက်တက်သော ရောဂါများ၏ လက္ခဏာများ၊ ကြိုတင်ကာကွယ်ရေးအစီအမံများ၊ ပျံ့နှံ့နိုင်သည့် လမ်းကြောင်းများ နှင့် ကုသရေးဆိုင်ရာ ဗဟုသုတများ တိုးမြှင့်စေအတွက် သင်တန်းပံ့ပိုးပေးသွားရန်၊ ■ လုပ်သားများတွင် ရှိနှင့်ပြီးသော ကူးစက်ရောဂါများအား ကြိုတင်သိရှိရန်အတွက် ခန့်အပ်မည့်လုပ်သားအားလုံးအား ကျန်းမာရေး ဆေးစစ်ချက်များ သေချာပြုလုပ်ရန်၊ ■ လူထုနစ်နာမှုတိုင်ကြားမှုအစီအစဉ်များအဖြစ် ပုဂ္ဂိုလ်ရေးလုံခြုံမှုနှင့် ဘေးကင်းလုံခြုံရေး ကိစ္စများအတွက် (သို့) ဆောင်ရွက်ချက်များကို စီမံကိန်းထံမှ လူထုနစ်နာမှု တိုင်ကြားမှု လုပ်ထုံးလုပ်နည်းများအရ စီစဉ်ဆောင်ရွက်ရန်၊ ■ မြေပေါ်မြေအောက်ရေ စီမံခန့်ခွဲမှုအစီအစဉ်အား ပြုစု အကောင်အထည်ဖော် ဆောင်ရွက်ရန်၊ ■ တည်ဆောက်ရေးကာလတွင်း စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ်ကို အကောင်အထည်ဖော် ဆောင်ရွက်သွားရန် နှင့် ■ ယာဉ်ကြောပိတ်ဆို့မှုဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်အား ပြင်ဆင်ပြီးဖြစ်ပါ၍ စီမံကိန်းမှစီမံခန့်ခွဲမှု အစီအစဉ်တွင် ဖော်ပြထားသော လျော့ချနည်းများအတိုင်း အကောင်အထည်ဖော် ဆောင်ရွက်ရန်။
စီးပွားရေးနှင့်သက်မွေးဝမ်းကြောင်း လုပ်ငန်းများအပေါ်သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ■ အချို့သော တံငါသည်များသည် ဆောက်လုပ်ရေးလုပ်ငန်းများနှင့် ငါးဖမ်းဧရိယာအတွင်း သင်္ဘောများ သွားလာခြင်းကြောင့် ၎င်းတို့၏ ငါးဖမ်းဧရိယာကို ယာယီဆုံးရှုံးနိုင်သည်။ ■ ရန်ကုန်မြစ်သည် ဤနေရာတွင် ၂ ကီလိုမီတာကျော် ကျယ်ဝန်းပြီး အခြားနေရာများတွင် ငါးဖမ်းရန် နေရာအလုံအလောက်ရှိသည်။ ဤဧရိယာသည် သီလဝါ အထူးစီးပွားရေးဇုန်နှင့် ကပ်လျက် ဖြစ်သောကြောင့် အခြားသော စီမံကိန်းများမှ သက်ရောက်မှုများလည်း ရှိနေပါသည်။ ■ စီမံကိန်းသည် ကာလတိုနှင့် ရေရှည်အတွက် အလုပ်သမားများ လိုအပ်သောကြောင့် ဒေသခံပြည်သူများအတွက် အလုပ်အကိုင်များစွာ ဖန်တီးပေးနိုင်မည်ဖြစ်သည်။ ဒေသခံပြည်သူများ၏ စီးပွားရေးနှင့် အသက်မွေးဝမ်းကျောင်းမှုအပေါ် ကောင်းကျိုးသက်ရောက်မှုရှိပါသည်။

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
			<ul style="list-style-type: none"> ■ ဤအထူးပြဿနာအတွက် ရေလုပ်သားများနှင့် အချိန်မီဆွေးနွေးရန် လိုအပ်မည်ဆိုလျှင် လိုအပ်နိုင်ပါသည်။ ■ မြစ်ကြောင်းသွားလာမှုဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်ကို ရေးဆွဲထားပြီး စီမံခန့်ခွဲမှုအစီအစဉ်တွင် ဖော်ပြထားသည့် လျော့ပါးသွားသည့်အတိုင်း စီမံကိန်းကို အကောင်အထည် ဖော်မည်ဖြစ်သည်။
လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအပေါ် သက်ရောက်မှု	အတန်အသင့်	အနည်းငယ်	<ul style="list-style-type: none"> ■ စီမံကိန်းအား မြန်မာအလုပ်သမားဥပဒေအတိုင်း လိုက်နာဆောင်ရွက်ရန်၊ ■ ဝန်ထမ်းများအားလုံး အလုပ်မစတင်မှီ နှင့် လိုအပ်သည့် အခါတိုင်း ကျန်းမာရေး ဆေးစစ်ချက် ပြုလုပ်ရန်၊ ■ စီမံကိန်းအတွက် သဘာဝပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုစနစ် လုပ်ကိုင်ဆောင်ရွက်ရန်၊ ■ လုပ်သားများအား လုပ်ငန်းများဆောင်ရွက်ရာတွင် မျက်လုံးအကာအကွယ်၊ လက်အိတ် နှင့် ဖိနပ်များ စသည့် သင့်တော်သော လုပ်ငန်းခွင်သုံးတံဆိပ်ကိရိယာကိရိယာကွယ်ရေးပစ္စည်း (PPE) ပံ့ပိုးပေးရန် နှင့် ■ လုပ်ငန်းခွင်အတွင်း ကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေးစီမံခန့်ခွဲမှုအစီအစဉ် နှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် များအား အကောင်အထည်ဖော်ဆောင်ရွက်ရန်။
ဆောက်လုပ်ရေးလုပ်ငန်းများအပေါ် သက်ရောက်မှု	အတန်အသင့်	အနည်းငယ်	<ul style="list-style-type: none"> ■ အပေါ်ယံမြေသားနှင့်သောင်မြေများကိုပြန်လည်အသုံးပြုခြင်းနှင့် သောင်တူးစုပုံခြင်းများကို လျော့ချရန်၊ ■ စီမံကိန်းမှထွက်ရှိလာသည့် အမှိုက်များစွန့်ပစ်ရာတွင် လိုင်စင်ရ စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲခြင်း ဝန်ဆောင်မှုပေးသည့်နေရာတွင်သာ စွန့်ပစ်ရန်၊ ■ ယာဉ်ကြောပိတ်ဆို့မှုဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်အား ပြင်ဆင်ပြီးဖြစ်ပါ၍ စီမံကိန်းမှစီမံခန့်ခွဲမှု အစီအစဉ်တွင် ဖော်ပြထားသော လျော့ချနည်းများအတိုင်း အကောင်အထည်ဖော် ဆောင်ရွက်ရန်၊ ■ တည်ဆောက်ရေးကာလတွင်း စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ်ကို အကောင်အထည်ဖော် ဆောင်ရွက်သွားရန် နှင့် ■ စီမံကိန်းနှင့် ပတ်သက်သည့် တိုင်ကြားချက်များအား နစ်နာမှုများတိုင်ကြားခြင်းအစီအစဉ်တွင် မှတ်တမ်းတင်ထားရန်၊ အကြောင်းအရင်း ဖော်ထုတ်သတ်မှတ်ရန် နှင့် လုပ်ငန်းနှောင့်နှေးကြန့်ကြာမှုများ မဖြစ်စေရန်အတွက် တိုင်ကြားစာလက်ခံရရှိပြီးသည့် ၄၈ နာရီအတွင်း သင့်လျော်စွာ အကြောင်းပြန်ကြားရန်။

လုပ်ငန်းလည်ပတ်မှုအဆင့်

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျှော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
ပတ်ဝန်းကျင် လေထုအရည်အသွေးအပေါ် သက်ရောက်မှု	မပြောပလောက်	မပြောပလောက်	<ul style="list-style-type: none"> ■ လမ်းဘေးတွင်အရံကာစိုက်ထားသောအပင်များအား ထိန်းသိမ်းရန် နှင့် ■ လေထဲသို့ ထုတ်လွှတ်မှုအားလုံးအား EQEG လေထုထဲသို့ထုတ်လွှတ်မှု (အထွေထွေ - EQEG ၏ အခန်း ၁.၂) အတိုင်း လိုက်နာဆောင်ရွက်ရန်။
ပတ်ဝန်းကျင်ဆူညံမှုအပေါ် သက်ရောက်မှု	မပြောပလောက်	မပြောပလောက်	<ul style="list-style-type: none"> ■ ဆူညံသံအဆင့်များအား EQEG ဆူညံသံ သတ်မှတ်ချက်အဆင့်များ (အထွေထွေ - EQEG ၏ အခန်း ၁.၄) အတိုင်း လိုက်နာဆောင်ရွက်ရန်။ ■ ဖြစ်နိုင်လျှင် ဆူညံသံထိန်းချုပ်သည့် ပစ္စည်းများ တပ်ဆင်အသုံးပြုရန်။ ■ စီမံကိန်းနှင့် ပတ်သက်သည့် တိုင်ကြားချက်များအား နစ်နာမှုများတိုင်ကြားခြင်းအစီအစဉ်တွင် မှတ်တမ်းတင်ထားရန်၊ အကြောင်းအရင်း ဖော်ထုတ်သတ်မှတ်ရန် နှင့် လုပ်ငန်းနှောင့်နှေးကြန့်ကြာမှုများ မဖြစ်စေရန်အတွက် တိုင်ကြားစာလက်ခံရရှိပြီးသည့် ၄၈ နာရီအတွင်း သင့်လျော်စွာ အကြောင်းပြန်ကြားရန် နှင့် ■ ဒေသတွင်းလမ်းများတွင် ကီလိုမီတာအရှိန်နှုန်း အနိမ့်ဆုံးကန့်သတ်မောင်းနှင်ကြရန်။
မြေပေါ်ရေနှင့် မြေအောက်ရေ အရည်အသွေးအပေါ်သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ■ စွန့်ထုတ်ရေ၊ မိုးရေ၊ စီးဆင်းရေ နှင့် မိလ္လာရေအညစ်အကြေးစွန့်ထုတ်မှုအားလုံးအား (EQEG ၏ အထွေထွေအခန်း ၁.၂) ပါအတိုင်း စွန့်ထုတ်ရန် နှင့် လုပ်ငန်းခွင် စီးဆင်းရေနှင့် စွန့်ပစ်ရေများအား (EQEG ၏ လမ်းအတွက် သတ်မှတ်ထားသည့် အခန်း ၂.၇.၈) အတိုင်း လိုက်နာဆောင်ရွက်ရန်။ ■ လုပ်ငန်းလည်ပတ်ရေးကာလစွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ် ကို အကောင်အထည်ဖော်ဆောင်ရွက် သွားရန် နှင့် ■ ရန်ကုန်မြစ်အတွင်းသို့ စွန့်ထုတ်မှုမျိုးများကို လျှော့ချသွားရန်အတွက် စွန့်ပစ်ညစ်ညမ်းရေများကိုစုဆောင်းထားပြီး သတ်မှတ်ထားသောစွန့်ပစ်မှုတာဝန်ယူသည့် ကန်ထရိုက်တာများထံပို့ဆောင်သွားရန်။
မြေသားထုအရည်အသွေးနှင့် မြေမျက်နှာသွင်ပြင်အပေါ် သက်ရောက်မှု	မပြောပလောက်	မပြောပလောက်	<ul style="list-style-type: none"> ■ ယိုဖိတ်လျှံကျမှုများကိုအနည်းငယ်များကို ထိန်းသိမ်းနိုင်ရန်အတွက် လျှံကျမှုကိုထိန်းချုပ်သည့် ကိရိယာများကို အသုံးပြုသွားရန်။ ■ သင့်လျော်သောစီမံခန့်ခွဲမှုများ၊ သိုလှောင်မှုများနှင့် စွန့်ပစ်ပစ္စည်းစွန့်ပစ်မှုများကို ကောင်းမွန်သော နိုင်ငံတကာစက်မှုဇုန်အလေ့အကျင့်များနှင့်အညီ ဆောင်ရွက်သွားရန် နှင့်

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျှော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
			<ul style="list-style-type: none"> ■ စွန့်ပစ်ပစ္စည်းများအားလုံးကို ပြန်လည်အသုံးပြုနိုင်ခြင်း၊ အန္တရာယ်ရှိခြင်းနှင့် သဘာဝအတိုင်းဇီဝဘက်တီးရီးယား ချေဖျက်နိုင်ခြင်းများအပေါ်မူတည်၍ သီးခြားစီခွဲထုတ်၍ စည်ပင်သာယာရေးဌာန၏ ခွင့်ပြုချက်ရှိသောနေရာများတွင် စုပုံစွန့်ပစ်သွားရန်။
ရေနေ သတ္တဝါများနှင့် ဒေသပေါက်ပင်များအပေါ် သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ■ လုပ်ငန်းလည်ပတ်သည့်ကာလအဆင့်တွင်လည်း မျက်နှာပြင်ရေ၊ မြေအောက်ရေနှင့် မြေအရည်အသွေးများအပေါ် သက်ရောက်မှုများကို လျှော့ချရေးအစီအမံများဆောင်ရွက်သွားရန်။
ဒေသခံလူထု ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအပေါ် သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ■ လုပ်သားများအပေါ်ကျန်းမာရေးစောင့်ရှောက်မှုများနှင့် ဆေးဝါးကုသမှုများ စီစဉ်ထားရှိရန်၊ ■ လူထုနစ်နာမှုတိုင်ကြားမှုအစီအစဉ်များအဖြစ် ပုဂ္ဂိုလ်ရေးလုံခြုံမှုနှင့် ဘေးကင်းလုံခြုံရေးကိစ္စများအတွက် (သို့) ဆောင်ရွက်ချက်များကို စီမံကိန်းထဲမှ လူထုနစ်နာမှုတိုင်ကြားမှုလုပ်ထုံးလုပ်နည်းများအရ စီစဉ်ဆောင်ရွက်ရန်၊ ■ ယာဉ်ကြောပိတ်ဆို့မှုဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ် အကောင်အထည်ဖော်ဆောင်ရွက်ရန် နှင့် ■ လုပ်ငန်းလည်ပတ်ရေးကာလစွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ် ကို အကောင်အထည်ဖော်ဆောင်ရွက် သွားရန် ။
ရှုခင်း နှင့် ဘေးပတ်ဝန်းကျင် မြင်ကွင်းများအပေါ်သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ■ စီမံကိန်းဆိုင်ရာအတွင်း သဘာဝအတိုင်းနေရာများ ထားရှိသွားရန် နှင့် ■ အလင်းရောင်အသုံးပြုမှုများလျှော့ချသွားရန်နှင့် လုပ်ငန်းခွင်ဧရိယာအတွင်း အလင်းရောင်ပြန့်ပွားမှုကို လျှော့ချရန်အတွက် အလင်းရောင်အသုံးပြုမှုများအား စီမံဆောင်ရွက်သွားရန်။
စီးပွားရေးနှင့်သက်မွေးဝမ်းကြောင်း လုပ်ငန်းများအပေါ်သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ■ စီမံကိန်းသည် ကာလတိုနှင့် ရေရှည်အတွက် အလုပ်သမားများ လိုအပ်သောကြောင့် ဒေသခံပြည်သူများအတွက် အလုပ်အကိုင်များစွာ ဖန်တီးပေးနိုင်မည်ဖြစ်သည်။ ဒေသခံပြည်သူများ၏ စီးပွားရေးနှင့် အသက်မွေးဝမ်းကျောင်းမှုအပေါ် ကောင်းကျိုးသက်ရောက်မှုရှိသည်။ ■ အချို့သော ရေလုပ်သားများသည် တံငါဧရိယာအတွင်း ရေယာဉ်များ သွားလာခြင်းကဲ့သို့သော လုပ်ငန်းများ ကြာမြင့်မှုကြောင့် စီမံကိန်းကြောင့် ၎င်းတို့၏ ငါးဖမ်းကွက်များ အပြီးတိုင် ဆုံးရှုံးနိုင်သည်။ သို့သော် မြစ်သည် ၂ ကီလိုမီတာထက် ကျယ်သောကြောင့် တံငါသည်များအတွက် အနီးအနားသို့ပြောင်းရွှေ့ ငါးဖမ်းရန် လုံလောက်သည်။ ထို့အပြင် အကျိုးသက်ရောက်မှုမှာ BE တစ်ခုတည်းသာမက သီလဝါ အထူးစီးပွားရေးဇုန် စီမံကိန်းများကဲ့သို့ အနီးအနားရှိ စီမံကိန်းများမှလည်း သက်ရောက်မှုရှိသည်။

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျှော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
			<ul style="list-style-type: none"> ■ အသက်မွေးဝမ်းကျောင်းမှု ပြန်လည်ထူထောင်ရေးဆိုင်ရာ အသက်မွေးဝမ်းကျောင်း လေ့ကျင့်ရေး အစီအစဉ်တွင် သဘာဝပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်တွင် ပါဝင်ရမည်။ ■ မြစ်ကြောင်းသွားလာမှု စီမံခန့်ခွဲမှုစီမံချက်ကို စီမံကိန်းတစ်လျှောက်လုံး အကောင်အထည်ဖော်ဆောင်ရွက်ရမည်။ ■ စီမံကိန်းကို စီမံခန့်ခွဲမှုအစီအစဉ်တွင် ဖော်ပြထားသည့် လျော့ပါးသက်သာမှုနှင့်အညီ အကောင်အထည်ဖော်ဆောင်ရွက်မည်ဖြစ်ပါသည်။
လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအပေါ် သက်ရောက်မှု	အတန်အသင့်	အနည်းငယ်	<ul style="list-style-type: none"> ■ စီမံကိန်းသည် မြန်မာအလုပ်သမားဥပဒေ၊ EQEG စံချိန်စံညွှန်းများ၊ နိုင်ငံတကာအလုပ်သမား အဖွဲ့အစည်း စံချိန်စံညွှန်းများနှင့် ကောင်းမွန်သည့်နိုင်ငံတကာစက်ရုံအလုပ်ရုံ စံချိန်စံညွှန်းများအတိုင်း လိုက်နာဆောင်ရွက်ရန်။ ■ လုပ်ငန်းစတင်မှီ နှင့် လိုအပ်သည့်အခါတိုင်း ဝန်ထမ်းများအားလုံး ကျန်းမာရေး ဆေးစစ်ချက် ပြုလုပ်ရန် နှင့် ■ လုပ်သားများအား လုပ်ငန်းများဆောင်ရွက်ရာတွင် မျက်လုံးအကာအကွယ်၊ လက်အိတ် နှင့် ဖိနပ်များ စသည့် သင့်တော်သော လုပ်ငန်းခွင်သုံးတံ့ကိုယ်ရည်ကာကွယ်ရေးပစ္စည်း (PPE) ပံ့ပိုးပေးရန်။
ဆောက်လုပ်ရေးလုပ်ငန်းများအပေါ် သက်ရောက်မှု	မပြောပလောက်	မပြောပလောက်	<ul style="list-style-type: none"> ■ ဆေးကြောမှုများအတွက်အသုံးပြုရန်အတွက် မြေအောက်ရေကိုဒေသခံအာဏာပိုင်များ၏ စမ်းသပ်ချက်များနှင့်ခွင့်ပြုပြီးမှသာ အသုံးပြုရန်။ သောက်သုံးရေအတွက် သက်ဆိုင်ရာ ရေသန့်အထောက်အပံ့များမှ ဝယ်ယူသုံးစွဲသွားရန်။ ■ လုပ်ငန်းလည်ပတ်ရေးကာလစွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ် ကို အကောင်အထည်ဖော်ဆောင်ရွက် သွားရန် နှင့် ■ ယာဉ်ကြောပိတ်ဆို့မှုဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ် အကောင်အထည်ဖော်ဆောင်ရွက်ရန်။
မတော်တဆမှုများ / ကြိုတင်မသိနိုင်သော ဖြစ်ရပ်များ			
ဖိတ်စင်မှုများနှင့် ယိုစိမ့်မှုများ	အတန်အသင့်	အနည်းငယ်	<ul style="list-style-type: none"> ■ မြေပြင်ပေါ်သို့ ဆီယိုစိမ့်မှု၊ ဆီယိုဖိတ်မှုများအား ကာကွယ်ရန် လုပ်ငန်းသုံးယာဉ်များ၊ ယန္တရားများ၏ ဆီဖြည့်ခြင်း၊ ပြုပြင်ထိန်းသိမ်းခြင်းအလုပ်များအား သတ်မှတ်ထားသော နေရာများတွင်သာ ဆောင်ရွက်ရန်။ ဆီဖြည့်ခြင်း၊ ပြုပြင်ထိန်းသိမ်းခြင်းအလုပ်များအား ကားဝပ်ရှေ့/ သတ်မှတ်ထားသည့်နေရာများတွင် မပြုလုပ်နိုင်သည့်အခါ ဆီခံစားမှုများအသုံးပြုဆောင်ရွက်ရန်။

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျှော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
			<ul style="list-style-type: none"> ■ အနည်းငယ်သော ယိုဖိတ်မှုများအား ထိန်းသိမ်း သန့်ရှင်းပေးရန်အတွက် ယိုဖိတ်မှုသန့်ရှင်းရေးသုံး ပစ္စည်းပုံးများ အသုံးပြုရန်။ ယိုဖိတ်မှုသန့်ရှင်းရေးသုံးပစ္စည်းပုံးများသည် လုပ်ငန်းခွင်အတွင်း အချိန်ပြည့် ရှိနေရန်။ ■ ပစ္စည်းကိရိယာများ၏ ညစ်ညမ်းမှု သို့မဟုတ် ပျက်စီးမှုဖြစ်နိုင်ချေအား လျှော့ချရန်အတွက် ဓာတုပစ္စည်းများ၊ လောင်စာဆီ၊ ဆီနှင့် အခြားအန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းများအား ကောင်းမွန်သောနိုင်ငံတကာ စက်မှုလုပ်ငန်းအလေ့အကျင့် များနှင့် အညီ စီမံခန့်ခွဲနိုင်သောဧရိယာများတွင် သိုလှောင်ရန်။ ■ တည်ဆောက်ရေးနှင့် လုပ်ငန်းလည်ပတ်ရေးအဆင့်များအတွင်း ယိုဖိတ်ခြင်းတုံ့ပြန်မှုအစီအစဉ် တစ်ခုအား အကောင်အထည်ဖော်ဆောင်ရွက်ရန်။ ■ စီမံကိန်း၏ တည်ဆောက်ရေးနှင့် လုပ်ငန်းလည်ပတ်ရေးကာလအတွက် ယိုဖိတ်မှုအတွက် တုံ့ပြန်မှုအစီအစဉ် အား ပြုလုပ် အကောင်အထည်ဖော်ဆောင်ရွက်ရန်။ ■ ယိုဖိတ်မှုအတွက် အရေးပေါ်အခြေအနေတုံ့ပြန်မှုအစီအစဉ် ပြုလုပ်ရန်။ ၎င်း အရေးပေါ်အခြေအနေ တုံ့ပြန်မှုအစီအစဉ်တွင် ဓာတုပစ္စည်းများယိုဖိတ်မှုအတွက် တုံ့ပြန်မည့်လုပ်ထုံးလုပ်နည်းများ ပါဝင်ရန်။ ၎င်းအစီအစဉ်ထဲတွင် ယိုဖိတ်မှုအားထိန်းချုပ်ရန်နှင့် သန့်ရှင်းရေးပြန်လည်ပြုလုပ်မည့် ပစ္စည်းများ၏ တည်နေရာများ ဖော်ပြ ပါဝင်ရန် နှင့် ■ စွန့်ပစ်ပစ္စည်းများ၏ အမျိုးအစား၊ ပမာဏ နှင့် စွန့်ပစ်မှုများအား အသေးစိတ် ဖော်ပြထားသည့် လုပ်ငန်းလည်ပတ်ရေးကာလစွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ် တစ်ခု အကောင်အထည်ဖော် ဆောင်ရွက်သွားရန်။
ယာဉ်တိုက်မှုများ	အတန်အသင့်	အနည်းငယ်	<ul style="list-style-type: none"> ■ အလုပ်သမားများအား အရေးကြီးသည့် ယာဉ်ကြောကြပ်တည်းသောဧရိယာများအကြောင်း ကြိုတင်အသိပေးထားရန် (ဥပမာ - စာသင်ကျောင်းများနေရာ၊ ဘုရားကျောင်းများ၊ စေတီများ၊ ဗလီများ၊ ကျန်းမာရေးဆေးပေးခန်းများ၊ ဆေးရုံများ၊ စသဖြင့်)။ ၎င်းဧရိယာများတွင် အရှိန်လျှော့မောင်းနှင်ရန်။ ■ ကျောင်းကြို/ပို့ချိန်များ နှင့် ယာဉ်ကြောကြပ်တည်းချိန်များတွင် ကုန်ပစ္စည်းများ သယ်ယူပို့ဆောင်ခြင်း အား ရှောင်ကျဉ်ရန်။ ■ ယာဉ်ကြောပိတ်ဆို့မှုဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်အား ပြင်ဆင်ပြီးဖြစ်ပါ၍ စီမံကိန်းမှစီမံခန့်ခွဲမှု အစီအစဉ်တွင် ဖော်ပြထားသော လျှော့ချနည်းများအတိုင်း အကောင်အထည်ဖော် ဆောင်ရွက်ရန်နှင့် ■ သယ်ယူပို့ဆောင်ခြင်းကြောင့်ဖြစ်ပေါ်လာနိုင်သည့် မတော်တဆမှု ဖြစ်နိုင်ချေများ ကာကွယ် လျှော့ချရန်အတွက် စီမံကိန်းအုပ်ချုပ်သူနှင့် ကန်ထရိုက်များမှ လိုက်နာဆောင်ရွက်ရမည့် စီမံခန့်ခွဲမှု

ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျှော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
			လုပ်ထုံးလုပ်နည်းများအား အရေးပေါ်အခြေအနေတုံ့ပြန်မှုအစီအစဉ်တစ်ခုဖြင့် ပြင်ဆင်ထားရန် နှင့် ၎င်းအစီအစဉ်တွင် ဒဏ်ရာရရှိပါက ဆက်လက်လုပ်ကိုင်ဆောင်ရွက်ရမည့် ဆေးဖက်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ ပါဝင်ရန်။
ပေါက်ကွဲမှု	အတန်အသင့်	အနည်းငယ်	<ul style="list-style-type: none"> ■ ဒေသခံပြည်သူလူထုအား ပေါက်ကွဲမှုနှင့် မီးဘေးအန္တရာယ်အကြောင်း သင်တန်းပို့ချပေးရန်၊ ■ ဒေသခံပြည်သူများအတွက် ဘေးအန္တရာယ်ကင်းရှင်းရေးဆိုင်ရာ ကြိုတင်သတိပေးချက်များနှင့် အရေးပေါ်အခြေအနေတွင် စွန့်ခွာခြင်းဆိုင်ရာ ညွှန်ကြားချက်များနှင့် လုပ်ထုံးလုပ်နည်းများ ပံ့ပိုးပေးရန်၊ ■ လုပ်သားများအား လုပ်ငန်းခွင်သုံးဦးထုပ် နှင့် အခြားသော ကာကွယ်ရေးပစ္စည်းများဖြစ်သည့် မျက်လုံးအကာအကွယ်၊ လုပ်ငန်းခွင်သုံးလက်အိပ်နှင့်ဖိနပ်များ ပံ့ပိုးပေးရန်။ ဝန်ထမ်းများအားလုံး ဘေးအန္တရာယ်ကာကွယ်ရေး ပစ္စည်းများအား အသုံးပြုမှု သေချာစေရန်နှင့် ■ ပေါက်ကွဲမှုနှင့် မီးဘေးအန္တရာယ် ဖြစ်နိုင်ချေများ လျှော့ချရန်အတွက် အရေးပေါ်အခြေအနေတုံ့ပြန်မှုအစီအစဉ် တစ်ခုအား ပြုစုထားပြီး မတော်တဆမှုကိစ္စရပ်များ ကြုံလာပါက တုံ့ပြန်ရမည့်အစီစဉ်အားသေချာစွာ လိုက်နာကျင့်သုံးရန်။

၁.၆ ဆက်စပ်သက်ရောက်မှုဆန်းစစ်ခြင်း

ယခုအချိန်တွင် စီမံကိန်း ဧရိယာတွင် အခြားစီမံကိန်းများနှင့် ပတ်သတ်သော အချက်အလက်များမှာ ရရှိနိုင်ရန် ကန့်သတ်ချက်များရှိနေပါသောကြောင့် ၎င်းစီမံကိန်းများ ဖွံ့ဖြိုးတိုးတတ်မှု အတည်ပြုနိုင်ချိန်တွင် စီမံကိန်းများ၏ နောက်ဆက်တွဲ ဆက်စပ်သက်ရောက်မှုများအား ထည့်သွင်းစဉ်းစားရပါမည်။ ယခုလက်ရှိအဆင့်တွင် ဆက်စပ်သက်ရောက်မှု ဆန်းစစ်ခြင်းများအား ဆွေးနွေးခြင်းသည် သက်ဆိုင်ရာတာဝန်ရှိသူများမှ အတည်ပြုရန် ရှိသေးသော တဆင့်စကားစီမံကိန်းများ ပေါ်အခြေခံခြင်းကြောင့် မှန်းဆရာ ရောက်နေမည် ဖြစ်ပါသည်။ အဆိုပါ သက်ရောက်မှုများသည် ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ဖော်ပြထားသော သက်ရောက်မှုများနှင့် သဘာဝအားဖြင့် တူညီမည်ဟု မျှော်လင့်ထားပါသည်။ ထို့အတူ စီမံကိန်းကြောင့် ဖြစ်နိုင်ခြေရှိသော ဆက်စပ်သက်ရောက်မှုအား လျော့ချရာတွင် စီမံကိန်းနှင့်ပတ်သတ်၍ ကြိုတင်စီမံထားသော လူမှုပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု လုပ်ထုံးလုပ်နည်းများပါဝင်သော လျော့ချမှု အစီအစဉ်များဖြင့် လုပ်ဆောင်သွားမည်ဟု မျှော်လင့်ပါသည်။ မည်သို့ပင် ဆိုစေကာမူ BE သည် အနီးပတ်ဝန်းကျင်ရှိစီမံကိန်း၏ အချက်အလက်များအား အများပြည်သူ သိနိုင်ချိန်တွင် ဆက်စပ်သက်ရောက်မှု ဆန်းစစ်ခြင်းများအား ပြုလုပ်သွားပါမည်ဟု ကတိပြုပါသည်။

၁.၇ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

စီမံကိန်းနှင့် သက်ဆိုင်သည့် သက်ရောက်မှုများ စီမံခန့်ခွဲရန်အတွက် သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ စီမံခန့်ခွဲမှု စနစ် (Environmental and Social Management System - ESMS) အား ပြုစုထားပြီး အဆိုပြုစီမံကိန်း၏ တည်ဆောက်ရေး နှင့် လုပ်ငန်းလည်ပတ်ရေးကာလအတွင်း ချမှတ်ထားသည့် စံချိန်စံညွှန်းများ၊ ဥပဒေဆိုင်ရာလိုက်နာ ဆောင်ရွက်မှုများအား သေချာစေရန်လိုအပ်ပါသည်။

စီမံကိန်းသည် တည်ဆောက်ရေးနှင့် လုပ်ငန်းလည်ပတ်ရေးအဆင့်များအတွင်း အောက်ဖော်ပြပါ စီမံခန့်ခွဲမှုအစီအစဉ် များအား ပြင်ဆင်ထားပါမည်။

- စွန့်ပစ်ပစ္စည်းများ စီမံခန့်ခွဲမှုအစီအစဉ် (လုပ်ငန်းလည်ပတ်ရေးကာလ)။
- ကျန်းမာရေး၊ ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်။
- အရေးပေါ်အခြေအနေတုန့်ပြန်မှုအစီအစဉ်။
- ယိုဖိတ်မှုကာကွယ်ခြင်းနှင့် တုံ့ပြန်မှုအစီအစဉ်။
- စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်းအစီအစဉ် နှင့်
- ပတ်ဝန်းကျင်စောင့်ကြည့်လေ့လာရေးအစီအစဉ်။

စီမံခန့်ခွဲမှု အစီအစဉ်များတွင် အချိန်ဇယား နှင့် ဇယား ၁.၄ တွင်ဖော်ပြထားသည့် လျော့ချရေးအစီအမံများ လိုက်နာ အကောင်အထည်ဖော်ခြင်းအတွက် တာဝန်ခံထားရှိခြင်းများ ပါဝင်ပါသည်။

သက်ရောက်မှုလျော့ချရေးအတွက်ချမှတ်ထားသည့်အစီအစဉ်များနှင့် လုပ်ငန်းဆိုင်ရာ လုပ်ကိုင်ဆောင်ရွက်မှုများ၏ အကျိုးသက်ရောက်မှုများအား အကဲဖြတ်ရန်လည်းကောင်း၊ လိုက်နာရမည့်သတ်မှတ်ချက်များအား လိုက်နာမှု အခြေအနေအားဆန်းစစ်ရန်အတွက် နှင့် ထိန်းသိမ်းလိုက်နာမှုလိုအပ်ချက်အား သေချာစေရန် စောင့်ကြည့်လေ့လာရေး အစီအစဉ်အား ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။ ပတ်ဝန်းကျင်စောင့်ကြည့်လေ့လာရေး အစီအစဉ်များအား ဇယား ၁.၅ တွင် ဖော်ပြထားပါသည်။ ပတ်ဝန်းကျင်ဆိုင်ရာစောင့်ကြည့်လေ့လာရေး အစီရင်ခံစာအား တည်ဆောက်ရေး အဆင့်ကာလ နှင့် လုပ်ငန်းလည်ပတ်သည့်ကာလအတွင်း (၆) လတစ်ကြိမ်အားဖြင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာနသို့ တင်ပြသွားမည်ဖြစ်ပြီး၊ စီမံကိန်း၏ ပတ်ဝန်းကျင်ဆိုင်ရာလိုက်နာဆောင်ရွက်မှုများ၊ တွေ့ရှိချက်များအား ထည့်သွင်းတင်ပြ သွားမည် ဖြစ်ပါသည်။

ဇယား ၁.၅ စီမံကိန်းအတွက် စောင့်ကြည့်လေ့လာရေး စီမံကိန်း (အနှစ်ချုပ်)

သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ အကြောင်းရင်း	စောင့်ကြည့်လေ့လာရေး စံချိန်စံညွှန်းများနှင့် အကြောင်းပြချက်	စောင့်ကြည့်လေ့လာရေး အချိန်ကာလ (စီမံကိန်း လည်ပတ်သည့်ကာလပတ်လုံး)	တာဝန်ရှိမှု
<p>တည်ဆောက်ရေးအဆင့်ကာလ စောင့်ကြည့်လေ့လာရေးတွင် -</p> <ul style="list-style-type: none"> ■ လေထု အရည်အသွေး ■ ဆူညံသံ ■ မြေပေါ်ရေ ■ မြေအောက်ရေ ■ မြေသားထု 	<p>အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (EQEG) စံချိန်စံညွှန်းများဖြင့် တည်ဆောက်ရေးလုပ်ငန်းများ၏ ထုတ်လွှတ်မှုများနှင့် စွန့်ထုတ်မှု ကန့်သတ်ချက်များအား နှိုင်းယှဉ်သွားမည်။</p>	<p>လစဉ် စောင့်ကြည့်လေ့လာခြင်း။ ၆ လ အကြာတွင် အကြိမ်အရေအတွက်အား ပြန်လည်သုံးသပ်သွားရန်။</p>	<p>တတိယအဖွဲ့အစည်း</p>
<p>တည်ဆောက်ရေးအဆင့်ကာလ စောင့်ကြည့်လေ့လာရေးတွင် -</p> <ul style="list-style-type: none"> ■ အန္တရာယ်ရှိ နှင့် အန္တရာယ်မဲ့ စွန့်ပစ်ပစ္စည်းများ ■ လျှော့ချခြင်းနှင့် စီမံခန့်ခွဲမှု အစီအမံများအား စစ်ဆေးခြင်း ■ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး ■ လူမှုရေးဆိုင်ရာ ■ သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ မလိုက်နာမှုများ 	<p>ဤအချက်အလက်များအား ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာအတိုင်း စီမံကိန်း၏ လိုက်နာဆောင်ရွက်မှုများ ဆန်းစစ်ရာတွင် ထည့်သွင်း အသုံးပြုသွားမည် ဖြစ်ပါသည်။ မည်သည့် နစ်နာမှုများ မဆို သို့မဟုတ် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ မလိုက်နာမှုများ မဆို အစီရင်ခံသွားမည် ဖြစ်ပါသည်။</p>	<p>လစဉ် စစ်ဆေးခြင်းများ</p>	<p>EPC ကန်ထရိုက် / စီမံကိန်း အုပ်ချုပ်သူ (BE)</p>
<p>လုပ်ငန်းလည်ပတ်ရေးအဆင့်ကာလ စောင့်ကြည့်လေ့လာရေးတွင် -</p> <ul style="list-style-type: none"> ■ အန္တရာယ်ရှိ နှင့် အန္တရာယ်မဲ့ စွန့်ပစ်ပစ္စည်းများ ■ လျှော့ချခြင်းနှင့် စီမံခန့်ခွဲမှု အစီအမံများအား စစ်ဆေးခြင်း ■ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး ■ လူမှုရေးဆိုင်ရာ ■ သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ မလိုက်နာမှုများ 	<p>ဤအချက်အလက်များအား ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာအတိုင်း စီမံကိန်း၏ လိုက်နာဆောင်ရွက်မှုများ ဆန်းစစ်ရာတွင် ထည့်သွင်း အသုံးပြုသွားမည် ဖြစ်ပါသည်။ မည်သည့် နစ်နာမှုများ မဆို သို့မဟုတ် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ မလိုက်နာမှုများ မဆို အစီရင်ခံသွားမည် ဖြစ်ပါသည်။</p>	<p>လစဉ် စစ်ဆေးခြင်းများ</p>	<p>စီမံကိန်း အုပ်ချုပ်သူ (BE)</p>

၁.၈ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် ထုတ်ဖော်တင်ပြခြင်း

၂၀၂၀ ခုနှစ် ဖေဖော်ဝါရီလနှင့် နိုဝင်ဘာလ အတောအတွင်းများတွင် စီမံကိန်းနှင့်ပတ်သက်ဆက်သွယ်သူများကို ရန်ကုန် တိုင်းဒေသကြီးအဆင့်နှင့် မြို့နယ်အဆင့်များတွင် တွေ့ဆုံဆွေးနွေးမှုများ ပြုလုပ်ခဲ့ပါသည်။ နယ်ပယ်တိုင်းတာ သတ်မှတ်ခြင်းအဆင့် တွေ့ဆုံဆွေးနွေးပွဲများ၏ရည်ရွယ်ချက်သည် စီမံကိန်းအကြောင်းအရာများကို ရှင်းလင်းတင်ပြ ခြင်း၊ စီမံကိန်းကြောင့်သက်ရောက်နိုင်ခြေရှိသော ပြည်သူလူထုများထံမှ သတင်းအချက်အလက်များ စုဆောင်းခြင်း၊ ဆက်လက်လေ့လာသွားရန် လိုအပ်သည့်အချက်အလက်များကိုစုဆောင်းခြင်းများအတွက်ဖြစ်ပါသည်။ နယ်ပယ်တိုင်း တာသတ်မှတ်ခြင်းအဆင့် ဆွေးနွေးခြင်းကို တိုက်ရိုက်ဖြစ်စေ အွန်လိုင်းစနစ်ဖြင့်ဖြစ်စေ စီမံကိန်းနှင့် သက်ဆိုင် သူများဖြစ်သည့် ရန်ကုန်တိုင်းဒေသကြီးဝန်ကြီးချုပ်၊ တိုင်းဒေသကြီးအဆင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန၊ အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊ ရန်ကုန်တိုင်းဒေသကြီးလွှတ်တော်ကိုယ်စားလှယ်၊ ပြည်သူ့လွှတ်တော် ကိုယ်စားလှယ် များနှင့် စီမံကိန်းဧရိယာမှ မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနများနှင့် တွေ့ဆုံဆွေးနွေးဆောင်ရွက်ခဲ့ ပါသည်။

နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်းအဆင့်ဆွေးနွေးခြင်းကို မြို့နယ်အဆင့်များတွင် ကမ္ဘာ့ကပ်ရောဂါ ကိုဗစ်ကာလနှင့် ရန်ကုန်တွင် မိမိအိမ်အတွင်းသာနေရမည့် အလေ့အကျင့်စနစ်များကြောင့် တိုက်ရိုက်တွေ့ဆုံဆွေးနွေးခြင်းများ မပြုလုပ် နိုင်ခဲ့ပါ။ သို့သော် BE နှင့် ERM တို့မှ ကျောက်တန်းမြို့နယ်နှင့် ကော့မှူးမြို့နယ်များထံ အွန်လိုင်းမီတင်စနစ်ဖြင့် ၂၀၂၀ခုနှစ် အောက်တိုဘာလနှင့် နိုဝင်ဘာလတွင် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ ထုတ်ပြန်ထားသော ကမ္ဘာ့ကပ်ရောဂါ COVID-19 ကာလတွင် အများပြည်သူနှင့်တွေ့ဆုံဆွေးနွေးခြင်းလမ်းညွှန်ချက်များနှင့်အညီ ဆွေးနွေးဆောင်ရွက်ခဲ့ ပါသည်။

တွေ့ဆုံဆွေးနွေးပွဲများသည် စီမံကိန်းကြောင့်သက်ရောက်နိုင်ခြေရှိသော ပြည်သူလူထုထံမှ သတင်း အချက်အလက်များ စုဆောင်းခြင်း၊ ဆက်လက်လေ့လာသွားရန် လိုအပ်သည့်အချက်အလက်များနှင့် ၎င်းတို့ကို ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် မည်ကဲ့သို့ထည့်သွင်းတင်ပြသွားနိုင်မည် စသည်တို့အတွက် များစွာအထောက်အကူပြုခဲ့ပါသည်။ အွန်လိုင်းအင်တာနက်ဖြင့် တွေ့ဆုံဆွေးနွေးမှုများတွင် ဒေသခံလူထု အဖွဲ့အစည်းများ၊ ရပ်ကွက်အုပ်ချုပ်ရေး များများ၊ တိုင်းဒေသကြီးလွှတ်တော် ကိုယ်စားလှယ်များနှင့် အခြားသက်ဆိုင်ရာ အစိုးရဌာနဆိုင်ရာအဖွဲ့အစည်းများမှ တက်ရောက်ဆွေးနွေးခဲ့ပါသည်။ ထို့အပြင် ဒေသခံလူထုအဖွဲ့အစည်းများ၊ အထွေထွေ အုပ်ချုပ်ရေးဦးစီးဌာန၊ သက်ဆိုင်ရာ အစိုးရဌာနများ၊ NGOs နှင့် CSOs များ ပါဝင်ဆွေးနွေးခဲ့ပါသည်။

COVID-19 ကမ္ဘာ့ကပ်ဘေးရောဂါ နှင့် လက်ရှိမြန်မာနိုင်ငံ၏ အခြေအနေများကြောင့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းအတွက် လူထုတွေ့ဆုံဆွေးနွေးပွဲပြုလုပ်ခြင်းနှင့် အခြေခံ လူမှုစီးပွားဆိုင်ရာ အချက်အလက်များ ကောက်ယူခြင်းအား ပြုလုပ်နိုင်ခြင်း မရှိသေးပါ။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအတွက် လူထုတွေ့ဆုံဆွေးနွေးပွဲ ပြုလုပ်ခြင်းနှင့် အခြေခံ လူမှုစီးပွား အချက်အလက်များကောက်ယူခြင်းများအား အများပြည်သူ ပါဝင်မှု ကောင်းမွန်စွာ ရရှိနိုင်ရန် အခြေအနေပေးသည်နှင့် ကျင်းပပြုလုပ်သွားမည် ဖြစ်ပါသည် ။ ထိုတွေ့ဆုံပွဲများနှင့် အချက်အလက် ကောက်ယူမှုများတွင် စီမံကိန်းမြေနေရာ သိမ်းဆည်းမှုကြောင့် ထိခိုက်ခံရသော မြေပိုင်ရှင်များနှင့် မြေအသုံးချသူများအား ပါဝင်စေပါမည်။ ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းအတွက် လူထုတွေ့ဆုံဆွေးနွေးပွဲ ပြုလုပ်ခြင်းနှင့် အခြေခံ လူမှုစီးပွား အချက်အလက်များ ကောက်ယူခြင်းများပြုလုပ်ပြီးပါက ဤပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာတွင် ဖြည့်စွက် ထည့်သွင်းတင် ပြသွားပါမည်။

တွေ့ဆုံဆွေးနွေးပွဲများ၏ တက်ရောက်သူများ၊ နေရာနှင့် နေ့ရက်တို့ကို ဇယား ၁.၆ တွင် ဖော်ပြထားပါသည်။

ဇယား ၁.၆ နယ်ပယ်တိုင်းတာခြင်းအဆင့် တွေ့ဆုံဆွေးနွေးမှုဆောင်ရွက်ချက်များ

နေ့စွဲ	စီမံကိန်းနှင့်သက်ဆိုင်သူ/ နေရာ	တွေ့ဆုံဆွေးနွေးခြင်း၏ရည်ရွယ်ချက်
၂၅ ရက် ဖေဖော်ဝါရီလ ၂၀၂၀ ခုနှစ် (အင်္ဂါနေ့)	ရန်ကုန်တိုင်းဒေသကြီးဝန်ကြီးချုပ်ရုံး	<ul style="list-style-type: none"> ■ စီမံကိန်းဆိုင်ရာ သတင်းအချက်အလက်များ တင်ပြခြင်း ■ မြို့နယ်/ကျေးရွာအဆင့် အစည်းအဝေးများအတွက် ခွင့်ပြုချက်ရယူခြင်း

နေ့စွဲ	စီမံကိန်းနှင့်သက်ဆိုင်သူ/ နေရာ	တွေ့ဆုံဆွေးနွေးခြင်း၏ရည်ရွယ်ချက်
၂၈ ရက် အောက်တိုဘာလ ၂၀၂၀ ခုနှစ် (ဗုဒ္ဓဟူးနေ့)	(အွန်လိုင်းအင်တာနက်စနစ်ဖြင့် တွေ့ဆုံဆွေးနွေးမှု) ကော့မှူးမြို့နယ် အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊ တိုင်းဒေသကြီးလွှတ်တော်ကိုယ်စားလှယ်၊ မြို့နယ်မြေယာစာရင်းအင်းရေးခွဲဌာန၊ သခွပ်ပင်ကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူး	<ul style="list-style-type: none"> ■ စီမံကိန်းနှင့်သက်ဆိုင်သူများထံမှ စိုးရိမ်ချက်နှင့်အကြံပေးချက်များ စုဆောင်းခြင်း ■ ဒေသခံအစိုးရအဖွဲ့များ၊ ရပ်ကွက်အုပ်ချုပ်ရေးမှူးများ၊ ဒေသခံလူထုများနှင့် အခြားစီမံကိန်းကိုစိတ်ပါဝင်စားသူများထံ စီမံကိန်းဆိုင်ရာ သတင်းအချက်အလက်များ တင်ပြခြင်း ■ စီမံကိန်းနှင့်သက်ဆိုင်သူများထံမှ စိုးရိမ်ချက်နှင့်အကြံပေးချက်များ စုဆောင်းခြင်း
၄ ရက် နိုဝင်ဘာလ ၂၀၂၀ ခုနှစ် (ဗုဒ္ဓဟူးနေ့)	(အွန်လိုင်းအင်တာနက်စနစ်ဖြင့် တွေ့ဆုံဆွေးနွေးမှု) သီတာမြိုင်ရပ်ကွက်အုပ်ချုပ်ရေးမှူးနှင့် ရာအိမ်မှူးများ၊ ရပ်ကွက်ဒေသခံ လူထုအဖွဲ့အစည်းများ	<ul style="list-style-type: none"> ■ ဒေသခံအစိုးရအဖွဲ့များ၊ ရပ်ကွက်အုပ်ချုပ်ရေးမှူးများ၊ ဒေသခံလူထုများနှင့် အခြားစီမံကိန်းကိုစိတ်ပါဝင်စားသူများထံ စီမံကိန်းဆိုင်ရာ သတင်းအချက်အလက်များ တင်ပြခြင်း ■ စီမံကိန်းနှင့်သက်ဆိုင်သူများထံမှ စိုးရိမ်ချက်နှင့်အကြံပေးချက်များ စုဆောင်းခြင်း

နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်းအဆင့် တွေ့ဆုံဆွေးနွေးမှုများမှ အဓိကကျသောမေးခွန်းများနှင့်စိုးရိမ်မှုများကို အောက်ပါအချက်များဖြင့် အကျဉ်းချုပ်၍ဖော်ပြထားပါသည်။

- စီမံကိန်းအချက်အလက်နှင့်ပတ်ဝန်းကျင်
 - ကုမ္ပဏီမှဆောက်လုပ်ရေးလုပ်ငန်းသုံး စက်ယန္တရားကြီးများကို စီမံကိန်းနယ်နိမိတ်အတွင်းရှိ နေရာများတွင်သာ ရပ်တန့်သိမ်းဆည်းထားရှိရမည်ဖြစ်ပါသည်။
 - ကုမ္ပဏီမှတည်ဆောက်ရေးလုပ်ငန်းကာလအတွင်း စုပြုံရောက်ရှိလာမည့် ဆောက်လုပ်ရေးအလုပ်သမားများ အတွက် ထည့်သွင်းစဉ်းစား၍ အတွက် တည်ဆောက်ရေးလုပ်ငန်းကာလအတွင်း အစားအစာကန်တင်းများ/ စင်တာများကို ထားရှိသင့်ပါသည်။
- နစ်နာမှုကိုတိုင်ကြားနိုင်သောယန္တရားစနစ်
 - ကုမ္ပဏီမှ နစ်နာမှုကိုတိုင်ကြားနိုင်သောယန္တရားစနစ်ကို အသေးစိတ်ဖော်ဆောင်ရွက်သွားရန်။
- သက်မွေးဝမ်းကြောင်းလုပ်ငန်း
 - သခွပ်ပင်ကျေးရွာအုပ်စုမှ ငါးဖမ်းလုပ်ငန်းများအတွက် သက်ရောက်နိုင်မှုအပေါ်စိုးရိမ်ခြင်း။
- စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှု
 - စွန့်ပစ်ပစ္စည်းများကိုမည်သို့စီမံခန့်ခွဲမည်နှင့် မြစ်အတွင်းသို့မည်သည့်စွန့်ပစ်ခြင်းမျိုးများမပြုရန်။

EIA လုပ်ထုံးလုပ်နည်းအပိုဒ် ၅၀ တွင် လိုအပ်ချက်များအရ BE သည်စီမံကိန်းနှင့်ပတ်သက်သည့် သတင်းအချက်အလက်များကို သတင်းစာနှစ်စောင်တွင်ဖော်ပြလိမ့်မည် (တစ်ခုမှာအင်္ဂလိပ်ဘာသာဖြင့် နှင့် တစ်ခုမှာ မြန်မာဘာသာဖြင့် ဖြစ်သည်)။ စီမံကိန်းသတင်းအချက်အလက်များကို BE ၏ ပတ်ဝန်းကျင်တွင်တွေ့နိုင်ပြီး ဆိုင်းဘုတ် များကိုထို site ရုံးတွင်တင်ထားလိမ့်မည်။ နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်းအဆင့်အတွက်ကြော်ငြာများကို Global New Light of Myanmar (English) နှင့် The ကြေးမုံ (မြန်မာ) တွင်ကြော်ငြာခဲ့သည်။ EIA အစီရင်ခံစာ ECD သို့တင်ပြပြီးနောက်တွင် EIA အဆင့်တို့ကို ကြော်ငြာမည်ဖြစ်သည်။

2 INTRODUCTION

2.1 Overview

Brighter Energy Company, Ltd. (BE) is developing a Petroleum Terminal and Storage Project in Thilawa of Myanmar (the Project). The Project Site is located in Kyauktan Township in Yangon which covers an area of approximately 112.5 acres that includes the jetty terminal area of 13.5 acres and land area of 99 acres. The Project is composed of three (3) key components as follows:

- Jetty terminal;
- Tank farm (diesel, gasoline, liquefied petroleum gas (LPG)); and,
- Interconnecting pipelines and advanced utilities.

Details of the Project are shown in Table 2-1.

Table 2-1 Project Details

Component	Details
Type of Project	Development of petroleum terminal and storage facilities
Project Owner	Brighter Energy Company Ltd.
Project Location	Thida Myaing Ward, Kyaik Kauk Pagoda Rd, Kyauktan Tsp to the south of Yangon
Project Components	Jetty terminal, Tank Farm (diesel, gasoline, LPG), and interconnecting pipelines and advanced utilities

Pursuant to Section 7 of the Environmental Conservation Law and Articles 52 and 53 of the Environmental Conservation Rules of the Republic of the Union of Myanmar, all projects undertaken in Myanmar which have the potential to cause significant environmental and social impacts are required to undertake an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) and to obtain an Environmental Compliance Certificate (ECC) in accordance with the Myanmar EIA Procedure (2015).

BE submitted a Project Proposal Report to the Environmental Conservation Department (ECD) of Ministry of Environmental Conservation and Natural Resources (MONREC) on 21 October 2019. The ECD responded on 25 November 2019 that this Project falls under the EIA Type environmental assessment and to proceed with an Environmental Impact Assessment (EIA) Study of the Project and prepare an Environmental Management Plan (EMP) to put forward its commitments for environmental and social mitigation and management measures.

Environmental Resources Management (ERM)-Hong Kong, Limited (ERM) has been commissioned by BE to undertake the EIA for the Project. As per the Environmental Impact Assessment (EIA) Procedure and promulgated on 29th December 2015, it is understood that proposed Project requires the Scoping Study and the EIA Study to be conducted and submitted to MONREC in order to obtain an Environmental Compliance Certificate (ECC).

In addition, the Scoping Study (prepared by ERM) for this Project has been submitted to MONREC on June 2020 and the comments from ECD on Scoping Report was received on September, 2020, and ECD's comments have been addressed and incorporated into the EIA report. The updated Scoping Report as per ECD's comment was submitted on November 2020. This EIA report has been prepared in compliance with Terms of Reference included in the Scoping Report. The outcomes of the assessment are included in the Report and submitted to MONREC in order to inform the decision to award an ECC.

Unfortunately, ERM could not complete the entire EIA study and terminated EIA consulting service with BE due to Covid-19 pandemic and ongoing situations of Myanmar. **Resource and Environment Myanmar Company Limited (REM)** has been commissioned by BE to undertake the existing EIA tasks

for this project. REM has to responsible for the existing EIA study and revenant tasks. REM received third party approval from Environmental Conservation Department (ECD) on 29th July 2022 for this project. REM received this project's previous EIA study report and related documents from BE and ERM. REM has been studying existing EIA tasks base on ECD's comments and responsible for outstanding tasks. So, REM has been updating with the additional fulfilment of required data, information and wroks in to existing EIA report in order to meet ECD's requirements.

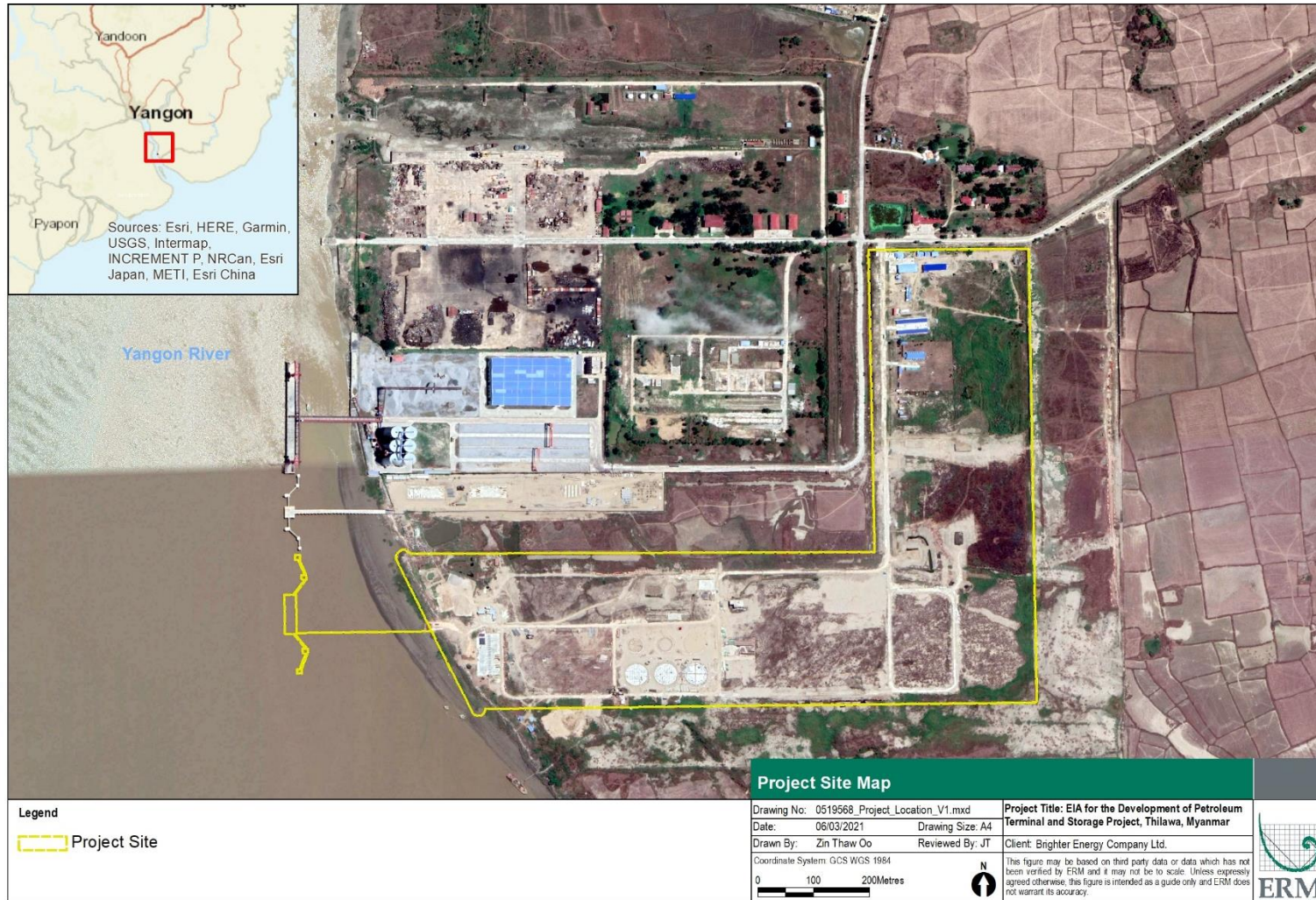


Figure 2.1 Overview of Petroleum Terminal and Storage Project

2.2 Presentation of the Project proponent

Contact details of the BE are provided below.

Contact Person: Mr. Rathapon Phakdeewong (COO) / Sai Aye Chan (Technical Director)

Address: No.337, Pyay Road, Mont Let Saung Gone (South) Quarter, Sanchaung Township, Yangon, Myanmar

Telephone: +95 9899820959 / +95 (0) 95003183

Email: rathapon.p@brighterenergymm.com / saiayechan@brighterenergymm.com

BE company registration document is attached in page 383.

1.2 Presentation of the EIA Experts

Table 2-2 lists the environmental and social consultants involved in the preparation of this EIA Report. ERM is supported by local Myanmar consultants, Resource and Environment Myanmar (REM), when conducting the public consultation and environmental baseline surveys.

Table 2-2 Key Environmental and Social Consultants for the Project

Name	Organisation	Academic Experience	Years' Experience	Area of Expertise	MONREC Consultation Registration Scheme	Responsibility
Craig Reid	ERM	BSc (Hons) Marine Biology	20	Ecology and Biodiversity. Risk Management and Hazard Identification.	ERM (No. 0016)	Overall accountability for EIA documentation
Tam Man Cheong (Jovy Tam)	ERM	MA Marine Science and Ecology	10	Ecology, Biodiversity, Environmental Science, Infrastructure Development	ERM (No. 0016)	Reviewing the environmental baseline and impact assessment chapters of the EIA documentation
Khin Su Su Naing	ERM	MA International and Community Development	>10	Socio-economic. Facilitation of Meeting	Applied for under ERM (No. 0016)	Leading public consultation and stakeholder engagement
Nay San Lin	ERM	MSc (Forest Management)	20	Socio-economic. Facilitation of Meeting	Applied for under ERM (No. 0016)	Public consultation and stakeholder engagement
Aung Soe Min	ERM	Bachelor of Civil Engineering	4	Socio-economic. Facilitation of Meeting	Applied for under ERM (No. 0016)	Public consultation and stakeholder engagement
To Kit Yu (Zoe To)	ERM	BA Anthropology, MSc Anthropology	3	Socio-economy	Applied for under ERM (No. 0016)	Writing the social baseline and impact assessment chapters of the EIA documentation
Tom Glenwright	ERM	PhD Marine Ecology	16	Water Pollution Control, Modelling for Water Quality Ground water and Hydrology	ERM (No. 0016)	Writing the physical (water) baseline and impact assessment chapters of the EIA documentation
Edmund Taylor	ERM	M.Sc Environmental Dynamics and Climate Change	8	Air Pollution Control, Meteorology, Modelling for Air Quality	Applied for under ERM (No. 0016)	Writing the air baseline and impact assessment chapters of the EIA documentation

Name	Organisation	Academic Experience	Years' Experience	Area of Expertise	MONREC Consultation Registration Scheme	Responsibility
Man Ping To (Mandy To)	ERM	MSc Environmental Management	20	Noise and Vibration	ERM (No. 0016)	Writing the physical (noise) baseline and impact assessment chapters of the EIA documentation
Chi Hung Wan (Frank Wan)	ERM	MSc Waste Management	30	Geology and Soil, Waste Management	ERM (No. 0016)	Reviewing the physical baseline and impact assessment chapters of the EIA documentation
Zin Thaw Oo	ERM	B.E (Civil)	5	GIS and Remote Sensing	ERM (No. 0016)	Leading environmental baseline surveys and write up of survey reports
Win Naing Tun	REM	M.A M. Res	14	Socio-economic, Facilitation of meeting	REM (No 0002)	Leading environmental baseline surveys and public consultation and write up of survey reports
Soe Yu Htun	REM	B.Sc (Geology)	7	Air, Noise, Soil, Surface Water and Ground water, Sediment	REM (No 0002)	Supporting the environmental baseline surveys (Air, Noise, Soil, Surface Water and Ground water, Sediment)
Kyaw Bala	REM	B.Sc (Geology)	2	Air, Noise, Soil, Surface Water and Ground water, Sediment	REM (No 0002)	Supporting the environmental baseline surveys (Air, Noise, Soil, Surface Water and Ground water, Sediment)
Lwin Moe	REM	B.Sc (Geology)	1	Air, Noise, Soil, Surface Water and Ground water, Sediment	REM (No 0002)	Supporting the environmental baseline surveys (Air, Noise, Soil, Surface Water and Ground water, Sediment)

Name	Organisation	Academic Experience	Years' Experience	Area of Expertise	MONREC Consultation Registration Scheme	Responsibility
Kyaw Si Thu	REM	M.Sc (Geology)	1	Air, Noise, Soil, Surface Water and Ground water, Sediment	REM (No 0002)	Supporting the environmental baseline surveys (Air, Noise, Soil, Surface Water and Ground water, Sediment)
Thet Naing Aung	REM	B.Sc (Zoology)	4	Ecology and Biodiversity	REM (No 0002)	Supporting the environmental baseline surveys (Biodiversity)
Naing Naing Win	REM	M.Sc (Zoology)	11	Ecology and Biodiversity	REM (No 0002)	Supporting the environmental baseline surveys (Biodiversity)
Than Than Htay	REM	M.Sc (Zoology)	6	Ecology and Biodiversity	REM (No 0002)	Supporting the environmental baseline surveys (Biodiversity)
Nyan Linn Maung	REM	B,Sc (Microbiology)	15	Ecology and Biodiversity	REM (No 0002)	Supporting the environmental baseline surveys (Biodiversity)

2.3 REM EIA EXPERT TEAM

Table 2-3 lists the environmental and social consultants were approved by ECE on 29th July 2022 for this EIA Report. Actually, REM was conducted environmental baseline surveys and used to conduct with ERM for public consultation for many projects as local partner.

Table 2-3 Key Environmental and Social Consultant (REM)

Name	Academic Experience	Years' Experience	Area of Expertise	MONREC Consultation Registration Scheme	Responsibility
U Win Naing Tun	B.Sc. (Geology) M.A. (Business Law) M.A. (Archaeology)	16	Cultural Heritage, Archaeology and socio-economy	0169	<ul style="list-style-type: none"> Facilitation of Meeting Socio-economy Cultural Heritage Management
Daw Khin Ohnmar Htwe	M.A. (Geography)	15	Socio-economy, Stakeholder Engagement, PCM	0032	<ul style="list-style-type: none"> Socio-Economy and Stakeholder Engagement Plan and Public Consultation
U Kyaw Zin win	B.Sc. (Geology) M.Sc.(RS)	12	GIS Mapping	0002	<ul style="list-style-type: none"> GIS and RS
U Sein Tun	B.E. (Civil)	10	Hydrological Survey, River Training	0093	<ul style="list-style-type: none"> Water Resource Management
U Myat Thu Kyaw	B.Sc.(Forestry) M.Sc.(EEM)	7	Air Pollution Control	0233	<ul style="list-style-type: none"> Air Pollution Control
Dr Ko Myint	PhD (Zoology)	16	Fauna Expert	0037	<ul style="list-style-type: none"> Ecology and Biology
Dr Kyaw Zay Moe	PhD (Botany)	10	Flora Expert	0033	<ul style="list-style-type: none"> Ecology & Biology
Daw Phyo Khine Zar Wint	B.E.(EC) Dip (EPM)	9	Water Pollution Control	0171	<ul style="list-style-type: none"> Water Pollution Control
U Kyaw Thu Aung	B.Sc.(hons) Geology M.Sc. (Geology)	8	Air Pollution, Vibration, Noise Control, and Water Pollution Survey	0033	<ul style="list-style-type: none"> Air Pollution, Vibration, Noise Control, and Water Pollution Survey
Daw Toe Toe Hlaing	B.Sc. (Hons) Geology, D.A.G M.Sc., M.Res. (Geology)	10	Geology and soil	0033	<ul style="list-style-type: none"> Geology and soil
Haymar Htet Naing	B.A. (English)	7	Socio-economic	0002	<ul style="list-style-type: none"> Socio-economic Ground water & Hydrology
Dr Ye Naing	M.B.B.S (Ygn)	8	Health Impact Assessment	0002	<ul style="list-style-type: none"> Public Health
Daw Ei Ei Win Myat	B.A. (LLB), DBL, DIL	6	Legal Expert	0002	<ul style="list-style-type: none"> Legal Expert

3 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This section provides the relevant legal and policy context in Myanmar relevant for the Project including the following:

- Corporate Environmental and Social Policies;
- Policy and Legal Framework; including:
 - Myanmar EIA legislation, other relevant Myanmar legislation; and
 - International conventions, standards and guidelines relevant to the Project.
- Institutional Framework of Myanmar; and
- Environmental, Social and/or Health standards related to the Project.

3.1 Corporate Environmental and Social Policies

BE has developed specific policy, guidelines and standards that will be met during project activity. Summary of those are mentioned as below:

- Risk Assessment Procedure
- Safety, Security, Health and Environment Management Policy and Plan
- Emergency Response Procedure
- Incident, Accident Investigation Procedure

3.2 Policy and Legal Framework

3.2.1 Myanmar EIA Procedure

The Myanmar EIA Procedure (dated 29 December 2015) sets out the requirements for development, assessment, and subsequent monitoring of an EIA. The Environment Conservation Law (2012) and Environment Conservation Rules (2014) outline the requirements to conduct an EIA.

BE undertook a systematic assessment of the proposed activities. Screening was conducted as part of the assessment to identify all potential environmental and social risks. A summary of the screening and the preliminary identified environmental and social impacts was submitted to Ministry of Natural Resources and Environmental Conservation (MONREC) in the form of a Project Proposal Report. Upon review of the Project Proposal Report, MONREC instructed BE to develop an EIA for the Project.

After screening, BE identified the potential impacts of the Project, the scope of the Study Area and Area of Influence for EIA assessment and submitted the Scoping Report together with Terms of Reference, Impact Assessment Methodology and the brief introduction of public consultation conducted, to MONREC.

EIA investigations were then conducted, in accordance with EIA Procedure (2015), to identify the potential environmental and social impacts of the Project, and likely Project Affected Peoples / Communities and to identify potential mitigation measures. Stakeholder engagement will be undertaken during this process to allow stakeholders to express views and concerns. Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation for EIA investigation is not yet conducted. Public consultation for EIA investigation will be conducted after situation allowed in order to have better participation by stakeholders. The EIA Report will be updated once the public consultation for EIA investigation is done.

The EIA report will be submitted to MONREC for approval as per local EIA Procedure depicted in Figure 3.1.

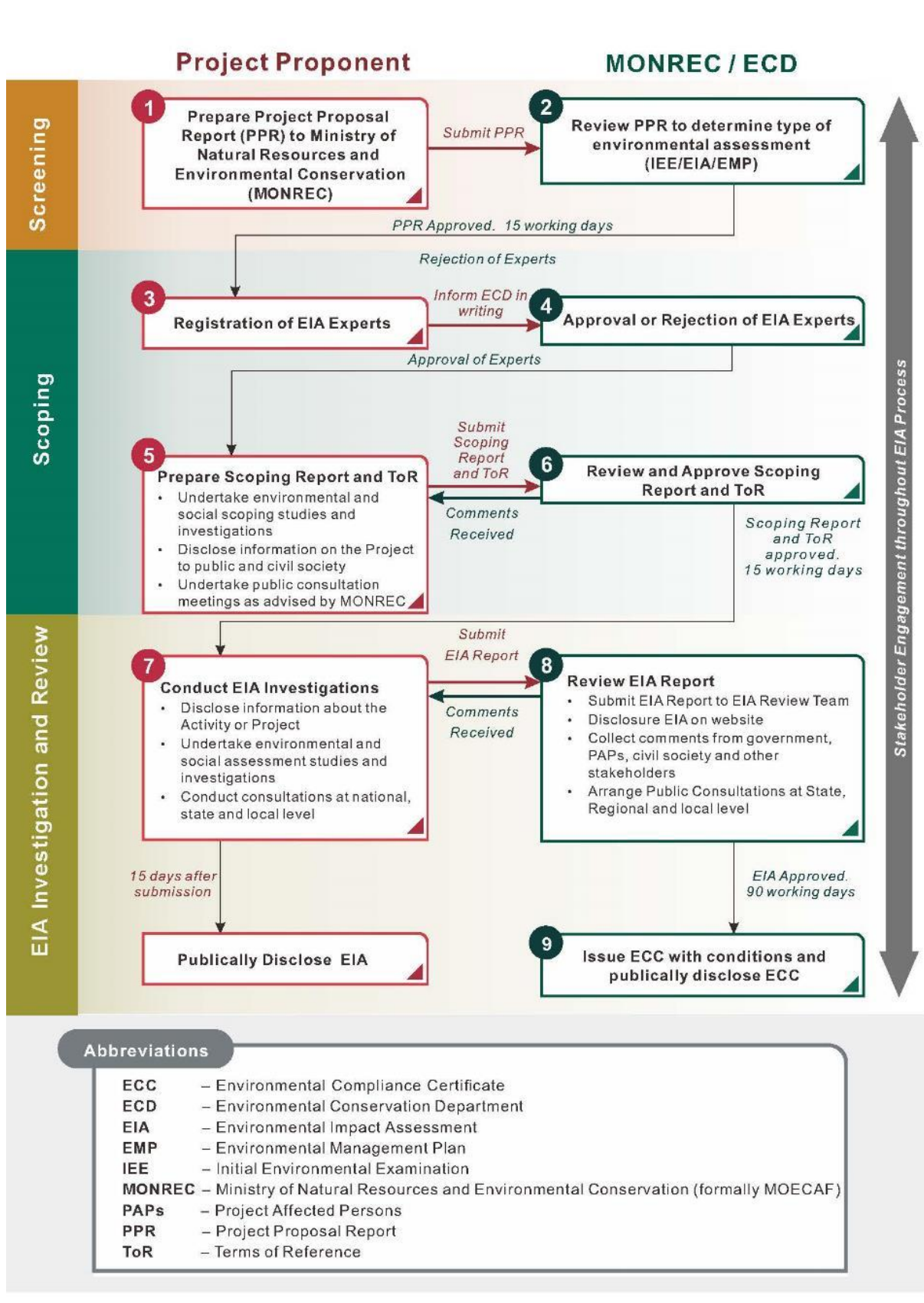


Figure 3.1 EIA Process in Myanmar

3.2.2 Myanmar Legislation Relevant to the Project

Laws relating to environmental and social issues related to the Project and hence their relevance to the EIA Study are included in Table 3-1.

Table 3-1 Myanmar Legislation Relating to the Project

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
ENVIRONMENTAL LAWS		
Environmental Conservation Law, 2012	Section 7 (o), Section 14, Section 15, Section 16, Section 22, Section 26, Section 28, Section 29, and Section 30.	<p>The Project Proponent commits to pay for the compensation, if it causes pollution to the environment, and contribute to the fund in environmental conservation works.</p> <p>The Project will conduct environmental assessment in line with EIA Procedure (2015).</p> <p>The Project Proponent commits to install or control any point source emission and ensure that relevant emission and discharge standards from the EQEG are met and reported in the Environmental Monitoring Report.</p> <p>The Project will have a Waste Management Plan for management, treatment, and disposal of wastes.</p> <p>The Project Proponent commits to acquire prior permission from the Ministry and insure the business in accord with the existing laws.</p> <p>The Project Proponent commits to have insurance depending on the category of the business, according to the existing law.</p> <p>The Project Proponent commits to comply with the rules, notifications, orders, directives and procedures issued under this Law and shall not carry out any business described under Section 30.</p>
Environmental Conservation Rules, 2014	Section 56, Section 63, and Section 69. (a), (b)	The Proponent shall apply for prior permission and follow the procedure mentioned in Chapter XII.

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
		<p>The Project Proponent will have a Waste Management Plan for management, treatment, and disposal of wastes and include it in EIA report.</p> <p>The Project Proponent commits to implement and monitor all mitigation measures related to protection of the environment and people (in the EMP).</p> <p>The Project Proponent will submit Environmental Monitoring Report(s) demonstrating adoption of mitigation measures.</p>
<p>Environmental Impact Assessment Procedure, 2015</p>	<p>All Sections - specifically; Section 3, Section 4, Section 7, Section 13, Section 102, Section 103, Section 104, Section 105, Section 106, Section 107, and Section 127.</p>	<p>The Project will obtain an ECC for all Projects that trigger Annex I of the EIA Procedure.</p> <p>The Project Proponent shall issue a letter of endorsement to the Department together with the EIA Report, confirming:</p> <ul style="list-style-type: none"> a) the accuracy and completeness of the EIA; b) that the EIA has been prepared in strict compliance with applicable laws including this Procedure and with the ToR for the EIA; and c) that the Project will at all times comply fully with the commitments, mitigation measures, and plans in the EIA Report. <p>The Project Proponent commits to arrange appropriate public consultation as per EIA Procedure and disclose the project information to the public in a timely manner.</p> <p>The Project Proponent will conduct an EIA Report for the Project and submit all relevant documentation including Project Proposal, Third Party Registration, Scoping Report, and EIA Report (with EMP).</p> <p>The Project Proponent will commit to being financially responsible for all actions of themselves and all sub-contractors of the Project.</p> <p>The Project Proponent commits to fully implement the EMPs and monitor all mitigation measures related to protection of the environment and people (in the EMP). The Project</p>

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
		<p>Proponent will submit Environmental Monitoring Report(s) demonstrating adoption of mitigation measures.</p> <p>The Project will ensure relevant emission and discharge standards from the EQEG are met and reported in the Environmental Monitoring Report.</p> <p>The Project Proponent commits to notifying in writing the Ministry, providing detailed information, of any incidents that could have an adverse impact on the environment or people</p>
<p>Environmental Quality (Emissions) Guidelines (EQEG), 2015</p>	<p>All</p>	<p>The Project Proponent commits to comply with the EQEG emission and discharge standards for sector specific operations (as contained in the ECC).</p>
<p>Conservation of Water Resources and Rivers Law, 2006, amended in 2017</p>	<p>Section 10, Section 11(a), Section 15, Section 19, and Section 24.</p>	<p>The Project Proponent commits to not anchoring in prohibited rivers or creeks.</p> <p>The Project Proponent commits to not disposing of any hazardous substances into water resources or rivers.</p> <p>The Project will ensure relevant discharge standards from the EQEG are met and reported in the Environmental Monitoring Report.</p> <p>The Project Proponent will obtain the approval of the directorate for any port / harbour related construction activities.</p> <p>The Project Proponent will ensure they do not violate the conditions of Section 24 of the Law.</p>
<p>Conservation of Water Resources and River Rule, 2013, amended in 2015</p>	<p>Section 8(a), and Section 9.</p>	<p>The Project will ensure relevant discharge standards from the EQEG are met and reported in the Environmental Monitoring Report.</p> <p>The Project commits to paying the applicable fees to the Department if rivers or streams are polluted by the Project activities.</p>
<p>Protection of Biodiversity and Protected Areas Law, 2018</p>	<p>Section 39 (d) (e).</p>	<p>The Project Proponent commits to implement and monitor all mitigation measures related to protection of biodiversity (in the EMP). The Project Proponent will submit Environmental Monitoring Report(s) demonstrating adoption of mitigation measures.</p>

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
		The Project commits to paying the applicable fees to the Department if guilty of: polluting soil, water and air intentionally, damaging the watercourse or poisoning water, electrification, using chemical or explosive materials with a Protected Area; Disposing or handling chemical waste and poisoning materials in the conservation area.
Disaster Management Laws and Rules, 2013	Section 13.	The Project will have an Emergency Response Plan in place covering mitigation and management measures to be adopted in event of natural hazards / disasters. The Project Proponent will carry out emergency response actions in event of any impacts from the Project on the environment or people.
AQUATIC RESOURCES		
Freshwater Fisheries Law, 1991	Section 40.	The Project commits to not cause harassment of freshwater fish and other aquatic organisms or pollution of the water in a freshwater fisheries law. The Project will have a Waste Management Plan for management, treatment, and disposal of wastes. The Project will ensure relevant discharge standards from the EQEG are met and reported in the Environmental Monitoring Report.
Inland Vessel Law, 2015	Section 34, and Section 35.	The Project Proponent commits to not disposing of any hazardous substances into water resources or rivers. The Project will have a Waste Management Plan for management, treatment, and disposal of wastes.
Myanmar Port Authority Law, 2015	Section 19, Section 23, Section 74, Section 78(b), Section 80, and Section 83	The Project Proponent commits to not disposing of any hazardous substances into water resources or rivers and take necessary preventative measure to prevent oil spill and leakage. The Project will have a Waste Management Plan for management, treatment, and disposal of wastes. The Project Proponent commits to not obstructing navigation of vessels into ports by discharging or disposing of materials.

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
Myanmar Territorial Sea and Maritime Zones Law, 2017	Section 10,	<p>The Project commits to carry necessary documents and observe precautionary measures as per international guidelines (MARPOL / UNCLOS / SOLAS)</p> <p>The Project commits to not conducting and oil and gas activities without approval from the Union Government (MOGE).</p>
TERRESTRIAL RESOURCES		
Forest Law, 2018	Section 12 (a, c)	The Project commits to obtain prior approval for any projects located in forest areas and for Project activities to be conducted in compliance with the Environmental Conservation Law.
Forest Rules, 1995	Section 27, Section 30, and Section 32.	<p>The Project Proponent commits to not cut or damage any teak or other reserved trees without permission from the Department.</p> <p>The Project Proponent commits to not make firewood or charcoal from any forest products without permission from the relevant forest department office.</p>
Announcement of Protected Tree Species (notification no. – 127/2019)		The Project Proponent commits to not fell any of the reserved trees under this Law.
SECTOR SPECIFIC AND INDUSTRY		
Myanmar Investment Law, 2016	Section 50(b,c,d), Section 51, Section 65, and Section 73	<p>The Project Proponent will register land in accordance with Section 50 of this Law.</p> <p>The Project Proponent commits to comply with the Environmental Conservation Law (2012), Environmental Conservation Rules (2014), and EIA Procedure (2015).</p> <p>The Project Proponent commits to register land or building lease and maintain the lease updated.</p> <p>The Project Proponent commits to comply with the conditions set out in Section 51 in recruiting for the employment.</p>

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
		<p>The Project Proponent commits to inform the Myanmar Investment Commission (MIC) if natural mineral resources or antique objects are found that are not related to the investment permitted.</p> <p>The Project Proponent commits to insure the type of insurance as per stipulations by the rules at a recognisable insurance enterprise.</p> <p>The Project Proponent commits to comply with any law related to employment, dispute, compensation and minimum wages and respect and comply with the customs, traditions and traditional culture of the ethnic groups in the Union; .</p>
<p>Petroleum and Petroleum Product Law, 2017</p>	<p>Section 11, Section 13, Section 15, Section 18, Section 30, Section 31, Section 32, Section 33, and Section 49</p>	<p>The Project commits to label containers of dangerous petroleum products as appropriate.</p> <p>The Project commits to display a danger warning sign on pipelines containing petroleum or petroleum products.</p> <p>The Project commits to obtain a license to transport or store more than 500 gallons of harmless petroleum and petroleum products.</p> <p>The Project commits to obtaining the relevant license according to this law and to not to transport, store, or distribute petroleum products without a license.</p> <p>The Project commits to immediately notify the Department in event of an incident and provide necessary information of the accident if there is an explosion or fire caused by any types of petroleum and petroleum products.</p> <p>The Project commits to operating the petroleum and petroleum products business without harm to the environment in accordance with the laws, rules, regulations and procedures in force</p>
<p>Control of Smoking and Consumption of Tobacco Product Law, 2006</p>	<p>Section 6 (a) (b) (j) (l); and Section 9 (a)(b)(c)</p>	<p>The Project Proponent commits to comply with the following To keep the caption and mark referring that it is a non-smoking area at the place mentioned in section 6 in accordance with the stipulations.</p>

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
		Arrange the specific place where smoking is allowed as mentioned in section 7, and keep the caption and mark also referring that it is a specific place where smoking is allowed, in accordance with the stipulations.
Narcotic Drugs and Psychotropic Substances Law, 1993 (amended in 2018)	All	The Project commits to not allow possession and trafficking of Psychotropic Substances, Paraphernalia and Chemical Precursors.
Myanmar Fire Force Law, 2015	Section 18, Section 24, and Section 25.	The Project Proponent commits to provide materials and apparatuses for fire safety; in conformity with the directive of the Fire Services Department.
CULTURAL HERITAGE		
Protection and Preservation of Antique Objects Law, 2015	Section 12, and Section 13 (a)	The Project Proponent commits to inform the relevant Ward or village-tract administrator if any antique objects are found during Project activities.
Protection and Preservation of Ancient Monuments Law, 2015	Section 12, Section 15, Section 17, Section 18, Section 19, and Section 20.	<p>The Project Proponent commits to inform the relevant Ward or village-tract administrator if any antique objects are found during Project activities.</p> <p>The Project Proponent will apply for permission for the activities listed in Section 15 of this Law.</p> <p>The Project commits not to conduct any of the following activities within a specified area of ancient monuments with prior permission;</p> <ul style="list-style-type: none"> ■ taking photo, video, film or copying and modelling an ancient monument stipulated as a listed ancient monument for commercial purposes; ■ using machines which causes vibration within the specified place of an ancient monument and running various types of vehicles; ■ landing and taking off and, flying airplane and helicopter which can directly or indirectly affect an ancient monument; and ■ discarding chemical substance and rubbish which can affect an ancient monument and the environment.
PUBLIC HEALTH		

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
Public Health Law, 1972	Section 9.	<p>The Project Proponent commits to abide any instruction or stipulation issued by Public Health Department and cooperate with the Department in controlling communicable diseases.</p> <p>The Project Proponent commits to accept inspection from the Department when requested.</p>
Protection and Prevention of Communicable Disease Law, 1995	Section 4(b), Section 8, Section 9, and Section 14.	In cases of outbreak of any communicable disease, the Project Proponent commits to report immediately to Department of Health, abide all the necessary sanitation measures by the Department and follow the prohibitive orders in order to control and contain the diseases.
LABOUR LAW		
Labour Organisation Law, 2011	Section 17, Section 18, Section 19, Section 20, Section 21, Section 22, Section 29, Section 30, and Section 31.	<p>The Project Proponent commits to allow employees to join a Labour Organisation and recognise their rights for representation, collective bargaining and participation in discussing rights or interests contained in the labour laws.</p> <p>The Proponent commits not to lock out any public utility or essential services mentioned in Section 41 (a).</p>
Minimum Wages Law, 2013	Section 12 (a – d), Section 13, Section 22, Section 23, Section 24, and Section 25.	<p>The Project Proponent commits to pay not less than minimum wage stipulated by the law, notify the workers relating to the rates of minimum wages and not deduct any other wage (amount) from employees who are paid less than the minimum wage stipulated.</p> <p>The Proponent commits to prepare, maintain and report the lists, schedules, documents and wages of the workers to the Department and receive the inspection and provide necessary assistances.</p>
Employment and Skill Development Law, 2013	Section 5, Section 14, and Section 15.	<p>The Project Proponent commits to include the conditions set under sub-section 5 (b)</p> <p>The Project Proponent commits to making employment agreements for daily wage workers and piece rate workers who are appointed temporarily.</p>

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
		<p>The Project Proponent commits to send a copy of the employment agreement made between the employer and employee, to the relevant employment and labour exchange office within the stipulated period and to get the approval.</p> <p>The Project Proponent commits to carry out training program in accordance with the work requirement.</p> <p>The Project Proponent commits to carry out the training for each work including on the job training, systematic training at worksite, outside training and training using information technology system, to enhance the employment skill and capacity of the workers.</p>
Settlement of Labour Dispute Law, 2012	Section 38, Section 39, Section 40, and Section 41.	<p>The Project Proponent commits to negotiate and coordinate in respect to any labour complaints within the prescribed period and to not alter the conditions of service of workers involved in disputes prior to investigation by tribunals.</p> <p>The Proponent commits to solve the dispute over negotiation and shall not lock-out or strike to amend the decision by the Arbitrary Body.</p>
Workmen Compensation Act, 1923 (amended in 1955, 1957, 2005)	Section 3 (1,2,3,6) Section 4, and Section 5.	The Project Proponent commits to required payment of compensation for injury by accident as per Section 3 and follow the instructions related to amount of compensation and method of calculating wages included in Section 4 and 5.
Payment of Wages Law, 2016	Section 3 (a), Section 4, Section 5, Section 7 (a), Section 8, Section 9, and Section 14.	<p>The Project Proponent commits to payment of salaries by the end of the month or, depending on the size of the employing enterprise, not later than 5 days after the end of the payment period.</p> <p>The Project Proponent commits to pay salary in either Myanmar Kyats or Foreign Cash permitted by National Bank of Myanmar.</p> <p>The Project Proponent commits to report to the Department, with evidence of payment at later date agreed with the employee, if the employer has difficulties to pay wages on time because of significant events (e.g. natural disaster).</p>

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
		<p>The Project Proponent commits to not cut salary by more than 50 % due to the employees absence.</p> <p>The Project Proponent commits to paying the presiding overtime rate, as required, as set by the Law.</p>
<p>Leaves and Holidays Act, 1951</p>	<p>Section 3, Section 4, Section 5, Section 6, and Section 11.</p>	<p>The Project Proponent commits to pay public holidays as announced by the Government in the Myanmar Gazette.</p> <p>The Project Proponent commits to grant earned leave for a period of ten days during a period of twelve months to every employee who has completed a period of twelve months continuous service.</p> <p>The Proponent commits to grant the employees casual leave and medical certificate leave as per Section 5 and 6.</p>
<p>Social Security Law, 2012</p>	<p>Section 18(a, b), Section 48(a), Section 51, Section 53, Section 54(a), and Section 75.</p>	<p>The Project Proponent commits to include funds for health and social care, family assistant, invalidity benefit, superannuation benefit and survivors benefit, unemployment benefit, other social security fund for social security system of compulsory registration and contribution stipulated by the Ministry of labour.</p> <p>The Project Proponent commits to arranging insurance for workers to enjoy social security benefits by contributing to the social security fund.</p> <p>The Project Proponent commits to deduct contributions to be paid by worker from their wages together with contribution to be paid by them and pay to the social security fund and in such case they can incur the expense.</p> <p>The Project Proponent commits to effect insurance by registering for employment injury benefit insurance system contained in Section 45 at the relevant township social security office.</p> <p>The Project Proponent commits to pay contribution to an employment injury benefit fund in accord with stipulations in order that workers applied to provisions of compulsory registration may obtain the employment injury benefits.</p>

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
		<p>The Project Proponent commits to report to the relevant township social security office immediately if a serious employment accident occurs to his insured worker.</p>
<p>Occupational Safety and Health Law, 2019 (not enforce yet)</p>	<p>Section 12, Section 26, Section 27, Section 28, Section 29, and Section 34.</p>	<p>The Project Proponent commits to appoint an occupational safety and health responsible person to oversee the safety and health of workers.</p> <p>The Project Proponent commits to organize a Safety and Health Committee in accordance with the stipulations of the Ministry including the equal numbers of representative from employees and employers.</p> <p>The Project Proponent commits to arrange to assess the risks of workplace and the likelihood of occurrence of hazards and prepare contingency plans accordingly and manage properly safety issues including providing physicians and personnel protective equipment.</p> <p>The Project Proponent commits to not dismiss or demote complainants of potential health and occupational hazards.</p> <p>The Project Proponent commits to pay for medical expenses if any worker injured due to an occupational accident or disease which is not covered under the Social Security Law, 2012.</p> <p>The Project Proponent commits to restrict any worker working if he/she does not meet the health standards due to medical check-up results and prepare arrangement for female Workers who are pregnant or breast-feed.</p> <p>The Project Proponent commits to submit a report from approved physician to inform the department in case of infectious disease or toxic release due to the materials use or operations process.</p>
NATIONAL RACE		
<p>Law protecting Ethnic Right, 2015</p>	<p>Section 5.</p>	<p>The Project Proponent commits to informing, coordinating and undertaking consultation with ethnic groups if projects are in areas with ethnic groups.</p>
LAND USE		

Relevant Laws, Rules and Regulations	Relevant Sections	Project Commitments
Farmland Law, 2012, amended 2018	Section 12(a, b, g).	The Project Proponent commits to not use the farmlands by other purposes without permission from the Department.
The Administration of Vacant, Fallow and Virgin Land Management Law, 2012, amended 2018	Section 16, and Section 22.	<p>The Project Proponent commits to only carry out the type of business permitted and affiliated economic enterprises on vacant, fallow and virgin lands.</p> <p>The Project Proponent commits to not extract natural resources above or below the ground except with permission.</p> <p>The Project Proponent commits to report of progress reclaiming the land and carry out the business in line with this Law.</p>
Land Acquisition Act, 1894	All	The Project Proponent commits to comply with the stipulations laid down in the Act.
The Land Acquisition, Resettlement and Rehabilitation Law, 2019 (not enforce yet)	Section 8, Section 47, Section 63, and Section 64.	<p>The Project Proponent commits to submit a proposal to the Central Committee for proposed land acquisition.</p> <p>The Project Proponent commits to arranging temporary quarters if the resettlement schemes have not been carried out when the possession of the land had been transferred.</p> <p>The Project Proponent commits to paying fines as per Section 63 and 64 of the Law if an offence is committed under the Law.</p>

3.2.3 Policies and Strategies relevant to the Project

Myanmar has prepared some policies and strategies in order to have sustainable development and comply with international conventions to which Myanmar is a signatory country while protecting and conserving its environment and biodiversity. Table 3-2 shows policies and strategies relevant to the Project and how the Project can contribute to their achievement.

Table 3-2 Relevant Policies and Strategies

Relevant Policies and Strategies	Relevant Sections	Project Commitments
The National Environment Policy, 2019	Section 6a (7) Section 6b (11) Section 6b (13)	<p>The Project will have a Waste Management Plan for management, treatment, and disposal of wastes.</p> <p>The Project will ensure relevant emission and discharge standards from the EQEG are met and reported in the Environmental Monitoring Report.</p> <p>The Project will have an Emergency Response Plan to cover disaster reduction strategies.</p>
National Sustainable Development Plan (2018-2030), 2018	Goal 5.1.4. Goal 5.1.6. Goal 5.1.7. Goal 5.1.10. Goal 5.3.6.	<p>The Project Proponent commits to implement and monitor all mitigation measures related to protection of natural habitats and biodiversity (in the EMP). The Project Proponent will submit Environmental Monitoring Report(s) demonstrating adoption of mitigation measures.</p> <p>The Project will ensure relevant emission and discharge standards from the EQEG are met and reported in the Environmental Monitoring Report.</p> <p>The Project will have a Waste Management Plan for management, treatment, and disposal of wastes.</p>
Myanmar Climate Change Policy, 2019	Section 12(d). Section 13(b-iii).	<p>The Project Proponent commits to implement and monitor all mitigation measures related to protection of the environment and people (in the EMP). The Project Proponent will submit Environmental Monitoring Report(s) demonstrating adoption of mitigation measures.</p> <p>The Project commits to adopt low carbon solutions for Projects, where possible.</p> <p>The Project will ensure relevant emission and discharge standards from the EQEG are met and reported in the Environmental Monitoring Report.</p>

Relevant Policies and Strategies	Relevant Sections	Project Commitments
Myanmar Climate Change Strategy and Action Plan (2018-2030), 2018	Section 2.2	The Project Proponent commits to implement and monitor all mitigation measures related to protection of the environment and people (in the EMP). The Project Proponent will submit Environmental Monitoring Report(s) demonstrating adoption of mitigation measures.
Myanmar's National Biodiversity Strategy and Action Plan 2015-2020	All	The Project Proponent commits to implement and monitor all mitigation measures related to protection of biodiversity (in the EMP) with the aim that the Project does not have significant impacts on the environment and its biodiversity. The Project Proponent will submit Environmental Monitoring Report(s) demonstrating adoption of mitigation measures.
Waste Management Strategy and Action Plan for Myanmar (2017-2030)	Goal B (Activities 1.6 & 2.2)	The Project will have a Waste Management Plan for management, treatment, and disposal of wastes. The Project will report waste use and disposal (types and volumes) in Environmental Monitoring Report(s).
National Land Use Policy, 2016	Section 27(b). Section 30.	The Project Proponent will prepare an EIA Report for the Project. The Project will have a Resettlement Action Plan, for all Projects where there is resettlement of people. This will include public consultation and ensure effective relocation without significant impacts to affected communities.
National Energy Policy, 2014	Chapter 3 (page 50)	The Project Proponent will conduct an EIA Report for the Project.

3.2.4 International Agreements and Conventions

Relevant international conventions to which Myanmar is a signatory include those related to waste management, biodiversity conservation, and labour conventions. The key international conventions of relevance to the Project are included in Table 3-3.

Table 3-3 International Conventions relevant to the Project

Conventions	Year (Ratified/Acceded/Accepted)
Environmental	
Plant Protection Agreement for the Southeast Asia and Pacific Region, Rome 1956	1959 (Ratified)
MARPOL: International Convention for the Prevention of Pollution from Ships 1973 and MARPOL Protocol of 1978	1988 (Accession)
United Nations Framework Convention on Climate Change (UNFCCC), New York 1992	1994 (Ratification)
Convention on Biological Diversity, Rio de Janeiro 1992	1994 (Ratification)
The Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris 1972	1994 (Acceptance)
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington DC 1973; and as amended in Bonn, Germany 1979	1997 (Accession)
ASEAN Agreement on Conservation of Nature and Nature Resources, Kuala Lumpur, 1985	1997 (Signatory)
Kyoto Protocol to the Convention on Climate Change, Kyoto 1997	2003 (Accession)
Establishment of ASEAN Regional Centre for Biodiversity	2005 (Signatory)
The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	2015 (Acceptance, and Entry into Force)
Social	
Universal Declaration of Human Rights (UNDHR)	signed
Convention on the Rights of the Child	1991 (acceded)
Convention on Elimination of All Forms of Discrimination against Women (CEDAW)	1997 (acceded)
Workmen's Compensation (Accidents) Convention 1925	1956
Workmen's Compensation (Occupational Diseases) Convention 1925 and its Revision 1934	2016
Relevant ILO Conventions in force in Myanmar C1 Hours of Work (Industry) C14 Weekly Rest (Industry) C17 Workmen's Compensation (Accidents) C19 Equality of Treatment (Accident Compensation) C26 Minimum Wage Fixing Machinery C29 Forced Labour Convention C42 Workmen's Compensation (Occupational Diseases) Revised 1934 C52 Holidays with Pay C87 Freedom of Association and Protection of the Right to Organize	

3.2.5 Good International Industry Practice Guidelines

BE will undertake this Study and Project activities in a manner guided by good international industry practice (GIIP). Applicable guidelines, which were considered in the preparation of the EIA, include:

- International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability (2012): International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability (2012): The IFC PS's represent the 'policy framework' for the EIA and sustainable social and environmental management for the Project, whereas the World Bank Group's Environmental, Health, and Safety (EHS) Guidelines provide guidance on general and industry best practice as well as recommended numerical limits for emissions to the atmosphere, noise, liquid and solid wastes, hazardous wastes, health and safety, and other aspects of industrial facilities and other types of development projects.
- World Bank Group (WBG) Environmental, Health and Safety (EHS) guidelines, including:
 - General EHS Guidelines (2007): The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs;

The following guidelines are applicable to the Project and committed by the Proponent.

- Environmental
 - Air emissions and ambient air quality
 - Fugitive sources (Annex 1.1.5 of the Guidelines)
 - Mobile sources – Land-based
 - Monitoring
 - Wastewater and ambient water quality
 - General liquid effluent quality (Table 1.3.1 of the Guidelines)
 - Wastewater management
 - Industrial wastewater - Stormwater management
 - Sanitary wastewater
 - Residuals from wastewater treatment operations
 - Monitoring
 - Water conservation
 - Building facility operations
 - Hazardous materials management
 - General hazardous materials management
 - Management of major hazards
 - Waste management
 - General waste management
 - Hazardous waste management
 - Noise
 - Prevention and control
 - Noise level guidelines

- Monitoring
 - Contaminated land
 - Risk screening
 - Interim risk management
 - Detailed risk assessment
 - Permanent risk reduction measures
 - Occupational health and safety considerations
 - Occupational health and safety
 - Community health and safety
 - Construction and decommissioning
- EHS Guideline for Crude Oil and Petroleum Product Terminals (2007): The EHS Guidelines for Crude Oil and Petroleum Product Terminals include information relevant to land and shore-based petroleum storage terminals receiving and dispatching bulk shipments of crude oil, gasoline, middle distillates, aviation gas, lube oil, residual fuel oil, compressed natural gas (CNG), liquid petroleum gas (LPG), and specialty products from pipelines, tankers, railcars, and trucks for subsequent commercial distribution;

The following industrial-specific guidelines are applicable to the Project and committed by the Proponent:

- Industry-specific impacts and management
 - Environment
 - Occupational health and safety
 - Community health and safety
- Performance indicators and monitoring
 - Environment
 - Occupational health and safety

The following industrial-specific guidelines are applicable to the Project and committed by the Proponent:

- Industry-specific impacts and management
 - Environment
 - Occupational health and safety
 - Community health and safety
- Performance indicators and monitoring
 - Environment
 - Occupational health and safety

3.3 Contractual and Other Commitments

BE commits to following all applicable local laws listed in this EIA Report in Table 3-1. BE also confirm that (as per Article 62 of the EIA Procedure);

- the accuracy and completeness of the EIA;

- that the EIA has been prepared in strict compliance with applicable laws including this Procedure for the EIA; and
- that the Project will at all times comply fully with the commitments, mitigation measures, and plans in the EIA Report.

A full list of other commitments, i.e., technical, environmental, and social commitments, are provided in **table 8-2** and make up the mitigation measures and monitoring requirements.

3.4 Institutional Framework

In Myanmar, matters pertaining to EIA are generally under the jurisdiction of the Ministries. Key Ministries and agencies that have jurisdiction over Health Safety Environment (HSE) matters in infrastructure projects in Yangon are included in Table 3-4.

Table 3-4 Key Ministries and Agencies

Ministry/Agency	Responsibility
Ministry of Natural Resources and Environmental Conservation (MONREC)	The Environmental Conservation Department (ECD) of MONREC has ultimate responsibility in the review and approval, or otherwise, of submissions under the IEE / EIA process.
Ministry of Electricity and Energy (MOEE)	MOEE manages HSE issues of power generation operators in Myanmar, encouraging operators to establish an HSE Management System and prepare their own EIA for their project.
Ministry of Construction (MOC)	The Department of Highways, Department of Industries, and Department of Rural Road Development are responsible for the construction of project and major roads.
Ministry of Transport and Communication (MOTC)	The Road Transport Administration Department and Road Transport Department are responsible for the operation of major roads.
Ministry of Agriculture, Livestock and Irrigation (MOALI)	The Department of Agriculture, Department of Agricultural Land Management and Statistics, Department Irrigation and water utilization management and Department of Rural Development are responsible for land management and livelihood of the community.
Myanmar Investment Commission (MIC)	MIC is a government agency responsible for coordinating with ministries (such as the MOEE) and other state entities to facilitate foreign investment in Myanmar. The MIC is also responsible for granting MIC permits, which enable foreign investors to carry out business activities under the Myanmar Investment Law (2016).
Myanmar Port Authority (MPA)	The MPA are responsible for managing port related infrastructure.
Ministry of Planning, Finance and Industry (MOPFI)	The Planning Department is involved in direct communication and coordination with various levels of different government agencies for planning related issues. The Directorate of Industrial Supervision and Inspection is the responsible department for the inspection of the heavy industries and factories whether in compliance with the regulations.
Directorate of Water Resources and Improvement of River Systems (DWIR)	DWIR under the Ministry of Transport and Communication is responsible for overseeing water resources and river systems, waterways navigation along rivers and creeks, and improving water resources and river systems.

Ministry/Agency	Responsibility
Yangon Region Government (YRG)	YRG is the cabinet of Yangon Region. Authorities under YRG (such as Electrical Committee, Water Committee District and Township General Administration Department) are included.
Yangon City Development Committee (YCDC)	YCDC is the administrative body of Yangon. It is responsible for the city's waste management, business licences and registries, water supply, roads and bridges, and environmental regulations.

3.5 Projects Environmental and Social Standards

With the release of the final EIA Procedure in December 2015, the Environmental Quality (Emissions) Guidelines (EQEG) were also released. These Guidelines provide the basis for regulation and control of noise and air emissions and effluent discharges from projects in order to prevent pollution and protect the environment and public health. These standards are noted to be the same as that recommended by the IFC General EHS Guidelines (2007) (World Bank Group, 2007). The general and industry-specific guidelines are provided in the following section.

3.5.1 General Guidelines

3.5.1.1 Air Emissions

Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that: (i) emissions do not result in concentrations that reach or exceed national ambient quality guidelines and standards, or in their absence current World Health Organization (WHO) Air Quality Guidelines¹ for the most common pollutants as summarized below; and (ii) emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards (i.e. not exceeding 25 percent of the applicable air quality standards) to allow additional, future sustainable development in the same air shed.

The air emission standards for the Project are provided in Table 3-5.

Table 3-5 EQEG Air Emissions (General; Section 1.1 of the EQEG) – Construction Phase

Parameter	Unit	Guideline Value ($\mu\text{g}/\text{m}^3$)
Nitrogen dioxide	1 year	40
	1 hour	200
Ozone	8 hour (daily) maximum	100
Particulate Matter (PM_{10}) ^a	1 year	20
	24 hour	50
Particulate Matter ($\text{PM}_{2.5}$) ^b	1 year	10
	24 hour	25
Sulphur Dioxide	24 hour	20
	10 minute	500

a Particulate matter in diameter $\leq 10\mu\text{m}$

b Particulate matter in diameter $\leq 2.5\mu\text{m}$

3.5.1.2 *Noise Level*

Noise prevention and mitigation measures should be taken by all projects where predicted or measured noise impacts from a project facility or operation exceed the applicable noise level guideline at the most sensitive point of reception. Noise impacts should not exceed the levels shown below, or result in a maximum increase in background levels of three decibels at the nearest receptor location off-site.

The noise emission standards for the Project are provided in Table 3-6.

Table 3-6 Noise Levels (General; Section 1.3 of the EQEG) – Construction Phase

Receptor	One hour LAeq (dBA) ^a	
	Daytime 07:00 – 22:00 (10:00 - 22:00 for public holidays)	Night Time 22:00 – 07:00 (22:00 - 10:00 for public holidays)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

^a Equivalent continuous sound level in decibels (at the nearest sensitive receptor)

3.5.1.3 Odour (General Section; 1.5 of EQEG)

Point and diffuse source odours from industries should be minimized using available prevention and control techniques as described in the IFC EHS industry-specific guidelines. Point source activities are those that involve stack emissions of odour and which generally can be controlled using waste reduction, waste minimization and cleaner production principles or conventional emission control equipment. Diffuse source activities are generally dominated by area or volume source emissions of odour (e.g. intensive agricultural activities) and which can be more difficult to control. Projects should control odours to ensure that odours that are offensive or unacceptable to neighbours do not occur. Generally, odour levels should not exceed five to ten odourant units¹ at the edge of populated areas in the vicinity of a project. Projects with multiple odorous point or diffuse releases, or emitting complex odours should conduct an odour impact assessment to determine ground-level maximum concentrations taking into account site-specific factors including proximity to populated areas.

3.5.1.4 Wastewater

The following guideline values Table 3-7 apply during the construction phase of projects, covering storm water or surface water, and sanitary wastewater discharges from all project sites.

Table 3-7 Site Runoff and Wastewater Discharges (Construction Phase)

Parameter	Unit	Maximum Concentration
Biological oxygen demand	mg/l	30
Chemical oxygen demand	mg/l	125
Oil and grease	mg/l	10
pH	S.U. ^a	6-9
Total coliform bacteria ^b	100 ml	400
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2

¹ The detectability of an odor is a sensory property that refers to the minimum concentration that produces an olfactory response or sensation. An odorant unit is defined as the amount of odorant mixtures which distributed in one cubic meter of air results in odor intensities corresponding to a defined threshold value. The odorant unit is therefore defined by a physiologically measured amount of substance. In practice, offensive odor can only be judged by public reaction to the odor, with the nuisance level being as low as two odorant units and as high as ten odorant units for less offensive odors. An odor assessment criteria of five to ten odorant units is likely to represent the level below which offensive odors should not occur.

Parameter	Unit	Maximum Concentration
Total suspended solids	mg/l	50

^a Standard unit

^b Coliforms refer to a group of bacteria which are found in the intestines of warm blooded animals and therefore are present in sewage, and on / in soils, surface waters and vegetation. Total coliforms is used as an indicator organism which, although by itself is not considered to cause diseases in man or animals, usually indicates the presence of pathogenic or disease-causing organisms. By measuring the number of total coliforms present in a sample a judgment can be made as to the water's usability for a given purpose.

Note: In addition to general and industry-specific wastewater guidelines applicable during project operations, the above guideline values apply during the construction phase of projects, covering storm water or surface water, and sanitary wastewater discharges from all project sites.

3.5.2 Industry-Specific Guidelines (Energy Sector Development)

3.5.2.1 Crude Oil and Petroleum Product Terminals

This guideline is applicable to land and shore-based petroleum storage terminals receiving and dispatching bulk shipments of crude oil, gasoline, middle distillates, aviation gas, lube oil, residual fuel oil, compressed natural gas, liquid petroleum gas, and specialty products from pipelines, tankers, railcars, and trucks for subsequent commercial distribution. Process effluent discharge quality guideline values should be established on a site-specific basis, taking into account effluent characteristics and receiving water use. Storm water runoff from terminals should be treated as required to achieve the effluent levels as provided in Table 3-8.

Table 3-8 Effluent Levels – Operational Phase

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

^a Standard unit

4 PROJECT DESCRIPTION AND ALTERNATIVES

4.1 Project Location

The Project Site is located at the semi-urban in the Kyauktan Township to the south of Yangon. The township is bordering with Thanlyin Township to the North, Thongwa to the East, Gulf of Mottama (Gulf of Martaban) to the South and Yangon River to the West. The Project Site covers an area of 112.5 acres that includes the jetty terminal area of 13.5 acres and land area of 99 acres.

Brighter Energy has rent the land from the Myanmar Economic Corporation (MEC). There are two (2) plots as shown in Figure 4.1;

1. Thilawa Petroleum Terminal project boundary (“the Project Site”); and
2. Future development area (there is no current plans to develop this area).

1.3 Project Key Components

The Project Site layout is presented in Figure 4.2 which will be composed of the following key components:

- Jetty terminal;
- Tank farm (diesel, gasoline, LPG); and
- Interconnecting pipelines and advanced utilities.

4.1.1 Jetty Terminal

The jetty terminal is designed for up to 25,000 DWT (deadweight tonnage) tankers and 2,000 DWT barges. There will be a working platform with four (4) mooring dolphins, which will be connected to the shore through a 9 m x 249.5 m trestle (Figure 4.1, Figure 4.2 and Figure 4.3). A retaining wall (revetment) will be built along the shore for coastal protection. The water depth at the jetty and the turning basin will be approximately -10.7 m chart datum (CD).

While a tanker or barge is moored at the jetty, a safety zone will be established to avoid potential collision from passing traffic. The size of this area is under examination and will depend on the findings of detailed design studies to be conducted under separate permitting exercises.

All product oil will be loaded and unloaded by the arms at jetty. Ship unloading flow rates will be measuring via the flowmeter which installed on jetty while barge loading flow rates will be measuring via the automatic tank gauging system by the difference of level in product tank which is key in providing product inventory control.

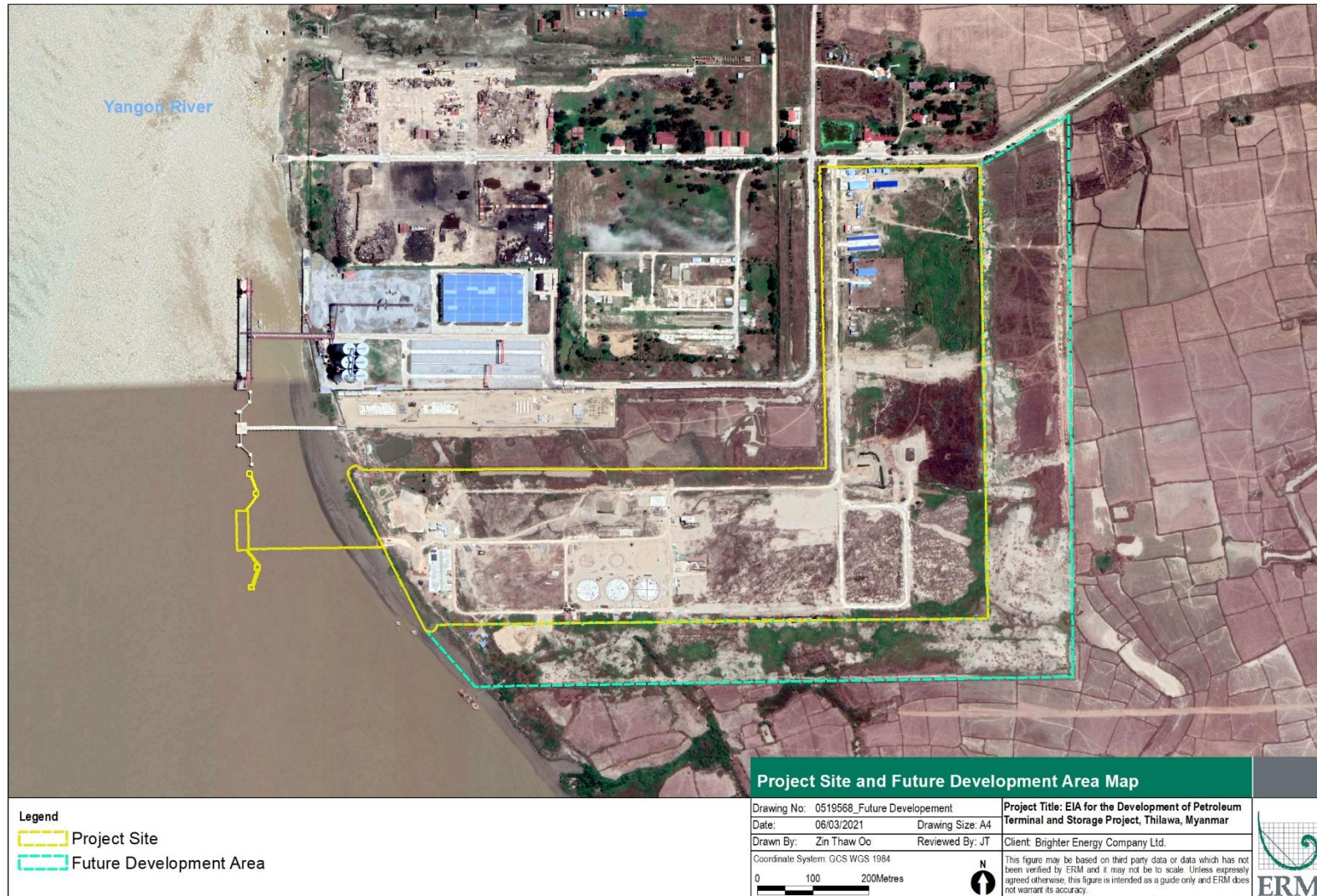


Figure 4.1 Project Boundary and Future Development Area

4.1.2 Tank Farm (Diesel, Gasoline, LPG)

The tank farm is allocated along the southern side of the Project Site (Figure 4.2, Figure 4.3). There will be a total of six (6) gasoline tanks (ULR91/ULG95) with a total storage capacity of 25.68 million gallons, six (6) diesel tanks (HSD/PD) with a total storage capacity of 22.59 million gallons and three (3) LPG tanks with a total storage capacity of 4,500 M.T. There will also be a fire water tank with a capacity of 1.585 million gallons.

Dimensions and capacity of these tanks are listed in Table 4-1

Table 4-1 Tank Specifications

Product Tank	Type	Tank Capacity (MT)	Number	Dimensions (D: Diameter; H: Height)	Max. filing rate (m3/hr)	Max. emptying rate (m3/hr)
Gasoline Tank (ULR 91)	DRT+IFR	15,000	4	D = 39 m, H = 18.72 m	600	660
Gasoline Tank (ULG 95)	DRT+IFR	6,000	2	D = 27.5 m, H = 15.59 m	600	660
Diesel (HSD)	DRT	15,000	4	D = 36 m, H = 18.72 m	600	660
Diesel (PD)	DRT	6,000	2	D = 27.5 m, H = 13.67 m	600	660
LPG Sphere Tanks	Spherical	1,500	3	D = 18 m	300	200
Fire Water Tank		1.585 million gallons	1	D = 24.0 m, H = 15.85 m		

All the product tanks, except fire water tank, can be generally classified into three types (15,000 M.T, 6,000 M.T and 3,000 m3) and each will be provided with automatic tank gauging system for tank level measurement.

Detail specification of tanks above are described in Table 4-2, Table 4-3, Table 4-4, Table 4-5, Table 4-6 and Table 4-7 respectively.

Table 4-2 Gasoline Tank (ULR 91)

Description	Specification
Roof Type	Dome Roof + Aluminum Internal Floating Roof
Floor Type	Cone Up (1:100)
Design Code	API 650, API 2000
Design Temperature (°C)	80
Design Pressure (kPa)	ATM+LIAUID HEAD
Coating (External / Internal)	As per coating specification
Volume (M. Ton)	15,000
Diameter (m)	39

Description	Specification
Height (m)	18.72
Dome Radius (m)	39
Base Material	A36
Design Specific Gravity	TANK:1.0, FLOATING DECK:0.7
Corrosion Allowance (mm – bottom/shell/roof)	2/1.5/1
Joint Efficiency	1

Table 4-3 Gasoline Tank (ULG95)

Description	Specification
Roof Type	Dome Roof + Aluminum Internal Floating Roof
Floor Type	Cone Up (1:100)
Design Code	API 650, API 2000
Design Temperature (°C)	80
Design Pressure (kPa)	ATM+LIAUID HEAD
Coating (External / Internal)	As per coating specification
Volume (M. Ton)	6,000
Diameter (m)	27.5
Height (m)	15.6
Dome Radius (m)	33
Base Material	A36
Design Specific Gravity	TANK:1.0, FLOATING DECK:0.7
Corrosion Allowance (mm – bottom/shell/roof)	2/1.5/1
Joint Efficiency	1

Table 4-4 Diesel Tank (HSD)

Description	Specification
Roof Type	Dome Roof
Floor Type	Cone Up (1:100)
Design Code	API 650, API 2000
Design Temperature (°C)	80
Design Pressure (kPa)	ATM+LIAUID HEAD
Coating (External / Internal)	As per coating specification
Volume (M. Ton)	15,000
Diameter (m)	36
Height (m)	18.72

Description	Specification
Dome Radius (m)	36
Base Material	A36
Design Specific Gravity	1.0
Corrosion Allowance (mm – bottom/shell/roof)	2/1.5/1
Joint Efficiency	1

Table 4-5 Diesel Tank (PD)

Description	Specification
Roof Type	Dome Roof
Floor Type	Cone Up (1:100)
Design Code	API 650, API 2000
Design Temperature (°C)	80
Design Pressure (kPa)	ATM+LIAUID HEAD
Coating (External / Internal)	As per coating specification
Volume (M. Ton)	6,000
Diameter (m)	27.5
Height (m)	13.67
Dome Radius (m)	33
Base Material	A36
Design Specific Gravity	1.0
Corrosion Allowance (mm – bottom/shell/roof)	2/1.5/1
Joint Efficiency	1

Table 4-6 LPG Sphere Tank

Description	Specification
Design Code	ASME Sec. VIII, Div.2
Design Temperature (°C)	-20~60
Design Pressure (MPa)	1.8
Test Pressure (MPa)	As per ASME Sec. VIII, Div.2
Coating (External / Internal)	As per coating specification
Volume (m3)	3,000
Filling coefficient	0.9
Diameter (m)	18
Base Material	SA 537 Class 1
Corrosion Allowance (mm)	3

Description	Specification
Joint Efficiency	1

Table 4-7 Fire Water Tank

Description	Specification
Roof Type	Dome Roof
Floor Type	Cone Up (12:1000)
Design Code	API 650, API 2000
Design Temperature (°C)	80
Design Pressure (kPa)	ATM+LIAUID HEAD
Coating (External / Internal)	As per coating specification
Volume (M. Ton)	4,000
Diameter (m)	22.5
Height (m)	12.31
Dome Radius (m)	27
Base Material	A36
Design Specific Gravity	1.0
Corrosion Allowance (mm – bottom/shell/roof)	2/1.5/1
Joint Efficiency	1

Tanks will be provided with the following accessories (as per design code and project requirements, but differs in tanks, to be confirmed during detailed design):

- Geodesic dome roof structure for ULR91 tank and HSD tank
- Aluminum internal floating roof for ULR91 tank and ULG95 tank
- Process nozzles, such as outlet, filling, low suction, water drain off etc.
- Vents
- Roof Manhole and Shell Manhole
- Gauge Hatch
- Instrumentations, such as pressure, temperature, level gauge, level switch etc.
- Stairway and top handrail
- Cable Conduit Support
- Wind Girder and Intermediate Stiffener (if necessary)
- Anchorage (if necessary)

4.1.3 Interconnecting Pipelines and Advanced Utilities

With the Project Site, there will be interconnecting pipelines for materials transfer and advanced utilities (e.g. drainage system, fire protection system) to support the Project operation. The pipelines will be mainly above ground on pipe rack.

The truck loading sheds are located next to the tank farm area for loading of petroleum products for further distribution (Figure 4.6). Information on the loading sheds are provided in Table 4-8. Truck parking areas are located next to the truck loading sheds.

The pump sheds for the petroleum products and fire water are located next to the respective storage tanks with information provided in Table 4-9.

Table 4-8 Dimensions and Type of Truck Loading Shed

Building	Type	Building Area	Building Height
Gasoline Truck Loading Shed	Steel Frame	630 m ²	7.15 m
Diesel Oil Truck Loading Shed	Steel Frame	630 m ²	7.15 m
LPG Truck Loading Shed	Steel Frame	252 m ²	7.15 m
LPG Cylinder Filling Shed	Steel Frame	5,500 m ²	7.15 m

Table 4-9 Dimensions and Type of Pump Shed

Building	Type	Building Area	Building Height
Gasoline pump shed	Steel Frame	1,020 m ²	6.55 m
Diesel Oil Pump Shed	Steel Frame	1,200 m ²	6.55 m
LPG Pump Shed	Steel Frame	187.5 m ²	6.45 m
Fire Fighting Pump Shed	Steel Frame	540 m ²	6.15 m
Air Compressor Pump Shed	Steel Frame	150 m ²	4.15 m
Diesel Generator Shed	Steel Frame	270 m ²	4.15 m
Compressor Workshop Shed	Steel Frame	150 m ²	4.15 m

The utilities buildings supporting daily operation of the Project are mainly located on the north eastern portion of the Project Site near the Liquefied Petroleum Gas (LPG) sphere tanks. Information of these buildings are shown in Table 4-10.

A green belt area for landscape purpose will be established around the utilities buildings area (Figure 4.2). There will also be a domestic water supply unit and three sewage treatment units serving the utilities building area.

An underground oily water separate unit will be constructed next to the area between the gasoline tank area and the revetment for treatment of oily wastewater to meet the EQEG standards before discharge (Table 4-10). Drainage will also be built around the Project Site to direct the storm water runoff, which will be discharge off-site after removal of silt to meeting EQEQ standards by silt removal equipment.

Table 4-10 Dimensions and Type of Utilities Buildings

Building	Type	Building Area	Building Height
Office	Reinforced concrete	647.4 m ²	4.8 m
Two (2) Guard Houses and Ticket Office	Reinforced concrete	32.83 m ²	3.9 m
Laboratory	Reinforced concrete	141.45 m ²	4.5 m
Workshop / Warehouse	Steel Frame	108.16 m ²	6.3 m
Two (2) Driver Anterooms	Reinforced concrete	219.96 m ²	4.8 m
Substation	Reinforced concrete	398.12 m ²	7.3 m

1.4 Pre-construction Phase

Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation for EIA investigation is not yet conducted. Public consultation for EIA investigation will be conducted after situation allowed in order to have better participation by stakeholders, including land owner and land users affected by land acquisition of the Project. The EIA Report will be updated once the Public consultation for EIA investigation is done.

1.5 Construction Phase

The construction plot plans are shown in Figure 4.2, Figure 4.3 and Figure 4.4. The Project drawing Layout Plan is provided in **Appendix B**.

According to the construction information provided by the BE at the time of writing this EIA, construction of the Project commenced in November 2019 for completion in mid-2021 (Figure 4.5). Construction hours are anticipated to be 8 hours per day, 6 days per week.

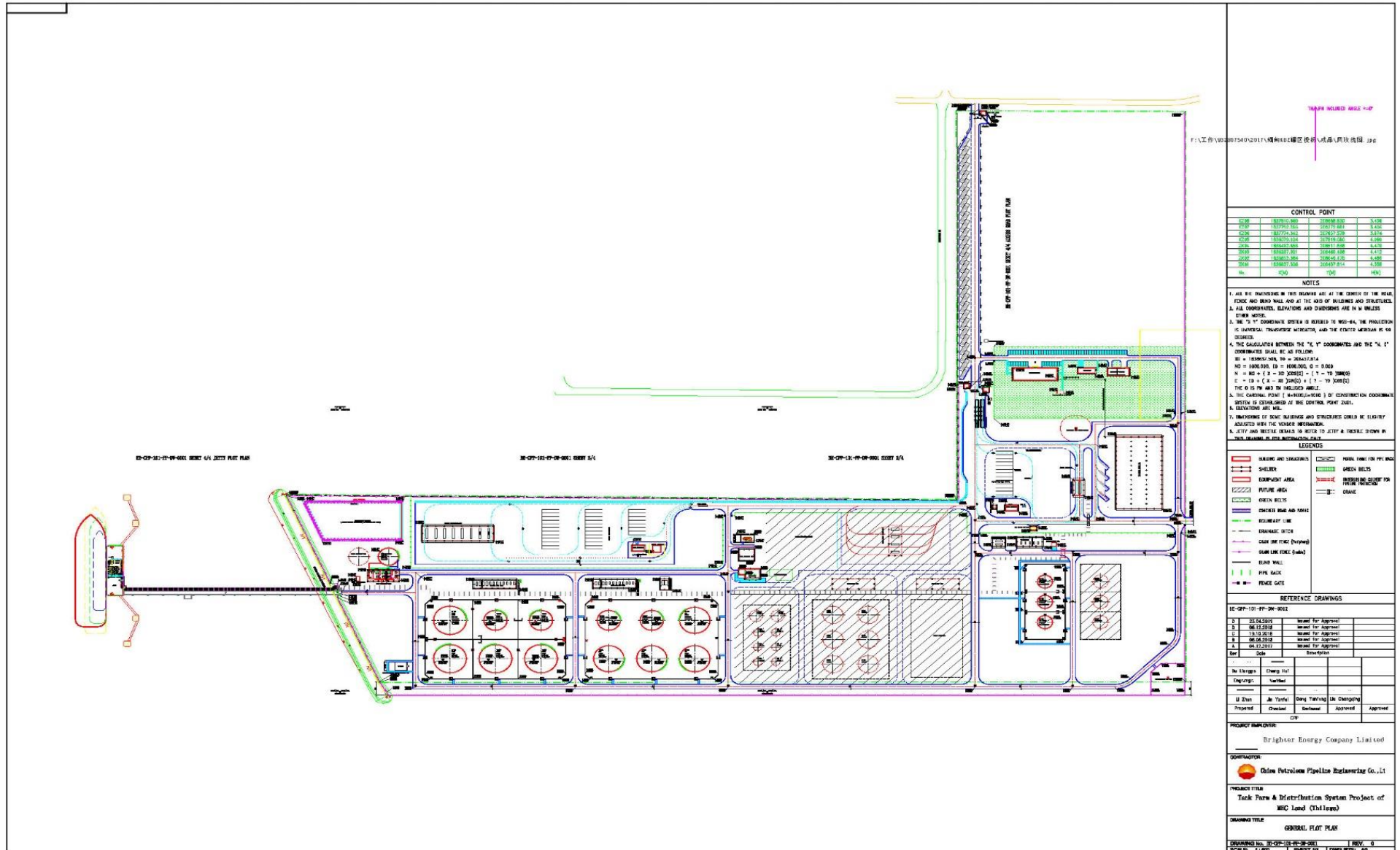


Figure 4.2 Project Site Layout

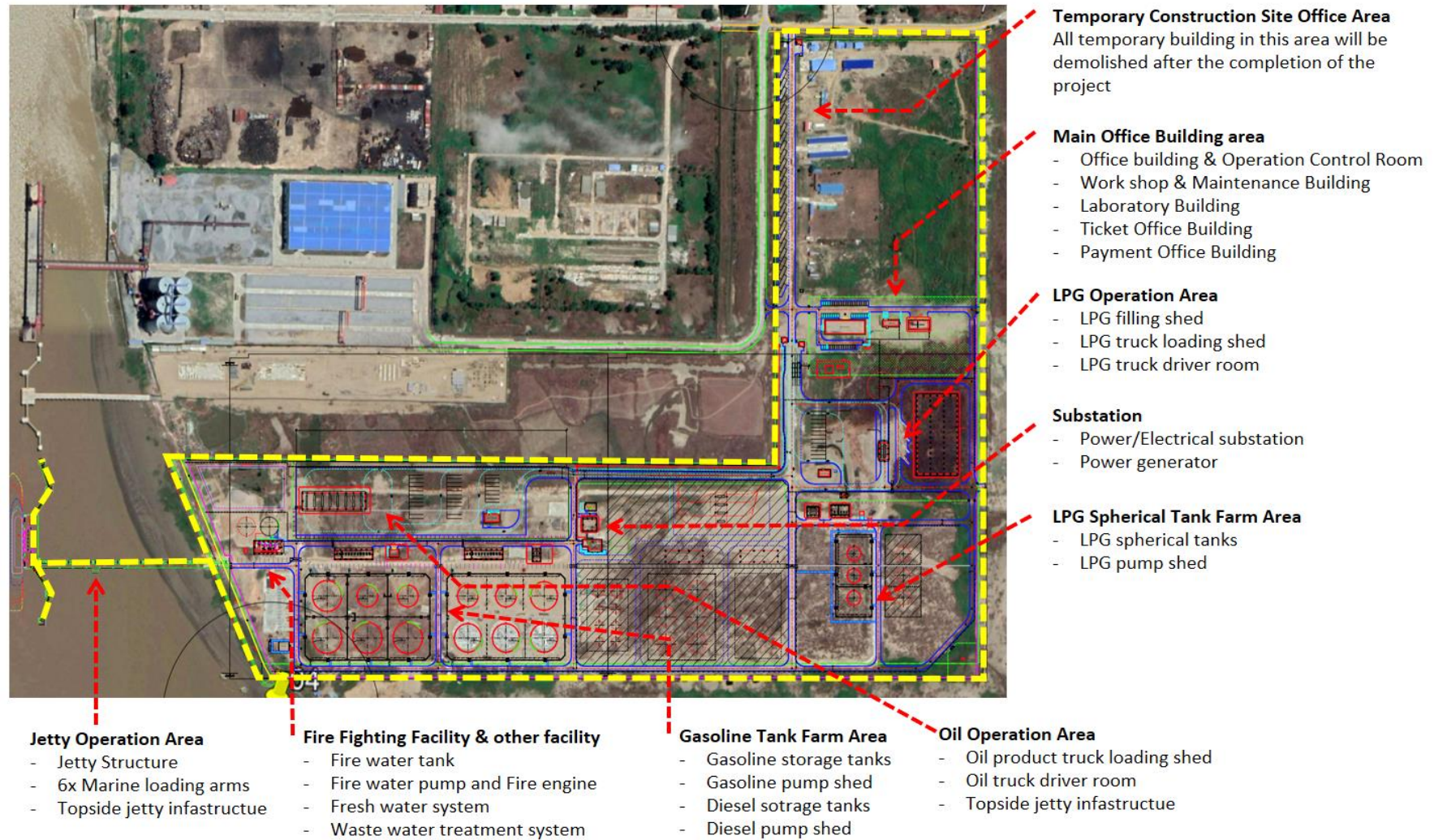
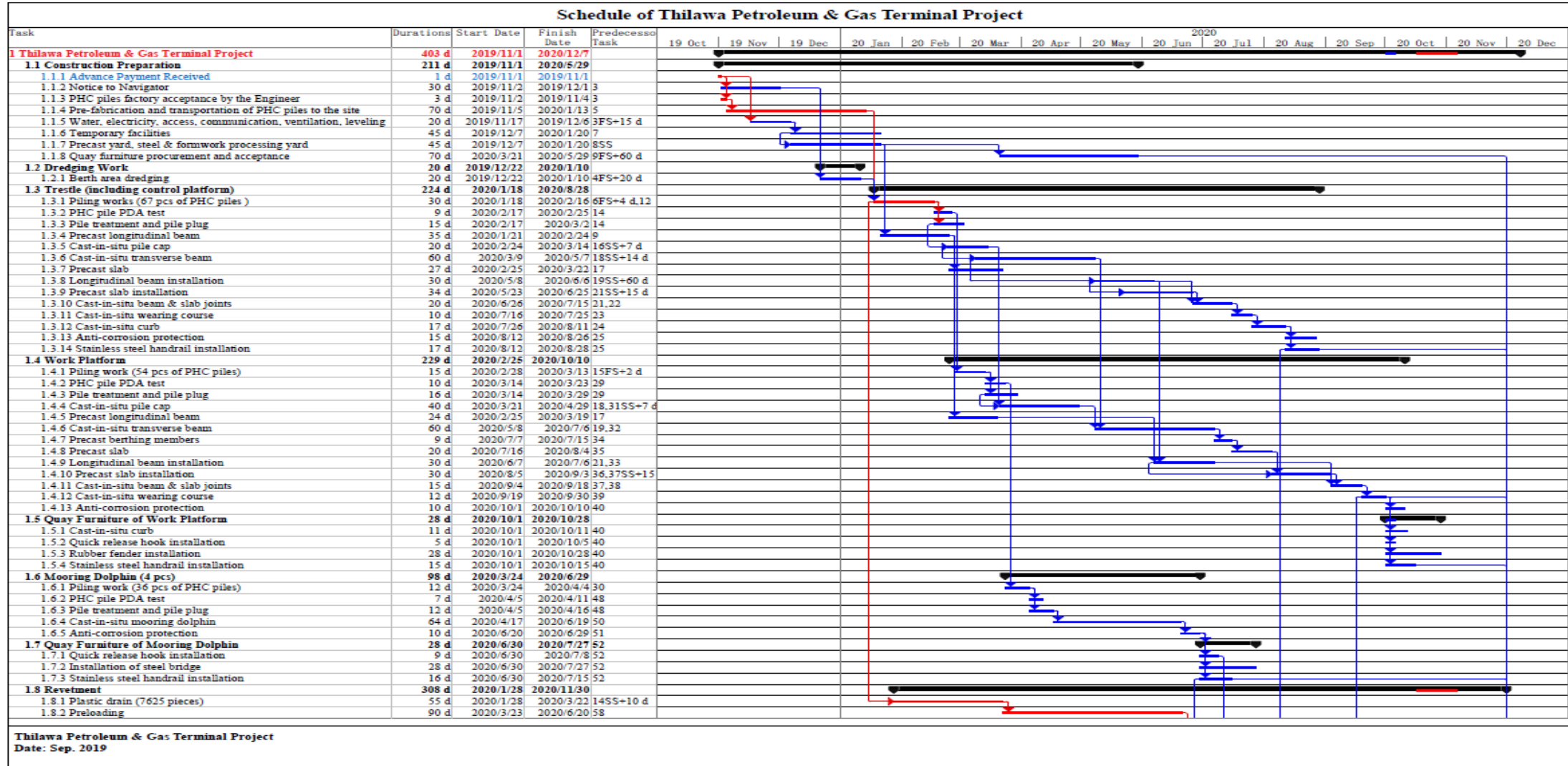


Figure 4.3 Construction Plot Plan



Figure 4.4 Project Site Road Map



Note: It is noted that the proposed schedule is tentative and it can be subject to change due to COVID-19 situation.

Figure 4.5 Construction Schedule of Project

4.1.4 Jetty Terminal

Construction of the jetty terminal will be undertaken on the Yangon River. Before commencement of construction, a notice to mariners will be issued to inform navigator of the activities of the Project for navigation safety.

Dredging will be required for the working platform with a dredging volume of ~1,700 m³. Dredging at the working platform will take around two (2) months and will be conducting using a grab dredger. **The dredged materials from the working platform will be disposed at Myanmar Port Authority (MPA)'s approved location (to be confirmed with MPA).** Since the disposal facility is managed by MPA and not under BE control, potential impacts due to disposal of dredged sediment are not covered under the EIA Study of the Project. Construction of the working platform and jetty will involve piling as well as installation of precast concrete slabs. The construction of trestle and working platform will each take around 7-8 months. Piling will be undertaken to form the foundation of the trestle and working platform for ~45 days. A total of 54 piles will be installed for the working platform while 67 piles will be installed for the trestle.

Dredging will be required for the revetment and will take ~20 days using backhoe dredging. The dredging volume and disposal location of dredged materials from the revetment is yet to be confirmed, which will be presented in assessed in the EIA Report. Revetment construction will also involve installation of plastic drains, preloading, slope excavation, geotextile laying, rock filling, sand filling, excavation for and installation of precast retaining wall as well as armour rock placement. These activities will take ~10 months.

Four (4) mooring dolphins will be constructed which require piling of 36 piles. Piling will last for approximately 12 days following by installation works of the mooring dolphin which will be cast in-situ. A steel bridge will be installed connecting the mooring dolphins and the working platforms within a one-month period.

Equipment installation and commissioning of the jetty terminal will take approximate 3-4 months to complete before commencement of operation.

The expected construction period and its progress for jetty terminal are shown in Table 4-11 and

CONSTRUCTION	Total	Total Achievement	Balance	REMARKS
Pile Cap for Trestle	61	61	0	Completed
Pile Cap for Berth	36	36	0	Completed
Precast Berthing Member Beam	8	8	0	Completed
Pile Treatment and Pile Plug casting for Trestle	51	51	0	Completed
Cast in-situ Transverse Beam THL4 (1st cast, 2nd cast, 3rd cast)	3	3	0	Completed
Cast in-situ Transverse Beam THL1 (1st cast)	26	26	0	Completed
Cast in-situ Transverse Beam THL1 (2nd cast)	26	26	0	Completed
Cast in-situ Transverse Beam THL1 (3rd cast)	26	26	0	Completed

CONSTRUCTION	Total	Total Achievement	Balance	REMARKS
Installation for TZL Long Beam for Trestle	112	112	0	Completed
Installation for TSB1 slab for Trestle	56	56	0	Completed
Cast in-situ longitudinal beam at working platform (BZL-1, BZL-2, BZL-3, BXL-1, BXL2)	42	42	0	Completed
Cast in situ Slab (B-XB2, B-XB3, B-XB4, B-XB5, B-XB6)	13	13	0	Completed
Cast in Situ Slab (B-XB1) and wearing course	32	15	17	Completed date will be on 25 June 21
Under beam B-UB1	2	1	1	Completed date will be on 25 June 21
Curb for Working platform	2	0	0	Completed date will be on 10 July 21
Pipe support foundation	22	8	14	Completed date will be on 10 July 21
Catwalk on Mooring dolphin	4	2	2	Completed date will be on 10 July 21
Catwalk stair on Working platform	2	0	2	Completed date will be on 25 June 21
Anti-corrosion protection	3	2	1	Completed date will be on 17 July 21
Steel Bridge installation	4	2	2	Completed date will be on 17 July 21

Table 4-12 respectively.

Table 4-11 Construction Progress of Jetty Terminal

CONSTRUCTION	Total	Total Achievement	Balance	REMARKS
Pile Cap for Trestle	61	61	0	Completed
Pile Cap for Berth	36	36	0	Completed
Precast Berthing Member Beam	8	8	0	Completed
Pile Treatment and Pile Plug casting for Trestle	51	51	0	Completed
Cast in-situ Transverse Beam THL4 (1st cast, 2nd cast, 3rd cast)	3	3	0	Completed
Cast in-situ Transverse Beam THL1 (1st cast)	26	26	0	Completed

CONSTRUCTION	Total	Total Achievement	Balance	REMARKS
Cast in-situ Transverse Beam THL1 (2nd cast)	26	26	0	Completed
Cast in-situ Transverse Beam THL1 (3rd cast)	26	26	0	Completed
Installation for TZL Long Beam for Trestle	112	112	0	Completed
Installation for TSB1 slab for Trestle	56	56	0	Completed
Cast in-situ longitudinal beam at working platform (BZL-1, BZL-2, BZL-3, BXL-1, BXL2)	42	42	0	Completed
Cast in situ Slab (B-XB2, B-XB3, B-XB4, B-XB5, B-XB6)	13	13	0	Completed
Cast in Situ Slab (B-XB1) and wearing course	32	15	17	Completed date will be on 25 June 21
Under beam B-UB1	2	1	1	Completed date will be on 25 June 21
Curb for Working platform	2	0	0	Completed date will be on 10 July 21
Pipe support foundation	22	8	14	Completed date will be on 10 July 21
Catwalk on Mooring dolphin	4	2	2	Completed date will be on 10 July 21
Catwalk stair on Working platform	2	0	2	Completed date will be on 25 June 21
Anti-corrosion protection	3	2	1	Completed date will be on 17 July 21
Steel Bridge installation	4	2	2	Completed date will be on 17 July 21

Table 4-12 Progress against the planned date

Construction activities delayed which is contributing are	Planned		Actual / Forecast	
	Start	Finish	Start	Finish
Cast in Situ Slab (B-XB1) and wearing course	18 -May -21	17-July-21	20-May -21	25-June -21
Under beam B-UB1	15 -March -21	8-May -21	5-June-21	25-June-21
Curb for Working platform	18 -May -21	17-July-21	4-June-21	10-July-21
Pipe support foundation	18 -May -21	17-July-21	31-May-21	10-July-21
Catwalk on Mooring dolphin	26- Nov-20	5- April -21	1-March-21	10-July-21

Catwalk stair on Working platform	18 -May -21	17-July-21	5-June-21	25-June-21
Anti-corrosion protection	19-April-21	17-July-21	20-April-21	20-July-21
Steel Bridge installation	21-April-21	17-July-21	10-May-21	20-June-21

Tank Farm, Interconnecting Pipelines and Advanced Utilities

Construction activities of tank farm (Figure 4.3), interconnecting pipelines and advanced utilities will involve construction works on land. Key activities involve the following:

- Site preparation;
- Civil and structural works;
- Mechanical works;
- Electrical works;
- Installation of firefighting, water supply and drainage system;
- Installation of process system;
- Installation of instrument system; and
- Installation of telecommunication system.

The above works will involve the use of Powered Mechanical Equipment (PME) as listed in Table 4-13. The PME will be the sources of noise and gaseous emissions during the construction phase.

Table 4-13 List of PME to be deployed for the Construction Phase

No.	Device Name	Specific Model	Quantity
Tank Construction Unit			
1	Crane	50 tons	2
2	Crane	25tons	2
3	Loader	WA470	1
4	Power distribution cabinet (level 1)		1
5	Distribution cabinet (secondary)		5
6	Power distribution cabinet (level 3)		18
7	Welding material drying box	500KG	2
8	Air compressor	9m ³ /h	3
9	Electric hoist	10T	90
10	Manual reverse chain	5t	15
11	Manual reverse chain	3t	15
12	Manual reverse chain	2t	10
13	Jack	32t	12
14	Jack	16t	10
15	Pressure test pump	SY350 5kw	2
16	Water pump	Q=600m ² /h	2
17	Submersible pump	100m ³ /h	5
18	Vacuum pump		2

No.	Device Name	Specific Model	Quantity
19	Plasma cutting machine	180	4
20	Semi-automatic cutting machine		20
21	Trailer	20T	2
22	Shearing machine		1
23	Rolling machine	WII-30	1
24	Post-weld heat equipment		1
25	Spherical tank heat treatment equipment		1

Anti-corrosion Construction

1	Pickup trucks	1.5	1
2	Truck	16t	1
3	Shot blasting machine		1
4	Spraying equipment		6
5	Gantry crane	16T	2
6	Air compressor	10m ³ /h	2

Civil Construction

1	Excavator	PC220	3
2	Roller	20t	2
3	Loader	ZL50C	2
4	Dump truck		10
5	Plug-in vibrator		10
6	Plate vibrator		4
7	Frog type snoring machine		4
8	Steel shear		2
9	Steel bending machine		2
10	Steel straightening machine		2
11	Woodworking machine		2
12	Submersible pump	50m ³ /h	3
13	Asphalt sand mixer		
14	Concrete mixer	JZC500	2
15	Water pump	100m ³ /h	6
16	Truck	16t	2
17	Pickup trucks	1.5t	2

Pile Foundation

1	Pile driver	660/800	4
2	Truck	12 meters	6
3	Crane	25 tons	2
4	Water pump	100m ³ /h	4
5	Pickup trucks	1.5 t	2

No.	Device Name	Specific Model	Quantity
Electrical Installation			
1	Electric welder	S400	2
2	Small pipe bending machine		2
3	Pickup trucks	1.5t	2
Instrument Installation			
1	Electric welder	S400	1
2	Small pipe bending machine		1
3	Pickup trucks	1.5t	1

In addition to the use of PMEs, construction of the onshore facilities of the Project will involve earth works such as sand filling for site formation, excavation for buildings and tanks foundation, excavation and backfilling for construction of underground facilities (e.g. interconnecting pipelines, underground oily water separator, drainage etc.) and grading around the perimeter of buildings and equipment which are disturbed by construction activities. The anticipated volume of backfill soil / sand is ~200,000 m³. Earth works will be a source of dust emission during the construction phase.

The construction progress of Tank Farm, Building and advanced utilities during construction phase are shown in Table 4-14 and Table 4-15.

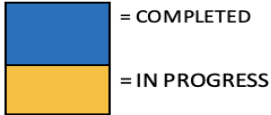
Table 4-14 Construction Progress for Tank Farm

Diesel & Gasoline Tank Farm Construcion Progress

WBS	Painting													
	Tank Accessories													
	Staircase installation													
	Tank Roof installation													
	Tank Installation													
	Tank base preparation													
	Foundation construction													
	Lean and Pile plug in casting													
	Load test													
	Piling													
		T-401	T-402	T-301	T-302	T-303	T-304	T-201	T-202	T-101	T-102	T-103	T-104	Fire water
		Diesel Tank Farm						Gasoline Tank Farm						

LPG Tank Farm Construction Progress

WBS	Tank Installation			
	Foundation construcion			
	Lean and Pile plug in casting			
	Load test			
	Piling			
		V-501	V-502	V-503
		LPG Tank Farm		



Blue square = COMPLETED
 Yellow square = IN PROGRESS

4.1.5 Construction Workforce

Anticipated of number of workers is ~300 at peak construction period and ~200 at normal construction period. Most of the workers will be from nearby villages. Accommodation of workers outside of the local area will be provided on site and off site depend on availability of the rentable houses / camp with proper facility near the Project Site. The man power schedule is provided in Table 4-16.

Worker influx is considered in Chapter 6.

Table 4-16 Manpower Development Schedule

Teams	Position	Monthly average	Total Manpower	2020				2021							
				Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
PROCESS BUILDINGS	EPC Management Team	Project Manager	1	10	1	1	1	1	1	1	1	1	1	1	
		Deputy Project Manager	1	10	1	1	1	1	1	1	1	1	1	1	1
		Site Manager	1	10	1	1	1	1	1	1	1	1	1	1	1
		Procurement engineer	1	10	1	1	1	1	1	1	1	1	1	1	1
		quality engineer/Site engineer	3	30	3	3	3	3	3	3	3	3	3	3	3
		Design Coordinator	3	30	3	3	3	3	3	3	3	3	3	3	3
		HSSE Manager	1	10	1	1	1	1	1	1	1	1	1	1	1
		Safety Engineer	1	10	1	1	1	1	1	1	1	1	1	1	1
		Quantity Surveyor	1	10	1	1	1	1	1	1	1	1	1	1	1
		Land Surveyor and follower	3	30	3	3	3	3	3	3	3	3	3	3	3
		Site Supervisor	1	10	1	1	1	1	1	1	1	1	1	1	1
		General workers	5	50	5	5	5	5	5	5	5	5	5	5	5
		Document Controller	1	10	1	1	1	1	1	1	1	1	1	1	1
		Admin	1	10	1	1	1	1	1	1	1	1	1	1	1
		Sub Total	24	240	24	24	24	24	24	24	24	24	24	24	24
	Supervisor	1	9	1	1	1	1	1	1	1	1	1			
	Rebar foreman	1	9	1	1	1	1	1	1	1	1	1			

Teams		Position	Monthly average	Total Manpower	2020				2021					
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
	Manpower Outsource Team	Rebar worker	8	74	10	10	10	10	10	7	7	5	5	
		Carpenter Foreman	1	9	1	1	1	1	1	1	1	1	1	
		Carpenters	9	79	10	10	10	10	10	7	7	5	10	
		General workers	6	53	7	7	7	7	7	5	5	4	4	
		Sub Total	26	233	30	30	30	30	30	30	22	22	17	22
NON PROCESS BUILDINGS	Management Team	Project Manager	1	9	1	1	1	1	1	1	1	1	1	
		Site Manager	1	9	1	1	1	1	1	1	1	1	1	
		Safety Supervisor	1	9	1	1	1	1	1	1	1	1	1	
		Document Controller	1	9	1	1	1	1	1	1	1	1	1	
		Subtotal	4	36	4	4	4	4	4	4	4	4	4	0
	CIVIL TEAM (a)	Site Engineer	1	9	1	1	1	1	1	1	1	1	1	
		QAQC Engineer	1	9	1	1	1	1	1	1	1	1	1	
		Rebar Foreman	1	9	1	1	1	1	1	1	1	1	1	
		Rebar workers	8	70	10	10	10	10	10	5	5	5	5	
		Carpenter Foreman	1	9	1	1	1	1	1	1	1	1	1	
		Carpenter	8	70	10	10	10	10	10	5	5	5	5	
		Scaffolder & General Worker	6	54	6	6	6	6	6	6	6	6	6	
		Subtotal	26	230	30	30	30	30	30	30				
	CIVIL TEAM (b)	Site Engineer	1	5	1	1	1	1	1					
		QAQC Engineer	1	5	1	1	1	1	1					

Teams		Position	Monthly average	Total Manpower	2020				2021					
					Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
		Rebar Foreman	1	5	1	1	1	1	1					
		Rebar workers	10	50	10	10	10	10	10					
		Carpenter Foreman	1	5	1	1	1	1	1					
		Carpenter	10	50	10	10	10	10	10					
		Scaffolder & General Worker	6	30	6	6	6	6	6					
		Subtotal	30	150	30	30	30	30	30					0
PLOT PLAN	TBA													
TOTAL				889	118	118	118	118	118	50	50	45	50	24

4.1.6 Wastewater Management

The following wastewater management measures will be put in place during construction phase:

- Sanitary facilities, including toilets with septic tanks will be provided for the use of construction workforce. Septic tanks will be cleared by license contractor regularly or when they are full;
- Install silt trap to treat surface run-off from bunded areas prior to discharge to the storm water drainage;
- Liquid effluents arising from construction activities will be treated prior to discharge to public drainage;
- Provision of channels, earth bunds or sand bag barriers on site to direct storm water to silt removal facilities;
- Design drainage pipes and culverts for the controlled release of storm flows;
- Wastewater collected from canteen kitchens, including that from basins, sinks and floor drains, should be discharged into sanitary sewers via grease traps; and
- Oil-contaminated water, if any, will be collected and handled by local licensed wastewater sub-contractors.

4.1.7 Waste Management

The majority of wastes generated from the Project during the construction phase will be non-hazardous. General construction waste will comprise of surplus or off-specification materials such as concrete, steel cuttings/fillings, wooden planks, packaging paper or plastic, wood, plastic pipes, metals, etc. Domestic wastes consisting of food waste, plastic, glass, aluminum cans and waste packages will also be generated by the construction workforce.

The main non-hazardous and hazardous waste streams that will be generated by construction activities can be generally categorised as follow:

- Soil and stone,
- Concrete,
- Wood,
- Bituminous mixtures,
- Gypsum,
- Iron and steel,
- Insulation materials and
- Canteen waste.

Fuel stored on site that will be used for machinery and construction vehicles during construction are considered as hazardous. Thus, all fuel tanks and draw off points will be prevented from spillage by providing metal tray or embankment. If fuel is correctly contained and bund, it is not likely to have any significant fuel wastage or spillage at site.

4.1.7.1 Waste Management Plan (Construction Phase)

A Waste Management Plan will be implemented during the construction phase. Waste will be segregated and proper storage of construction materials and wastes will be implemented. Disposal of waste will be carried out by licensed contractors at regular basis if cannot be recycled or reused by the Project. All biodegradable waste will be transferred to municipal waste collection points on regular basis.

A successful waste management plan is largely dependent on how really it can be integrated in to normal site operations by the person responsible. It is recognized that the plan should not be obstructive to site operations and the construction programme by placing the responsibility of construction waste management with the manager. All reuse, recycling, wastage and necessary disposal can be monitored as close to the source as possible. An Environmental Representative from each works sub-contractor will also be nominated responsible for all waste management in their own operations. In this way, it is possible to identify where the greatest material wastage occurs, with a view to implementing better management both in this and future projects.

The site construction manager will be designated as the responsible person and have overall responsibility for the implementation of the on-site WMP. The responsible person will be assigned the authority to instruct all site personnel to comply with the specific provisions of the plan. At the operational level, a nominated environmental representative from each sub-contractor or company on the site shall be assigned the direct responsibility to ensure that the discrete operations stated in the WMP are performed on an on-going basis.

Depending on the nature and characteristics of waste, specific measures will be taken as follow:

4.1.7.1.1 Bedrock, Blocks and Concrete

The majority of the waste will be clean, inert material and it is proposed to reuse it for construction purposes where possible. If bedrock is encountered during excavations, it will either be crushed on site and used for infill during construction or be removed from the site by appropriately permitted waste collectors. Rock recovered from the site will be recovered at an authorized site locally.

4.1.7.1.2 Soil/Subsoil

Excess inert soils and sub-soils excavated that is not required or use as fill on site will be recovered off-site. Soil will only be removed by authorized waste collectors to an authorized site. Any fill material excavated at the site, which is deemed to be contaminated (i.e, non-hazardous or hazardous) will be stored separately to the inert material, sampled and tested, in order to appropriately classify the material as non-hazardous or hazardous in accordance with local regulation which establishes the criteria for the acceptance of waste at landfills before being transported to an appropriately authorized facility by permitted contractors.

4.1.7.1.3 Plastic

As plastic is now considered a highly recyclable material, much of the plastic generated during construction will be diverted from landfill and recycled. The plastic will be segregated at source and kept as clean as possible and stored in a dedicated skip/bin.

4.1.7.1.4 Timber

There will be timber waste generated from the construction work as off-cuts or damaged pieces of timber or from the demolished buildings. Timber that is uncontaminated i.e. free from paints, preservatives, glues etc, will be recycled. It will be collected on-site in a designated area, and collected by a timber recycling company, or a recycling company that will pass it on to a timber recycling company. Such companies shared the timber and use it in energy recovery or for manufacture of wood products or for landscaping woodchip etc.

4.1.7.1.5 Scrap Metal

Steel is a highly recyclable material and there are numerous companies that will accept waste steel and other scrap metals. A segregated skip metal will be available for steel/metal storage on-site pending recycling.

4.1.7.1.6 Cardboard Packaging

Cardboard packaging can also be recycled. Cardboard will be flattened and placed in a covered skip to prevent it getting wet.

4.1.7.1.7 Hazardous Wastes

On-site storage of any hazardous wastes produced will be minimized with off-site removal organized on a regular basis. Appropriate storage of all hazardous wastes on-site will be undertaken including burning of fuels, lubricants etc so as to minimize exposure to on-site personnel (and the public) and to also minimize potential for environmental impacts. Hazardous wastes will be recovered where possible and falling this, disposed of appropriately.

4.1.7.1.8 Canteen Wastes/WC utilities Waste

Regular housekeeping of the temporary canteen, WC areas will be carried out. Removal of domestic waste from the construction compound will be carried out by a permitted waste contractor. Any temporary WC utilities used on site during the construction phase will be maintained by an approved and permitted contractor.

1.6 Operation Phase

4.1.8 Operational Overview

The Project operation concept is presented in Figure 4.6.

During operation, the Project will receive oil and LPG from tankers at the jetty termina. These will then be transferred to storage tanks at the tank farm via the interconnecting pipelines. Oil, gasoline and diesel will be transferred from the storage tanks to the oil barges or to the tanker trucks for further distribution by inland water or land transportation, respectively. For LPG, they will be transferred from the LPG tanks to LPG trucks, or to gas bottling within the Project Site for further distribution.

Based on the natural conditions and the design bottom level, it is expected that maintenance dredging will be required every two years. The dredged materials will be disposed at location approved by the MPA. The volume of each maintenance dredging is expected to be 1,100 m³.

Average number of workers present during operation is expected to be ~50.

Stormwater, industrial wastewater and sewage water will be collected and treated prior to discharge. Drains from all equipment containment drainage, spills, floor wash downs and fire protection discharges will be led to oil-water separator. Oil/water separator will be designed for outdoor, underground in Reinforced Cement Concrete (RCC) construction. There will be a Waste Management Plan in place to cover the Operational Phase.

Sanitary wastewater will be treated by a package of sewage treatment units. The capacity of the system will be sufficient for simultaneous use by 25 people. There will be three (3) water treatment units and each unit consist of septic tank, aerobic tank and sedimentation tank and air pump.

The stormwater discharge system will consist of a series of underground conduits and drainage outflows. The drainage system will be designed to be able to accommodate a worst-case storm event based on local meteorological conditions.

Oily wastewater separator is designed to treat the oily water from the tank farms and loading bays. The treated water will drain to public drains near the Project Site after treatment to meet the EQEQ standards.

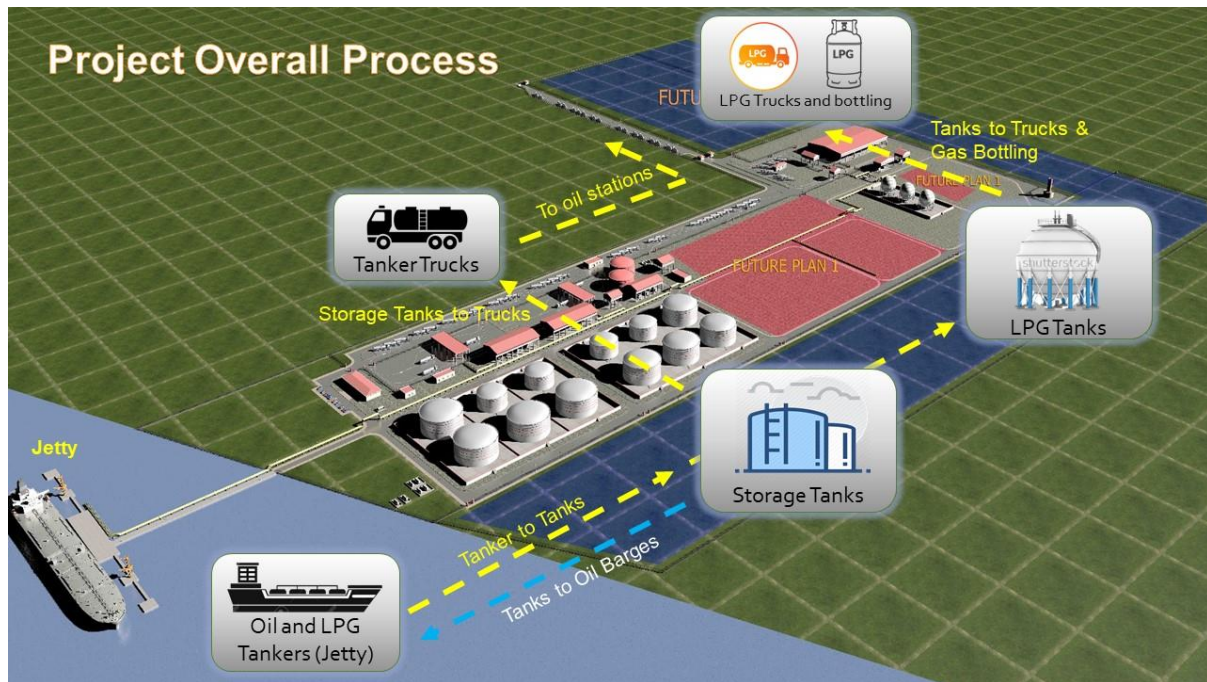


Figure 4.6 Project Operation Concept

4.1.9 Operation Work Force

The estimate number of staff during the Operational Phase is around 50 people as shown in Figure 4.7. This number is based on a normal working day scenario. If the terminal operates 24 hours with three shifts, the total number of staff may need to be revised. The estimate does not currently include outsourced contractors or truck drivers.

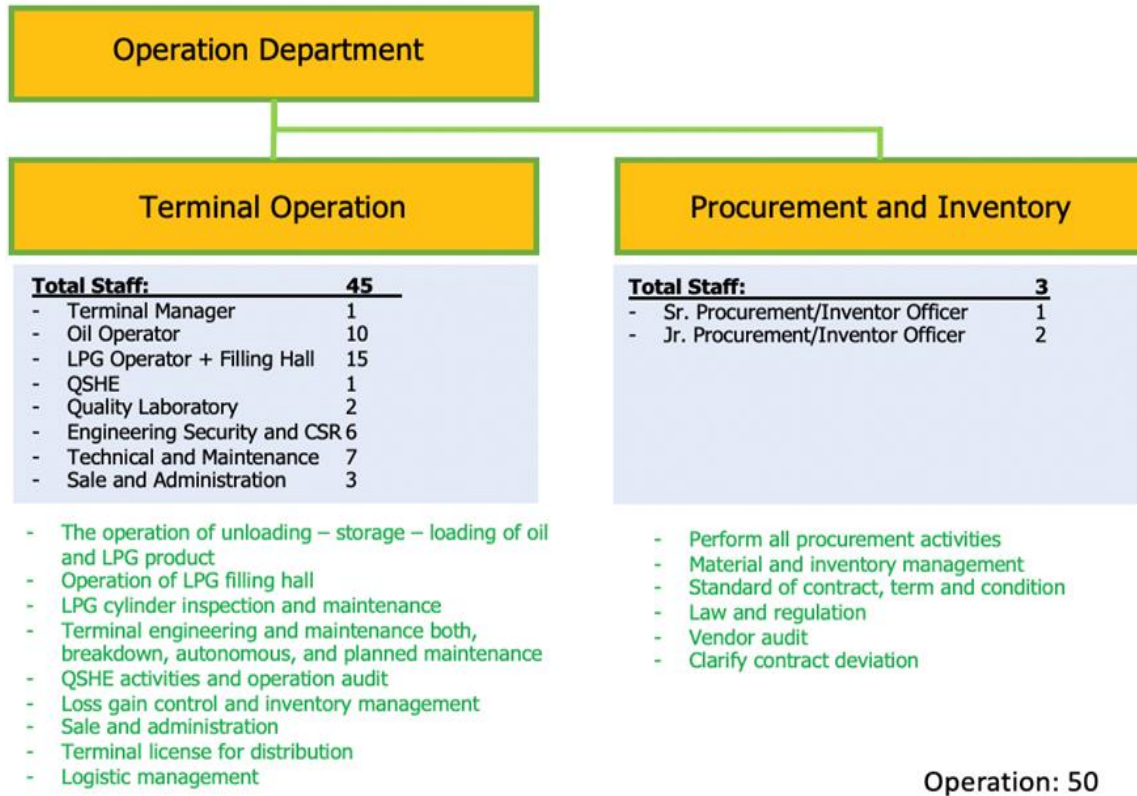


Figure 4.7 Operation Manpower Schedule

4.2 Decommissioning Phase

There is currently no plan for decommissioning of the Project. Given that limited information is available on the decommissioning phase, the current EIA Study does not cover decommissioning activities. It is expected that potential impacts related to decommissioning will be similar to construction and as such similar mitigation for construction phase will be adopted for decommissioning phase. This will be assessed and confirmed when detailed information on decommissioning becomes available when approaching and before the decommissioning phase.

BE will conduct the decommissioning process per international standards. As the terminal shall be operated under an approved EMP, before the decommissioning, BE will submit the relevant documentation to all related government departments for approval.

4.3 Project Alternatives

Consideration of project alternatives is a fundamental requirement in the planning of any project as a means of avoiding or reducing adverse environmental impacts and maximising or enhancing project benefits. Several options that have been considered for the Project include the following:

- **Project Site Location** – the proposed Project Site is located away from nearby village settlements. This option reduces the potential environmental and social impacts to nearby communities. In addition, the Project Site is located near existing road networks, which would reduce the requirements of temporary access road and permanent road construction and therefore reduce the associated potential environmental and social impacts on such construction.
- **Jetty Terminal Design** – the jetty terminal will be a piled deck structure instead of formed by reclamation. The use of piled structure will reduce obstruction of river flow compared to a reclaimed area. In addition, unlike reclamation, piling will not require any filling works to be undertaken in the river, therefore reducing the potential water quality impacts related to the dispersal of suspended solids.

5 DESCRIPTION OF THE ENVIRONMENT

5.1 Introduction

This section describes the physical, biological, and social environment of the Study Area (as defined in Section 5.2). The information provided is based on primary data collected for the Project in 21st to 29th December 2020 and 5th to 10th January 2021, a review of published information, available literature from BE and ERM's in-house library.

The purpose of reviewing the baseline conditions is to present an understanding of the potential environmental and social sensitivities of the Study Area.

Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation is not yet conducted. Public consultation and primary socio-economic data collection for EIA investigation will be conducted after situation allowed in order to have better participation by stakeholders, including land owner and land users affected by land acquisition of the Project. The EIA Report will be updated once the public consultation and primary socio-economic data collection for EIA investigation is done.

5.2 Setting the Study Limits

The **Project Site** is defined as the location of the jetty terminal, tank farm as well as the interconnecting pipelines and advanced utilities (Figure 5.1). The Project components will be located in Kyauktan Township in Yangon Region.

The **Study Area** is defined as the wider area in which the environmental and social conditions are evaluated with the sources of risk, in order to determine interactions and the magnitude and significance of potential impacts resulting from the Project. For this Project, the Study Area is defined as a 20 km buffer around the Project Site, encompassing the Township of Kyauktan to make sure that proper understanding of socioeconomic situation of the area has acquired and the impact assessment is done based on this understanding. This area definition also facilitates the consideration of cumulative impacts in which the Project might have contributed and

The '**Area of Influence**' (**Aoi**) is defined as area in which Project impacts are likely to occur significantly on physical, biotic and socioeconomic components of the surrounding environment. It was defined and identified based on the terms of reference established during the scoping stage for this EIA assessment. For this Project, a buffer of 5 km has been included to encompass the Potential Aoi including the Kyauktan, Kawhmu, and Dala Townships, considering that some villages on both sides of Yangon River are using the river for transportation and, to some extent, there are some families who engaged in fishing for their livelihoods. These are the spatial areas where the Project might have direct, indirect and cumulative impacts on communities and their surrounding environment.

The **Project Site**, **Study Area** and **Area of Influence** are shown in Figure 5.1. The coordinate points of Project Site, Study Area and Aoi are listed in Table 5-1.

Table 5-1 Coordinate Points of Project Site, Study Area and Area of Influence

Item	Coordinate Points*
Project Site	Between 96.258860°E 16.607154°N and 16.605244°E 96.258901°N for jetty area. Between 96.260585°E 16.607233°N, 96.268197°E 16.607188°N, 96.268107° E 16.612037°N, 96.270691°E 16.612082°N, 96.270854°E 16.604776°N and 96.261713°E 16.604655°N.
Area of Influence	Between 96°16'4.859"E 16°33'33.856"N and 96°16'1.496"E 16°39'26.965"N, Between 96°12'41.4"E 16°36'46.385"N and 96°19'3.095"E 16°36'33.774"N.
Study Area	Between 96.280458°E 16.420520°N and 96.244116°E 16.787836°N,

Between 96.075300°E 16.617916°N and 96.458654°E 16.620693°N.

**There may be some deviation between these coordinated points as the areas are not straight lines between them.*

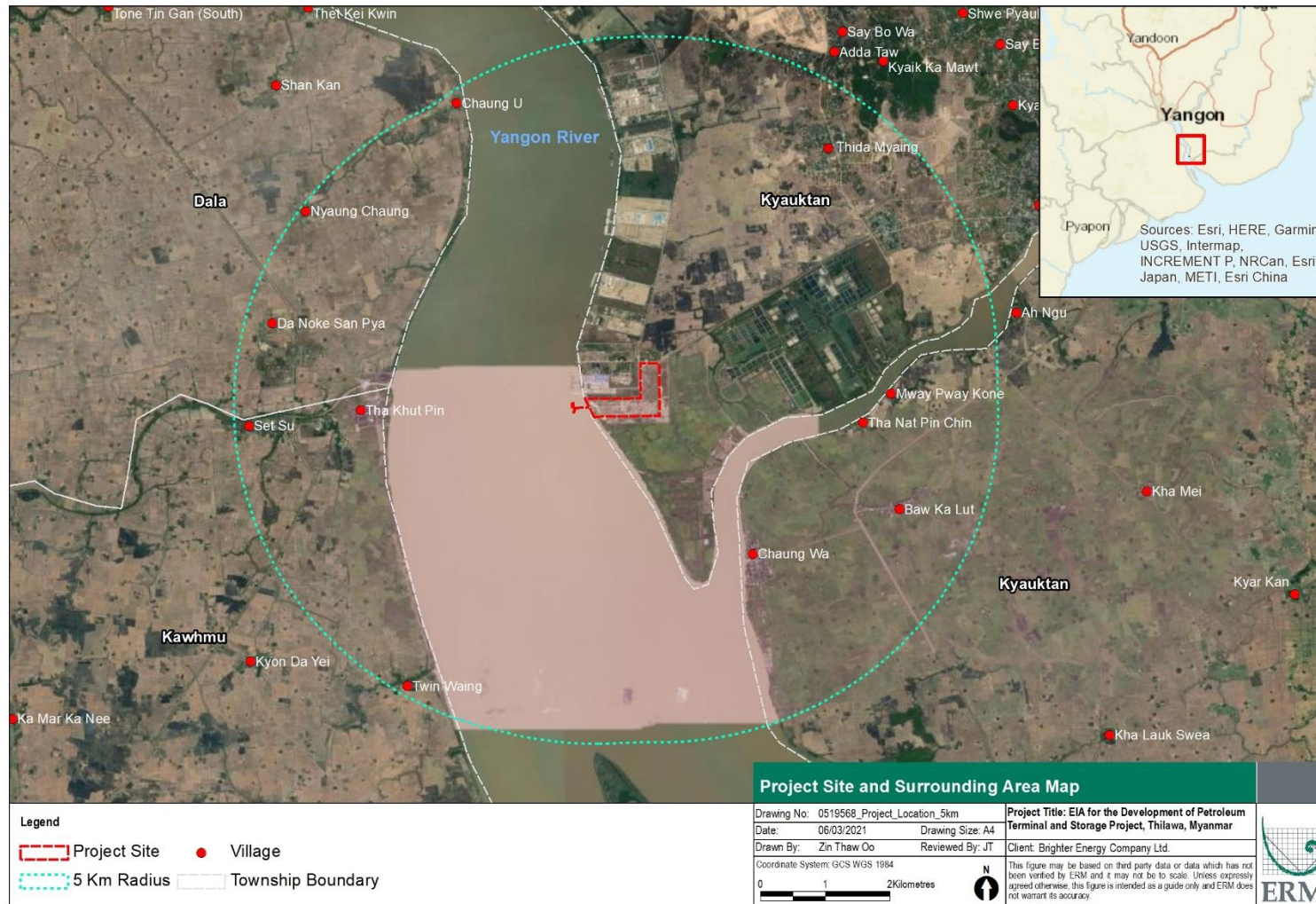


Figure 5.1 Project Site and Surrounding Area

5.3 Methodology and Approach

As part of the EIA requirement, a comprehensive primary baseline sampling programme has been conducted for the Project from 21st to 29th December 2020 and from 5th to 10th January 2021. The following sections provide the primary environmental and social data collection conducted specifically for the Project. In addition to previous study, REM team has been conducted social baseline survey from 22nd to 25th September 2022 at Thidar Myaing Ward, Kyauktan township and Setsu and Thakhut Pin villages at Kawhmue township.

5.3.1 Environmental Baseline

5.3.1.1 Sampling Details

The primary baseline survey was designed to cover the Project Site and includes surveys for air quality, noise, soil quality, ground water quality, surface water quality, and terrestrial and aquatic biodiversity, river sediment quality and traffic. A summary of the baseline data collection plan is provided in Table 5-2.

Table 5-2 Summary of Sampling Plan

Topic	Parameters	Number of Sites	Sample per Site	Total	Monitoring Frequency / Details
Air Quality	NO ₂ , SO ₂ , CO, PM ₁₀ , PM _{2.5}	4	1	4	One day (24hrs) continuous monitoring with machine
Noise	Sound Level (LAeq in dB(A))	4	1	4	Day time (07:00-22:00) and night time (22:00-07:00) monitoring for 24 hours at key Noise Sensitive Receivers (NSRs)
Ground Water Quality	pH value, Total Suspended Solid, Total Cyanide, Ammonia, Nitrite, Nitrate, Reactive Phosphorus, Oil & Grease, Chemical Oxygen Demand, Biochemical Oxygen Demand, Phenols, Arsenic, Cadmium, Chromium, Copper, Mercury, Faecal Coliforms	4	1	4	In situ and lab analysis using existing well, locations in villages/wards.
Surface Water Quality	pH, Total Suspended Solid, Total Cyanide, Ammonia, Nitrite, Nitrate, Reactive Phosphorus, Oil & Grease, Chemical Oxygen Demand, Biochemical Oxygen Demand, Phenols, Arsenic, Cadmium, Chromium, Copper, Mercury, Faecal Coliforms	3	1	3	In situ and lab analysis in Yangon River, local creeks and ponds
Soil Quality	pH, Iron (Fe), Cadmium (Cd), Lead (Pb), Zinc (Zn), Copper (Cu), moisture content	4	1	4	Lab analysis of soil within the Project footprint.

Environmental Impact Assessment Report

Topic	Parameters	Number of Sites	Sample per Site	Total	Monitoring Frequency / Details
River Sediment Quality	Analyzed for Particle Size Distribution, Total Petroleum Hydrocarbon (C10 – C36), Total Organic Carbon (TOC), Oil & Grease, Arsenic, Barium, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Nickel, Selenium, Zinc and Mercury as well as macro-benthos diversity.	3	1	3	In situ and lab analysis in Yangon River, local creeks and ponds.
Biodiversity	Conduct habitat mapping and establish biodiversity indices, species inventory and identification of threatened species	-	Within 500 m radius of Project Site	-	Three days surveys for birds, mammals, reptiles, fish, and dragonflies/butterflies.
Traffic Survey	Observation of number and type of vehicles using access road at 2 locations on main road from hilawa SEZ Class A to the Project Site and 1 location on access road in front of Project Site.	3	1	3	To be undertaken for 24 hours and over separate two days, one being a weekday and one being a weekend day.

5.3.1.2 Survey Locations

Environmental Baseline Survey (EBS) points and their descriptions are provided in Table 5-3 and their related figures are provided in Figure 5.2.

Table 5-3 Locations of Environmental Baseline Survey

Station Name	Location	Coordinates		Description
		Latitude	Longitude	
Air Quality (NO₂, SO₂, CO, PM 2.5, PM 10)				
A1	Kyauktan	16°36'31.92"N	96°16'8.28"E	On the Project Site and 350 m north of the point is road. Residential area (Thidar Myaing Quarter) is 4 km away.
A2	Kyauktan	16°36'44.01"N	96°15'35.24"E	600 m from the western boundary of the Project Site and near the eastern bank of Yangon River
A3	Kyauktan	16°36'7.78"N	96°16'56.53"E	800 m southeast of the Project Site and 150 m away from road
A4	Kyauktan	16°35'20.09"N	96°16'36.92"E	Close to road and 1.2 km from the Project Site
Noise Level				
N1	Kyauktan	16°36'31.92"N	96°16'8.28"E	On the Project Site and 350 m North of the point is road. Residential area

Environmental Impact Assessment Report

Station Name	Location	Coordinates		Description
		Latitude	Longitude	
				(Thidar Myaing Quarter) is 4 km away.
N2	Kyauktan	16°36'44.01"N	96°15'35.24"E	600 m from the western boundary of the Project Site and near the eastern bank of Yangon River
N3	Kyauktan	16°36'7.78"N	96°16'56.53"E	800 m southeast of the Project Site and 150 m away from road
N4	Kyauktan	16°35'20.09"N	96°16'36.92"E	Close to road and 1.2 km from the Project Site
Soil Quality				
S1	Kyauktan	16°36'52.60"N	96°16'8.37"E	300 m north of the Project Site
S2	Kyauktan	16°36'26.95"N	96°15'48.09"E	30 m northwest of the Project Site
S3	Kyauktan	16°36'29.18"N	96°16'22.02"E	400 m east of the Project Site
S4	Kyauktan	16°36'9.57"N	96°16'4.22"E	440 m south of the Project Site
Traffic Volume				
T1	Kyauktan	16°36'47.35"N	96° 16'20.88"E	Beside the road to Kyauktan and 200 m northeast of the Project Site
T2	Kyauktan	16°37'22.12"N	96° 16'11.77"E	Beside the road to Thilawa SEZ and about 1.2 km north of the Project Site
T3	Kyauktan	16°39'47.46"N	96° 15'47.24"E	Beside the road to Thilawa SEZ and about 6 km north of the Project Site
Groundwater Quality				
GW1	Kyauktan	16° 36' 32.32"N	96° 16' 7.58"E	In the Project Site
GW2	Kyauktan	16° 38' 7.25"N	96° 17' 46.13"E	4 km north of the Project Site and in residential area in Shwe Pyi Tharyar Ward, Kyauktan
GW3	Kyauktan	16° 38' 45.92"N	96° 17' 36.13"E	5 km north of the Project Site and in residential area in Shwe Pyi Tharyar Ward, Kyauktan
GW4	Kyauktan	16° 39' 17.31"N	96° 17' 36.46"E	5.5 km north of the Project Site and in residential area in Aye Mya Thida Ward, Kyauktan
Surface Water Quality				
SW1	Kyauktan	16°36'53.52"N	96°15'22.09"E	Yangon River, 1 km upstream of the Proposed Jetty Area
SW2	Kyauktan	16°36'22.03"N	96°15'30.29"E	Yangon River, at the Proposed Jetter Area
SW3	Kyauktan	16°35'52.24"N	96°15'42.28"E	Yangon River, 1 km downstream of the Proposed Jettey Area
Sediment Quality				

Environmental Impact Assessment Report

Station Name	Location	Coordinates		Description
		Latitude	Longitude	
SE1	Kyauktan	16°36'53.52"N	96°15'22.09"E	Yangon River, 1 km upstream of the Proposed Jetty Area
SE2	Kyauktan	16°36'22.03"N	96°15'30.29"E	Yangon River, at the Proposed Jetter Area
SE3	Kyauktan	16°35'52.24"N	96°15'42.28"E	Yangon River, 1 km downstream of the Proposed Jettey Area
Biodiversity				
BSA	Kyauktan	16°36'39.88"N	96°15'35.14"E	The survey area extend 500 m surround of the periphery of the Project Site
		16°36'56.01"N	96°15'53.82"E	
		16°36'53.80"N	96°16'27.59"E	
		16°36'5.16"N	96°16'25.59"E	
		16°36'0.92"N	96°15'54.19"E	

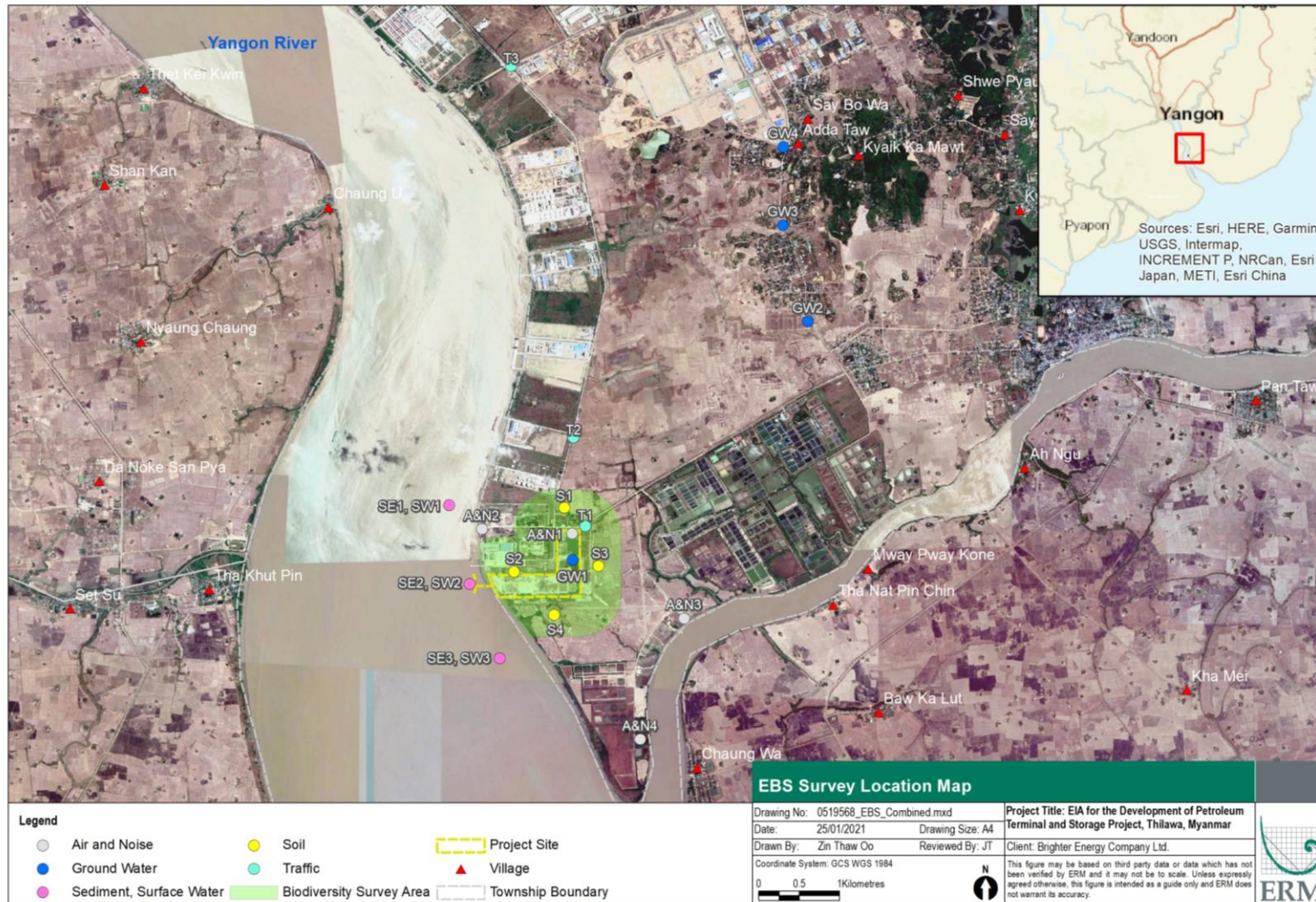


Figure 5.2 Environmental Baseline Survey Locations



Source: ERM 2020

Figure 5.3 Air Quality Monitoring



Source: ERM 2020

Figure 5.4 Noise Level Monitoring



Source: ERM 2020

Figure 5.5 Soil Quality Sampling

Environmental Impact Assessment Report



Source: ERM 2020

Figure 5.6 Traffic Survey



Source: ERM 2020

Figure 5.7 Ground Water Quality Sampling



Source: ERM 2020

Figure 5.8 Surface Water Quality Sampling



Source: ERM 2020

Figure 5.9 River Sediment Quality Sampling



Source: ERM 2020

Figure 5.10 Biodiversity Survey

Environmental Impact Assessment Report

The coordinates for the sampling locations are provided in Table 5-3 and the results of all surveys are provided in Table 5-8 and Table 5-9.

5.3.1.3 Sampling Methodology

5.3.1.3.1 Ambient Air Monitoring

Baseline ambient air monitoring was conducted around the Project Site at locations shown in Figure 5.3. There is limited local monitoring of meteorology and therefore the Weather Research and Forecasting Model (Advanced Research WRF Version 3. NCAR Tech) data was used to generate meteorological data for the purpose of reviewing climatic conditions, regional air quality, and identifying representative sensitive receptors.

Four (4) sites for NO₂, SO₂, CO, PM₁₀ and PM_{2.5} air quality monitoring sites were selected. Sampling and analysis of ambient air quality were conducted over 24-hour period by referring to the recommendation of the United States Environmental Protection Agency (U.S.EPA). A Haz-Scanner Environmental Perimeter Air Station (EPAS) was used to collect ambient air survey data. Sampling rate or air quality data were measured automatically and directly read and recorded onsite for the parameters.

5.3.1.3.2 Ambient Noise Monitoring

Baseline ambient noise monitoring was conducted at the same sites where air quality monitoring were taken around the Project Site, as shown in Figure 5.4. The noise levels were recorded over a 24-hour period (day and night) at each site, covering a weekday and a weekend day. The noise was measured using a Sound level Meter (Model: SL-4023SD) along with an SD card real time data recorder (USB/RS232) according to the recommendation of ISO 1996-1:2003 and ISO 1996-2:2007. The noise meter was set up to record at one minute intervals during the survey period. The monitoring procedures, data analysis, and interpretation are carried out in accordance with the guidelines of US EPA and the manufacture.

5.3.1.3.3 Ground Water and Surface Water Quality

Water samples were collected using a clean sampling dipper in order to avoid sample contamination from other sources and in accordance with standard operation procedures. Before sample collection, appropriate measures including the wearing of disposable and powder-less gloves and rinsing of the sampling dipper with native water was carried out to condition, or equilibrate to the sample environment and make sure that all cleaning-solution residues are removed.

Water samples were taken by Alpha horizontal water sampler and collected in sterilized sample containers as shown in Figure 5.7 and Figure 5.8. All sampling was in strict accordance with recognized standard procedures. Total dissolved solid (TDS), conductivity, chlorine, pH value, and temperature were measured on-site at the sampling locations according to standard procedures (USEPA, 2006).

After collecting the sample, the sample bottles will be kept in a cooling box with ice/ice packs until they reached the laboratory. Water samples were sent to REM-UAE Laboratory in Yangon and UAE Thailand for laboratory analysis for the parameters mentioned in Table 5-2. These parameters were selected as they are included in the WHO Drinking Water standards and Myanmar EQEG and can provide information on the quality of the water source (i.e., whether it is or is not polluted).

5.3.1.3.4 Soil Quality

Soil samples were collected from holes dug to approximately 50 cm using a soil auger (hand held drill). In order to refrain from contamination, about 0-50 cm of top soil was removed by the sampler before sampling and soil samples were taken and collected from 50-70 cm depth approximately. For each sample site, samples from three points in triangle shape at 10 m interval were taken and mixed thoroughly. During sample collection, gloves were worn, and the gloves and drill were rinsed with clean

Environmental Impact Assessment Report

water. Samples were transferred into wide-mouth glass bottles and sent to the laboratory of United Analyst and Engineering Consultant Co., Ltd. in Thailand. The soil samples were collected according to the standard procedure (Carter and Gregorich, 2006) and kept in cooling box at 4°C until they reached the laboratory. Samples were protected from sunlight to minimize any potential reaction. The parameters tested are provided in Table 5-2 and were selected based on the Dutch Standards for Soil Quality in order to provide information on the quality of the soil in line with recognised international standards.

5.3.1.3.5 Sediment Quality and Benthos

The same sampling points where surface water quality was assessed were taken for riverbed sediment assessment using Grab Sampler. The sample sediments are collected in an amber glass bottle and plastic bag. The samples were sent to UAE laboratory, Thailand for the analysis of physical and chemical parameters of sediment shown in Table 5-2.

Regarding benthos, 3 replicates or grabs (1 grab = 3.14 kg) of benthic samples at each station were collected in a plastic basin. Each benthic sample was then slowly washed through a sieve with mesh sizes of 0.5 and 1 mm. The specimens and coarse sediment retained in the sieve were collected in a plastic bottle and preserved in 37% formalin solution for laboratory analyses and sent to SGS (Thailand) Limited Laboratory.

5.3.1.3.6 Biodiversity

5.3.1.3.6.1 Desktop Survey

Publicly available sources of information were analysed to build an outline of known and likely ecological values for the Study Area. Aerial imagery was used to build a more complete spatial understanding of the pattern of vegetation communities and human uses on the site, and to map access routes and internal tracks. In addition, ecologists with experience of the Study Area were consulted where possible to obtain information about species known to be present or previously recorded from the site, and other ecological values considered by them to be relevant.

5.3.1.3.6.2 Field Observation

Flora

A Global Positioning System (GPS) was used to navigate and mark coordinates between sample points in/around the Aol. Field observations were conducted within the Project Site. During the field survey period, plotless sampling methods and transect sampling methods were used. Plotless sampling methods are based on the random selection of points within a particular survey area whereas the transect is a long, thin quadrat that are used to sample along narrow areas or to sample across different habitats.

All trees, shrubs, herbs, and cultivated crops were recorded and listed. The identified species and families were translated to scientific name with assistance of a checklist of trees, shrubs, herbs and climbers of Myanmar (Kress, et al, 2003).

Fauna

(1) Mammals

The data collection for mammal species was conducted in three ways; (1) direct observation of mammals in the field, (2) observation of track and signs such as footprints, scat, and feeding signs in their natural habitats, and (3) interview surveys with local communities. Mammal surveys were conducted, by point count and transects count methods, during the daytime. The direct observation method was used for the species of tree dwelling mammals, such as squirrels and tree shrews. The track and sign observation method was used for some small carnivores. All encountered signs and footprints found by track and sign observation were examined and then photo records were taken for

Environmental Impact Assessment Report

species identification. The presence or absence of well-known mammal species was confirmed by interviewing local people familiar with the Project Site.

(2) Reptiles and Amphibians

Reptile and amphibian surveys were conducted through direct observation and active searching within the Aol in all major representative habitat types and in potential hiding places such as among leaf litter, inside holes and under stones and logs within the Aol. Surveys were conducted during the daytime. Visual observations, documented where possible by photographs, were made of some captured specimens that were not collected for preservation. Wherever possible, animals was captured by hand.

(3) Butterflies and Dragonflies

Butterfly and dragonfly surveys were conducted through direct observation and active searching in the Aol in all different habitats by using point count method. Animals were recorded by taking photos and then identified to species level using reference books (Kinyon, S. 2004).

(4) Bird

A random point count method ² was used for bird surveys and photo were taken for species identification, observed numbers, and habitat utilisation. Species identification was conducted using field guidebooks, with binoculars, camera, and GPS. Nocturnal birds were observed at dusk. Point count and opportunistic methods (incidental sightings) were used to census the species richness and point counting was used to get the relative measure of bird abundance.

(5) Aquatic

Interviews with local fisherman from the Aol were conducted as well as collection of specimens. Questions asked related to fishing processes including the type of gear used, number of times fishing per day, and the target species. The fishes were collected from the main rivers, ponds, and creeks in the Aol with the help of fishers and were photographed and measured. A survey of the local fish markets was also conducted.

5.3.1.3.6.3 Interview survey

In addition to field observation, secondary data was also collected by interviewing local residents. In the interview survey, the surveyor visited residents around the Project Site and recorded the name of plants and animals they had observed using photographs. The historic situation of flora and fauna, and any changes observed in biodiversity was also discussed.

5.3.1.3.7 Traffic Survey

The survey for traffic volume counted the number and types of vehicles which passed through the survey points. The vehicle traffic survey was conducted for four (4) periods within daytime and evening (5:00-7:00; 8:00-11:30; 15:00-18:30; 20:30-22:30) for one weekday and one weekend during 5th to 10th January 2021. The survey team set up three (3) points as shown in Figure 5.6.

² point count is a tally of all birds detected by sight and sound by a single observer located at a fixed position during a specified period of time

Table 5-4 Locations of Traffic Survey Points

Station Name	Location	Coordinates		Description
		Latitude	Longitude	
T1	Kyauktan	16°36'47.35"N	96° 16'20.88"E	Beside the road from Kyauktan Town to the Project Site. About 200m from northeast corner of Project Site.
T2	Thilawa SEZ Class A	16°37'22.12"N	96° 16'11.77"E	Beside the road from Thilawa SEZ Class A to the Project Site. About 1.2km from northern boundary of Project Site.
T3	Thilawa SEZ Class A	16°39'47.46"N	96° 15'47.24"E	Beside the road from Thilawa SEZ Class A to the Project Site and in front of Thilawa sub-station. About 6km from northern boundary of Project Site.

Table 5-5 Survey Periods for Traffic Survey

Survey Points	Survey Period (Weekday)	Survey Period (Weekend)
T1	5 th January, 2021	9 th January, 2021
T2	6 th January, 2021	9 th January, 2021
T3	7 th January, 2021	10 th January, 2021

Manual direct observation and recording using tally counters were conducted to count the number of vehicles moving in both direction at each station. Types of vehicles were also recorded.

5.3.2 Social Baseline

The social baseline information collected for the EIA Report is based on a review of published information, as well as through a review of available literature ERM's in-house library.

Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation was not conducted until August 2022. REM has been conducted second Public consultation meeting on 6th October 2022 and primary socio-economic data collection at Kyauktan and Kawhmu townships from 22nd to 25th September 2022 as soon as situation was allowed for SIA investigation. REM and BE had tried for better participation by stakeholders, including land owner and land users affected by land acquisition of the Project at the meeting. The EIA report has been updated According to socio-economic data collection and results of public participation meeting.

5.4 Public Administration and Planning

The Project is located in Kyauktan Township, Yangon Region under the administration of Southern District and neighbored with Thanlyin Township to the North, Thongwa to the East, Gulf of Mottama (Gulf of Martaban) to the South and Yangon River to the West. Kawhmu and Dala Townships are on the opposite side of Yangon which share with Kyauktan Township in using Yangon River.

Yangon Region has the smallest area and highest population density among all 14 States and Regions and 1 Union Territory of Myanmar. Yangon Region is composed of 45 townships and one sub-township; 33 of these Townships are in the city area under Yangon City Development Committee (YCDC) (United

Environmental Impact Assessment Report

Nations Development Programme, 2015). The population and area of the Townships in the Study Area are provided in Table 5-6.

Table 5-6 Townships in the Study Area with Population and Area

District	Township	Number of urban wards	Number of village tracts	Population from the 2014 Census		Total Area in km ²	Density (people/km ²)
				Total	Female		
Yangon (South)	Kyauktan	13	45	169,659	51%	844	210
	Kawhmu	7	55	135,336	51%	624	9,333
	Dala	24	23	165,625	51%	224	739

Source: Township Profiles, 2019 (www.mimu.com)

1.7 Legally Protected National, Regional or State Areas

There are 39 Protected Areas in Myanmar covering an area of 38,906 km². Based on Myanmar's National Biodiversity Strategy and Action Plan (NBSAP) for 2015 to 2020, there are plans to establish nine more Protected Areas in three phases from 2020 to 2021. With the addition of these nine proposed areas, the total area under protection in Myanmar will be 52,932 km², representing a coverage of 7.82% of the country's total land area (National Biodiversity Strategy and Action Plan, 2015).

There are no protected or sensitive areas within the Project Site or Study Area (i.e., within 20 km of the Project). Within a 50 km radius of the Project Site, there is one national protected area (Hlawga National Wildlife Park), one Endemic Bird Area (EBA) and three key biodiversity areas (KBAs). The closest KBA is Hlawga Reservoir KBA located 36 km to the north. Information on these areas is provided in Table 5-7 and their location in relation to the Project Site is shown in Figure 5.11.

Table 5-7 Protected Area, Endemic Bird Area, and Key Biodiversity Areas within 50 km of the Project Site

Protected Area	Details and Key Species	Nearest Distance from the Project Site
Hlawga National Wildlife Park	Area: 6km ² Year Designated: 2012 <i>Columba punicea</i> (Pale-capped pigeon) (VU)	42 km
Hlawga Reservoir KBA	Area: 23 km ² Year Designated: 2012 <i>Dalbergia cultrata</i> (Yin-daik) (EN), <i>Dipterocarpus alatus</i> (Kanyin-byu) (EN), <i>Hopea odorata</i> (Thingan) (VU).	36 km
Payagyi Terrestrial KBA	Area: 2 km ² Year Designated: 2012 <i>Grus Antigone</i> (Sarus crane) (VU), Congregatory waterbirds	39 km
Maletto Inn fresh water KBA	Area: 386 km ² Year Designated: 2012 <i>Grus Antigone</i> (Sarus crane) (VU), <i>Emberiza aureola</i> (Yellow-breasted Bunting) (EN), Congregatory waterbirds	37 km
Ayeyarwady Plains	Area: 160,000 km ²	28 km

Environmental Impact Assessment Report

	Year Designated: 1991 <i>Crypsirina cucullata</i> (Hooded Treepie) (NT), <i>Chatarrhaea gularis</i> (White-throated Babbler)	
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Note: IUCN Red List Designations: LC – Least Concern, EN – Endangered, VU – Vulnerable, NT – Near Threatened, IUCN category IV- Habitat/Species Management Area that aim to protect particular species or habitats and management reflects this priority (IUCN, 2019).

**PETROLEUM TERMINAL AND STORAGE PROJECT,
THILAWA, MYANMAR**

Environmental Impact Assessment Report

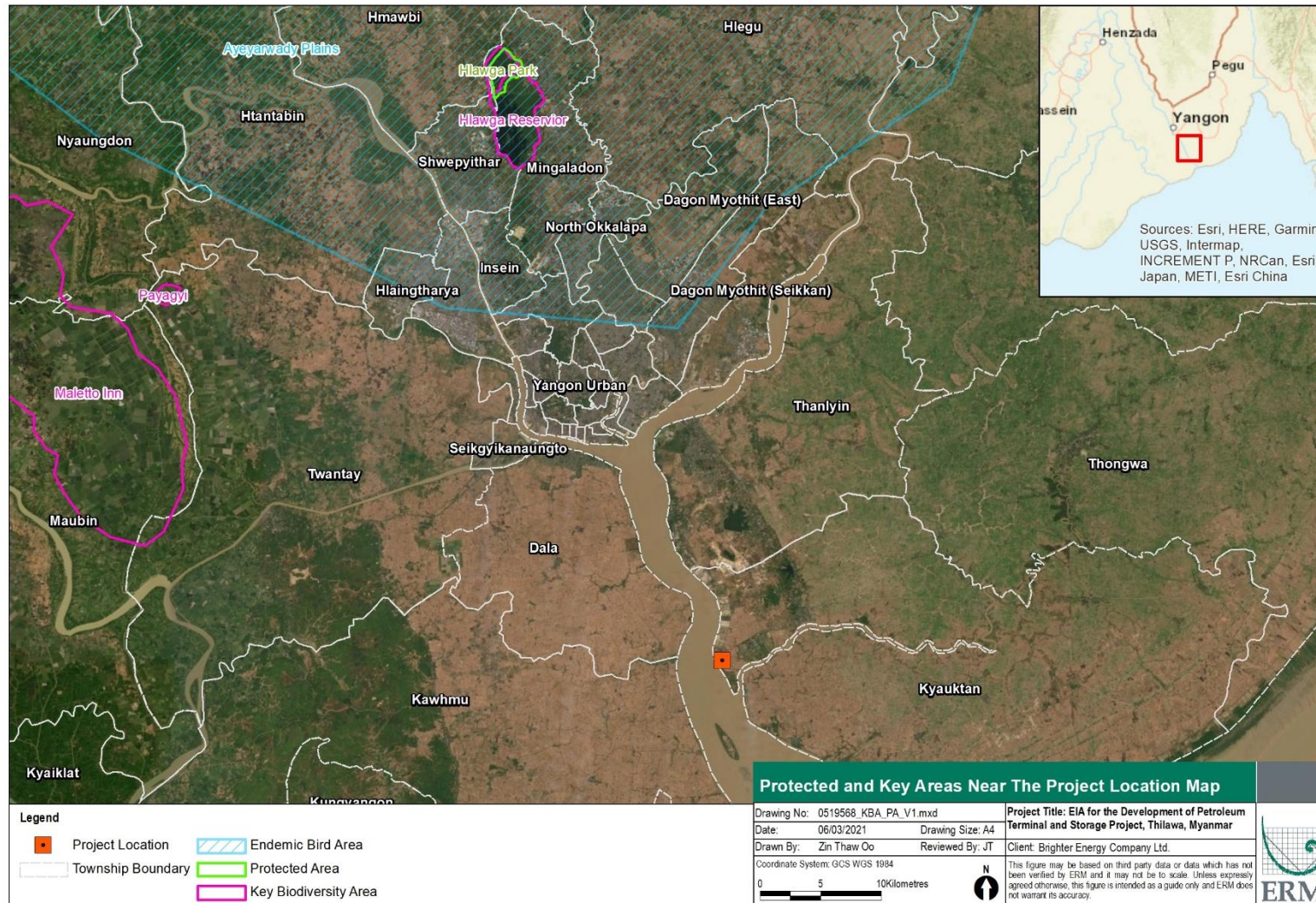


Figure 5.11 Key Biodiversity Area, Endemic Bird Areas and Protected Areas

5.4.1 Key Biodiversity Areas

In Myanmar, KBAs fall in different land management categories including protected areas, conservation area, protected forests, reserve forests, and other resource and land use areas (Instituto Oikos and BANCA, 2011). Therefore, they accommodate different management systems, which include government, private, community-led and joint management. The closest KBA to the Project is 36 km to the north and there are no KBAs in the Study Area.

5.4.2 Alliance for Zero Extinction Sites

Alliance for Zero Extinction (AZE) Sites are the sites that hold the last remaining populations of 1,483 of the Earth's most threatened species (Alliance for Zero Extinction, 2019). There are no AZE Sites located within a 50 km radius of the Project Site.

5.4.3 Important Bird and Biodiversity Areas

There is no important bird and biodiversity area in the Project Site and a 50 km radius of the Project Site (Bird Life International, 2019).

5.4.4 World Heritage Areas

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), cultural heritage refers to; monuments, groups of buildings and sites with historical, aesthetic, archaeological, scientific, ethnological or anthropological value, while natural heritage refers to outstanding physical, biological and geological formations, habitats of threatened species of animals and plants and areas with scientific, conservation or aesthetic value (UNESCO World Heritage Centre, 2008). There are no World Heritage Areas within 50 km of the Project Site.

5.4.5 RAMSAR Sites

The Convention on Wetlands, called the RAMSAR Convention, is the intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources (RAMSAR, 2019). There are no RAMSAR sites within 50 km of the Project Site.

5.4.6 Endemic Bird Areas

Endemic Bird Areas (EBAs) are regions of the world that represent natural areas of bird endemism where the distributions of two or more restricted-range bird species overlap. A restricted-range species is defined as one having a historical breeding range of no more than 50,000 km.

The Project Site is located around 28 km south of the Ayeyarwady Plains EBA (BirdLife International, 2021), which extends across the lowlands (sea level up to 1,000 metres) where there are distinct wet and dry seasons and the indigenous vegetation is tropical dry deciduous monsoon forest dominated by *Dipterocarpus spp.*

Two restricted range species occur in Irrawaddy Plains EBA (BirdLife International, 2021):

- White-throated babbler (*Turdoides gularis*): Least concern; and
- Hooded treepie (*Crypsirina cucullata*): Near Threatened.

5.5 Physical Characteristics

Baseline information on the physical environment of the Study Area is provided in the following sections.

5.5.1 Ambient Air Quality

5.5.1.1 Desktop Data Review

Air quality monitoring was first conducted in Yangon in 2007 by the Department of Medical Research and Yangon City Development Committee (YCDC) (Ohnmar May Tin Hlaing et al., 2009). The monitoring results indicated that particulate matter (as Total Suspended Particles (TSP) and PM₁₀) were the main pollutants of concern. The PM₁₀ levels in Yangon are two to three times higher than the World Health Organisation (WHO) guideline levels for human health of 50 µg/m³. Comparison between the residential, commercial, and industrial areas of Yangon showed that the commercial areas typically have higher levels of TSP and PM₁₀ compared to residential and industrial sites (Ohnmar May Tin Hlaing et al., 2009).

According to the air quality monitoring in Yangon during 2008-2009 (Toe Aung, 2009), higher concentration of pollutants, particularly TSP and PM₁₀, is observed during the dry season than raining season. The precipitation and the high frequency of relative humidity occurs during raining season helped to decrease the dispersion of such particulate in the atmosphere. The study confirmed that the mean annual concentration of particulate matters is more than WHO Standards although SO₂ and NO₂ fall below WHO Standard.

5.5.1.2 Ambient Air Quality Survey Results (2020)

As discussed in Section 5.3.1.3, primary air quality data were collected for the Project for PM_{2.5} and PM₁₀ and NO₂, CO and SO₂. Surveys were conducted between 21st to 27th December. Survey locations and methodology is provided in Section 5.3.1.

Results of the NO₂, CO and SO₂ survey, and PM_{2.5} and PM₁₀ are shown in Table 5-8 and Table 5-9. The full survey reports for ambient air quality sampling are provided in Table 5-8.

Table 5-8 Ambient Air Quality Survey Results (NO₂, CO and SO₂) (2020)

Sampling Point	Location	NO ₂ 1-hour (ug/m ³)	CO 24-hour (mg/m ³)	SO ₂ 24-hour mean (ug/m ³)
A-1	On the Project Site and 350 m from the road. Residential area (Thidar Myaing Quarter) is 4 km away.	58	0.21	40
A-2	600 m from the western boundary of the Project Site and near the eastern bank of Yangon River	80	0.16	14
A-3	800 m southeast of the Project Site and 150 m away from road	77	0.13	19
A-4	Close to road and 1.2 km from the Project Site	74	0.11	14
WHO/EU Annual Mean Air Quality Critical Level (Agriculture)		-	10	20

Environmental Impact Assessment Report

Sampling Point	Location	NO ₂ 1-hour (ug/m ³)	CO 24-hour (mg/m ³)	SO ₂ 24-hour mean (ug/m ³)
			(8 hour mean)	
EQEG Annual Mean Air Quality Guideline (Human Health)		200		20

Note: results in red exceed the WHO/EU Annual Mean Air Quality Critical Level (Agriculture) and WHO Guideline values:

Table 5-9 Ambient Air Quality Survey Results (PM_{2.5} and PM₁₀) (2020)

Sampling Point	Sampling Date (Start –End)	Location	PM _{2.5} µg/m ³ 24–hours mean	PM ₁₀ µg/m ³ 24–hours mean
A-1	26.12.2020 – 27.12.2020	On the Project Site and 350 m from the road. Residential area (Thidar Myaing Quarter) is 4 km away.	13	55
A-2	24.12.2020 – 25.12.2020	600 m from the western boundary of the Project Site and near the eastern bank of Yangon River	14	60
A3	22.12.2020 – 23.12.2020	800 m southeast of the Project Site and 150 m away from road	10	62
A-4	21.12.2020 – 22.12.2020	Close to road and 1.2 km from the Project Site	8	25
WHO Air Quality Guideline values - Particulate Matter (PM)			25	50

Note: results in red exceed the WHO Air Quality Standards for Human Health

NO₂, CO and SO₂, and PM_{2.5} and PM₁₀ were sampled in four locations in the Aol. For ambient air quality, none of the values for NO₂ and CO exceeded the World Health Organisation (WHO) guidelines for human health and EQEG. SO₂ exceeded guidelines value at A-1, which is 350 m from the main road (from Kyauktan to ship breaking compound) but 4 km away from residential area. Possible emission sources are from nearby industries, power plant, vehicles, and ships in Yangon River.

For PM_{2.5} and PM₁₀, the data were compared to the WHO standards for Human Health. There were exceedances of PM₁₀ in all of the stations surveyed except at A-4 which is the furthest from the Project and main road among other locations. The increase of coarse particle PM₁₀ could result from the dust along the traffic at main road and construction activities around the site. It is also recorded that fine particles PM_{2.5} is within the WHO standards.

5.5.2 Ambient Noise

5.5.2.1 Desktop Data Review

There is no secondary data in the Project Site regarding ambient noise. Ambient noise levels (LAeq) may have the potential to exceed the EQEG limits for the night time noise standards and daytime noise standards, depending on the effect of noise emission sources in the area e.g., cars, motorcycles.

5.5.2.2 Survey Results (2020)

Primary ambient noise data were conducted for the Project at 4 locations between 21st to 27th December. Survey locations are the same as air quality monitoring stations.

Environmental Impact Assessment Report

Noise levels were sampled at the following sites described in Table 5-10. The survey indicated that ambient noise levels at N-2 and N-3 locations at night time slightly exceeded the IFC noise level guidelines (for residents). Those two locations are located next to the rivers and it is likely that this noise was generated from private generators and ships/boats from the rivers.

Table 5-10 Ambient Noise Survey Results (2020)

Sample ID	Survey Results One Hour LAeq (dBA)		Location information
	Day Time 7:00- 22:00	Night Time 22:00-7:00	
N-1	46	44	On the Project Site and 350 m from the road. Residential area (Thidar Myaing Quarter) is 4 km away. Traffic activity was observed.
N-2	51	49	600 m from the western boundary of the Project Site and near the eastern bank of Yangon River. Boats and ships transportation activity were observed.
N-3	45	49	800 m southeast of the Project Site and 150 m away from road. Residential activities were observed.
N-4	54	43	Close to road and 1.2 km from the Project Site. Construction, residential and traffic activities were observed.

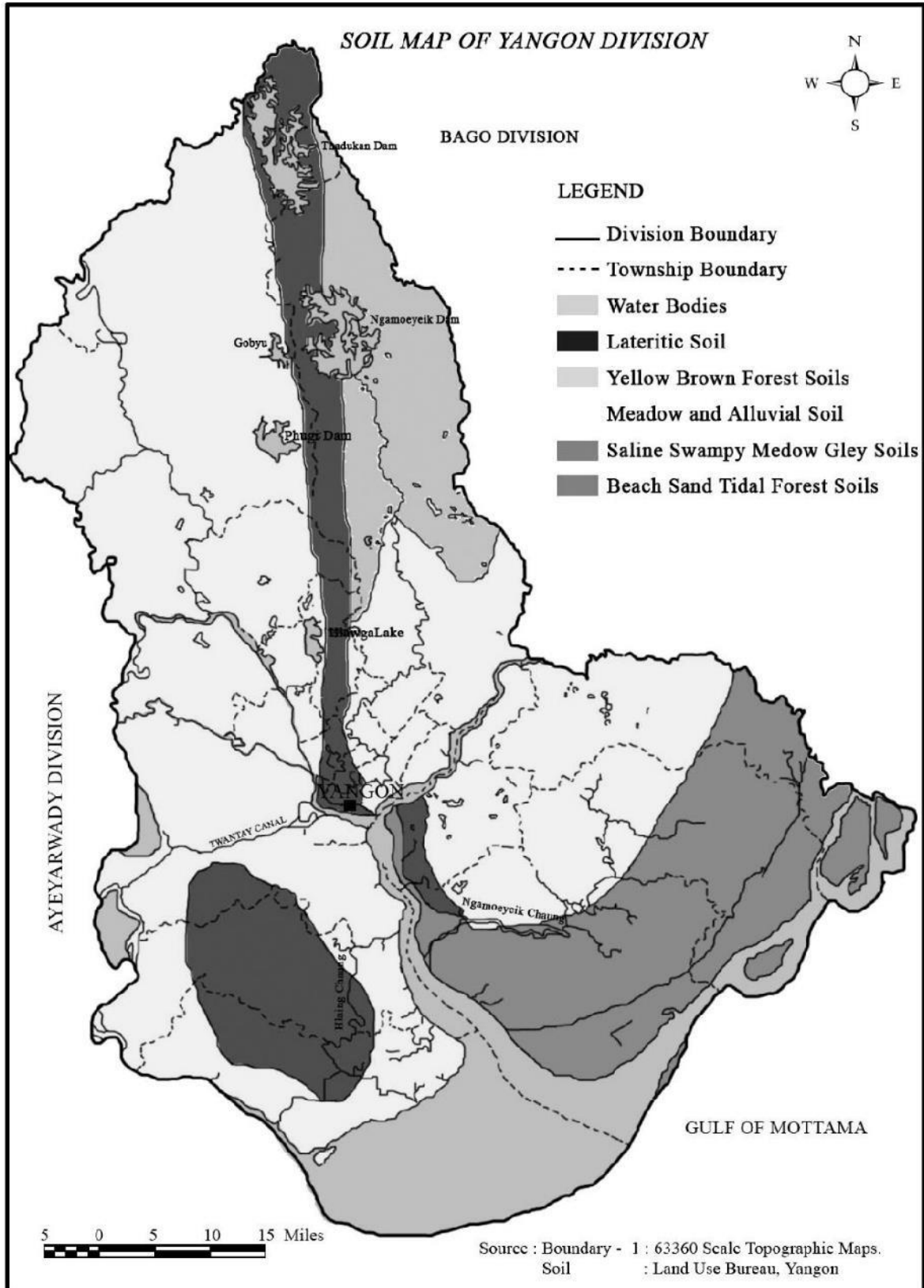
*Note: results in red exceed the IFC Noise level guidelines (for resident)
IFC Noise level guidelines (for resident) One Hour LAeq (dBA) 55 Daytime and 45 Night-time*

5.5.3 Geology, Topography and Soils

5.5.3.1 Desktop Data Review

The geological landscape in this part of Myanmar is characterised by the Indo-Burman Ranges, which branch southwards from the eastern Himalayas and the Irrawaddy Valley Basin also known as the Inner Myanmar Tertiary Basin.

Yangon is underlain by alluvial deposits, the non-marine fluvial sediments of Irrawaddy Formation, and hard, massive sandstone of Pegu Series. The alluvial deposits are composed of gravel, clay, silts, sand and laterite, which lies upon the eroded surface of Irrawaddy Formation at 5 m above mean sea level. The central part of Yangon is occupied by the anticlinal ridge as a backbone, 30 m above mean sea level and covered with sands, sand rock, soft sandstones, shale, clays, and lateritic of the Irrawaddy Formation. The hard compact sandstone and shale of Pegu series can be found at the northwest corner of Hlawga Lake. Alluvial deposits are found in the surrounding areas of the ridge whereas lateritic soils can be found along the ridge (Hla Aung, 2011). Figure 5.12 provides the soil map for Yangon.



Source: Land Use Bureau of Yangon (n.d.)

Figure 5.12 Soil Map of Yangon

5.5.3.2 Soil Survey Results (2020)

Primary soil quality survey was conducted for the Project at 4 locations. Soil samples were collected within the Project Site from 23rd December 2020. Survey locations and methodology is provided in Section 5.3.1.

Description of the survey points and the results of the survey are shown in Table 5-11 and Table 5-12 respectively.

Table 5-11 Description of Soil Sampling Locations

Sampling location	Description
S-1	About 300 m from northern boundary of project site. The soil is fine grained, light grey coloured silty clay.
S-2	About 30 m from northwestern boundary of project site. The soil is fine grained, yellowish brown coloured silty clay.
S-3	About 400 m from eastern boundary of project site. The soil is fine to medium grained, light grey coloured silty clay.
S-4	About 440 m from southern boundary of project site. The soil is fine to medium grained, light grey coloured silty clay.

Table 5-12 Soil Quality Survey Results (2020)

Parameters	Physical and Aggregate Properties		Metals and Major Cations				
	Moisture Content (dried @ 103°C)	pH Value	Cadmium	Copper	Iron	Lead	Zinc
FAO Soil Bulletin 65 & Dutch Standards	N/A	N/A	0.8	36	N/A	85	140
Units			mg/kg dry matter	mg/kg	mg/kg	mg/kg	mg/kg
S-1	24.1	6.8	ND	31.6	50,101	27.6	111
S-2	22.3	6.8	ND	26.5	41,018	20.3	86.6
S-3	18.0	6.7	ND	27.7	43,999	19.3	95.0
S-4	18.2	7.4	ND	24.3	33,407	18.3	90.1

Note: results in red exceed the FAO Soil Bulletin 65 & Dutch Standards

Environmental Impact Assessment Report

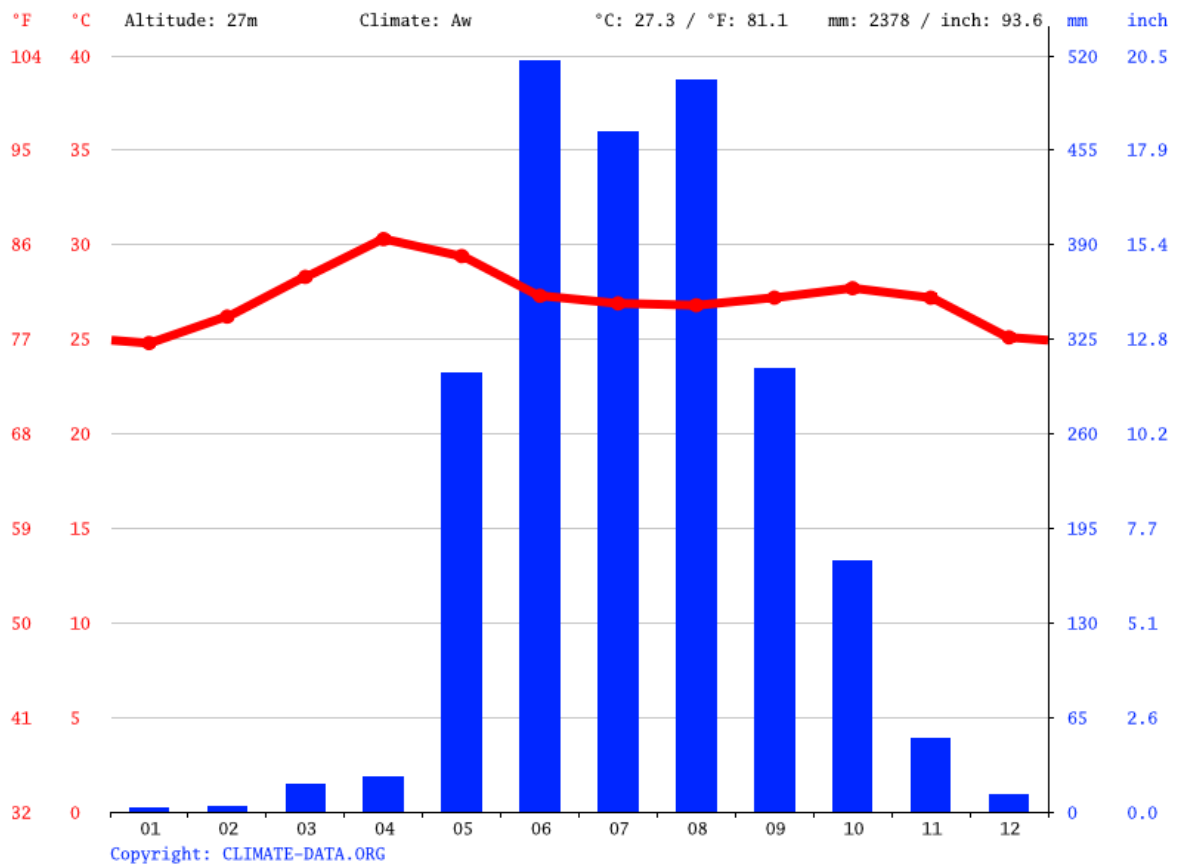
Out of four sampling locations, none of the location exceeded the Food and Agriculture Organization of the United Nations (FAO) Soil Bulletin 65 and the Dutch Standard.

5.5.4 Climate

The weather and climate of Myanmar is primarily influenced by the northeast and the southwest monsoons and the short transitional periods between them. The southwest monsoon (June to September) is characterised by extensive cloud cover, light rain almost daily, interspersed with rain squalls or thunderstorms. The northeast monsoon (December to April) brings less cloud, scant rainfall, mild temperatures and lower humidity during winter (Suwannathatsa, et al, 2012).

The spring and autumn transition periods between the monsoons (April and May, October and November) are generally hot with very variable weather and heavy squalls. The transition periods are governed by the Inter-Tropical Convergence Zone (ITCZ), which separates the main wind streams of the northern and southern hemispheres. The ITCZ moves seasonally over the area (northwards in spring and southwards in autumn), with no well-defined weather pattern (Suwannathatsa, et al, 2012).

In Yangon, as with Myanmar in general, there is much less rainfall in summer. The average maximum temperature is 29°C while average annual rainfall is 2,378 mm (Figure 5.13). The driest month is January, with 3 mm of rainfall and June is the wettest month with an average of 516 mm. The warmest month is April, with an average temperature of 30°C. January has the lowest average temperature of the year; 25 °C. During the year, the average temperatures vary by 5.5 °C (Climate Data Website, 2021).



Source: CLIMATE-DATA.ORG (Accessed on 21-1-2021)

Figure 5.13 Average Monthly Temperature and Rainfall Chart of Yangon, Myanmar

5.5.5 Natural Hazards

Myanmar is exposed to multiple natural hazards including cyclones, earthquakes, and flooding. These are discussed in the following sections. The accidental events impact assessment and the relevant mitigation measures are further discussed in Section 6.6.

5.5.5.1 Storms and Cyclones

Gale force winds (17.2 m s^{-1} or over) are mainly associated with local rain squalls and with severe tropical storms or cyclones. The central region off the coast receives the worst buffeting during the summer monsoon. The threat of cyclones with winds above 32.7 m s^{-1} affects different areas at different times of the year, affecting all areas though the major tracks do not pass over the Andaman Sea (OCHA, 2011). Cyclones are most frequent from mid-May to early December.

5.5.5.2 Flooding

Yangon is prone to flooding due to the low elevation relative to its surroundings. Pluvial flood can occur due to runoff to low lying areas with limited drainage capacity. Fluvial flooding can occur when the surroundings are lower than the water in the surrounding river or canal (Royal Haskoning DHV, 2019).

The average tidal range of the Yangon River is about 6 m at spring tide and 3 m at neap tide. Modelling of the discharge of Yangon River indicates discharges ranging from $<500 \text{ m}^3/\text{s}$ in April to approximately $7,000 \text{ m}^3/\text{s}$ in August, with tidal water level variations of around 1 to 6 m based on water level measurements at Monkey Point located downstream of the Study Area (De Koning and Janssen, 2015). In the Ayeyarwady Delta, which includes the Yangon River, drainage, salt intrusion, and flood protection are key concerns (EO Earth Website, 2016).

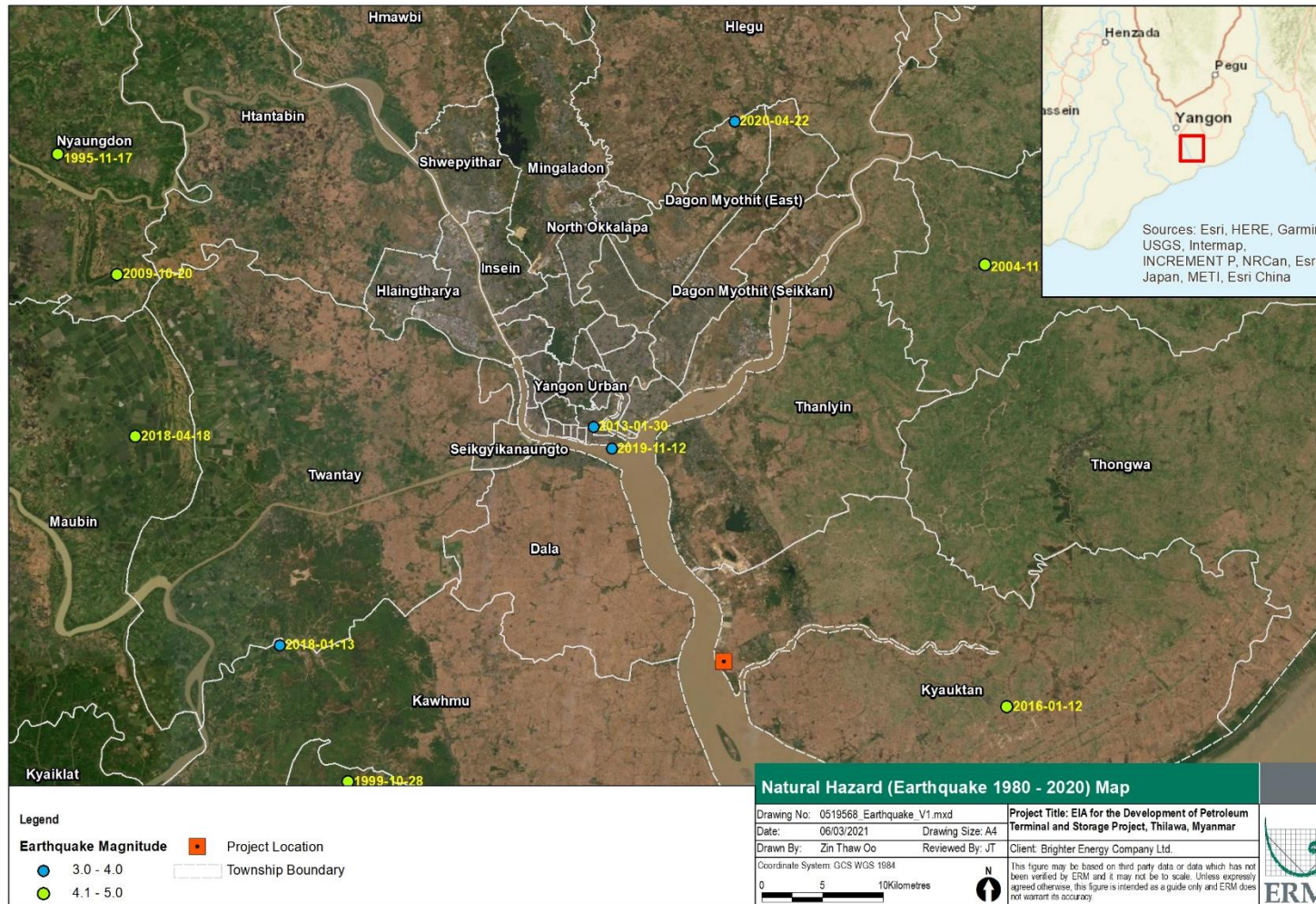
Two main forces dominate the Yangon River system that can result in fluvial floods (Royal Haskoning DHV, 2019).

- **Increased water levels from the sea:** there is a strong tide from the Gulf of Martaban. The spring tide range is approximately 5.4 m in the Hlaing River, and the neap tide range is approximately 2 m. In addition, storm surges can increase offshore water levels.
- **Increased discharges during the monsoon period:** the Irrawaddy River feeds the Yangon River with rainfall from the Irrawaddy River Basin and water levels increase by an additional approximate 0.7 m during the monsoon period.

5.5.5.3 Earthquake Risk

A review of available literature has shown that Myanmar is seismologically unstable and vulnerable to earthquakes due to its location in the active Alpide seismotectonic belt and the young Alpine Himalayan-Sumatran orogenic belt (Willige et al., 2009). Historic records show that at least 15 major earthquakes with magnitudes $M \geq 7.0$ Richter scale (RS) have occurred in Myanmar in the last hundred years. These earthquakes occurred within Myanmar in the last century, in Yangon Region, these include on 27 March, 16 May, and 21 May 1931 and in 1970. Figure 5.14 presents the locations of historic earthquakes in Yangon taken from United States Geological Survey (USGS) data from 2021.

Environmental Impact Assessment Report



Source: USGS Website, 2021

Figure 5.14 Historic Earthquakes in Yangon

5.5.6 Water Resources

5.5.6.1 Desktop Data Review

In Yangon City, municipal water supply only reaches around 38% of the population. The remainder use alternative sources such as groundwater, tube wells, and private water vendors etc., which are untreated and unlikely to meet the bacteriological guidelines for drinking (Another Development & East Asia Institute, 2018).

5.5.6.1.1 Fluvial-Coastal System

Yangon River is about 40 km long and flows from southern Myanmar as an outlet of Irrawaddy River into Ayeyarwady delta. The River joins with Pegu River before emptying into Gulf of Martaban. Most part of Yangon Region is fluvial flood plain while other is lower coastal plains where there have few surface drainage channels. In and around Yangon River areas, the water table is often high; relatively young and subjected to a minimum of dissection. High water table minimises runoff and restricts drainage system which helps form floods (Aung Lwin, 2012).

5.5.6.1.2 Groundwater

Groundwater is an important source of water supply for various uses and is used to meet the needs of city residents. Ground water is especially important for Yangon City, as many local communities rely on groundwater for domestic purposes. The number of tube wells increased from 17 in 1983 to 442 in 2014, operated solely by YCDC (Another Development & East Asia Institute, 2018).

Ground water depletion is progressing at a fast rate given the conditions in Yangon City. Population dynamics, rural-urban migration, urban area expansion, industrialisation, improved living standard, and insufficient water supply account for the increasing ground water usage in Yangon. Although 85% of the city is covered by high potential growth area, there is still a dependence on the long-term rechargeable value. This implies that the more groundwater extraction exceeds the rate of rechargeable value, the more the potential ground water source decreases (Another Development & East Asia Institute, 2018).

5.5.6.1.3 Surface Water

A study carried out in 2013 (Hiroshi Sakai, et al, 2013) sampled river waters from Yangon River. The total coliform level of the river waters in Yangon was close to 50 total coliforms per ml, indicating that the river can be used for drinking water after treatment. Amongst the sampling points on the Yangon River, the sampling point approximately 19 km north of the Project Site has significantly higher (21 fold higher) total coliform level than those sampling points in the centre of the river.

Analysis of chemical levels in river water samples indicated that the dissolved organic carbon (DOC) was less than 3mg C L⁻¹. Levels of the Chlorine (Cl⁻) ion increased downstream. The levels of Bromine (Br) ion and Arsenic (As) displayed a similar trend, although the increase was not as marked. In contrast to the elemental measurements, DOC, dissolved total nitrogen (DTN), and nitrate were stable along the river flow. It was therefore assumed that the sources of Cl⁻, Br⁻ and As were different from those of carbon and nitrogen. Overall, lake and river water quality were considered good in terms of their chemical parameters, but levels of bacterial contamination are concerns (Hiroshi Sakai, et al, 2013).

5.5.6.1.4 Drainage System

Precipitation that falls within the Project Site will infiltrate in the ground or runoff through natural small creeks and manmade ditches and drainage canals flows to Yangon River and Hmaw Wun Creek.

5.5.6.2 Groundwater Survey Results (2020)

Primary ground water quality survey was conducted at 4 locations on 23rd December 2020. Survey locations and methodology is provided in Section 5.3.1.

Descriptions of the survey points and the results of the survey are shown in Table 5-13 and Table 5-14 respectively.

Table 5-13 Description of Ground Water Sampling Locations

Sampling location	Description
GW-1	Tube well located in the Project Site. The depth of tube well is 60m. The water is transparent and utilized for washing, cooking and plantation.
GW-2	Tube well in residential compound, Shwe Pyi Tharyar Quarter, Kyauktan Township, about 4km north of Project Site. The depth of tube well is 15m. The water is transparent and utilized for washing, cooking and plantation.
GW-3	Tube well in residential compound, Shwe Pyi Tharyar Quarter, Kyauktan Township, about 5km north of Project Site. The depth of tube well is 37m. The water is transparent and utilized for washing, cooking and plantation.
GW-4	Tube well in residential compound, Aye Mya Thida Quarter, Kyauktan Township, about 5.5km north of Project Site. The depth of tube well is 110m. The water is transparent and utilized for washing, cooking and plantation.

Groundwater quality was sampled at four locations in the Study Area (i.e., wells at project site and in local villages). The results analysis were compared to the WHO Drinking Water Standards (i.e., seven parameters (pH, nitrate (as N), arsenic, chromium, copper, cyanide and mercury)) and Myanmar National Drinking Water Quality Standards (DWQS) (i.e., eight parameters (pH, ammonia (as N), nitrate (as N), arsenic, chromium, copper, mercury, and cyanide)).

Sample result at GW-1 which is located at the Project Site shown that ammonia values and cyanide were outside the recommended range of DWQS, and both DWQS and WHO standard, respectively. Ammonia can be oxidized from nitrate, a common element of fertilizer that may have been on local farm land; or ammonia can enter groundwater through sewage effluent and runoff from the farm land where manure has been applied or stored. Cyanide can be occasionally found in water, primarily as a concern of industrial contamination. The remaining parameters do not exceed the standard values of both WHO and DWQS.

Table 5-14 Groundwater Quality Survey Results (2020)

*WHO

Parameters	Physical and Aggregate Properties		Inorganic Non-metallic Parameters				Metals and Major Cations - Filtered					Aggregate Organics				
	Suspended solid	pH	Ammonia as N	Phosphorus	Nitrate as N	Nitrite as N	Arsenic	Chromium	Copper	Mercury	Cyanide	Biochemical Oxygen	Chemical Oxygen	Oil & Grease	Phenols (Total)	Faecal Coliform
Unit	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	MPN/100ml
WHO Guidelines	-	6.5 to 8.5	-*	-	50	-	0.01	0.05	2	0.006	0.07		-	-	-	-
Myanmar DWQS	-	6.5 to 8.5	1.5	-	50	-	0.05	0.05	2	0.001	0.07	-	-	-	-	-
GW-1	158	6.9	3.08	0.02	11.1	ND	0.0013	ND	ND	ND	20	1.5	51	ND	0.009	<1.8
GW-2	213	7.6	ND	0.23	ND	ND	0.0010	ND	ND	ND	ND	1.2	53	ND	ND	4.5
GW-3	6.5	7.1	ND	0.18	2.44	ND	0.0012	ND	ND	ND	ND	ND	26	ND	ND	2.0
GW-4	14.4	7.1	ND	0.03	0.62	ND	0.0006	ND	ND	ND	ND	1.2	29	ND	ND	4.5

Drinking Water Standards suggested Ammonia as N, Chloride and Zinc are not of health concern at levels found in drinking water

Key	
	Exceed both standards
	Exceed WHO Guidelines for Drinking Water Quality
	Exceed Myanmar National Drinking Water Quality

5.5.6.3 Surface Water Survey Results (2020)

Primary surface water quality surveys were conducted at 3 locations 23rd December 2021. Survey methodology and locations are provided in Section 5.3.1.

A description of the survey points and the results of the survey are shown in Table 5-15 and Table 5-16 respectively.

Table 5-15 Description of Surface Water Sampling Locations

Sampling location	Water Depth (m)	Description
SW-1	1.5	Yangon River, upstream of project site, about 1km from proposed jetty area. Water depth is 20m. The water is low transparency and highly turbid.
SW-2	1.5	Yangon River, at proposed jetty area. Water depth is 20m. The water is low transparency and highly turbid.
SW-3	1.5	Yangon River, downstream of project site, about 1km from proposed jetty area. Water depth is 20m. The water is low transparency and highly turbid.

Table 5-16 Surface Water Quality Survey Results (2021)

Parameters	Physical and Aggregate Properties		Inorganic Non-metallic Parameters				Metals and Major Cations - Filtered					Aggregate Organics				
	Suspended solid	pH	Ammonia as N	Phosphorus	Nitrate as N	Nitrite as N	Arsenic	Chromium	Copper	Mercury	Cyanide	Biochemical Oxygen Demand	Chemical Oxygen Demand	Oil & Grease	Phenols (Total)	Faecal Coliform
Unit	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	mg/L	mg/L	mg/L	mg/L	MPN/100ml
WHO Guidelines	-	6.5 to 8.5	1*	-	50	-	0.01	0.05	2	0.006	0.07	-	-	-	-	-
Myanmar DWQS	-	6.5 to 8.5	1.5	-	50	-	0.05	0.05	2	0.001	0.07	-	-	-	-	-
SW-1	214	6.9	ND	0.03	0.44	ND	0.0038	0.019	0.004	ND	ND	2.9	74	ND	ND	920
SW-2	126	7.2	ND	0.03	0.53	ND	0.0025	0.014	ND	ND	ND	ND	58	ND	ND	79
SW-3	78.7	7.3	ND	0.02	1.24	ND	0.0019	ND	ND	ND	ND	1.5	45	ND	ND	350

*WHO Drinking Water Standards suggested Ammonia as N, Chloride and Zinc are not of health concern at levels found in drinking water.

Key	
	Exceed both standards
	Exceed WHO Guidelines for Drinking Water Quality
	Exceed Myanmar National Drinking Water Quality

Surface water was sampled in three locations in Yangon River (upstream and downstream of the Project Site, and at the Project Site). The results were compared to the WHO Drinking Water Standards (i.e., seven parameters (pH, nitrate (as N), arsenic, chromium, copper, cyanide and mercury)) and DWQS (i.e., eight parameters (pH, ammonia (as N), nitrate (as N), arsenic, chromium, copper, mercury, and cyanide)).

None of the parameters at locations exceed WHO Drinking Water Standards and Myanmar National Drinking Water Quality Standards.

5.5.7 Traffic

A traffic survey was conducted at four locations (Figure 5.6) between 5th January 2021 and 7th January 2021. Type of vehicles are classified as per Table 5-17.

Table 5-17 Classification of vehicle types

No.	Classification	Description
1	Two-wheeled vehicle	Motorbike
2	Four-wheeled light vehicle	Sedan/pickups, small trucks (2-axles) and minibus
3	Four-wheeled heavy vehicle	Medium trucks (3-axles), larger trucks (4-axles and more) and bus/express
4	Other	Local tractor

5.5.7.1 Traffic Survey Results

Traffic volume recorded at the survey point is presented in Table 5-18 and Figure 5.15. The table shows that the number of all types of vehicle recorded each duration. Among four types of vehicles, two-wheel vehicle is highest because of local people mostly use the motorbike. Comparing between four-wheeled vehicles, the volume of four-wheeled light vehicle is also higher than heavy vehicles at all survey points.

Table 5-18 Vehicle Traffic Volume

Survey Point	Date	Survey Period	Two-wheeled vehicle	Four-wheeled light vehicle	Four-wheeled heavy vehicle	Others	Total
T1	Weekday (5.1.2021)	05:00-07:00	97	6	15	3	121
		8:00-11:30	312	67	5	13	397
		15:00-18:30	284	61	3	7	355
		20:30-22:30	13	4	0	0	17
	Weekend (9.1.2021)	05:00-07:00	51	4	0	9	64
		8:00-11:30	197	55	5	5	262
		15:00-18:30	264	68	15	8	355
		20:30-22:30	8	3	0	0	11
T2	Weekday (6.1.2021)	05:00-07:00	57	9	5	0	71
		8:00-11:30	181	125	10	4	320
		15:00-18:30	201	111	7	9	328
		20:30-22:30	6	3	0	2	11
	Weekend (9.1.2021)	05:00-07:00	74	6	6	13	99
		8:00-11:30	168	89	17	6	280
		15:00-18:30	223	95	23	9	350
		20:30-22:30	11	7	3	0	21
T3	Weekday (7.1.2021)	05:00-07:00	95	14	27	3	139
		8:00-11:30	290	307	240	3	840
		15:00-18:30	385	337	212	5	939

Survey Point	Date	Survey Period	Two-wheeled vehicle	Four-wheeled light vehicle	Four-wheeled heavy vehicle	Others	Total
		20:30-22:30	44	13	19	0	76
	Weekend (10.1.2021)	05:00-07:00	101	15	20	2	138
		8:00-11:30	209	122	149	8	488
		15:00-18:30	333	201	98	3	635
		20:30-22:30	10	2	2	0	14

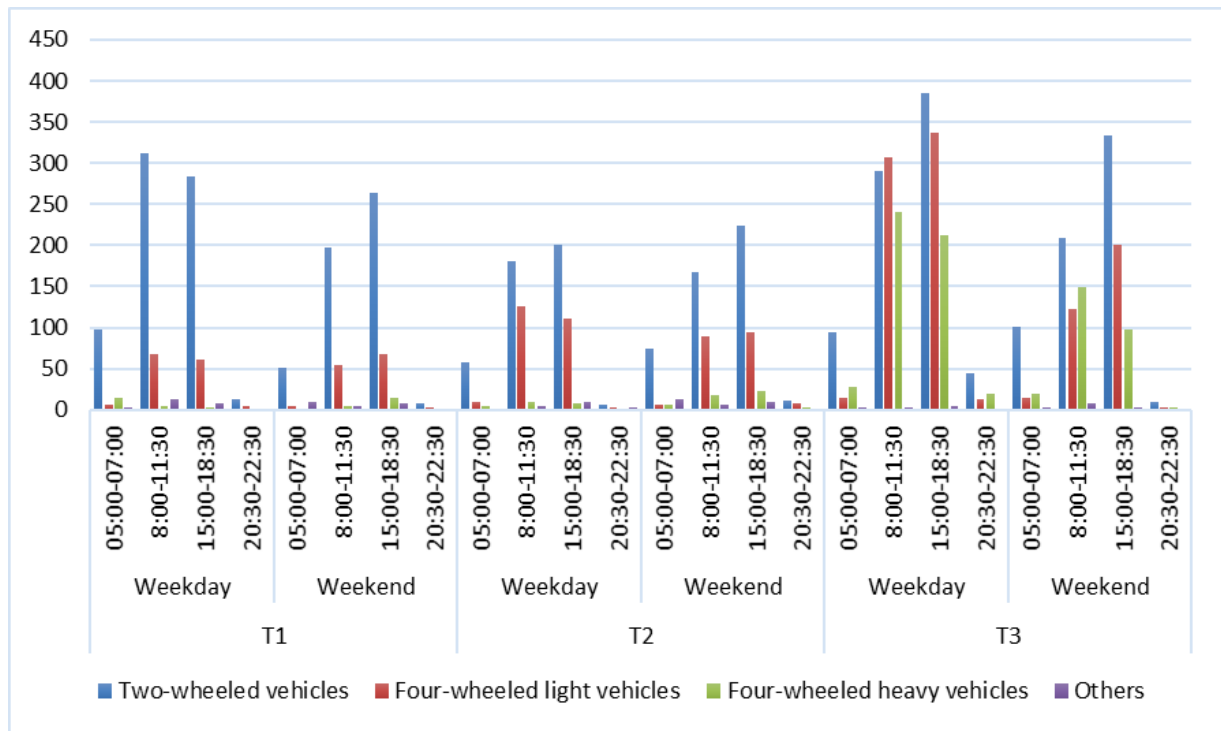


Figure 5.15 Vehicle Traffic Volume

1.8 Biological Components

5.5.8 Desktop Assessment Results

1.8.1.1 EcoRegion Description

The Project Site is characterised by generally flat plain area with rivers, creeks, channels, and lakes. The area has low elevation comprising no hills and low-lying fields. The nearest shoreline is around 20 km from Project Site. As the land use of the region is mostly intensive agricultural land and human settlement, there are limited records of varieties of wildlife species (General Administrative Department; Township Profile Report, 2019).

1.8.1.2 Species of Conservation Significance

The Integrated Biodiversity Assessment Tool (Integrated Biodiversity Assessment Tool, 2021) was used to identify threatened species likely to occur within 50 km of the Project Site. Threatened species were identified via the Integrated Biodiversity Assessment Tool (IBAT) species grid, freshwater species grid and nearby IBAs. Of the threatened species identified, there were 23 bird species, 41 fish species, 41 invertebrate species, 15 mammal species, three (3) plant species, seven (7) marine animal, and six (6) reptile species. Species listed as International Union for Conservation of Nature (IUCN) Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and restricted range were screened for this purpose. There are eight migratory bird and 18 migratory fish species from this data source within 50 km of the Project, which are species of conservation significance from IBAT report (Living International Treasure, 2019, Fish Base, 2019). One (1) restricted range species and one (1) endemic species were also recorded (IBAT, 2021) (Living International Treasure, 2019). The information from IBAT is summarised in Appendix D.

1.8.1.3 Invasive Species

An invasive species is an organism that inhabits a non-native ecosystem and can often reproduce in large numbers and spread over vast areas, damaging native species (Moore, B. A., 2005). Aside from impacts to local biodiversity, invasive species can also cause socio-cultural and economic impacts. There are 48 known invasive species in Myanmar, which, are listed in Table 5-19 (Moore, B. A., 2005). Of the total 44 flora species recorded during survey in the Study Area (Table 5-27), only three (3) species are recorded as invasive species. These are shown in pink in Table 5-19.

Table 5-19 Invasive Species in Myanmar

Taxonomic Group	Scientific Name	Common Name
Virus	Banana bunchy top virus (BBTV)	-
Bacteria	<i>Yersinia pestis</i>	-
Plant	<i>Acacia auriculiformis</i> +	Acacia
Plant	<i>Acacia longifolia</i>	-
Plant	<i>Acacia mangium</i>	-
Plant	<i>Adenantha pavonina</i>	-
Plant	<i>Ageratum conyzoides</i> +	Goat Weed
Plant	<i>Alternanthera philoxeroides</i>	-
Plant	<i>Cardamine flexuosa</i>	Wavy Bittercress
Plant	<i>Chromolaena odorata</i>	Siam Weed, Bitter Bush
Plant	<i>Eichhornia crassipes</i>	Water Hyacinth

Taxonomic Group	Scientific Name	Common Name
Plant	<i>Eichhornia crus-galli</i> +	Barnyard Grass
Plant	<i>Hyptis suaveolens</i> +	Bush Tea
Plant	<i>Imperata cylindrica</i>	Blady Grass
Plant	<i>Lantana camara</i> +	Lantana
Plant	<i>Leucaena leucocephala</i>	-
Plant	<i>Limnocharis flava</i>	-
Plant	<i>Loranthus pulverulentus</i> +	Mistletoe
Plant	<i>Mikania micrantha</i> +	Mile-a-Minute
Plant	<i>Mimosa diplotricha</i> +	Giant Sensitive Plant
Plant	<i>Mimosa pigra</i> +	Giant Sensitive Plant
Plant	<i>Paspalum conjugatum</i> +	Buffalo Grass
Plant	<i>Pennisetum</i> spp. +	Mission Grass
Plant	<i>Prosopis juliflora</i> +	Mesquite
Plant	<i>Sorghum halepense</i> +	Johnson Grass
Plant	<i>Ziziphus mauritiana</i>	Chinese Date
Algae	<i>Acanthophora spicifera</i>	-
Insect	<i>Aedes aegypti</i>	Yellow Fever Mosquito
Insect	<i>Brontispa longissima</i>	Coconut Leaf Beetle
Insect	<i>Matanastria grisea</i> +	Gypsy Moth
Insect	<i>Paratrechina longicornis</i>	Longhorn Crazy Ant
Insect	<i>Solenopsis geminata</i>	Tropical fire Ant
Insect	<i>Tapinoma melanocephalum</i>	Ghost Ant
Insect	<i>Trogoderma granarium</i>	Khapra Beetle
Invertebrate	<i>Achatina fulica</i> +	Giant African Snail
Invertebrate	<i>Pomacea canaliculata</i> +	Golden Apple Snail
Invertebrate	<i>Teredo</i> spp. +	Shipworm
Invertebrate	<i>Varroa jacobsoii</i> +	Parasitic Bee Mite
Fish	<i>Clarias gariepinus</i>	African Sharptooth Catfish
Fish	<i>Ctenopharyngodon idella</i>	Grass Carp
Fish	<i>Cyprinus carpio</i>	European Carp
Fish	<i>Gambusia affinis</i>	Mosquito Fish
Fish	<i>Hypophthalmichthys nobilis</i>	Bighead Carp
Fish	<i>Oreochromis aureus</i>	Tilapia
Fish	<i>Poecilia reticulata</i>	Guppy
Fish	<i>Labeo rohita</i>	Rohu
Reptile	<i>Hemidactylus frenatus</i>	Common House Gecko
Mammal	<i>Rattus exulans</i>	Polynesian Rat/Pacific Rat

Notes: + Additionally sourced from Myanmar NBSAP 2015-2020 (2015), Moore, B. A., 2005

Acacia mangiumm, *Ageratum conyzoides*, *Chromolaena odorata*, and *Leucaena leucocephala* were recorded in the Project site.

5.5.9 Field Survey Findings

Field surveys were conducted by local specialists between 21st and 29th December 2020, as discussed in Section 5.3.1. The results of these surveys are provided in the following sections.

1.8.1.4 Fauna

A biodiversity survey was conducted that covered a range of fauna species including mammals, birds, fish, reptiles, butterflies. The fauna survey was conducted via direct observation in the field observation of track and sign such as footprint and feeding signs in their natural habitats and interview survey were local communities. Fauna species were found Least Concern and Not Evaluated. There was no threatened species recorded during survey. A summary of the number of species recorded in provided in Table 5-20.

Table 5-20 Number of Species Record during Field Survey

Fauna Group	Total Number of Species
Mammal	2
Bird	30
Fish	19
Butterflies	8
Reptiles	6
Total	65

Mammals

Mammal were identified through direct observation and interview survey one mammal species were recorded. One species was interview from local people in survey area. According to the IUCN Red List of threatened species, all species was least concerned and there was no threatened and no endemic species (Table 5-21).

Table 5-21 Mammals Species Recorded during Field Survey

No	Common Name	Scientific Name	Family Name	Conservation Status		Record Method
				Myanmar	IUCN Status ¹	
1	Java Mongoose	<i>Herpestes javanicus</i>	Herpestidae	NPWA	LC	Interviewed
2	Greater Bandicoot	<i>Bandicota indica</i>	Muridae		LC	Observed

¹= IUCN (2020): LC = Least Concerned
NPWA = Normally Protected Wildlife Animal



Source: projectnoah.org

Figure 5.16 Java Mongoose

Birds

A total of 30 bird species were recorded during the survey are listed in Table 5-22. All species classified as least concerned on the IUCN Red List 2020. One endemic species “White throated Babbler” was observed in the Survey Area. There was no threatened species. Among 30 bird species recorded, 10 species are classified as migratory birds as according to Bird Life international 2020. Photos of birds observed during the survey are provided in Figure 5.17.

Table 5-22 Bird Species Recorded during Field Survey

No	Common Name	Scientific Name	Family	Conservation Status		Migratory ²
				Myanmar	IUCN ¹	
1	White_throated Kingfisher	<i>Halcyon smyrnensis</i>	Halcyonidae	CPWA	LC	
2	Oriental Magpie Robin	<i>Copsychus saularis</i>	Muscicapidae	SPWA	LC	
3	White Wagtail	<i>Motacilla alba</i>	Motacillidae		LC	Y
4	Little Cormorant	<i>Microcarbo niger</i>	Phalacrocoracidae		LC	Y
5	Common Sandpiper	<i>Actitis hypoleucos</i>	Scolopacidae	CPWA	LC	Y
6	Brahminy Kite	<i>Haliastur indicus</i>	Accipitridae	CPWA	LC	
7	Indian Pond Heron	<i>Ardeola grayii</i>	Ardeidae	NPWA	LC	Y
8	Little Egret	<i>Egretta garzetta</i>	Ardeidae	NPWA	LC	Y
9	Barn Swallow	<i>Hirundo rustica</i>	Hirundinidae	SPWA	LC	Y
10	House Crow	<i>Corvus splendens</i>	Corvidae		LC	
11	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	CPWA	LC	Y
12	Spotted Dove	<i>Spilopelia chinensis</i>	Colubidae	SPWA	LC	Y
13	Rock Pigeon	<i>Columba livia</i>	Colubidae		LC	
14	Red_collared Dove	<i>Streptopelia tranquebarica</i>	Colubidae	SPWA	LC	
15	House Sparrow	<i>Passer domesticus</i>	Passeridae	SPWA	LC	
16	Common Myna	<i>Acridotheres tristis</i>	Sturnidae		LC	
17	Jungle Myna	<i>Acridotheres fuscus</i>	Sturnidae	LPWA	LC	
18	Asian Pied Starling	<i>Gracupica contra</i>	Sturnidae	LPWA	LC	
19	Vinous_breasted Myna	<i>Acridotheres burmannicus</i>	Sturnidae	LPWA	LC	
20	Red_whiskered Bulbul	<i>Pycnonotus jocosus</i>	Pycnonotidae		LC	
21	Red_vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	SPWA	LC	
22	Streak_eared Bulbul	<i>Pycnonotus conradi</i>	Pycnonotidae		LC	

No	Common Name	Scientific Name	Family	Conservation Status		Migratory ²
				Myanmar	IUCN ¹	
23	White_throated Babbler	<i>Argya gularis (Chatarrhaea gularis)</i>	Leiothrichidae		LC/ endemic to Myanmar	
24	Indian Roller	<i>Coracias benghalensis</i>	Coraciidae	NPWA	LC	
25	Asian Palm Swift	<i>Cypsiurus balasinesis</i>	Apodidae		LC	
26	Brown Shrike	<i>Lanius cristatus</i>	Laniidae	SPWA	LC	Y
27	Lesser spotted Woodpecker	<i>Dryobates minor</i>	Picidae		LC	
28	Little Green Bee Eater	<i>Merops orientalis</i>	Meropidae	NPWA	LC	Y
29	Plain Prinia	<i>Prinia inornata</i>	Cisticolidae	SPWA	LC	
30	Grey breasted Prinia	<i>Prinia hodgsonii</i>	Cisticolidae	SPWA	LC	

¹ = IUCN (2020): LC = Least Concerned

² =Bird Life International (2020): Y=Yes (Migratory)

CPWA = Completely Protected Wild Animal; NPWA = Normally Protected Wild Animal; SPWA = Seasonally Protected Wild Animal



White_throated Babbler (Argya gularis)



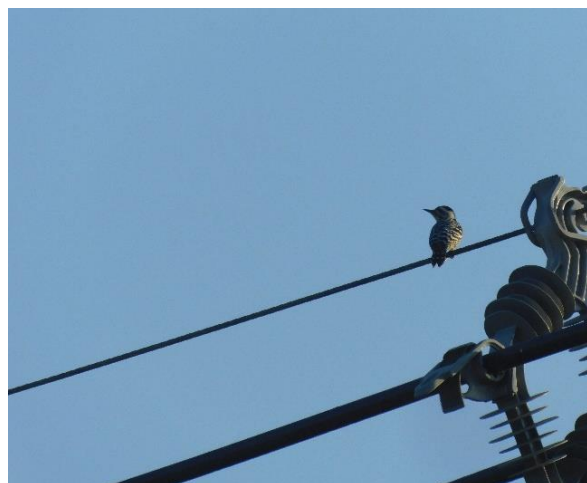
Red_whiskered Bulbul (Pycnonotus jocosus)



Common Sandpiper (Actitis hypoleucos)



Little Cormorant (Microcarbo niger)



Asian Pied Starling (Gracupica contralis)

Lesser spotted Woodpecker (Dryobates minor)

Source: ERM Field Survey (2020)

Figure 5.17 Bird Species Recorded During Field Survey

Fish

A field survey and interview with local fishers from the nearby Study Area were conducted in 2020. Fishing activities in this area are mostly traditional methods such as cast nets. Fishers were also interviewed with regards to the fishery process. A total of 19 species distributed amongst 14 family groups were identified. The most common species are *Puntius ticto* and *Channa orientalis*. The dominant Family is Cyprinidae (carp). According to the IUCN Red List of threatened species, all species were least concerned and/or not evaluated; there are no species of conservation concern. The list of fish species recording during field survey is provided in Table 5-23.

Table 5-23 Fish Species Recorded during Field Survey

No	Family Name	Scientific Name	Common Name	IUCN ¹
1	Notopteridae	<i>Notopterus notopterus</i>	Grey feather-back	LC

No	Family Name	Scientific Name	Common Name	IUCN ¹
2	Cyprinidae	<i>Catla catla</i>	Catla	NE
3	Cyprinidae	<i>Puntius ticto</i>	Ticto barb	LC
4	Cyprinidae	<i>Cirrhinus mrigala</i>	Mrigal	LC
5	Cyprinidae	<i>Labeo angra</i>	Angra labeo	LC
6	Cyprinidae	<i>Labeo boga</i>	Boga labeo	LC
7	Belontiidae	<i>Colisa labiosa</i>	Stripled gourami	LC
8	Bagridae	<i>Mystus cavasius</i>	Gangetic mystus	LC
9	Bagridae	<i>Mystus leucophasis</i>	Sittang mystus	LC
10	Belonidae	<i>Xenentodon cancila</i>	Freshwater garfish	LC
11	Anabantidae	<i>Anabas testudineus</i>	Climbing perch	DD
12	Channidae	<i>Channa orientalis</i>	Asiatic snakehead	LC
13	Latidae	<i>Lates calcarifer</i>	Seabass	LC
14	Pangasiidae	<i>Pangasius pangasius</i>	Pangas Catfish	LC
15	Sciaenidae	<i>Otolithoides pama</i>	Croaker	LC
16	Polynemidae	<i>Polynemus paradiseus</i>	Indian salmon	LC
17	Polynemidae	<i>Eleutheronema tetradactylum</i>	King fish	LC
18	Clupeidae	<i>Tenualosa ilisha</i>	Hilsa	LC
19	Palaemonidae	<i>Macrobrachium malcolmsonii</i>	Monsoon River Prawn	LC

¹ =IUNC (2020): DD = Data Deficient, LC = Least Concerned, NE = Not Evaluated



Channa orientalis



Tenualosa ilisha



Anabas testudineus



Colisa labiosa

Source: ERM Field Survey (2020)

Figure 5.18 Fish Species Recorded During Field Survey

Reptiles and Amphibians

A total of six reptile species was identified during the survey and listed in Table 5-24. Three species were observed and three species were identified from interviews with local people in Survey Area. According to IUCN Red List of threatened species, there was no threatened species and endemic species in this area.

Table 5-24 Reptiles Species Recorded during Surveys

No	Common Name	Scientific Name	Family Name	Conservation Status		Observation / Status
				Myanmar	IUCN Status ¹	
1	Indian Rat Snake	<i>Ptyas mucosa</i>	Colubridae	CPWA	NE	Interview
2	Garden Lizard	<i>Calotes versicolor</i>	Agamidae		NE	Observed
3	Common Sun Skink	<i>Eutropis multifasciata</i>	Scincidae		NE	Observed
4	Chequered Keelback Water Snake	<i>Xenochrophis piscator</i>	Colubridae		NE	Observed
5	Russell's Viper	<i>Daboia russelii</i>	Viperidae		NE	Interview
6	Monocled Cobra	<i>Naja kauuthia</i>	Elapidae	CPWA	LC	Interview

¹ =IUCN (2020): LC = Least Concerned, NE = Not Evaluated
CPWA = Completely Protected Wildlife Animals



Source: ERM Field Survey (2020)

Figure 5.19 Garden Lizard (*Calotes versicolor*)



Source: ERM Field Survey (2020)

Figure 5.20 Chequered Keelback Water Snake (*Xenochrophis piscator*)

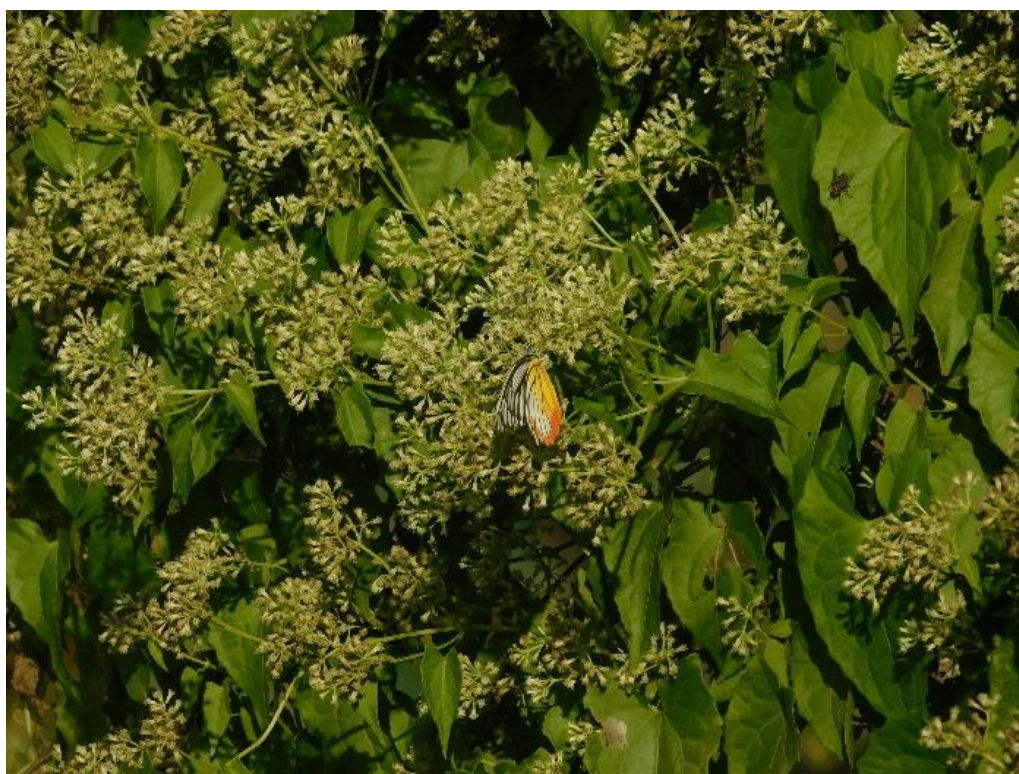
Butterflies

A total of eight species of butterflies under the order Lepidoptera were recorded. According to the IUCN Red List of (2020), one species, *Junonia almana* is classified as Least Concern and there are no threatened species. The list of butterflies recording during field survey is provided in Table 5-25.

Table 5-25 Butterflies Recorded during Field Survey

No.	Common Name	Scientific Name	Family Name	IUCN ¹
1	Common Emigrant	<i>Catopsilia pomona</i>	Pieridae	NE
2	Common Jezebel	<i>Delias eucharis</i>	Pieridae	NE
3	Common Grass Yellow	<i>Eurema hecabe</i>	Pieridae	NE
4	Plain Tiger	<i>Danaus chrysippus</i>	Nymphalidae	NE
5	Blue Tiger	<i>Tirumala limniace</i>	Nymphalidae	NE
6	Leopard lacewing	<i>Cethosia cyane</i>	Nymphalidae	NE
7	Grey Pansy	<i>Junonia atlites</i>	Nymphalidae	NE
8	Peacock Pansy	<i>Junonia almana</i>	Nymphalidae	LC

¹=IUCN (2019): LC = Least Concerned, NE = Not Evaluated



Source: ERM Field Survey (2020)

Figure 5.21 Common Jezebel (*Delias eucharis*)



Source: ERM Field Survey (2020)




Figure 5.22 Common Emigrant (*Catopsilia Pomona*)


1.8.1.5 Habitat Mapping

Satellite imagery was used to map the land classes identified around the Project Site. These land classes were verified during the field investigations. Three major habitat types were observed in the Study Area namely; (1) Mangrove area, (2) agricultural land, and (3) Shrub land. The habitat map of the proposed Project Site was shown in Figure 5.23. The land class descriptions are provided in

Table 5-26.

Table 5-26 Land Class Description

Land Class	Description	Natural/ Modified Class	Photo (Source: ERM Field Survey, 2020)
Shrub land	Shrub land is a low-density forest forming open habitats with plenty of sunlight and limited shade. Shrub land support shrubs and herbaceous plants including grasses. Small shrub land patches are scattered throughout the Study Area.	Natural	
Agricultural Land	Agricultural land is typically land devoted to agriculture, the systematic and controlled use of other forms of life, particularly the rearing of livestock and production of crops, to produce food for humans or animals. It is therefore generally synonymous with both farmland or cropland, as well as pasture or rangeland. This type of land is the most predominant land class in the Study Area.	Modified	
Mangrove	Mangrove can be found in low altitude coastal and sub -coastal area along river bank. A mangrove is a tree, shrub, palm or ground fern, generally exceeding one metre in height that normally grows above sea level in the intertidal zone of marine coastal environment and Eurasian margins.	Natural	

Land Class	Description	Natural/ Modified Class	Photo (Source: ERM Field Survey, 2020)
Residential Area	Human settlements occur on the north-eastern side of the Project Site (Thidar Myaing Ward), although no human settlement is observed in the Project Site.	Modified	

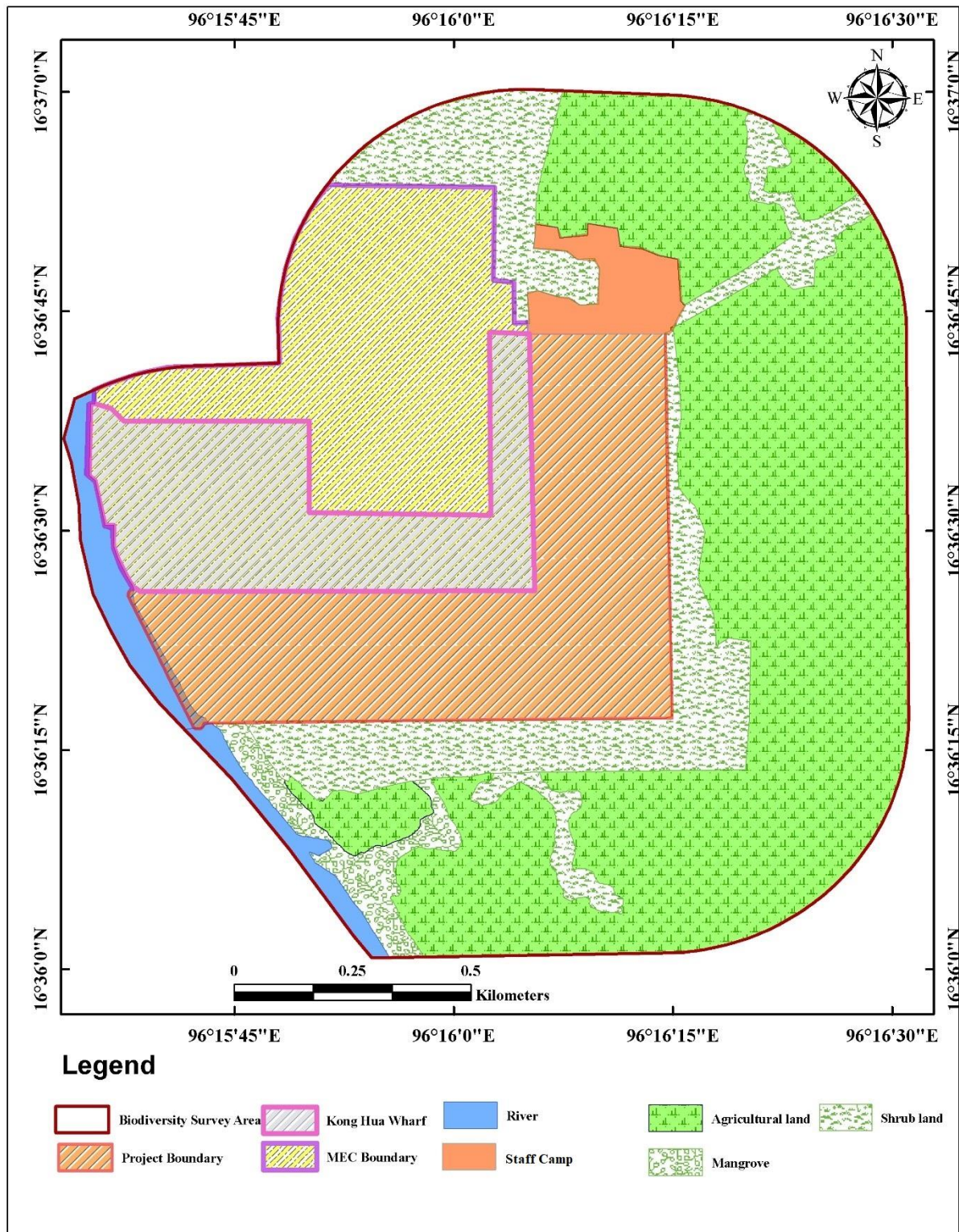


Figure 5.23 Habitat Map of the Study Area

1.8.1.6 Flora

Floral surveys were conducted to obtain an understanding of the diversity of floral taxa groups. Of the 44 floral species identified during the surveys, two (2) species are listed as Endangered and are found in Shrub land,

Environmental Impact Assessment Report

out of Project site, 19 species were classified as Least Concern, two (2) as Data Deficient, and 21 as Not Yet Assessed on the IUCN Red List. Endemic/ restricted range floral species (Living International Treasures, 2020) were not observed during field survey (Living International Treasures, 2020). Table 5-27 provides the findings of the flora survey for the Study Area. There are also two reserved species under the Forest Law notification (identified in Table 5-27). These species are not allowed to be cut; however they are located outside of the Project Site and not in the footprint of the Project.

Htan or Palmyrah Palm (*Borassus flabellifer*) is identified as Endangered on IUCN Red List and is an economically important flora species. The part of the plant such as root, leaves, seeds and fruits are used for various purposes (Aman, et al., 2018). The exploration of natural resources and expansion of agricultural and human settlement are the main threats to the species.

Padauk (*Pterocarpus macrocarpus*) is also listed as Endangered on the IUCN Red List. It is also known as Burma Padauk, and a major timber species in Southeast Asia, where large quantities are exported each year. Most timber is harvested from natural forests and the species is suffering both from overexploitation and also loss of habitat through agricultural expansion.

Table 5-27 Floral Species Recorded during Field Survey

No	Common Name	Family Name	Scientific Name	IUCN ¹	Endemic / Restricted Range ² / Reserved ³
1	Kokko	Mimosaceae	<i>Albizia lebbek</i>	LC	-
2	Mangansha	Fabaceae	<i>Acacia mangium</i>	LC	-
3	Taw-pike-san	Fabaceae	<i>Crotalaria sericea</i>	LC	-
4	Malaka	Myrtaceae	<i>Psidium guajava</i>	LC	-
5	Bezatz	Asteraceae	<i>Chromolaena odorata</i>	NE	-
6	Magyi	Caesalpiniaceae	<i>Tamarindus indica</i>	LC	-
7	Banda	Combretaceae	<i>Terminalia catappa</i>	LC	-
8	Thayet	Anacardiaceae	<i>Mangifera indica</i>	DD	-
9	Sekku-pan	Nyctaginaceae	<i>Bougainvillea spectabilis</i>	NE	-
10	Khaya	Acanthaceae	<i>Acanthus ebracteatus</i>	LC	-
11	Dani	Areaceae	<i>Nypa fruticans</i>	LC	-
12	Lamu	Lythraceae	<i>Sonneratia caseolaris</i>	LC	-
13	Pinle-kabwe	Casuarinaceae	<i>Casuarina equisetifolia</i>	LC	-
14	Thaman-shaw	Malvaceae	<i>Thespesia lampas</i>	NE	-
15	Kala-magyi	Mimosaceae	<i>Pithecellobium dulce</i>	LC	-
16	Tikayone	Mimosaceae	<i>Mimosa pudica</i>	NE	-
17	Dantalon	Moringaceae	<i>Moringa aleifera</i>	NE	-
18	Thinbaw	Caricaceae	<i>Carica papaya</i>	DD	-
19	Malaysia-padauk	Mimosaceae	<i>Acacia auriculiformis</i>	LC	-
20	Kyun	Verbenaceae	<i>Tectona grandis</i>	NE	Reserved
22	Padauk	Fabaceae	<i>Pterocarpus macrocarpus</i>	EN	Reserved
21	Ohn	Areaceae	<i>Cocas nucifera</i>	NE	-

Environmental Impact Assessment Report

No	Common Name	Family Name	Scientific Name	IUCN ¹	Endemic / Restricted Range ² / Reserved ³
23	Thabut-gyi	Annonaceae	<i>Milium velutina</i>	NE	-
24	Bawdi-nyaung	Moraceae	<i>Ficus religiosa</i>	NE	-
25	Thabye	Myrtaceae	<i>Syzygium syzygioides</i>	NE	-
26	Htan	Arecaceae	<i>Borassus flabellifer</i>	EN	-
27	Zi	Rhamnaceae	<i>Ziziphus jujuba</i>	LC	-
28	Sit	Mimosaceae	<i>Albizia procera</i>	LC	-
29	Nget-pyaw	Musaceae	<i>Musa sapientum</i>	NE	-
30	Khayay	Sapotaceae	<i>Manikara hexandra</i>	NE	-
31	Paukpan-byu	Fabaceae	<i>Sesbania grandiflora</i>	NE	-
32	Sin-hna-maung	Boraginaceae	<i>Heliotropium indium</i>	NE	-
33	Ye-kazun	Convolvulaceae	<i>Ipomoea aquatica</i>	LC	-
34	Ta-myet-si	Acanthaceae	<i>Eranthemum macrophyllum</i>	NE	-
35	Kaing	Poaceae	<i>Mnesithea striata</i>	NE	-
36	Katsi-hne	Poaceae	<i>Setaria forbesiana</i>	NE	-
37	Gaung-onsa	Fabaceae	<i>Maghania strobilifera</i>	NE	-
38	Nyan	Fabaceae	<i>Sesbania cannabina</i>	LC	-
39	Wet-la	Cyperaceae	<i>Cyperus pangorei</i>	LC	-
40	Chin- ya	Euphorbiaceae	<i>Flueggea virosa</i>	NE	-
41	Wetchi-pane	Malvaceae	<i>Urena lobata</i>	LC	-
42	Pazun-sa	Amaranthaceae	<i>Alternanthera sessilis</i>	LC	-
43	Pilaw-kha	Tiliaceae	<i>Corchorus aestuans</i>	NE	-
44	Kazun-gyi	Convolvulaceae	<i>Argyreia nervosa</i>	NE	-

¹ = IUCN (2019): DD = Data Deficient, EN = Endangered, LC = Least Concerned, NA = Not applicable, NE = Not Evaluated,

² = Living International Treasure (2020)

³ = Reserved Trees under the Forest Law (2019)



Crotalaria sericea



Tectona grandis



Argyreia nervosa



Acanthus ebracteatus

Source: ERM Field Survey, 2020

Figure 5.24 Observed Flora Species during Field Survey

5.5.9.1 Sediment Assessment

5.6 Socio-Economic Components

This section aims to outline the socio-economic background of the Study Area. It includes the following components:

- Overview of Townships within the Study Area;
- Demography;
- Education;
- Public health;
- Traffic and Transport;
- Living conditions and public services; and
- Income and livelihood.

Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation is not yet conducted. Public consultation and primary socio-economic data collection for EIA investigation will be conducted after situation allowed in order to have better participation by stakeholders, including land owner and land users affected by land acquisition of the Project. The EIA Report will be updated once the public consultation and primary socio-economic data collection for EIA investigation is done.

5.6.1 Overview of Townships within the Study Area

5.6.1.1 Yangon Region

Yangon's transport infrastructure includes roads, railways, ports, and airports. There are a number of roads connecting Yangon Region with other States and Regions of Myanmar. There is a railway station in Yangon that connects to different parts of the country. Yangon Port receives international and domestic vessels and Twantay Canal connects Yangon River with Irrawaddy River. The biggest international airport in the country is located in Yangon.

5.6.1.2 Kyauktan Township

With an area of 849 km², Kyauktan is located in the southern district of Yangon Region. It has thirteen (13) wards and 45 village tracts. The mean household size is 3.9 persons which is relatively smaller than Union Average (4.7 persons) and only 26% of the population lives in urban areas. The population growth rate is around 1% annually. Nearly half of the households are living in bamboo houses (45%), followed by households in wooden houses (39%) (Myanmar Population and Housing Census, 2014). The most common ethnicity is Bamar (97%), followed by Indian and Chinese. The dominant religion is Buddhism, although Christianity, Islam and Hinduism are also prevalent. Rice is the main agricultural crop while pulses and beans are cultivated during the dry season as second crop. As the township is situated near Thilawa SEZ, there is significant development of suburban areas.

5.6.1.3 Kawhmu Township

Kawhmu is located on the western bank of Yangon River over an area of about 624 km² and about 15 feet above sea level. It has seven (7) wards and fifty five (55) village tracts. Only 8% of the population live in urban areas and the area is experiencing a population growth rate of 1.4% annually. Mean household size is 4.1 persons which is slightly smaller than Union Average (4.7 persons) and unemployment rate is low at around 3.55%. The majority of the population are Burmese (84%), followed by Karen (15%) although there also has some other ethnicities. Rice is the major crop while rubber and coconut plantations are observed in the Township.

5.6.1.4 Dala Township

Dala is also on the western bank of Yangon River and bordered with Kawhmu in the south. It has twenty (24) wards and twenty three (23) village tracts covering an area of 224 km². As the township is only around 12 feet above sea level, certain wards and village tracts are classified as a flood risk area. In Dala Township, there is a main road and the Dala pier, which ferries cars and people from Pansodan Pier of Yangon to Dala. The Dala Ferry Terminal transports approximately 30,000 passengers per day. A bridge connecting Yangon City and Dala Township is planned to be constructed in the future.

5.6.2 Overview of Villages in Study Area

There are 10 villages, 3 wards and one town within the Study Area. Their respective distances to the project are summarised in Table 5-28.

Table 5-28 Distances between the Project and Villages within Study Area

Township	Village Tract/ Town	Village/ Ward	Distance to Project (km)
Kyauktan	Chaung Wa Village Tract	Chaung Wa Village	2.5
Kyauktan	Urban Area	Thida Myaing Ward	3.9
Kyauktan	Urban Area	Kyaik Ka Mawt Ward	5.7
Kyauktan	Urban Area	Kyar Kan Deik Ward	6.5
Kyauktan	Tha Nat Pin Chin Village Tract	Mway Pway Kone Village	3.4
Kyauktan	Tha Nat Pin Chin Village Tract	Tha Nat Pin Chin Village	3.0
Kyauktan	Baw Ka Lut Village Tract	Baw Ga Lut Village	3.8
	Baw Ka Lut Village Tract	Kha Mei Village	7.3
Kyauktan	Kyauktan Town		6.1
Kyauktan	Chaung Wa Village Tract	Chaung Wa Village	2.5
Kawhmu	Tha Khut Pin Village Tract	Tha Khut Pin Village	3.4
Kawhmu	Tha Khut Pin Village Tract	Set Su Village	4.6
Dala	Da Noke San Pya Village Tract	Da Noke San Pya Village	4.8
Dala	Nyaung Chaung Village Tract	Chaung U Village	4.9

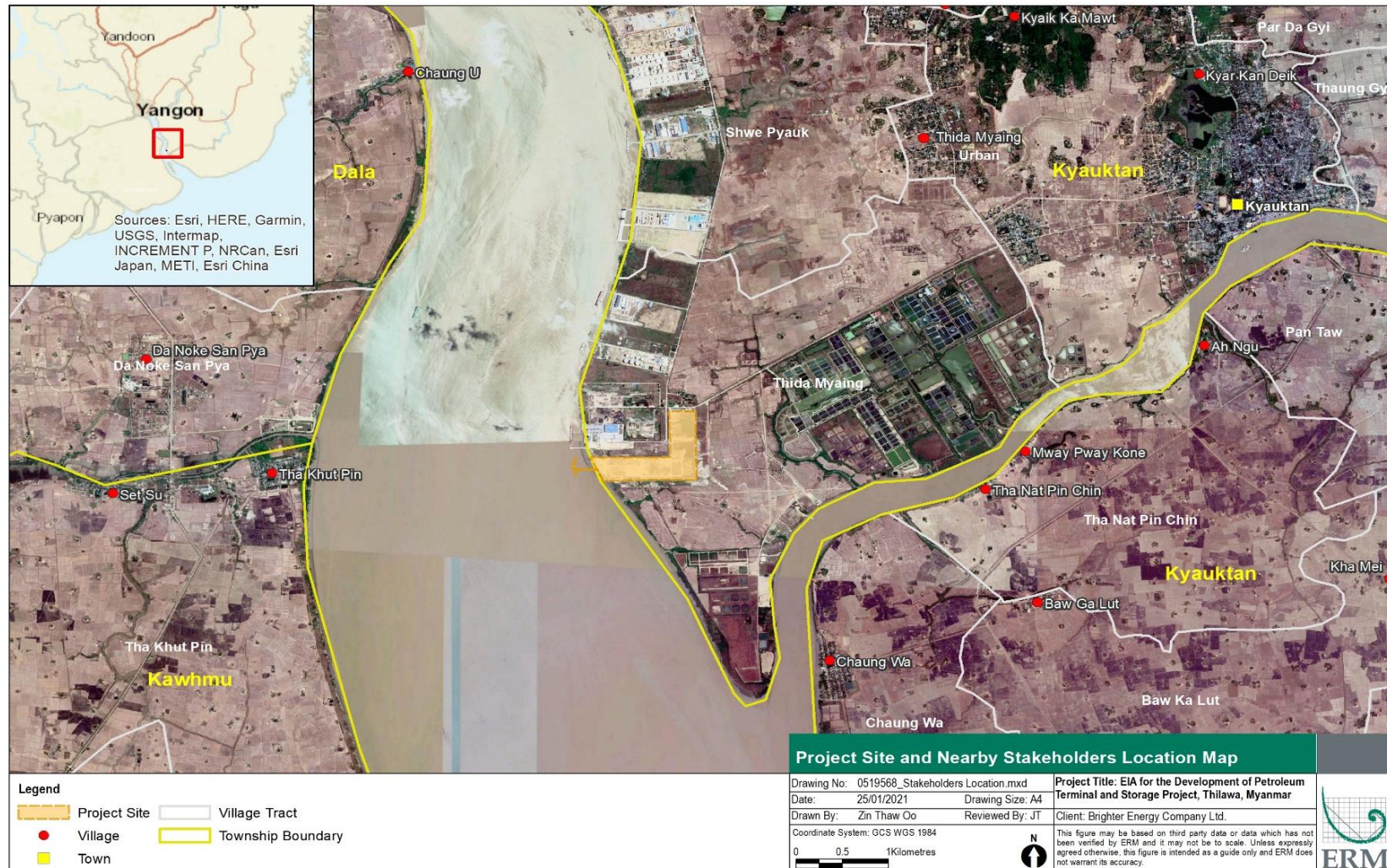


Figure 5.25 Villages in the Study Area

5.6.3 Demographic Conditions

5.6.3.1 Population Density and Male to Female Ratio

According to the General Administration Department (GAD) Township Profile Report, although the number of inhabitants in Kyauktan Township is higher than other townships in the Study Area, the highest population density is observed in Dala Township, with 739 inhabitants per square kilometre (inh/km²). This is, however, significantly lower than the average population density of Yangon's urban areas (2,844 inh/km²). The lowest population density within the Study Area is Kyauktan, with 201 inh/km² (General Administration Department Township Profile Report, 2019). The male to female ratio are similar in these three townships (Table 5-29).

Table 5-29 Overview of Population and Demographics in Kyauktan, Kawhmu and Dala Townships

Item	Kyauktan Township	Kawhmu Township	Dala Township
Total Population	169,659	135,336	165,625
Male Population	83,359 (49.1%)	66,405 (49%)	80,896 (48.8%)
Female Population	86,300 (50.9%)	68,931 (51%)	84,729 (51.2%)
Area (km ²)	844	624	224
Population Density (Inh./km ²)	201	217	739

Source: General Administration Department Township Profile Report, 2019

5.6.3.2 Urban and Rural Population

Rural areas are classified by the GAD as village tracts. Generally these areas have low population density and are predominantly agricultural land. Urban areas are classified by the GAD as wards. Generally, these areas have an increased density of building structures, population, and better infrastructural development compared to rural areas (Myanmar Population and Housing Census Township Report, 2014).

According to the GAD reports in 2019, except Dala Township (42%), the majority of the population in Kyauktan and Kawhmu is living in rural areas at 73% and 92% respectively.

5.6.3.3 Ethnicity

In all townships, the main ethnicity is Burmese where Karen is the second major ethnicity. Details of ethnicity in Kyauktan, Kawhmu, and Dala Townships are summarised in Table 5-30.

Table 5-30 Ethnicity in Kyauktan, Kawhmu and Dala Township

Ethnicity	Kyauktan Township (Number of Population)	Kawhmu Township (Number of Population)	Dala Township (Number of Population)
Burmese	164,581	114,267	156,333
Karen	224	20,740	2,462
Rakhine	90	8	517
Mon	8	-	88
Chin	12	-	40
Shan	3	109	-

Source: General Administration Department Township Profile Report, 2019

5.6.3.4 Religion

According to GAD township profile report (2019), most of the population practise Buddhism followed by other major religions where Dala has more people practising Islam and Hindu than the other two townships (Table 5-31).

Table 5-31 Religion in Kyauktan, Kawhmu and Dala Township

Religion	Kyauktan Township (Number of Population)	Kawhmu Township (Number of Population)	Dala Township (Number of Population)
Buddhist	164,581	133,212	148,363
Christian	1,220	1,850	2,437
Hindu	3,264	110	6,974
Islam	594	164	7,748

Source: General Administration Department Township Profile Report, 2019

Figure 5.26 Demographic Characteristics of the Study Area

5.6.4 Education

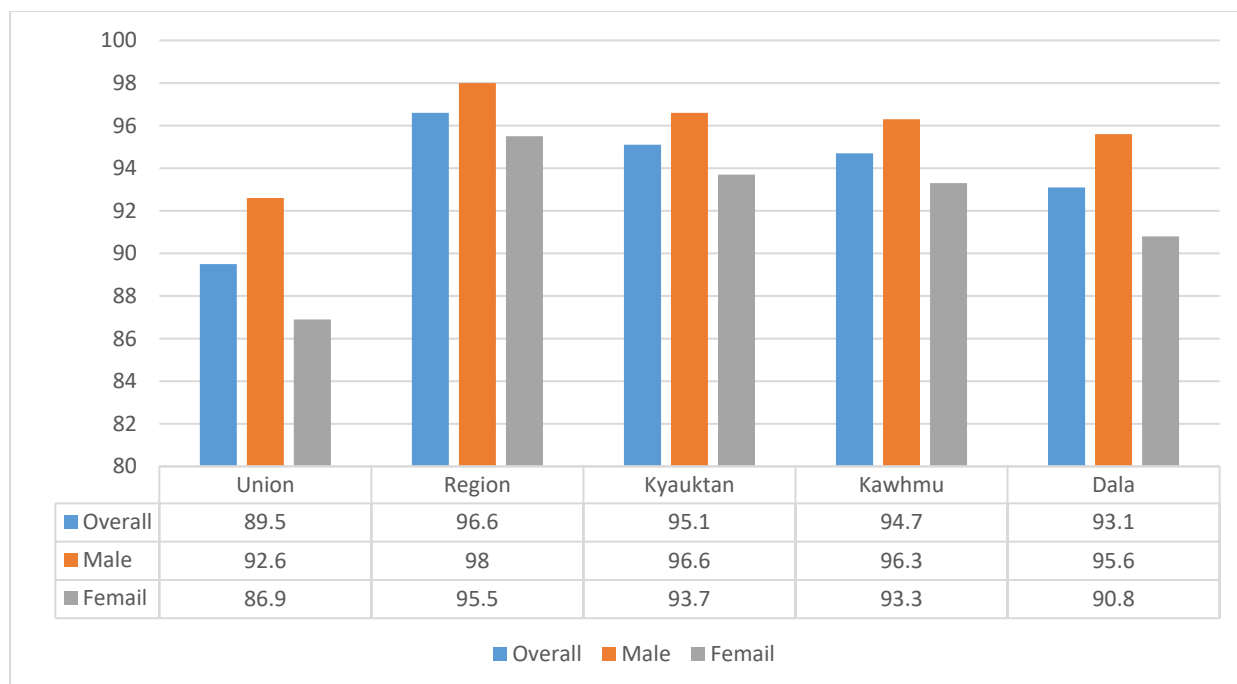
The number of schools within the Townships in the Study Area is summarised in Table 5-32. Kyauktan has the most schools, while Dala has the least. Although Dala has a higher population than Kawhmu, it has 50% fewer schools. Teacher-student ratio in High School is highest in Dala (1:36). Therefore, some students have to go to neighbour townships in order to continue their education. Kyauktan has good educational services and the rate of students who passed the matriculation exam is highest (30.6%) in the Study Area.

Table 5-32 Number of Schools within the Townships in the Study Area

Township	University	High School	Middle School	Primary School	Nursery School	Monastic Education
Kyauktan	-	8	16	94	29	5
Kawhmu	-	11	12	106	7	5
Dala	-	6	10	60	2	3

Source: General Administration Department Township Profile Report, 2019

In terms of literacy rate, all the townships have literacy rates higher than the Union Average (89.5%) (Figure 5.22). Kyauktan has the most schools and also the lowest gender gap in literacy. Dala has the highest gender gap in literacy rate (Myanmar Population and Housing Census Township Report, 2014).



Source: Myanmar Population and Housing Census, 2015
* Persons aged 15 and over

Figure 5.27 Literacy Rate at Union, Region and Township Level

5.6.5 Public Health

An increase of life expectancy is observed at every state and region from 2014 to 2020 as the country increase its expenditure (4.8% of GDP by 2018) on health care. In general, the life expectancy in Yangon shows an increasing trend from 65.6 years in 2014 to 67.8 years in 2020 for both sexes (MoHS, 2020). Table 5-33 summarises the number of public health facilities within the Townships in the Study Area and Table 5-34 shows the health professional-to-patient ratios. Although Kyauktan has more public health care facilities, doctors to total population ratio is lower than in other Townships. The highest nurse to population rate is observed in Kawhmu. However, in general, all the townships have lower numbers of medical professionals compared to the Union and Regional averages.

The most common diseases in the Study Area are diabetes, hypertension, stroke, pneumonia, tuberculosis, pneumonia and diarrhoea (especially in Under Age 5).

Table 5-33 Public Health Facilities within the Townships in the Study Area

Township	Hospitals		Clinics	Rural Health Centres
	Public	Private		
Kyauktan	6	-	1	47
Kawhmu	3	-	12	22
Dala	3	-	27	12

Source: General Administration Department Township Profile Report, 2019

Table 5-34 Health Professional-to-Patient Ratios within the Townships in the Study Area

Township	Medical doctors to total population	Nurses to total population	Rural Health Assistants to total population
Union	1:4,545	1:2,380	1:2,439
Yangon	1:1,886	1:1,886	1:2,222
Kyauktan	1:24,237	1:6,525	1:13,050
Kawhmu	1:19,333	1:4,833	1:15,037
Dala	1:23,660	1:11,041	1:33,125

Source: General Administration Department Township Profile Report, 2019



Source: ERM (2019)

Figure 5.28 Township Hospital in the Study Area (Dala Township)

5.6.6 Traffic and Transport

The results of the traffic survey are presented in Table 5-35 and Figure 5.29. Among four types of vehicles, two-wheel vehicle were the highest as most local people mostly motorbikes for transportation. The volume of four-wheeled light vehicles is also higher than heavy vehicles at all survey points.

Table 5-35 Traffic Survey Record

Survey Point	Date	Survey Period	Two-wheeled vehicle	Four-wheeled light vehicle	Four-wheeled heavy vehicle	Others	Total
T1	Weekday (5.1.2021)	05:00-07:00	97	6	15	3	121
		8:00-11:30	312	67	5	13	397
		15:00-18:30	284	61	3	7	355
		20:30-22:30	13	4	0	0	17
	Weekend (9.1.2021)	05:00-07:00	51	4	0	9	64
		8:00-11:30	197	55	5	5	262
		15:00-18:30	264	68	15	8	355
		20:30-22:30	8	3	0	0	11
T2	Weekday (6.1.2021)	05:00-07:00	57	9	5	0	71
		8:00-11:30	181	125	10	4	320
		15:00-18:30	201	111	7	9	328
		20:30-22:30	6	3	0	2	11
	Weekend (9.1.2021)	05:00-07:00	74	6	6	13	99
		8:00-11:30	168	89	17	6	280
		15:00-18:30	223	95	23	9	350
		20:30-22:30	11	7	3	0	21
T3	Weekday (7.1.2021)	05:00-07:00	95	14	27	3	139
		8:00-11:30	290	307	240	3	840
		15:00-18:30	385	337	212	5	939
		20:30-22:30	44	13	19	0	76
	Weekend (10.1.2021)	05:00-07:00	101	15	20	2	138
		8:00-11:30	209	122	149	8	488
		15:00-18:30	333	201	98	3	635
		20:30-22:30	10	2	2	0	14

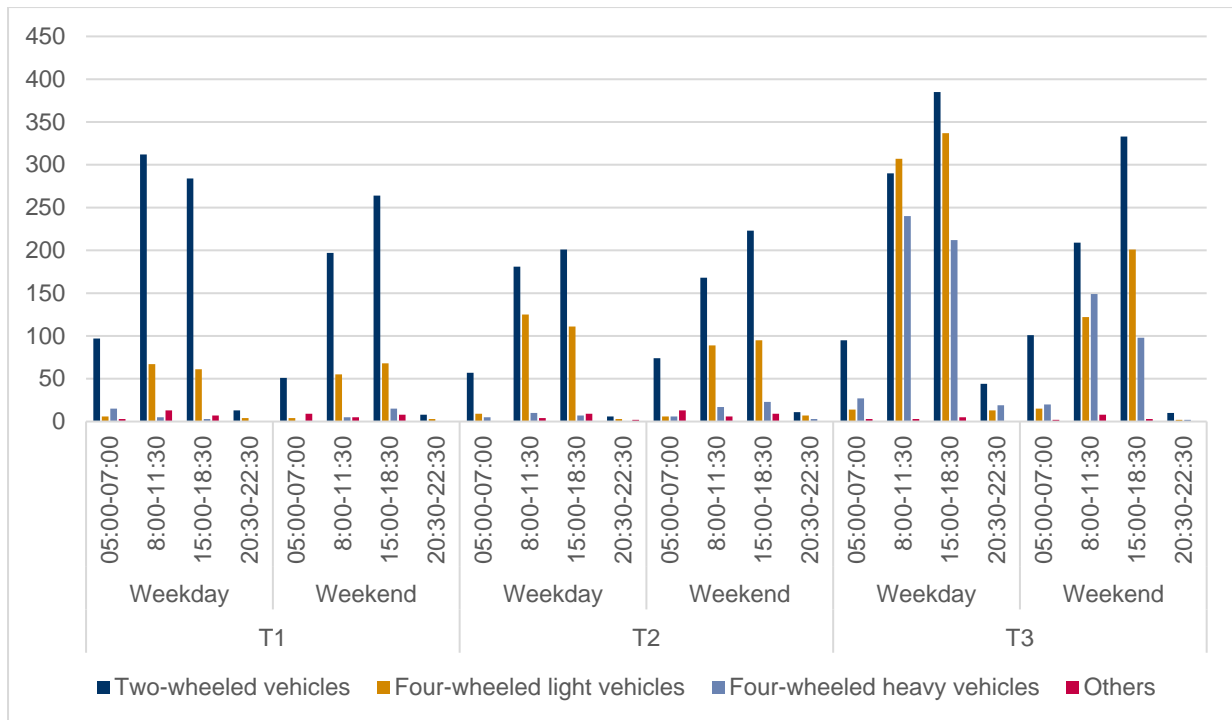


Figure 5.29 Vehicle Traffic Volume

5.6.7 Living Conditions and Public Services

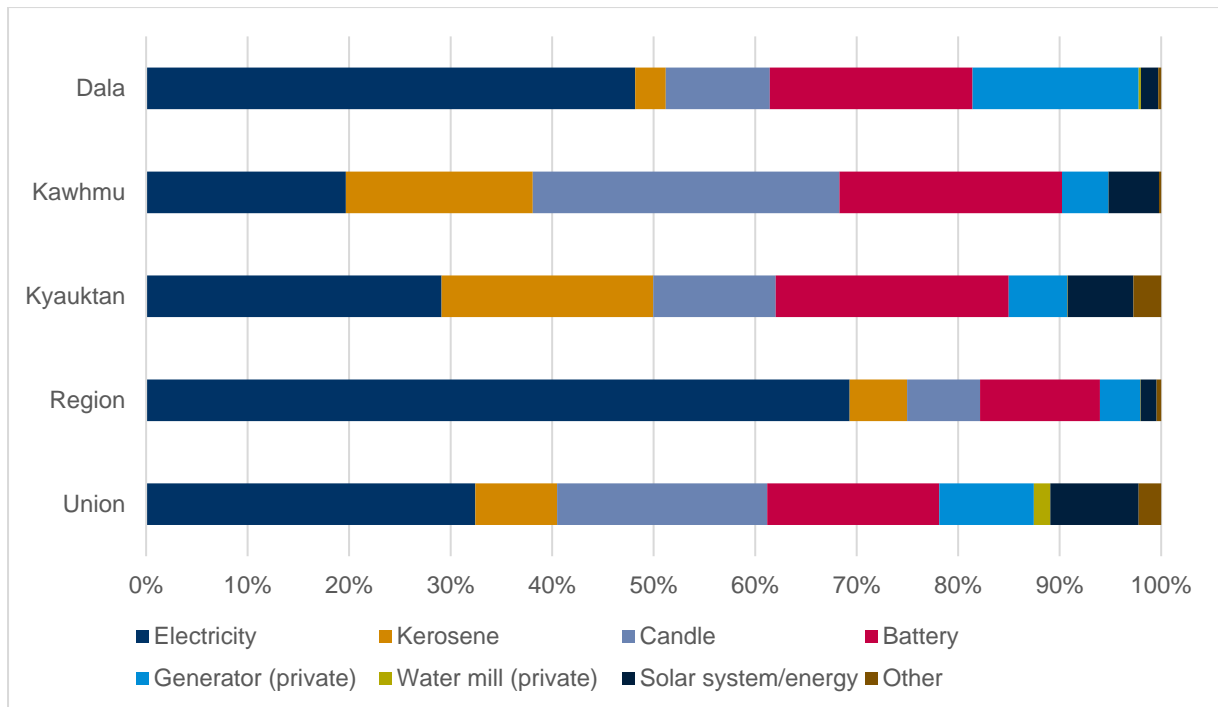
5.6.7.1 Electricity

5.6.7.1.1 Lighting

Figure 5.30 shows that Kyauktan and Kawhmu have less access to electricity for lighting than the Union average even though these areas are in Yangon Region which has about 69.3% coverage in general. More than 50% of households depend on kerosene, candle, and battery for lighting. Dala has better access to electricity than the other Townships in the Study Area although it is lower than the Regional Average.

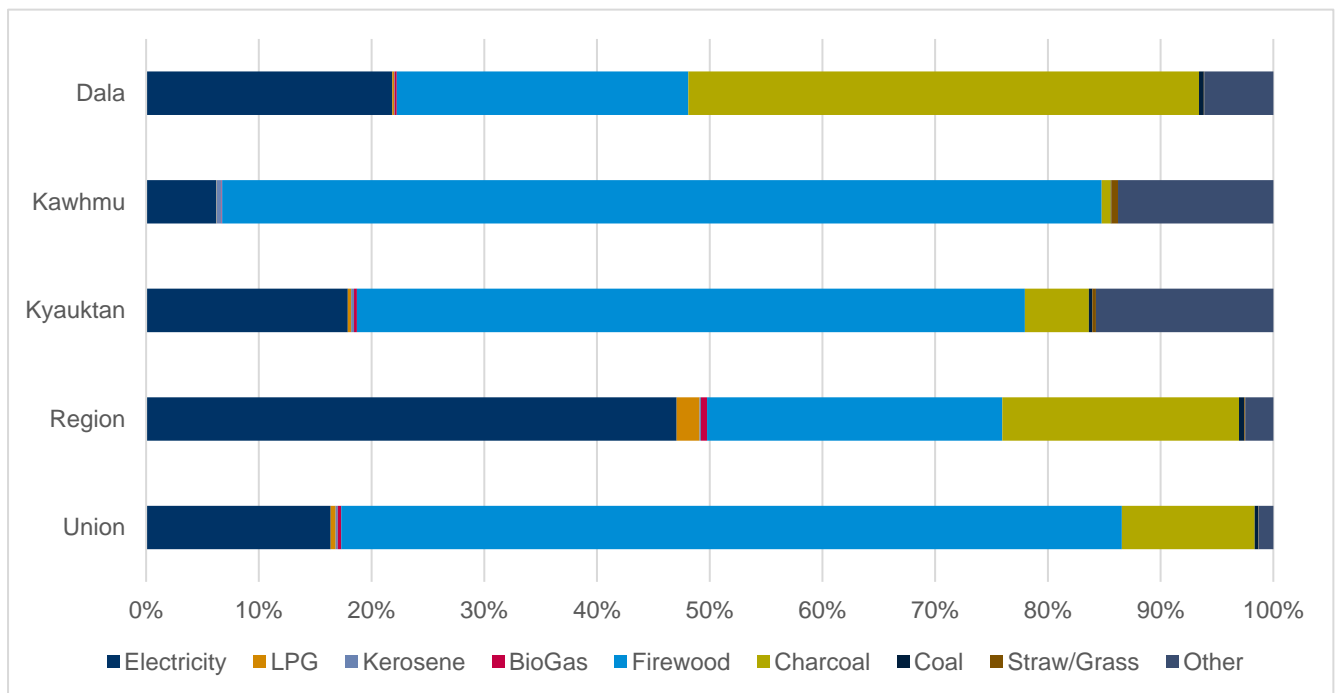
5.6.7.1.2 Cooking

As shown in Figure 5.31, all three townships uses firewood and charcoal as a main source of energy for cooking. Almost all the households in Kawhmu use firewood and only a small percentage of households in Kyauktan use charcoal. The share of households which uses Liquefied Petroleum Gas (LPG) is almost zero in the Study Area.



Source: Myanmar Population and Housing Census, 2015

Figure 5.30 % of Households using Different Energy Sources for Lighting in the Study Area



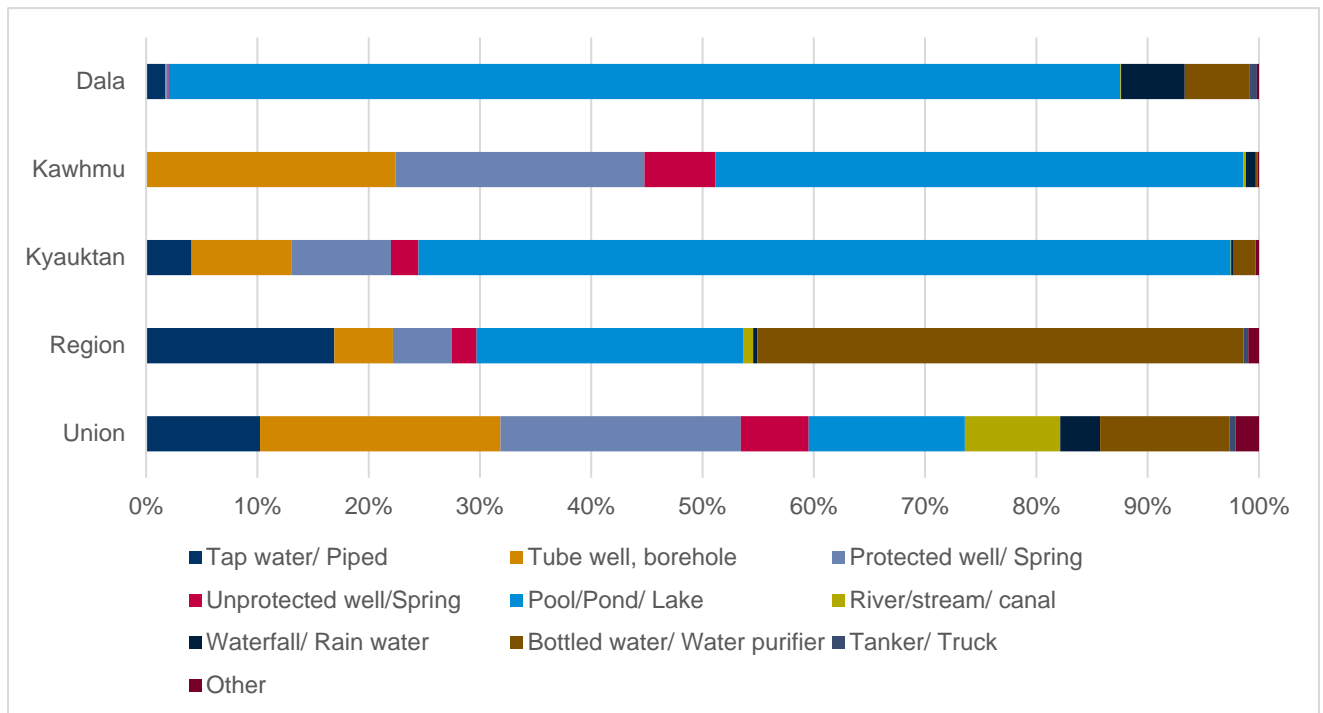
Source: Myanmar Population and Housing Census, 2015

Figure 5.31 % of Households using Different Energy Sources for Cooking in the Study Area

5.6.7.2 Water

5.6.7.2.1 Drinking Water

As shown in Figure 5.32, 85% of households in Dala use water from lakes and ponds for drinking, followed by Kyauktan and Kawhmu at 76% and 51% respectively. Groundwater usage in Dala is almost zero. Municipality water distribution in the Study Area is significantly low when compared to the Regional average. Households in the Study Area do not use river water for drinking as the water quality is poor.

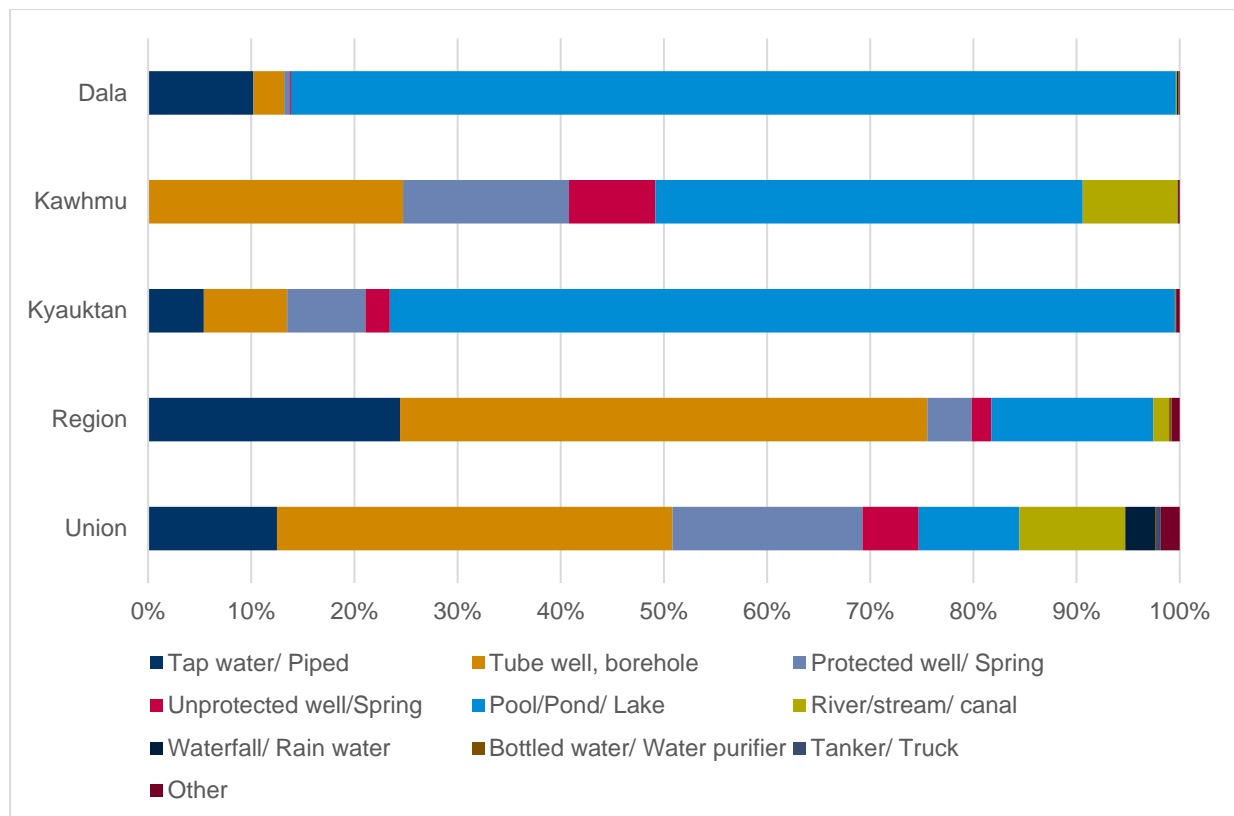


Source: Myanmar Population and Housing Census, 2015

Figure 5.32 % of Households using Different Sources for Drinking Water in the Study Area

5.6.7.2.2 Domestic Use

Figure 5.33 shows that 86% of households in Dala use ponds and lake water for domestic use where 76% in Kyauktan and 41% in Kawhmu. Kawhmu has almost no municipality water distribution system. Groundwater usage in Dala is almost zero (3%) while 49% of households in Kawhmu use groundwater and 18% in Kyauktan.



Source: Myanmar Population and Housing Census, 2015

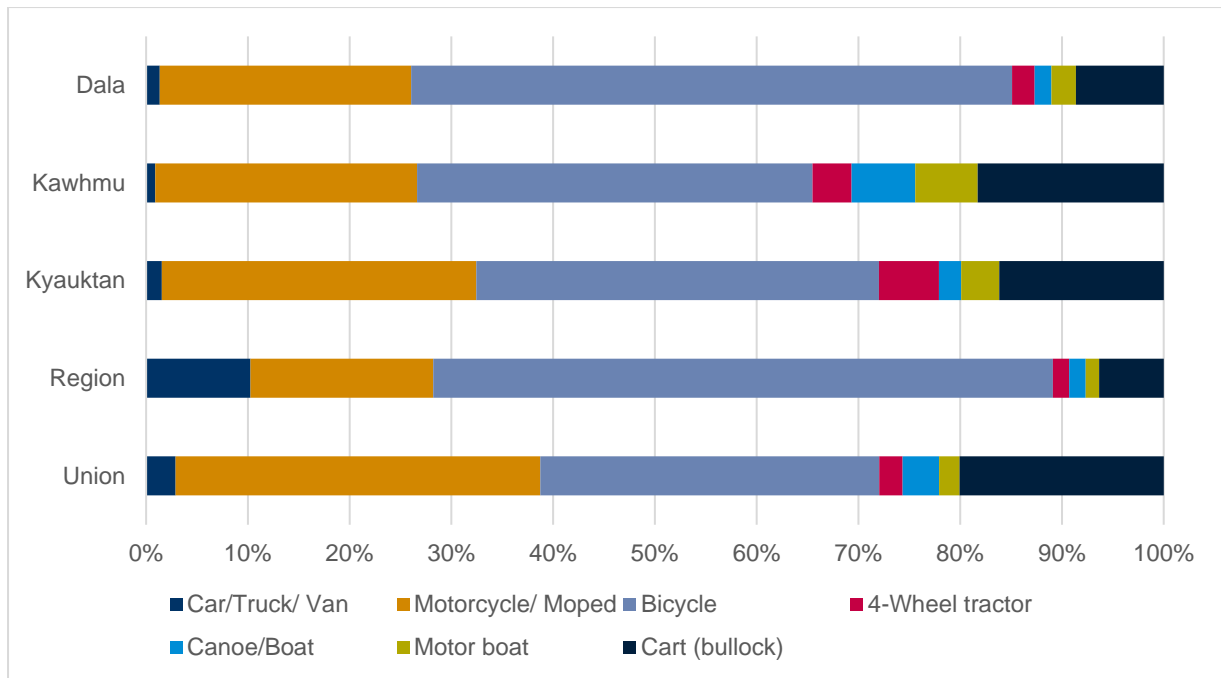
Figure 5.33 % of Households using Different Water Sources for Domestic Usage in the Study Area

5.6.7.3 Transport

Although the Study Area is located in Yangon, the most developed region in Myanmar, the use of car or truck is much lower than Union Average (Figure 5.34). People mainly use motorcycles and bicycles to commute (50%). The local community still use bullock carts to transport agricultural products and sometimes to commute nearby villages. People from Kawhmu and Kyauktan often use boats to cross Yangon River and to access Yangon (even though there are roads routes available) as it is quicker to use boats.

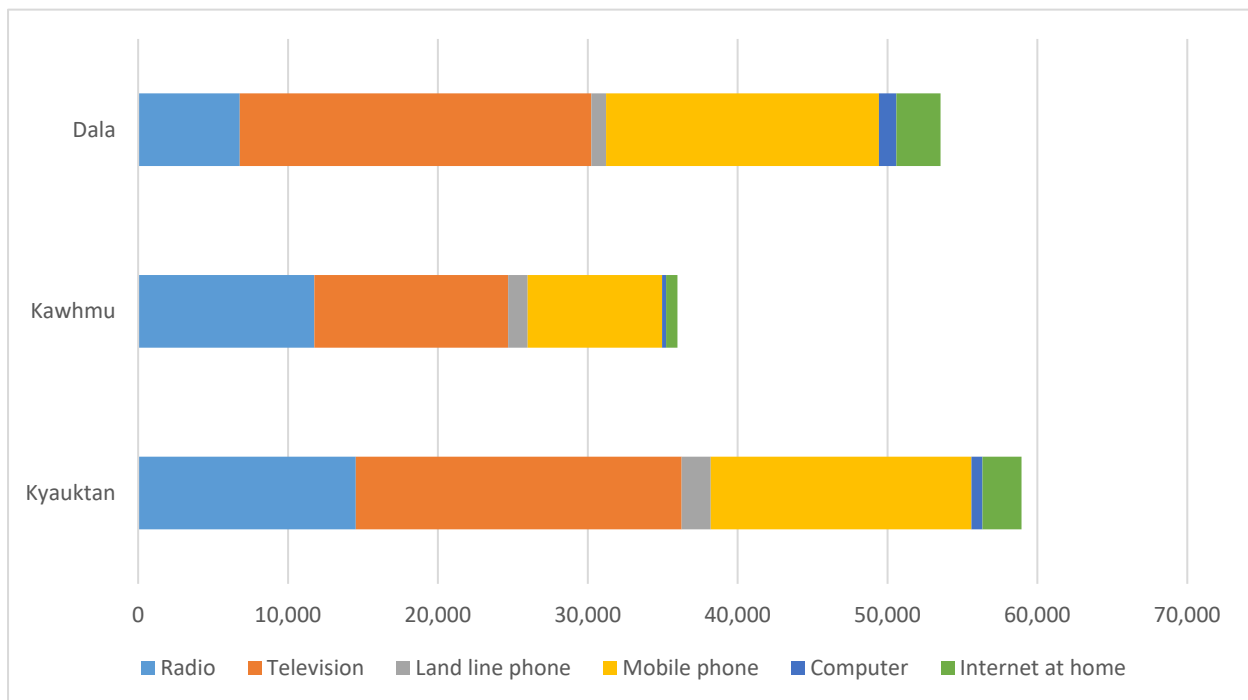
5.6.7.4 Communication

All the townships in the Study Area use different kinds of communication devices in which Kyauktan and Dala have more mobile phone usage (Figure 5.35). In addition, more electricity coverage in Dala and Kyauktan encourage the people in these townships to use more television to get inform and entertain. Regarding access to computer and internet, Kawhmu is proportionately lower than its peers, only 3.5% of households get access to these gadgets.



Source: Myanmar Population and Housing Census, 2015

Figure 5.34 % of Households using Different Kinds of Transportation in the Study Area



Source: Myanmar Population and Housing Census, 2015

Figure 5.35 Numbers of households those have access to different kinds of communication gadgets

5.6.8 Income and Livelihood of the Study Area

5.6.8.1 Overview

The livelihood details of the Study Area are summarized in Table 5-36. The female participation rate is significantly lower than male participation rate in all three Townships (Myanmar Population and Housing Census, 2014).

Table 5-36 Overview of Livelihood of the Study Area

Township	Major Economic Activities / Occupation
Kyauktan	<ul style="list-style-type: none"> ■ Skilled agricultural, forestry and fishery workers (30.7%) ■ Elementary occupations (21.4%)
Kawhmu	<ul style="list-style-type: none"> ■ Skilled agricultural, forestry and fishery workers (42.2%) ■ Elementary occupations (21.0 %)
Dala	<ul style="list-style-type: none"> ■ Wholesale and retail trade, repair of motor vehicles and motorcycles (22.0%) ■ Agriculture, forestry and fishing (16.3%)

Source: Myanmar Population and Housing Census, 2014

Kyauktan Township is one of the commercial townships in Yangon Region and the main income sources are from skilled agricultural, forestry and fishery workers. Fishery workers are reported in Kyauktan and small fishing boats were observed fishing in the Yangon River during the field visit conducted in December 2019. Passenger boats were also observed using the section of Yangon River near the Project Site. In addition to people from Kyauktan, people from the Tha Kut Pin Village may potentially be fishing along the river section near the Project Site and may be affected by the Project activities.

In Kawhmu Township, most of the employees work in the agricultural, forestry and fishery industry followed by elementary occupations.

In Dala Township, the highest proportion of employees work in the industry of wholesale and retail trade, repair of motor vehicles and motorcycles.

5.6.8.2 Labour Force Participation Rate

The labour force herein refers to people aged from 15 to 64. The labor force participation rate of Kyauktan and Dala Townships within the Study Area is around 60 % and there is 80% in Kawhmu Township (Myanmar Population and Housing Census Report, 2014). There is a significant gender gap in Kyauktan and Dala Townships, with fewer women joining the labor force. The difference between male and female labor force participation rate in Kyauktan Township is 50% and Dala Township is 46%. In Kawmhu Township, there is not much difference between female and male labor force participation rate, 17.3 % (Table 5-37 and Figure 5.36).

Table 5-37 Labor Force Participation Rate in the Study Area

Township	Labor Force Participation Rate	Male Participation Rate	Female Participation Rate
Kyauktan	63.0%	89.1%	38.9%
Kawhmu	80.3%	89.2%	71.9%
Dala	58.6%	82.4%	36.1%

Source: Myanmar Population and Housing Census, 2014

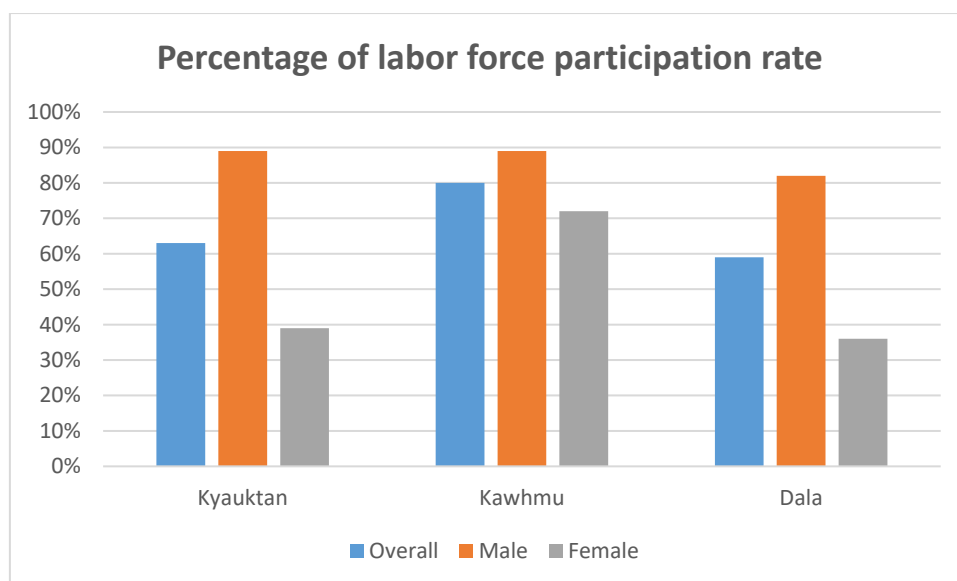


Figure 5.36 Labor Force Participation Rate of Townships within the Study Area

5.6.9 Land Acquisition

Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation is not yet conducted. Public consultation and primary socio-economic data collection for EIA investigation will be conducted after situation allowed in order to have better participation by stakeholders, including land owner and land users affected by land acquisition of the Project. The EIA Report will be updated once the public consultation and primary socio-economic data collection for EIA investigation is done.

5.7 Cultural Characteristics

Yangon Region has a number of culturally significant sites, particularly Buddhists sites. There are pagodas, shrines, monasteries, nunneries, mosques, churches, Hindu temples, Chinese temples, and Buddhist ordination halls located in the Study Area that are considered as important cultural centres for the local communities.

There are 18 Pagodas, 342 Shrines, 415 Monasteries, 62 Nunneries, 250 Buddhist ordination Halls, 12 Churches, 13 Mosques, 48 Hindu Temples and 1 Chinese Temples as shown in Table 5-38. Kyaikhmawwun Yele Pagoda (6.3 km from Project Site), located on a small island in Hmaw Wun Creek, is well-known Buddhist religious site. However, it is unlikely to be affected by the Project due to the distance. This is the closest cultural heritage site to the Project.

Table 5-38 Cultural Heritage from Townships in the Study Area

Townships	Pagodas	Shrines	Monasteries	Nunneries	Buddhist ordination Halls	Churches	Mosques	Hindu Temples	Chinese Temples
Kyauktan	6	151	164	61	157	2	2	9	1
Kawhmu	5	130	163	1	62	6	1	-	-
Dala	7	61	88	-	31	4	10	38	-
Total	18	342	415	62	250	12	13	48	1

Source: General Administration Department Township Profile Report, 2019

5.8 Visual Characteristics

The Project Site and its surrounding area are flat plains and typical rural landscapes of urban neighbourhood. The Thilawa Special Economic Zone is located just next to Project Site.

5.9 Summary

The following summarises the main findings of the baseline section:

- For ambient air quality, none of the values for NO₂ and CO exceeded the WHO/EU Annual Mean Air Quality Critical Level. SO₂ exceeded the WHO guideline for agriculture in one location. No exceedance of WHO Air Quality Guideline values was observed for PM_{2.5} at all locations but here were exceedances of PM₁₀ at 3 out of 4 locations.
- For ambient noise, 2 out of 4 locations for night time exceeded the standard value by over 4 dB, whilst, all 4 locations during day time did not exceed the IFC Noise level guidelines standard.
- For soil quality, none of the sample exceeded the Food and Agriculture Organization of the United Nations (FAO) Soil Bulletin 65 and the Dutch Standard.
- For groundwater quality, the 3 out of 4 samples met the WHO Drinking Water Standards which are from residential wells. There was one location where Amonia level exceeded National (DWQS) and Cyanide level exceeded both WHO and National (DWQS) at the Project Site.
- For surface water quality, it was sampled in 3 locations in Yangon River within the Study Area. None of the surface water sampling points exceeded both WHO and National (DWQS).
- For fauna, two mammal species recorded were all classified as Least Concern on the IUCN Red List. A total of 30 bird species were recorded during the survey. All bird species are classified as least concern on the IUCN Red List and 10 species are classified as migratory birds according to Bird Life International 2020. For fish, the surveys identified 17 Least Concern species, one (1) Data Deficient species, and one (1) Not Evaluated on the IUCN Red List. For reptiles and amphibians, the surveys identified no species of conservation concern (as per IUCN Red List) and no endemic / range restricted species. In total 6 reptiles and amphibians species were reported. During the survey, 8 butterflies species were identified, of which none are classified as species of conservation concern according to the IUCN Red List.
- For flora, of the 44 floral species identified during the surveys, two (2) species are classified as Endangered (i.e., Padauk (*Pterocarpus macrocarpus*) and Htan (*Borassus flabellifer*)), 19 species as Least Concern, two (2) species as Data Deficient and 21 species as Not Yet Assessed on the IUCN Red List. Two (2) endemic/ restricted range floral species (Living International Treasures, 2019) (i.e., Padauk (*Pterocarpus macrocarpus*) and Kyun (*Tectona grandis*)) were observed during field survey.
- There are no Key Biodiversity Areas, Protected Areas, World Heritage and RAMSAR Sites within the Project Site. The Project Site is located 28 km south of the Ayayawady Plains EBA. Two restricted range species occur in Ayayawady Plains EBA (BirdLife International, 2021) (White-throated babbler (*Turdoides gularis*): Least concern; and Hooded treepie (*Crypsirina cucullata*): Near Threatened.)
- Except Dala Township, the majority of the population in Kyauktan and Kawhmu is living in rural areas. The highest population density is observed in Dala Township, with 739 inhabitants per square kilometre (inh/km²). This is, however, significantly lower than the average population density of Yangon's urban area (2,844 inh/km²). The lowest population density within the Study Area is Kyauktan, with 201 inh/km². In all townships of the Study Area there are slightly more women than men.

- In all townships, the main ethnicity is Burmese where Karen is the second major ethnicity. Most of the population practise Buddhism followed by other major religions where Dala has more people practising Islam and Hindu than the other two townships.
- There are 374 education facilities in the Study Area and Kyauktan has the most schools, while Dala has the least. Although Dala has a higher population than Kawmhu, it has 50% fewer schools. Kyauktan has good educational services and the rate of students who passed the matriculation exam is highest (30.6%) in the Study Area. In terms of literacy rate, all the townships have literacy rates than the Union Average (89.5%). Kyauktan has the most schools and also the lowest gender gap in literacy. Dala has the highest gender gap in literacy rate.
- There are 81 healthcare facilities in the Study Area. Kyauk Tan has the largest number of healthcare facilities with 58%. The most common diseases in the Study Area are diabetes, hypertension, stroke, pneumonia, tuberculosis, pneumonia and diarrhoea (especially in Under Age 5).
- Among four types of vehicles, two-wheel vehicle were the highest as most local people mostly motorbikes for transportation. The volume of four-wheeled light vehicles is also higher than heavy vehicles at all survey points.
- Kyauktan and Kawmhu have less access to electricity for lighting than the Union average even though these areas are in Yangon Region which has about 69.3% coverage in general. More than 50% of households depend on kerosene, candle, and battery for lighting. Dala has better access to electricity than the other Townships in the Study Area although it is lower than the Regional Average.
- 86% of households in Dala use ponds and lake water for domestic use where 76% in Kyauktan and 41% in Kawmhu. Kawmhu has almost no municipality water distribution system. Groundwater usage in Dala is almost zero (3%) while 49% of households in Kawmhu use groundwater and 18% in Kyauktan.
- Although the Study Area is located in Yangon, the most developed region in Myanmar, the use of car or truck is much lower than Union Average. People mainly use motorcycles and bicycles to commute (50%). The local community still use bullock carts to transport agricultural products and sometimes to commute nearby villages. People from Kawmhu and Kyauktan often use boats to cross Yangon River and to access Yangon (even though there are roads routes available) as it is.
- All the townships in the Study Area use different kinds of communication devices in which Kyauktan and Dala have more mobile phone usage. Regarding access to computer and internet, Kawmhu is proportionately lower than its peers, only 3.5% of households get access to these gadgets.
- Kyauktan Township is one of the commercial townships in Yangon Region and the main income sources are from agriculture, fishing and employment at government departments. In Kawmhu Township, most of the employees work in the agricultural, forestry and fishery industry followed by elementary occupations. In Dala Township, the highest proportion of employees work in the industry of wholesale and retail trade, repair of motor vehicles and motorcycles.
- The labor force participation rate of Kyauktan and Dala Townships within the Study Area is around 60 % and there is 80% in Kawmhu Township. There is a significant gender gap in Kyauktan and Dala Townships, with fewer women joining the labor force. The difference between male and female labor force participation rate in Kyauktan Township is 50% and Dala Township is 46%. In Kawmhu Township, there is not much difference between female and male labor force participation rate, 17.3 %.
- There are 18 Pagodas, 342 Shrines, 415 Monasteries, 62 Nunneries, 250 Buddhist ordination Halls, 12 Churches, 13 Mosques, 48 Hindu Temples and 1 Chinese Temples in the Study Area. Kyaikhmawwun Yele Pagoda (6.3 km from Project Site), located on a small island in Hmaw Wun

Creek, is well-known Buddhist religious site. However, it is unlikely to be affected by the Project due to the distance. This is the closest cultural heritage site to the Project.

- The Project Site and its surrounding area are flat plains and typical rural landscapes of urban neighbourhood. The Thilawa Special Economic Zone is located just next to Project Site.

6 KEY POTENTIAL IMPACT AND MITIGATION MEASURES

This Section presents the environmental and social impact assessment methodology, impact assessment, and recommended mitigation measures to reduce or avoid potential impacts, where appropriate.

The impact assessment methodology provides a basis to characterise the potential impacts of the Project. The methodology is based on models commonly employed in impact assessment and takes into account good international industry practices.

Potential impacts arising from both planned (routine and non-routine) activities and unplanned events are assessed. Unplanned events are those not anticipated to occur during the normal course of Project activities, for example vehicle accidents, spills and leaks, fires and explosions.

6.1 Impact Assessment Methodology

Impact identification and assessment starts with scoping and continues through the remainder of the impact assessment process. The principal impact assessment steps are summarised in Figure 6.1 and comprise:

- Impact prediction: to determine what could potentially happen to resources/receptors as a consequence of the Project and its associated activities.
- Impact evaluation: to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resource/receptor.
- Mitigation and enhancement: to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.
- Residual impact evaluation: to evaluate the significance of impacts assuming effective implementation of mitigation and enhancement measures.

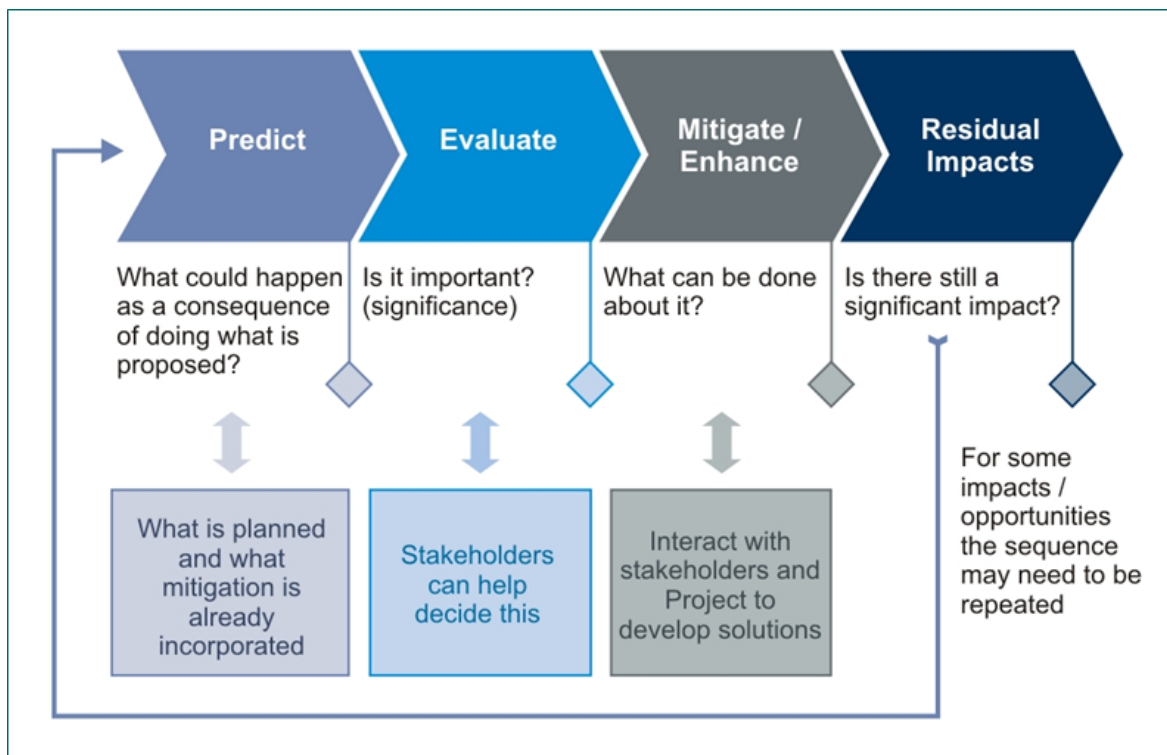


Figure 6.1 Impact Assessment Process

6.1.1 Prediction of Impacts

Prediction of impacts is an objective exercise to determine what could potentially happen to the environment as a consequence of the Project activities. This is a repeat of the process undertaken in scoping, whereby the potential interactions between the Project and the baseline environmental and social setting are identified. In the impact assessment stage, these potential interactions are updated based on additional Project and baseline information. From these potential interactions, the potential impacts to the various resources/receptors are identified, and are elaborated to the extent possible. The diverse range of potential impacts considered in the impact assessment process typically results in a wide range of prediction methods being used including quantitative, semi-quantitative and qualitative techniques.

6.1.2 Evaluation of Impacts

Once the prediction of impacts is complete, each impact is described in terms of its various relevant characteristics (e.g., type, scale, duration, frequency, extent). The terminology used to describe impact characteristics is shown in Table 6-1.

Table 6-1 Impact Characteristic Terminology

Characteristic	Definition	Designations
Type	The relationship of the impact to the Project (in terms of cause and effect).	Direct Indirect Induced
Extent	The “reach” of the impact (e.g., confined to a small area around the Project footprint, projected for several kilometres, etc.).	Local Regional International
Duration	The time period over which a resource / receptor is affected.	Temporary Short-term Long-term Permanent
Scale	The size of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.)	[no fixed designations; intended to be a numerical value]
Frequency	A measure of the constancy or periodicity of the impact.	[no fixed designations; intended to be a numerical value]

The definitions for the type designations are shown in Table 6-2. Definitions for the other designations are resource/receptor-specific, and are discussed in the resource/receptor-specific chapters.

Table 6-2 Impact Type Definitions

Designations (Type)	Definition
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected).
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).

Designations (Type)	Definition
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large Project workforce).

The above characteristics and definitions apply to planned and unplanned events. An additional characteristic that pertains only to unplanned events is likelihood. The likelihood of an unplanned event occurring is designated using a qualitative scale, as described in Table 6-3.

Table 6-3 Definitions for Likelihood Designations

Likelihood	Definition
Unlikely	The event is unlikely but may occur at some time during normal operating conditions.
Possible	The event is likely to occur at some time during normal operating conditions.
Likely	The event will occur during normal operating conditions (i.e., it is essentially inevitable).

6.1.3 Impact Magnitude, Receptor/Resource Sensitivity and Impact Significance

Once an impact's characteristics are defined, the next step in the impact assessment phase is to assign each impact a 'magnitude'. Magnitude is a function of some combination (depending on the resource/receptor in question) of the following impact characteristics:

- Extent
- Duration
- Scale
- Frequency

Additionally, for unplanned events only, magnitude incorporates the 'likelihood' factor discussed above.

Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. As discussed above, the magnitude designations themselves are universally consistent, but the definitions for these designations vary on a resource/receptor-by-resource/receptor basis, as further discussed in each of the resource/receptor-specific chapters. The universal magnitude designations are:

- Positive
- Negligible
- Small
- Medium
- Large

In the case of a positive impact, no magnitude designation (aside from 'positive') is assigned. It is considered sufficient for the purpose of the impact assessment to indicate that the Project is expected to result in a positive impact, without characterising the exact degree of positive change likely to occur.

The definitions for these designations vary on a resource/ receptor basis. The impact magnitude for air quality, ambient noise, water quality, soil quality, landscape and visual character, habitats, species, local communities, labourers, infrastructure services, and cultural heritage are provided in Table 6-4 to Table 6-25.

Table 6-4 Impact Magnitude for Air Quality and GHG emissions

	Extent / Duration / Scale / Frequency
Large	Change in air quality conditions over a large area that lasts over the course of several months with quality likely to cause secondary impacts on ecosystems and nearest household or community. Affects the majority of the area or population in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.
Medium	Tendency is that impact affects a substantial area, ecosystem or number of people and/or is of medium duration. Frequency may be occasional and impact may potentially be regional in scale.
Small	Concentration of air emissions exceeds the expected. Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.
Negligible	Air emissions correspond to the expected range. Change remains within the range commonly experienced within the household or community.

Table 6-5 Impact Magnitude for Ambient Noise

	Extent / Duration / Scale / Frequency
Large	Change in ambient noise quality conditions over a large area that lasts over the course of several months with quality likely to cause secondary impacts on ecosystems and nearest household or community. Affects the majority of the area or population in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area, ecosystem or number of people and/or is of medium duration. Frequency may be occasional and impact may potentially be regional in scale.
Small	Concentration of noise emissions exceeds the expected. Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.
Negligible	Noise emissions correspond to the expected range. Change remains within the range commonly experienced within the household or community.

Table 6-6 Impact Magnitude for Water Quality

	Extent / Duration / Scale / Frequency
Large	Change in water quality over a large area that lasts over the course of several months with quality likely to cause secondary impacts on marine ecology; and/or routine exceedance of benchmark effluent discharge limits.
Medium	Temporary or localised change in water quality with water quality returning to background levels thereafter and/or occasional exceedance of benchmark effluent discharge limits.
Small	Slight change in water quality expected over a limited area with water quality returning to background levels within a few metres and/or discharges are well within benchmark effluent discharge limits.
Negligible	Immeasurable, undetectable or within the range of normal natural variation.

Table 6-7 Impact Magnitude for Soil Quality

	Extent / Duration / Scale / Frequency
Large	Change in soil quality over a large area that lasts over the course of several months with quality likely to cause secondary impacts on ecosystems and nearest household or community. Affects the majority of the area or population in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area, ecosystem or number of people and/or is of medium duration. Frequency may be occasional and impact may potentially be regional in scale.
Small	The change in soil quality exceeds the expected. Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.
Negligible	Soil quality changes correspond to the expected range. Change remains within the range commonly experienced within the household or community.

Table 6-8 Impact Magnitude for Landscape and Visual Character

	Extent / Duration / Scale / Frequency
Large	Change in landscape conditions and visual characters over a large area that lasts over the course of several months with quality likely to cause secondary impacts on ecosystems and nearest household or community. Affects the majority of the area or population in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area, ecosystem or number of people and/or is of medium duration. Frequency may be occasional and impact may potentially be regional in scale.
Small	The change in landscape and visual characters exceeds the expected. Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.
Negligible	Landscape changes and visual characters correspond to the expected range. Change remains within the range commonly experienced within the household or community.

Table 6-9 Impact Magnitude for Terrestrial and Aquatic Habitats

	Extent / Duration / Scale / Frequency
Large	May affect the integrity of an area or region, by substantially changing, in the long term, its ecological features, structures and functions, across its whole area, that enable it to sustain the habitat, complex of habitats and/or population levels of species that makes it important.
Medium	May affect some, if not all, of the area's ecological features, structures and functions in the short or medium term. The area or region may be able to recover through natural regeneration and restoration.
Small	May cause some minor impacts of limited extent, or to some elements of the area, are evident but easy to recover through natural regeneration.
Negligible	Immeasurable, undetectable or within the range of normal natural variation.

Table 6-10 Impact Magnitude for Terrestrial and Aquatic Species

	Extent / Duration / Scale / Frequency
Large	May affect an entire population or species in sufficient magnitude to cause a decline in abundance and/ or change in distribution beyond which natural recruitment (reproduction, immigration from unaffected areas) would not return that population or species, or any population or species dependent upon it, to its former level within several generations.
Medium	May affect a portion of a population and may bring about a change in abundance and/ or distribution over one or more generations, but does not threaten the integrity of that population or any population dependent on it.
Small	May affect specific group of localised individuals within a population over a short time period (one generation or less), but does not affect other trophic levels or the population itself.
Negligible	Immeasurable, undetectable or within the range of normal natural variation.

Table 6-11 Impact Magnitude for Local Communities

	Extent / Duration / Scale / Frequency
Large	Change dominates over baseline conditions. Affects the majority of the area or population in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area or number of people and/or is of medium duration. Frequency may be occasional and impact may potentially be regional in scale.
Small	Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.
Negligible	Change remains within the range commonly experienced within the household or community.

Table 6-12 Impact Magnitude for Labourers

	Extent / Duration / Scale / Frequency
Large	Change dominates over baseline conditions. Affects the majority of the area or labourers in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area or number of people and/or is of medium duration. Frequency may be occasional and impact may potentially be regional in scale.
Small	Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.
Negligible	Change remains within the range commonly experienced within the labour workforce.

Table 6-13 Impact Magnitude for Infrastructure Services

	Extent / Duration / Scale / Frequency
Large	Change in infrastructure services over a large area that lasts over the course of several months with quality likely to cause secondary impacts on ecosystems and nearest household or community. Affects the majority of the area or population in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area, ecosystem or number of people and/or is of medium duration. Frequency may be occasional and impact may potentially be regional in scale.
Small	The change in infrastructure services exceeds the expected. Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.
Negligible	Infrastructure changes correspond to the expected range. Change remains within the range commonly experienced within the household or community.

Table 6-14 Impact Magnitude for Cultural Heritage

	Extent / Duration / Scale / Frequency
Large	Change in cultural heritage over a large area that lasts over the course of several months with quality likely to cause secondary impacts on ecosystems and nearest household or community. Affects the majority of the area or population in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area, ecosystem or number of people and/or is of medium duration. Frequency may be occasional and impact may potentially be regional in scale.
Small	The change in cultural heritage exceeds the expected. Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.
Negligible	Cultural heritage changes correspond to the expected range. Change remains within the range commonly experienced within the household or community.

In addition to characterising the magnitude of impact, the other principal impact evaluation step is definition of the sensitivity / vulnerability / importance of the impacted resource/receptor. There are a range of factors to be taken into account when defining the sensitivity / vulnerability / importance of the resource/receptor, which may be physical, biological, cultural or human. Other factors may also

be considered when characterising sensitivity/vulnerability/importance, such as legal protection, government policy, stakeholder views and economic value.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations vary on a resource/receptor basis. The universal sensitivity/vulnerability/importance designations are:

- Low
- Medium
- High

The receptor sensitivities for air quality, ambient noise, water quality, soil quality, landscape and visual character, habitats, species, local communities, labourers, infrastructure services, and cultural heritage are provided in Table 6-14.

Table 6-15 Receptor Sensitivity for Air Quality and GHG emissions

Category	Designation / Importance / Vulnerability
High	Existing air quality is already under stress and/ or public health is very sensitive to change (children, schools).
Medium	Existing air quality conditions already shows some signs of stress and/ or supports ecological resources that could be sensitive to change in air quality (protected species, migratory birds, protected areas).
Low	Existing air quality condition is good and the ecological resources that it supports are not sensitive to a change in air quality.

Table 6-16 Receptor Sensitivity for Ambient Noise

Category	Designation / Importance / Vulnerability
High	Existing ambient noise is already under stress and/ or public health is very sensitive to change (children, schools).
Medium	Existing noise quality conditions already shows some signs of stress and/ or supports ecological resources that could be sensitive to change in noise quality (protected species, migratory birds, protected areas).
Low	Existing noise quality condition is good and the ecological resources that it supports are not sensitive to a change in noise quality.

Table 6-17 Receptor Sensitivity for Water Quality

Category	Designation / Importance / Vulnerability
High	Existing water quality is already under stress and/ or the ecological resources it supports are very sensitive to change (secondary ecological or health impacts are likely).
Medium	Existing water quality already shows some signs of stress and/ or supports ecological resources that could be sensitive to change in water quality.
Low	Existing water quality is good and the ecological resources that it supports are not sensitive to a change in water quality.

Table 6-18 Receptor Sensitivity for Soil Quality

Category	Designation / Importance / Vulnerability
High	Existing soil quality is already under stress and/ or the ecological resources it supports are very sensitive to change (secondary ecological or health impacts are likely).
Medium	Existing soil quality already shows some signs of stress and/ or supports ecological resources that could be sensitive to change in soil quality.
Low	Existing soil quality is good and the ecological resources that it supports are not sensitive to a change in soil quality.

Table 6-19 Receptor Sensitivity for Landscape and Visual Character

Category	Designation / Importance / Vulnerability
High	Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project.
Medium	Some but few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the Project.
Low	Minimal vulnerability; consequently with a high ability to adapt to changes brought by the Project and opportunities associated with it.

Table 6-20 Receptor Sensitivity for Habitats

Category	Designation / Importance / Vulnerability
High	A habitat that has designated conservation status at an international scale (e.g. IUCN). Areas of particular biodiversity importance that may support populations of restricted range, endemic or endangered species, or is in itself unique or threatened.
Medium	A habitat that has designated conservation status at a national or regional scale. Areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition.
Low	A habitat not protected by law. Areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition.

Table 6-21 Receptor Sensitivity for Species

Category	Designation / Importance / Vulnerability
High	A species population that has designated conservation status at an international scale (e.g. IUCN). A species that is globally rare. A keystone species fundamental to the functioning of the ecosystem.
Medium	A species population that has designated conservation status at a national or regional scale. A species common globally but rare locally. Important to ecosystem functions or under threat or population in decline.
Low	A species not protected by law. Not critical to other ecosystem functions (e.g. as prey to other species or as predator to potential pest species) or common / abundant locally.

Table 6-22 Receptor Sensitivity for Local Communities

Category	Designation / Importance / Vulnerability
High	Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project.
Medium	Some but few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the Project.
Low	Minimal vulnerability; consequently with a high ability to adapt to changes brought by the Project and opportunities associated with it.

Table 6-23 Receptor Sensitivity for Labourers

Category	Designation / Importance / Vulnerability
High	Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project.
Medium	Some but few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the Project.
Low	Minimal vulnerability; consequently with a high ability to adapt to changes brought by the Project and opportunities associated with it.

Table 6-24 Receptor Sensitivity for Infrastructure Services

Category	Designation / Importance / Vulnerability
High	Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project.
Medium	Some but few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the Project.
Low	Minimal vulnerability; consequently with a high ability to adapt to changes brought by the Project and opportunities associated with it.

Table 6-25 Receptor Sensitivity for Cultural Heritage

Category	Designation / Importance / Vulnerability
High	Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project.
Medium	Some but few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the Project.
Low	Minimal vulnerability; consequently with a high ability to adapt to changes brought by the Project and opportunities associated with it.

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterised, the significance can be assigned for each impact. Impact significance is designated using the matrix shown in Table 6-26.

Table 6-26 Impact Significance

		Sensitivity / Vulnerability / Importance of Resource / Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor-specific considerations are factored into the assignment of magnitude and sensitivity/vulnerability/ importance designations that enter into the matrix. Box 6.1 provides a context for what the various impact significance ratings signify.

It is important to note that impact prediction and evaluation take into account any embedded controls (i.e., physical or procedural controls that are already planned as part of the Project design, regardless of the results of the impact assessment process). An example of an embedded control is a standard acoustic enclosure that is designed to be installed around a piece of major equipment. This avoids the situation where an impact is assigned a magnitude based on a hypothetical version of the Project that considers none of the embedded controls.

Box 6.1 Context of Impact Significances

An impact of **negligible** significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

An impact of **minor** significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.

An impact of **moderate** significance has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

An impact of **major** significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of IA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.

6.1.4 Identification of Mitigation and Enhancement Measures

Once the significance of an impact has been characterised, the next step is to evaluate what mitigation and enhancement measures are warranted. For the purposes of this impact assessment, ERM has adopted the following mitigation hierarchy:

- **Avoid at Source; Reduce at Source:** avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).
- **Abate on Site:** add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping).
- **Abate at Receptor:** if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).
- **Repair or Remedy:** some impacts involve unavoidable damage to a resource (e.g. agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.
- **Offset / Compensate in Kind / Compensate Through Other Means:** where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).

The priority in mitigation is to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

6.1.5 Residual Impact Evaluation

Once mitigation and enhancement measures are declared, the residual impact significance is identified (i.e. a repeat of the impact assessment steps discussed above). In some cases, it may only be possible to reduce the impact to a certain degree such as where an impact could not be completely avoided. All residual significant impacts are described in this report with commentary on why further mitigation is not feasible.

The degree of significance attributed to residual impacts is related to the weight that should be given to them in reaching a decision on the Project:

- Residual impacts of Major significance are considered to warrant substantial weight in the Project decision making process. Conditions should be imposed to ensure adverse impacts are strictly controlled and monitored;
- Residual impacts of Moderate significance are considered to be of reducing importance to decision-making, however, still warrant careful attention to ensure best available techniques are used to keep adverse impacts to as low as is technically and financially feasible;
- Residual impacts of Minor significance should be brought to the attention of the decision-maker but are identified as warranting little if any weight in the decision; and
- Not significant residual impacts are those that, after assessment, are found not to be significant to the decision making about the Project.

6.1.6 Management and Monitoring

The final stage in the impact assessment process is definition of the management and monitoring measures that are needed to identify whether: a) impacts or their associated Project components remain in conformance with applicable standards; and b) mitigation measures are effectively addressing impacts and compensatory measures and offsets are reducing effects to the extent predicted.

An Environmental and Social Management Plan, which is a summary of all actions which BE has committed to executing with respect to environmental/social/health performance for the Project, is also included as part of the EIA report. The Environmental and Social Management Plan includes mitigation measures, compensatory measures and offsets and management and monitoring activities.

6.2 Identification of Impacts

For the Project, potential impacts have been identified through a systematic process whereby the activities (both planned and unplanned) associated with the Project have been considered with respect to their potential to interact with environmental and social resources or receptors.

The results from the scoping process for the Project are presented in the Scoping Matrix in Table 6-27. The scoping matrix displays Project activities against resources/receptors, and supports a methodological identification of the potential interactions each Project activity may have on the range of resources/receptors within the Area of Influence for the Project.

Table 6-27 Potential Interactions and Significance of Impacts to Receptors / Receivers

Project Activities (below) / Project Receptors (right)	Physical Environment					Biological Environment		Human Environment					
	Hydrology & Hydrogeology	Ambient Air Quality	Ambient Noise & Vibration	Surface Water & Groundwater Quality	Soil Quality & Topography	Landscape & Visual Character	Terrestrial Biodiversity	Aquatic Biodiversity	Community Health & Safety	Economy & livelihood	Visual aesthetics	Occupational Health & Safety	Infrastructure Services
Pre-construction Phase													
Land acquisition													
Construction Phase													
Use of powered mechanical equipment (PME) (e.g. generators)		■	■										
Lighting for night work / navigational safety						■	■						
Worker / equipment / material transport		■	■				■			■			■
Vessel operational discharges				■			■						
Vessel anchoring							■						
Exclusion zone of construction activities on river								■	■				■
Jetty terminal construction (e.g. piling, dredging)			■	■			■	■	■			■	
Wastewater discharge and runoff				■	■		■	■					
Waste storage and disposal (including hazardous waste)				■	■		■	■					■
Operational Phase													

Project Activities (below) / Project Receptors (right)	Physical Environment						Biological Environment		Human Environment				
	Hydrology & Hydrogeology	Ambient Air Quality	Ambient Noise & Vibration	Surface Water & Groundwater Quality	Soil Quality & Topography	Landscape & Visual Character	Terrestrial Biodiversity	Aquatic Biodiversity	Community Health & Safety	Economy & livelihood	Visual aesthetics	Occupational Health & Safety	Infrastructure Services
Venting and fugitive emissions		■							■			■	
Vessel operational traffic									■	■	■	■	■
Vessel operational discharges				■					■				
Vessel anchoring												■	
Jetty terminal and tank farm discharges to river				■				■					
Facilities presence at site and safety zone	■					■					■		
Maintenance dredging				■	■			■					
Worker / equipment / material transport		■	■						■			■	
Waste storage and disposal (including hazardous waste)				■	■		■	■					■
Unplanned / Accidental Events													
Vehicle / Vessel collision							■		■			■	
Spills and Leaks				■	■		■	■	■			■	
Fire and Explosion							■		■			■	

Key

	An interaction is not reasonably expected
	An interaction is reasonably possible but none of the resulting impacts are likely to lead to significant effects
	The interaction is reasonably possible and at least one of the resulting impacts is likely to lead to an effect that is significantly negative
	The interaction is reasonably possible and at least one of the resulting impacts is likely to lead to an effect that is significantly positive

6.2.1 Scoped Out Impacts

Potential interactions that were deemed not to result in a potentially significant impact (grey in the matrix) have been scoped out with justification and will not be considered in more detail. The rationale for scoping out these impacts is provided in Table 6-28.

Table 6-28 Scoped-out Analysis

Impact	Rationale for scoping out of assessment
Construction Phase	
Impacts to terrestrial biodiversity due to lighting for night works and worker / equipment transport	The Project construction is 60.29% complete. Land clearance in the Project footprint has already been conducted therefore this EIA will not cover the impacts from this activity. The terrestrial environment is located in a modified habitat (industrialized area), which has low ecological value. Considering the habitat nature, no potentially significant impacts to biodiversity are expected to arise.
Impacts to landscape and visual character due lighting for night work	The Project is located within an industrial area. As such, the lighting of the Project Area would unlikely lead to potentially significant impacts to the landscape and visual character. In addition, the nearest village (Chaug Wa) is located 2.5 km from the Site.
Impacts to infrastructure services due to worker / equipment / material transport	The Project is located within an industrial area with an existing road network. As such, construction of the Project is not expected to cause potentially significant impacts on road infrastructure. Construction vessels for the Project would mainly be deployed within the Project Site with limited movement along the Yangon River. As such, construction of the Project is not expected to cause potentially significant impacts on water transport infrastructure.
Impacts to hydrology & hydrogeology due to facilities presence at site and safety zone	The jetty terminal will be a piled structure with no reclamation works. As such, obstruction to water flow is unlikely and potential impacts to hydrology is not expected to be potentially significant.

6.2.2 Scoped-In Impacts

There have been interactions between the resources/receptors and project activities that have been identified as likely to lead to significant impacts which should be further investigated during this EIA. Those interactions, which have been identified as unlikely to result in significant impacts have been scoped, out and do not require further assessment in this EIA.

The following impacts which are anticipated to have potential to generate significant impacts from the proposed Project as presented in table 6-27 are defined as requiring further detailed assessment and are carried out to the next stage of the EIA process.

Note that at the time of writing the EIA Report, around 60.29% of the construction and 100% of the pre-construction phase has been completed. As such, the EIA focuses on the construction works not yet completed and the operational phase.

1.8.1.7 Pre-construction Phase

The scoped-in impacts from pre-construction include the following:

- Impacts to economy and livelihood from:
 - Land acquisition

1.8.1.8 Construction Phase

The scoped-in impacts from construction phase include the followings:

- Impacts to ambient air quality from:
 - Use of PME
 - Earth works
 - Worker / equipment / material transport
- Impacts to ambient noise and vibration from:
 - Use of PME
 - Earth works
 - Worker / equipment / material transport
 - Jetty terminal construction
- Impacts to surface water and groundwater quality from:
 - Vessel operational discharges
 - Jetty terminal construction
 - Disposal of dredged materials
 - Wastewater discharge and runoff
 - Waste storage and disposal (including hazardous waste)
- Impacts to soil quality and topography from:
 - Wastewater discharge and runoff
 - Waste storage and disposal (including hazardous waste)
- Impacts to aquatic biodiversity from
 - Jetty terminal construction (e.g. piling, dredging)
- Impacts to community health and safety from:
 - Use of PME
 - Earth works
 - Worker / equipment / material transport
 - Vessel operational discharges
 - Vessel anchoring
 - Exclusion zone of construction activities on river
 - Jetty terminal construction (e.g. piling, dredging)
 - Disposal of dredged materials
 - Wastewater discharge and runoff
 - Waste storage and disposal (including hazardous waste)
- Impacts to economy and livelihood from:
 - Worker / equipment / material transport
 - Exclusion zone of construction activities on river
- Impacts to occupational health and safety from:

- Use of PME
- Earth works
- Worker / equipment / material transport
- Vessel anchoring
- Jetty terminal construction (e.g. piling, dredging)
- Disposal of dredged materials
- Waste storage and disposal (including hazardous waste)
- Impacts to infrastructure services from:
 - Exclusion zone of construction activities on river
 - Jetty terminal construction (e.g. piling, dredging)
 - Disposal of dredged materials
 - Waste storage and disposal (including hazardous waste)

1.8.1.9 Operational Phase

The scoped-in impacts from operational phase include the followings:

- Impacts to ambient air quality from:
 - Venting and fugitive emissions
 - Worker / equipment / material transport
- Impacts to ambient noise and vibration from:
 - Worker / equipment / material transport
 - Maintenance dredging
- Impacts to surface water and groundwater quality from:
 - Vessel operational discharges
 - Jetty terminal and tank farms discharges to river
 - Maintenance dredging
 - Waste storage and disposal (including hazardous waste)
- Impacts to soil quality and topography from:
 - Waste storage and disposal (including hazardous waste)
- Impacts to aquatic biodiversity from
 - Maintenance dredging
- Impacts to community health and safety from:
 - Venting and fugitive emissions
 - Vessel operational traffic
 - Vessel operational discharges
 - Jetty terminal and tank farms discharges to river
 - Facilities presence at site and safety zone
 - Maintenance dredging

- Worker / equipment / material transport
- Waste storage and disposal (including hazardous waste)
- Impacts to landscape and visual character:
 - Facilities presence at site and safety zone
- Impacts to economy and livelihood from:
 - Vessel operational traffic
 - Facilities presence at site and safety zone
- Impacts to occupational health and safety from:
 - Venting and fugitive emissions
 - Vessel operational traffic
 - Vessel anchoring
 - Maintenance dredging
 - Worker / equipment / material transport
 - Waste storage and disposal (including hazardous waste)
- Impacts to infrastructure services from:
 - Vessel operational traffic
 - Maintenance dredging
 - Facilities presence at site and safety zone
 - Waste storage and disposal (including hazardous waste)

1.8.1.10 *Unplanned / Accidental Events*

The unplanned or accidental events can be from incidents during construction and operation caused by the work force, equipment, or supplies. This also includes consequences of natural disasters (floods, cyclones, and/or earthquakes) that can lead to environmental or social impacts.

- Impacts from spills and leaks on surface water and groundwater quality, aquatic biodiversity, soil quality, community health and safety, and occupational health and safety;
- Impacts from vehicle collision on community health and safety, and occupational health and safety; and
- Impacts from fire and explosion on community health and safety, and occupational health and safety.

6.3 Pre-Construction Phase Impact Assessment

6.3.1 *Impacts to Economy and Livelihood*

The following activities can have impacts to economy and livelihood of the communities:

- Acquisition of land for the Project.

Construction of the Petroleum Terminal and Storage Project is located on the East bank of the Yangon River in Kyauktan Township. Project activities results in temporary and permanent loss of agricultural land as a direct impact from the Project footprint of the Tank Farm and Petroleum Receiving Jetty, construction camps, lay down areas, borrow pits and access roads. In addition, loss of agricultural land might also result from safety and security exclusion zones around Project facilities. The Project Site

covers an area of 112.5 acres that includes the jetty terminal area of 13.5 acres and land area of 99 acres.

However, the land was acquired by Myanmar Economic Corporation (MEC) a few decades ago with certain amount of compensation and the farmers were already relocated in Thida Myaing Ward. Given that, the impact on resettlement is not discussed in this report. Although the land has been acquired by MEC, BE, as a matter of sympathy, negotiated with the farmers in 2017 to set up a scheme to provide additional compensation that reflect the current market price, although BE does not oblige to. Based on the agreement acquired over the meeting, the additional compensation was paid to the entitled villagers in February, 2018.

The summary of people who received the additional compensation with respect to their ownership status are presented in Table 6-29.

Table 6-29 The number of people who received additional compensation and their respective ownerships

Ownership Status	Number of people
Landowners	33
Hut owners who owned the land acquired	29
Hut owners who didn't own the land but rented.	27
Fishermen hut owners	10

Therefore, there will only be:

- Temporary loss of livelihoods associated with the temporary loss of land used for annual crops e.g. due to construction access road or laydown areas.
- Permanent loss of livelihoods associated with the permanent loss of land used for annual crops e.g. for land take directly for the Project Area footprint.

1.8.1.11 Existing Controls / Mitigation Measures

In order to limit the impact on economy and livelihood of the community, the following mitigation measures will be taken:

- Land take for temporary activities, such as landing site, for example, should be minimised to the extent possible both in terms of geographical size and duration; and as such, when no activities are being undertaken, exclusions will be lifted.
- BE will propose the contractor to recruit in priority the stakeholders whose land is being impacted during construction phase. Recruitment should be considered to offer the jobs to those who can extend past the construction phase, in particular for those whose land is permanently impacted.
- Although BE will limit its construction activities within its Project Site Area, if the Project causes unintended damage to its proximity, BE will compensate stakeholders whose land is temporarily or permanently impacted during construction and operation using market price with a premium (to compensate for the change).
- BE will compensate stakeholders whose crops, if any, is being impacted for temporary occupation during construction using market price.
- BE will use an external specialist/or will do market survey as appropriate to identify market price for the type of land and crops, in case impacted by project activities.

1.8.1.12 Significance of Impact

After implementing the above mentioned mitigation measures, the impact magnitude is considered to be **medium**. Even though BE acquired the land from MEC which had already paid the compensation to the community, BE has paid additional compensation, not less than the market price, to original land owners. As only 50% of the farmers live on the land for their main income sources and they have received proper compensation from BE, the receptor sensitivity is assessed to be **medium**. With the existing controls and mitigation measures in place, the impact significance associated with land acquisition are considered to be **moderate**.

Table 6-30 Impact Assessment for Economy and Livelihood during Pre-Construction Phase

Impact	Impact on economy and livelihood				
Impact Nature	Negative		Positive	Neutral	
	Potential impact on Economy and Livelihood is considered to be adverse (negative).				
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local		Regional	International	
Impact Scale	The total area to be impacted by the construction of the Project is 99 acres.				
Frequency	The impact will occur 24/7 during the construction phase.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major	

1.8.1.13 Additional Mitigation, Management and Monitoring

The significance of impacts is expected to **moderate** through the implementation of the existing control and mitigation measures. In order to mitigate the impacts to its lowest possible level, a number of following additional mitigation, management and monitoring measures are required throughout the construction period:

- BE will need to develop and implement a **Stakeholder Engagement Plan** as part of the Project. The plan should include measures to notify local stakeholders in advance of any particularly activities on their land property. This will ensure that stakeholders can anticipate and appropriately respond to the change and limitation of uses of agricultural areas.
- The Project should also develop a **Grievance Mechanism** to collect grievances from local stakeholder whose agricultural activities are affected by the Project activities.

1.8.1.14 *Significance of Residual Impact*

With the implementation of the above existing control and mitigation measures, as well as the above-recommended additional mitigation and management measures, it is expected that the residual impact significance would be reduced to minor.

6.4 Construction Phase Impact Assessment

6.4.1 *Impacts to Ambient Air Quality*

1.8.1.15 *Source of Impact*

The following activities can have impacts to ambient air quality during the Construction Phase of the Project.

- Use of PME;
- Earth works; and
- Worker / equipment / material transport.

Construction activities can result in emissions of dust and particulate matter (PM₁₀ and PM_{2.5}) to air. Any dust generated will remain airborne and can travel considerable distances from the source (Desert Research Institute, 2010). If not managed accordingly, fugitive dust has the potential to cause significant impacts on any nearby sensitive receptors). The distance at which impacts due to emissions of dust and particulate matter would occur depend on the duration and type of construction activity, the size distribution of particles generated, the sensitivity of the receptors and the meteorological conditions.

The Institute of Air Quality Management (2014) provides guidance for defining the significance arising from construction sites based on the magnitude of the change and the sensitivity of the receptors identified. The risk of dust emissions is defined using a number of variables including, but not limited to the activities being undertaken, the duration of activities, the size of the site and the meteorological conditions. According to the guidance, air quality impacts are not considered likely to areas that are respectively beyond 350 m and 50 m from the construction site and access roads. The premise of the guidance is that with the implementation of effective site-specific mitigation measures, the environmental effect will not be significant in most cases. While this is likely to be applicable during the wet season, it is considered that airborne dust may travel further in Myanmar during the dry season owing to climatic conditions.

In terms of dust emissions from open surfaces (i.e. exposed construction areas, disturbed land, stockpiles), the United States Environmental Protection Agency (1995) presented evidence which suggests that at wind speeds of less than 5.3 m/s and where rainfall exceeds 0.25 mm over a 24 hours' period, dust is unlikely to be carried as airborne particles. In Yangon, the wettest month (June) has an average rainfall of 516 mm, while the driest month (January) has an average rainfall of 3 mm. Considering the abundant rainfall during the year (with an average annual rainfall of 2,378 mm) (Section 5.6.4), the dust emissions during the wet season will be negligible. It should be noted, however, that fugitive dust emitted from an unpaved surfaces or from material handling processes may be dispersed via substantially lower wind speeds once emitted and travel considerable distances, so additional consideration to this process should be given.

The conditions presented suggest that emissions and subsequent impacts to air quality associated with the construction activities will depend greatly upon the nature of the activities occurring at any one time or location and local meteorological conditions at the time of release.

Greenhouse Gas Emissions

Table 6-31 lists the potential combustion emissions and greenhouse gases produced by the project activities. During site preparation activities, combustion products will be released from vehicles transporting personnel and equipment and construction machinery. A conservative emission factor for

construction activity operation is 1.2 tons of total suspended particulate (TSP) per acre per month (or 98.8 kg / hectare / day). The value is most applicable to construction operations with medium activity level and semiarid climate. This emission factor is not directly applicable for particulate matter less than 10 µm (PM₁₀), therefore, for this Project, PM₁₀ emissions estimate, which is assumed to equal TSP, will be conservatively high.

Table 6-31 Potential Impacts of Combustion Emissions and Greenhouse Gases

Emission Species	Potential Environmental Impact
CO	Indirect GHG. Enhances low-level of ozone formation.
CO ₂	GHG. Contributes to atmospheric GHG concentrations.
NO _x	Air pollutant. Contributes to the formation of acidic species that can be deposited by wet and dry processes, potentially impacting aquatic and terrestrial ecosystems.
N ₂ O	Air pollutant and GHG. A source of ozone depletion. Deficiency of vitamin B12 in human health
SO _x	Air Pollutant. Contributes to the formation of acidic species that can be deposited by wet and dry processes, potentially impacting aquatic and terrestrial ecosystems.
CH ₄	Air pollutant and GHG. Contributes to climate change and ground level ozone air pollution, which can exacerbate respiratory and cardiovascular problems.
Total Hydrocarbons	Air Pollutant. Precursor to ground-level ozone and a major component of smog.

Greenhouse gases (GHG) emissions are estimated for key project activities following the Tier 1 approach of IPCC (2006) for stationary combustion (generators) and mobile combustion (transportation), using volume-based approaches depending on available information and based on examples from online sources and estimations of numbers to get volumes and number approximations, only. GHG emissions are estimated using emission factors for the three main greenhouse gases (CO₂, CH₄ and N₂O), and converted carbon dioxide equivalent, using global warming potentials. GHG Emissions are calculated using the same general methodology described for stationary and mobile combustion emissions.

The site preparation and construction activities for the Project is estimated to take respectively an approximately 720 days. Based on previous experience with similar projects, diesel consumption for these transportation needs is approximately 20-40 litre per day (l/day). The conservative calculation estimated that the total diesel consumption for the Project over a period of 720 days is 1,339,200 litres (Table 6-32).

Table 6-32 Fuel Consumption of Project

Source Type	Quantity	Activity Data		
		Fuel Consumed (Litre / day)	Working Day (day)	Litre
Crane	8	40	720	230,400
Excavator	3	40	720	86,400
Loader	3	40	720	86,400
Pile Driver	4	40	720	115,200
Roller	2	40	720	57,600
Truck	9	20	720	129,600
Pickup Truck	10	20	720	144,000

Service Truck	3	20	720	43,200
Minibus	7	20	720	100,800
SUV	4	20	720	57,600
Dump Truck	10	40	720	288,000
Total				1,339,200

1.8.1.16 Existing Controls / Mitigation Measures

The controls committed to be implemented for the Project will include the following:

- All air emissions will comply with EQEG Air Emissions (General; Section 1.2 of the EQEG);
- Establish and implement a Grievance Mechanism;
- Ensure stockpiles are located as far as possible from receptors;
- Cover and/or water stockpiles of friable/dusty materials such as excavated spoils, dredged materials, filling materials to avoid fugitive dust. Enclose any skip hoist for material transport with impervious sheeting;
- Implement a watering and sprinkling regime in particular during the dry season, when and where necessary (e.g. prior to truck entering the site in the morning and in the afternoon, watering in area with loose soil and fine sediment; the number of watering trucks will be assigned due to practical demand);
- Ensure regular maintenance of all diesel-powered equipment to reduce emissions of NO_x and SO₂;
- Switch off machinery and equipment when not in operation;
- Use low sulphur fuels in heavy good vehicles (HGVs) and diesel powered equipment in collaboration with best management practices for construction phase;
- Use alternative fuels and fuel mixes where possible;
- Prohibit the burning of waste or vegetation on site;
- Maintain speed limit at 20 kilometres per hour (km/h), where possible; and
- Domestic and construction waste storage area will be located away from receptors.

1.8.1.17 Significance of Impact

According to the ambient air baseline survey results, PM10 at three sample points are higher than EQEG values although PM2.5 at all sample points are well under EQEG standards. This high PM10 value at the sample points can be attributable to construction activities and high wind speed at the time of sampling. The ambient air baseline survey recorded no exceedances of the WHO Human Health standards for CO, NO_x and SO₂ values.

The nearest settlements are Thida Myaing Ward (3.9km), Chaung Wa Village (2.5 km) and Tha Khut Pin Village (3.4 km) which are at least 2.5 km from the Project Site. They are unlikely to be affected by the Project activities and thus the receptor sensitivity is considered **low**. The impact magnitude is considered short-term and localised and is, therefore, expected to be of **small** magnitude.

If the existing controls are implemented properly, the impact significance associated with dust and particulate matters generated during construction are considered to be minor (Table 6-33).

Table 6-33 Impact Assessment for Air Quality - Construction Phase

Impact Category	Impact Assessment on air quality due to construction phase				
Impact Nature	Negative	Positive		Neutral	
	Elevated ambient concentrations of dust, and PM ₁₀ from construction related activities will have a negative impact on air quality.				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local	Regional		International	
Impact Scale	The scale of the impact is likely to be up to 350 m from the construction site boundary.				
Frequency	Impacts will arise continuously from related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium		High	
Impact Significance	Negligible	Minor	Moderate		Major

1.8.1.18 Significance of Residual Impacts

The significance of impacts is expected to be **minor** through the implementation of the existing control and mitigation measures. Thus, it is considered no additional mitigation measure is warranted.

6.4.2 Impacts to Ambient Noise

1.8.1.19 Source of Impact

The following activities can have impacts to ambient noise during the Construction Phase of the Project.

- Use of PME;
- Earth works;
- Worker / equipment / material transport; and
- Jetty terminal construction

One of the main source of noise during construction activities are from equipment's engine, usually use diesel, without sufficient muffling.

- Typical stationary equipment are pumps, generators, compressors, pile drivers, pavement breakers, etc.; and
- Typical mobile equipment are bulldozers, loaders, trucks, etc.

Construction activities can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations, which unlike noise; vibration dissipates rapidly over a distance such that the magnitude and extent of vibration impacts are commonly minimal when compared to noise. On this basis, no further consideration of

ground-borne vibration issues is warranted or provided in this section which focuses on environmental air-borne.

The choice of boring and piling technology for jetty will affect the noise level during construction. If diesel hammer technology is selected, potentially significant ambient and underwater noise will be generated. Underwater noise is not expected to reach any sensitive receptor given the low biodiversity and ecological status of the Yangon River.

The working camps will be located in Kyauktan Township. This increase in population could be expected to increase noise levels.

1.8.1.20 Existing Controls / Mitigation Measures

The controls committed to be implemented for the Project will include the following:

- Noise levels will comply to EQEG Noise Levels (General; Section 1.4 of the EQEG);
- Select equipment with lower Sound Power Levels (SPL) that comply to EQEG Noise Levels (General; Section 1.4 of the EQEG) where possible;
- Where necessary, install acoustic enclosures / mufflers for equipment casing radiating noise;
- Ensure equipment is maintained as per operating standards;
- Limit the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community. Shut down or throttled down between work periods for machines and construction plant items (e.g. trucks) that may be in intermittent use;
- Reduce the number of equipment operating simultaneously as far as practicable;
- Orientate equipment known to emit noise strongly in one direction so that the noise is directed away from receptors as far as practicable;
- Locate noisy equipment (such as hydraulic hammer and lorry mounted concrete pump) as far away from receptors whenever possible;
- Avoid transportation of materials in and out site through existing community areas as far as logistically possible;
- Use material stockpiles and other structures, where practicable, to screen noise sensitive receptors from on-site construction activities;
- Silencers, mufflers, or acoustic enclosures shall be installed to reduce sound power level of noisy equipment if deemed necessary;
- Any activity that has the potential to generate impulsive noise will be avoided where possible when in close proximity to noise sensitive receptors;
- During the works, unnecessary noise due to idling diesel engines and fast engine speeds will be avoided when lower speeds are sufficient;
- Normal working hours of the contractor should be in line with Myanmar legal requirements;
- Noise barriers such as berms and vegetation shall be installed to limit noise at plant boundary, if deemed necessary following noise modelling; and
- Maintenance works should be conducted during the daytime only.

1.8.1.21 Significance of Impact

According to the ambient noise quality assessment at four (4) points in which the nearest point to the Project Area is about 200 m, the noise level detected is well below the EQEG although daytime noise level is slightly above the night-time level. The nearest resettlement areas are Chaung Wa, Thida Myaing Ward in Kyauktan Township and Tha Khut Pin Village in Kawhmu Village; all of these are more

than 2 km from the Project Site and unlikely to be affected by the Project. Given that, the receptor sensitivity is assessed to be **low**.

Considering the nature of the project and the type of construction activities, the impact magnitude is expected to be of **medium** magnitude. With the existing controls and mitigation measures in place, the impact significance associated with noise due to construction are considered to be **minor** (Table 6-34).

Table 6-34 Impact Assessment for Ambient Noise - Construction Phase

Impact Category	Impact Assessment on ambient noise from construction phase				
Impact Nature	Negative	Positive		Neutral	
	Potential noise impacts would be considered to be adverse (negative).				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local	Regional		International	
Impact Scale	Within 500m of the construction site, localised impact				
Frequency	During construction mainly during boring and piling phase				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium		High	
Impact Significance	Negligible	Minor	Moderate		Major

1.8.1.22 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, it is expected that the residual impact significance would be **minor**. Thus, it is considered that it requires no additional mitigation measure.

6.4.3 Impacts to Surface Water and Groundwater Quality

1.8.1.23 Source of Impact

The following activities can have impacts on surface water and groundwater quality during the Construction Phase of the Project:

- Vessel operational discharges;
- Jetty terminal construction;
- Wastewater discharge and runoff; and
- Waste storage and disposal (including hazardous waste).

Domestic Water and Sewage

Domestic-type wastewater and sewage will arise from the construction workforce. Black and grey water will arise from the construction workforce and from facilities serving site workers. It is estimated that an average of 300-450 workers (Section 4.4.3) will be working on-site during the construction phase of the Project. This is the number of workers estimated for peak time and is therefore a conservative estimate of the impacts to water quality. With an assumed sewage generation rate of 0.19 m³ per worker per day (Hong Kong Environmental Protection Department, 2005), up to about 57 m³ of sanitary wastewater will be generated per day, mostly from the labour camp and site office. Mismanagement of sewage and wastewaters would have the potential to result in contamination of surface waters, which may result in localised land/ecological contamination, impacts to health, odour nuisance and attraction of vermin.

Surface run-off from the Project, particularly following heavy rains, could have potential impacts on water quality of surface waters. Surface run-off from the construction site could contain high levels of suspended solids. It may also contain contaminants if washed out from areas used for maintenance, material and equipment laydown, parking, fuel storage and fuelling.

Earth Works

Surface water hydrology can be affected during road construction activities. Construction activities can result in compaction of soils and an increase in impermeable (or slowly permeable) surfaces. The subsequent increase in surface runoff may in turn increase the risk of flooding. Roads and culverts can potentially alter the flow regimes of the river thereby affecting water velocity, depth, depositional patterns and channel morphology. These changes in turn may increase the risk of flooding and erosion. Additionally, certain activities may encourage soil erosion and increase the sediment loads of nearby streams.

Construction activities may also have significant impacts on groundwater hydrology and quality. The site may need to be drained to provide suitable conditions for the engineering works to occur, resulting in temporary changes to ground flow. Also, contaminated soil, if present, from a previous land use may be disturbed during construction works, causing pollutants such as heavy metals to enter ground and surface waters.

Sedimentation

The construction activities will include excavation and handling of substantial quantities of soil. The generation of sediment-laden run off could be transferred to the nearby freshwater bodies, which could increase total suspended solids and turbidity in receiving waters.

Waste, Chemicals, Fuel, and Oil Storage, Handling and Disposal

Construction activities can generate large amounts of waste materials that then need to be disposed of. Construction waste includes waste that is generated during construction activities (such as packaging, or the products of demolition) and materials that are surplus to requirements (as a result of over-ordering or inaccurate estimating). Typical hazardous and non-hazardous construction waste products can include:

- Insulation materials;
- Concrete, bricks, tiles and ceramics;
- Wood, glass and plastic;
- Bituminous mixtures, coal tar and tar.
- Metallic waste (including rebar, steel, cables and pipes);
- Soil, contaminated soil, stones and dredging spoil;
- Gypsum;

- Cement;
- Paints, thinners, and varnishes;
- Adhesives and sealants;
- Organic waste (from kitchens);
- Sewage (from offices and camps); and
- Process wastewater.

During the construction phase, waste, chemicals, fuel, and oils storage, handling, and disposal, have the potential to cause surface water contamination through direct release or from contaminated storm-water runoff.

Dredging

Dredging is expected to occur during site preparation for boring and piling for working platform and jetty. The two most common methods are Grab on Barge or Trailing Suction Hopper Dredgers (TSHD). Dredging materials are expected with a volume of ~1,700 m³ and will be disposed at Myanmar Port Authority's approved location. Revetment construction will also involve installation of plastic drains, preloading, slope excavation, geotextile laying, rock filling, sand filling, excavation for and installation of precast retaining wall as well as armour rock placement. These activities will take ~10 months.

1.8.1.24 Existing Controls / Mitigation Measures

The controls committed to be implemented for the Project will include the following:

- All discharges will be in compliance with Wastewater, storm Water Runoff, Effluent and Sanitary Discharges (General; Section 1.2 of the EQEG) and EQEG Site Runoff and Effluent Levels (for Roads; Section 2.7.8 of the EQEG);
- Install silt trap to treat surface run-off from bunded areas prior to discharge to the storm water drainage;
- Liquid effluents arising from construction activities will be treated prior to discharge to public drainage;
- Provision of channels, earth bunds or sand bag barriers on site to direct storm water to silt removal facilities;
- Design drainage pipes and culverts for the controlled release of storm flows;
- Wastewater collected from canteen kitchens, including that from basins, sinks and floor drains, should be discharged into sanitary sewers via grease traps;
- Oil-contaminated water, if any, will be collected and handled by local licensed wastewater sub-contractors;
- Earthworks to form the final surfaces should be followed up with surface protection and drainage works to prevent erosion caused by rainstorms.
- Design and construct a road drainage system meet changing conditions expected with climate change:
 - A flood control system will be set up and the constructed land will be placed above the flood line.
 - Flood control and drainage works will consider the topography of the Project Area and measures will be taken to reduce the runoff as far as possible.
- Site drainage facilities should be developed following the design basis below:
 - Provide oily water separator at the tie-in point of the existing drainage system.

- Convey surface runoff and roof drainage away from the equipment and buildings.
- All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly;
- Sanitary facilities, including toilets with septic tanks will be provided for the use of construction workforce. Sewage will be discharged into leak proof septic tank. The septic tank will be adequately sized and placed in a sheltered impervious bund/containment (to prevent external deposition of solids or ingress of rain);
- Grey water from showers and canteen kitchens (including that from basins, sinks and floor drains) should be discharged into soaking pit equipped with grease traps. Grease will be treated as oil waste;
- Domestic, construction and hazardous waste as well as sewage will be disposed of by a registered and licensed waste vendor to approved landfill and / or treatment facility;
- Use of spill or drip trays to contain spills and leaks; and
- Storage of chemicals, fuel, and oil in adequately banded impervious areas, as per international bunding and storage requirements.
- **Construction Waste Management Plan** is developed and the Project will be implemented as per the measures include in the Plan. It is provide in **Appendix E**.

1.8.1.25 Significance of Impact

The impact on surface and ground water during construction is related to wastewater discharges and waste management from the workers' camps and construction sites. The impact magnitude of the impact is considered to be **medium** given that the scale of the Project is medium sized and involves lots of earthworks and dredging. The receptor sensitivity is considered **high** given that water quality of Yangon River is already degraded and a number of villagers depend on the river for fishing. The impact significance associated with surface water and groundwater during the construction is considered **major** (Table 6-35).

Table 6-35 Impact Assessment for Surface Water and Groundwater quality - Construction Phase

Impact Category	Impact Assessment on surface water and groundwater from construction phase			
Impact Nature	Negative	Positive	Neutral	
	Surface water and groundwater quality impact from the construction activities is negative.			
Impact Type	Direct	Indirect	Induced	
Impact Duration	Temporary	Short-term	Long-term	Permanent
Impact Extent	Local	Regional	International	
Impact Scale	Along the eastern and western riverbank and across Yangon river			
Frequency	During construction for a maximum of 15 months			

Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High
Impact Significance	Negligible		Minor	Moderate	Major

1.8.1.26 Additional Mitigation, Management and Monitoring

The significance of impacts is expected to be **major** through the implementation of the existing control and mitigation measures. Therefore, it is considered that a number of additional mitigation, management and monitoring measures are required to be implemented throughout the construction period. These additional mitigation, management, and monitoring measures are as follows:

General Mitigation Measures

- Debris and refuse generated on-site should be collected, handled, and disposed of properly to avoid entering the receiving waters. Stockpiles of cement and other construction materials should be kept covered when not being used;
- Vehicles, trucks, equipment wash, and maintenance activities shall be undertaken on protected ground (and sheltered area when possible) with appropriate drainage to collect wastewater and avoid surface runoff;
- Assess the possibility to re-use water for dust suppression activities and allowing groundwater recharge. Water treatment methods for reducing suspended solids or turbidity on site include water filtration systems easily implemented on site such as but not limited to silt socks, geobags, and settling tanks or ponds.

Construction Site Run-off and Drainage

- Exposed soil surfaces should be protected by paving or fill material as soon as possible to reduce the potential of soil erosion;
- Open stockpiles of construction material or construction waste on-site should be covered with tarpaulin or similar fabric during rainstorms where necessary, depending on the material/waste;
- Use methods for minimising sediment runoff, as appropriate to the conditions on-site, such as wheel cleaning facilities;
- Protect temporary trafficked areas on-site with coarse stone ballast or equivalent;
- Regularly, and particularly following rainstorms, inspect and maintain drainage systems and erosion control and silt removal facilities to ensure proper and efficient operation at all times;
- Mulch to stabilise exposed areas, where practicable and appropriate;
- Re-vegetate areas promptly, where practicable and appropriate; and
- Provide measures to prevent the washing away of construction materials, soil, silt or debris into any drainage system of open stockpiles of construction materials.

Dredging

Dredging operations should be undertaken in such a manner as to minimise resuspension of sediments. Standard good dredging practice measures should, therefore, be implemented including the following requirements, which should be written into the dredging contract.

- Trailer suction hopper dredgers shall not allow mud to overflow;

- Use of Lean Material Overboard (LMOB) systems shall be prohibited;
- Mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted;
- Barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material;
- Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes;
- Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation;
- Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved;
- Adequate freeboard shall be maintained;
- All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash;
- Single layer silt curtains shall be applied around works areas when feasible
- The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.

1.8.1.27 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, it is expected that the residual impact significance would be reduced to **minor**. This is based on the assumption that the review of dredging information provides no significant impacts to sensitive receivers.

6.4.4 Impacts to Soil Quality and Topography

1.8.1.28 Source of Impact

The following activities can have impacts to soil quality and topography during the Construction Phase of the Project.

- Wastewater discharge and runoff; and
- Waste storage and disposal (including hazardous waste)

Sources of pollutions are likely to be similar to the ones identified in the source of impacts to surface water – refer to section 6.4.3.1.

1.8.1.29 Existing Controls / Mitigation Measures

The project will commit to the following mitigation measures:

Top Soil Impacts

- Reuse of topsoil as backfill where ever possible;
- Excess inert soils and sub-soils excavated that is not required or use as fill on site will be recovered off-site to an authorised site;
- Any fill material excavated at the site, which is deemed to be contaminated (i.e, non-hazardous or hazardous) will be stored separately to the inert material, sampled and tested, in order to appropriately classify the material as non-hazardous or hazardous in accordance with local

regulation which establishes the criteria for the acceptance of waste at landfills before being transported to an appropriately authorized facility by permitted contractors;

- Schedule activities (as far as possible) to avoid extreme weather event such as heavy rainfall and high winds;
- Re-vegetate areas with temporary land use, conducting 'progressive rehabilitation;
- Minimise the amount of soil handling;
- If bedrock is encountered during excavations, it will either be crushed on site and used for infill during construction or be removed from the site by appropriately permitted waste collectors;
- Stabilise exposed areas;
- Cover or spray water on stockpiles of excavated material or backfill; and,
- Reduce or prevent sediment runoff through use of settlement ponds, silt fences.

Soil Compaction

- Demarcate routes for movement of heavy vehicles;
- Strip and placing soils when dry, and not when wet; and,
- Restrict the height of topsoil stockpiles to minimise compaction, restricted to 2 m.

Soil and groundwater contamination

- Appropriate management of black and grey wastewater;
- Appropriate management, storage and disposal of waste as per good international industry practices;
- Waste will be segregated on site and only the recyclable wastes will be transferred to designated waste collection points while non-recyclable wastes will be handed over to an authorised waste collector;
- Waste which are suitable for reuse will be used for construction purposes where possible;
- Implementation of a periodic soil and groundwater management programme (including daily inspection of chemicals storage area, waste storage area, and sewage storage area);
- On-site storage of any hazardous wastes produced will be minimized with off-site removal organized on a regular basis;
- Appropriate management of chemicals by implementing good international industry standards;
- Store chemicals, fuel, and oil in adequately sheltered and impervious bund as per international best practices;
- Ensure spill kits are available on site at all time and located at strategic areas (e.g., refuelling area, chemical storage area, waste areas, etc.);
- Bulk storage of fuels and oils should be in clearly marked containers (tanks/drums etc.) indicating the type and quantity being stored. In addition, these containers should be surrounded by bunds to contain the volume being stored in case of accidental spillage; and
- Installation of skips and bins:
 - Skips and bins should be strategically placed within the campsite and construction site.
 - The skips and bins at the construction campsite should be adequately designed and covered to prevent access by vermin and minimise odour.

- The skips and bins at both the construction campsite and construction site should be emptied regularly to prevent overflowing.
- Disposal of the contents of the skips and bins should be done at an approved disposal site.

■ Implement **Construction Waste Management Plan**.

1.8.1.30 Significance of Impact

Impacts to soil during construction will be short-term and localised. Provided that the existing controls and mitigation measures in Section 6.4.3.2 and Section 6.4.3.2 are implemented properly, the impacts on soil quality are expected to be of **small** magnitude. The soil quality results indicated that most of the parameters measured are within the Standards (Dutch standards for soil quality) except the exceedances for sulphide at one location. As such, the receptor sensitivity is expected to be **medium**. Therefore, significance of impacts to soil quality is considered **minor** (Table 6-36).

Table 6-36 Impact Assessment for Soil Quality - Construction Phase

Impact Category	Impact Assessment on Soil quality from the construction works				
Impact Nature	Negative		Positive	Neutral	
	Soil quality impact from the construction activities is negative.				
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short-term		Long-term	Permanent
Impact Extent	Local		Regional	International	
Impact Scale	Impact scale is considered small given it is a localised Project.				
Frequency	Impacts will arise continuously from construction related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High
Impact Significance	Negligible	Minor		Moderate	Major

1.8.1.31 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, it is expected that the significance of residual impacts would be **minor**. As such, no additional mitigation measure is considered required.

6.4.5 Impacts to Aquatic Flora and Fauna

1.8.1.32 Source of Impact

The following activities can have impacts to aquatic flora and fauna during the Construction Phase of the Project.

- Jetty terminal construction (e.g. piling, dredging).

The construction phase of Jetty may lead to impacts in surface water quality from dredging and piling. Impacts to surface water quality can also result from site run-off and waste (liquid and solid) storage / disposal which are sourced from the construction of jetty and tank farm.

Dredging volume is expected to be ~1,700 m³ using a grab dredger which would take around 2 months. Dredging will also be required for the revetment and will take ~20 days using backhoe dredging. Revetment construction will also involve installation of plastic drains, preloading, slope excavation, geotextile laying, rock filling, sand filling, excavation for and installation of precast retaining wall as well as armour rock placement. These activities will take ~10 months. Construction of the working platform and jetty will involve piling as well as installation of precast concrete slabs. Piling will be undertaken to form the foundation of the trestle and working platform for ~45 days. A total of 54 piles will be installed for the working platform while 67 piles will be installed for the trestle.

During the construction phase, waste material (solid and liquid), if not stored and disposed of appropriately, have the potential to cause surface water contamination through direct release or from contaminated storm-water runoff. Surface water contamination could occur due to improper construction waste storage and disposal, either directly or as a secondary impact due to contaminated surface water run-off being discharged from waste storage and disposal areas. These activities could lead to indirect impacts to aquatic fauna and flora with increased turbidity, sediment and nutrient load, however the majority of impacts will occur within the vicinity of construction site.

Dewatering may require to discharge onto the nearest receiving water body. Turbidity and process wastewater are considerable source of disturbance to the aquatic flora and fauna environment.

1.8.1.33 Existing Controls / Mitigation Measures

In addition to the existing controls and mitigation measures provided in Section 6.4.3.2 for surface water and groundwater, the following mitigation measures will be relevant to reduce the impacts to aquatic flora and fauna:

- Undertake sampling to determine the physical and chemical properties of material to be dredged to ensure the appropriate type of dredger is used;
- Limit the dredging activities as far as possible;
- Seek the opportunities of beneficial use of dredged material as a resource, either on-site or off-site (e.g. agricultural use, industrial/commercial use or recreational use) as per the guidelines of MPA depending on the contamination of the dredged material; and
- The excess dredged materials from the working platform will be disposed at Myanmar Port Authority (MPA)'s approved location.

1.8.1.34 Significance of Impact

All 19 fish species identified during the surveys are listed as least concerned species. There are no species recorded that are listed as vulnerable or above on the IUCN Red List. Receptor sensitivity is considered **low** as the area does not include any of range restricted or endangered species or species protected by law and is considered to be modified habitat.

Provided that the existing controls and mitigation measures provided in Section 6.4.3.2 for surface water and groundwater are implemented properly, the aquatic flora and fauna impacts from the Project are expected to be of medium magnitude as impacts will be limited in extent and short-term. As such, the significance of impacts to aquatic flora and fauna is considered minor (

Table 6-37).

Table 6-37 Impact Assessment for Aquatic Flora and Fauna - Construction Phase

Impact Category	Impact Assessment on aquatic flora and fauna due to jetty construction as well as wastewater discharge and site run-off from the construction phase				
Impact Nature	Negative	Positive	Neutral		
	Aquatic flora and fauna impact from the construction activities is negative.				
Impact Type	Direct	Indirect	Induced		
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local	Regional	International		
Impact Scale	Impact scale is considered small given it is a localized and expected to occur downstream of the Project Area.				
Frequency	Impacts will arise continuously from construction related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium	High		
Impact Significance	Negligible	Minor	Moderate	Major	

1.8.1.35 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures presented in Section 6.4.3.2 and Section 6.4.5.2, it is expected that the residual impact significance would be **minor**. Therefore, no additional mitigation measure is considered.

6.4.6 Impacts to Community Health and Safety

1.8.1.36 Source of Impact

The following activities can have impacts to community health and safety during the Construction Phase of the Project.

- Use of PME;
- Earth works;
- Worker / equipment / material transport;
- Vessel operational discharges;
- Vessel anchoring;
- Exclusion zone of construction activities on river;
- Jetty terminal construction (e.g. piling, dredging);

- Disposal of dredged materials;
- Wastewater discharge and runoff; and
- Waste storage and disposal (including hazardous waste)

The construction activities could have potential direct and negative impact on human health. They might also cause significant nuisance issues.

Regarding ambient air quality, it is likely that potential negative impacts will arise continuously during the construction phase of the Project. Health impacts from fugitive dust, PM₁₀ and PM_{2.5} include:

- Effects on breathing and respiratory systems; and
- Decreased lung function and symptomatic effects, including acute bronchitis, particularly in children and asthmatics.

Nuisance issues from fugitive dust are typically related to soiling of surfaces and obscuration of visibility.

During construction, noise generation may cause nuisance to nearby residential areas.

The influx of construction workers and in-migration could change the disease profile in the community resulting in declining community health and well-being.

The handling, transport and treatment of the Project waste during construction may also result in risks to public health due to contamination of water resources and spread of disease carrying species such as rats.

During public consultation for the Project, local communities were concerned about noise pollution and the influx of workers. These concerns are respectively addressed in Section 9.3.

1.8.1.37 Existing Controls / Mitigation Measures

The controls committed to be implemented for the Project will include the following:

- All workers, except those based in Project Area, will be accommodated in the labour camp during construction;
- Provide training on the most common communicable diseases to all workers to raise awareness of the likely diseases, symptoms, preventative measures, transmission routes, and treatment;
- Ensuring health check-ups of all labourers employed to screen pre-existing communicable diseases;
- Provide access for workers to healthcare services (facilities) and medical care;
- Community grievances in relation to the conduct of security personnel and safety issues or activities should be addressed in accordance with the Project established Grievance Procedure;
- The Project should employ at least 65% Myanmar nationals to work on the construction phase;
- As part of the stakeholder engagement activities, communities near the Project Area should be informed about the risks and consequences of trespassing. Such engagement should start prior to the start of construction activities;
- Speed limit of 20 km/h shall be enforced within the construction site;
- Security team to monitor entrance to the construction site;
- Implement **Construction Waste Management Plan**;
- **Traffic Management Plan** (TMP) is developed and the Project will be implemented as per the mitigation described in the Management Plan. The Traffic Management Plan is provide in **Appendix F**.

1.8.1.38 Significance of Impact

In terms of the work force, the construction could last for a maximum of 10 months and its impact is expected to occur localised. Only one ward (Thida Myaing Ward in Kyauktan Township which is about 3.9 km from the Project) and two villages (Chaung Wa Village in Kyauktan Township which is about 2.5 km from the Project and Tha Khut Pin Village which is about about 3.4 km from the Project) are the settlements near the Project which is at least 2.5 km away from the Projcet Site. Impact magnitude is thus considered **medium**. Receptor sensitivity is expected to be **low** given the number of workers employed in the Project are relatively small and the Project is located relatively far away from the settlement area. The impact significance for community health and safety are expected to be **minor** (Table 6-38).

Table 6-38 Impact Assessment for Community Health and Safety - Construction Phase

Impact Category	Impact Assessment on community health and safety from construction phase				
Impact Nature	Negative	Positive	Neutral		
	Potential injury or death to humans or livestock would be a negative occurrence				
Impact Type	Direct	Indirect	Induced		
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local	Regional	International		
Impact Scale	Impact scale is considered small given it is a localized Project.				
Frequency	Impacts will arise continuously from construction related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium	High		
Impact Significance	Negligible	Minor	Moderate	Major	

1.8.1.39 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, it is expected that the residual impact significance would be **minor**. However, on-going monitoring and evaluation of the management measures and community health situation will be needed. If monitoring indicates an increase in the transmission of communicable diseases, the management measures will need to be revised.

6.4.7 Impacts to Economy and Livelihood

Impacts to economy and livelihood of land owners and users may occur due to land acquisition of the Project. Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation is not yet conducted. Public consultation and primary socio-economic data collection for EIA investigation will be conducted after situation allowed in

order to have better participation by stakeholders, including land owner and land users affected by land acquisition of the Project. The EIA Report will be updated once the public consultation and primary socio-economic data collection for EIA investigation is done.

6.4.8 Impacts to Occupational Health and Safety

1.8.1.40 Source of Impact

Construction involves high-risk activities with the potential for accidents that may result in injuries and potential fatalities as well as lost man-hours. The following activities can have impacts to occupational health and safety during the Construction Phase of the Project.

- Use of PME;
- Earth works;
- Worker / equipment / material transport;
- Vessel anchoring;
- Jetty terminal construction (e.g. piling, dredging); and
- Waste storage and disposal (including hazardous waste).

Retrenchment of workers is likely to be required across the lifespan of the Project, particularly during the transition from construction to operation. Retrenchment of workers should be undertaken in line with national law and good international industry practices, and should include providing skills to enable individuals to secure alternative employment.

1.8.1.41 Existing Controls / Mitigation Measures

The controls committed to be implemented for the Project will include the following:

- The Project will comply with Myanmar labour laws;
- All staff will have medical check-ups prior to commencing work, where required;
- Create and implement an environmental management system for the Project. It will include mandatory health and safety training courses for all workers and contractors, including handling of hazardous material. This training will take place prior to work starting on operation. Training course attendance will be recorded and monitored by the Project. The plan shall be issued and approved prior to start any construction activity; and
- Provide workers with the required and appropriate personal protective equipment (PPE) such as eye protection, work gloves and protective boots to undertake site activities.

1.8.1.42 Significance of Impact

Employees of local contractors and those in the supply chain may not have international standard training in occupational health and safety, covering issues such as use of personal protective equipment, and in general, there is poor enforcement of occupational health and safety regulations so the vulnerability of contractors and workers in the BE chain workforce is expected to be medium.

There is assumed to be no handling of hazardous materials but some working at heights. As such, the impact magnitude is expected to be **medium**. Therefore, the significance of impacts to occupational health and safety is considered to be **moderate** (Table 6-39).

Table 6-39 Impact Assessment for Occupational Health and Safety - Construction Phase

Impact Category	Impact Assessment on Occupational Health and Safety from construction phase				
Impact Nature	Negative	Positive	Neutral		
	Occupational health and safety impacts from the construction activities are negative.				
Impact Type	Direct	Indirect	Induced		
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local	Regional	International		
Impact Scale	Impact scale is considered small given the localized				
Frequency	Impacts will arise continuously from construction related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium	High		
Impact Significance	Negligible	Minor	Moderate	Major	

1.8.1.43 Additional Mitigation, Monitoring and / or Management

The significance of impacts is expected to be **moderate** through the implementation of the existing control and mitigation measures. Considering the commitment to follow best practices, a number of additional mitigation, management and monitoring measures are recommended to be implemented throughout the construction period. These additional mitigation, management and monitoring measures are as follows:

- The Project will develop and implement a **Safety, Security, Health and Environmental Management Plan** which will be a subset of the overall EMP system, tailored to the needs of the project. This plan will set standards that will be met by all contractors and subcontractors;
- Monitoring, recording and reporting of Health, Safety and Environmental (HSE) matters as per good international industry practice shall be done on a monthly basis;
- Ensure activities are supervised by trained personnel;
- Suitable training is required for all employees who work at height. Employees should be trained in working on different pieces of equipment and surfaces, such as how to work safely on scaffolding, ladders, and roofs;
- Minimise the consequences of a fall when applicable, for example by providing a safety net;
- Avoid working at height where possible. (e.g., assemblage on ground level);
- Provide walkways that are clearly designated as walkways, having good conditions underfoot, and being well lit;

- Implement good housekeeping practice as such keeping work and storage areas tidy and designating specific areas for waste collection;
- Cordless tools should be used where possible. If this is not possible, cables should be run at high levels;
- If a surface is slippery with mud, it should be treated with stone. Any areas that are slippery should be signposted, and footwear with a good grip should be worn;
- Construction workers should be given appropriate protection when using vibrating tools, and equipment should be well maintained;
- Where duties involve manual handling, adequate training must be provided;
- Consider the kind of support that is best suited for the trench, ensure the trench is fully secure and regularly inspect the trench both before and during the work shift;
- Reversing movements of vehicles and mobile plant should be minimized by providing, where possible, drive through circulation routes. Where reversing is unavoidable, turning heads should be provided and banksmen should be deployed to guide reversing vehicles and plant where necessary; and steps should be taken to ensure that banksmen wear high-visibility safety vests and use walkie-talkie or similar equipment for effective communication;
- Safety reversing devices such as reversing video device (RVD), cross view mirror, parking sensor, and reversing alarm and warning light shall be used when applicable;
- Ensure height and stock pile location are in line with good international industry practices;
- Ensure excavation of trenches are undertaken as per good international industry practices; and
- Ensure loading and unloading of material is undertaken as per good international industry practices.

1.8.1.44 *Significance of Residual Impact*

With the implementation of the above existing control and mitigation measures, as well as the above recommended additional mitigation and management measures, it is expected that the residual impact significance would be reduced to **minor**.

6.4.9 *Impacts to Infrastructure Services*

1.8.1.45 *Source of Impact*

The following activities can have impacts to infrastructure services during the Construction Phase of the Project.

- Road transportation
- Exclusion zone of construction activities on river;
- Jetty terminal construction (e.g. piling, dredging); and
- Waste storage and disposal (including hazardous waste).

The above activities are impacting on the existing infrastructure (roads & maritime network, waste stream, population influx, healthcare system, etc.).

1.8.1.46 *Existing Controls / Mitigation Measures*

The controls committed to be implemented for the Project will include the following:

- Before commencement of jetty construction, a notice to mariners will be issued to inform navigator of the activities of the Project for navigation safety and will be limited to the minimum period possible;
- Duration for jetty construction will be reduced by practicing prefabrication and assembly methods;
- Reuse topsoil and dredged materials wherever possible and reduce the amount of dredge to be disposed;
- Limit the number of vehicles using public infrastructure and services whenever possible;
- Dispose of the waste generated by the Project at licensed landfill sites by registered and licensed waste management vendor; and
- Site reinstatement and rehabilitation will be performed including repairing any damage caused as part of the construction activities and reinstating existing access roads when needed.
- **Construction Waste Management Plan** is developed and the Project will be implemented as per the measures included in the Plan.
- Traffic Management Plan (TMP) is developed and the Project will be implemented as per the mitigation described in the Management Plan.

1.8.1.47 Significance of Impact

Given that the existing controls and mitigation measures provided above for infrastructure services are implemented properly and the Project supposes to use the infrastructure provided for Thilawa SEZ which is more convenient than the road available for the community near the Project Site, the impact magnitude is considered **medium**. The receptor is **medium** given there is one existing ward near the Project Site and they use local road daily which is, according to the traffic survey, in good condition. The impact significance during the construction is considered **moderate** (Table 6-40).

Table 6-40 Impact Assessment on Infrastructure Services: Construction Phase

Impact Category	Impact Assessment on Infrastructure Services from construction phase				
Impact Nature	Negative		Positive		Neutral
	Infrastructure services impacts from the construction activities are negative.				
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local		Regional		International
Impact Scale	The scale of this impact is limited to the infrastructures that will be used by the Project.				
Frequency	Impacts will arise continuously from construction related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High

Impact Significance	Negligible	Minor	Moderate	Major
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1.8.1.48 *Additional Mitigation, Management and Monitoring*

The significance of impacts is expected to be **moderate** through the implementation of the existing control and mitigation measures. In order to make sure that the Project keeps its impacts at its lowest possible level, the following additional mitigation, management and monitoring measures are recommended throughout the construction period:

- Record complaints under the Grievance Mechanism process and follow up by identifying the causes and responding appropriately within 48 hours of receiving the complaint to mitigate the disturbance;

1.8.1.49 *Significance of Residual Impact*

With the implementation of the above existing control and mitigation measures, as well as the above recommended additional mitigation and management measures, it is expected that the residual impact significance would be reduced to **minor**.

6.5 Operational Phase Impact Assessment

6.5.1 *Impacts to Ambient Air Quality*

1.8.1.50 *Source of Impact*

The following activities can have impacts to ambient air during the Operational Phase of the Project.

- Venting and fugitive emissions
- Worker / equipment / material transport

As well as being a leading source of GHG emissions, the transport sector is responsible for a large proportion of urban air pollution. Transport is a significant and growing contributor to particulate air pollution exposures.

1.8.1.51 *Existing Controls / Mitigation Measures*

The control committed to be implemented for the Project will include the following:

- All air emissions will comply with EQEG Air Emissions (General; Section 1.2 of the EQEG);
- Maintain roadside vegetation barriers;
- Ensure regular maintenance of all diesel-powered equipment to reduce emissions of NO_x and SO₂;
- Switch off machinery and equipment when not in operation; and
- Use low sulphur fuels in heavy good vehicles (HGVs) and diesel powered equipment in collaboration with best management practices.

1.8.1.52 *Significance of Impact*

The sources of air emissions for the Project are mainly limited to vehicle emissions. The impact magnitude is localised and smaller comparing to construction phase. As such, it is expected to be of **small** magnitude.

Considering the nearest settlement to the Project, Thida Myaing Ward and Chaung Wa Village are 3.9 km and 2.5 km from the Project respectively. No settlement within 350 m is observed. Therefore, it is considered that the receptor sensitivity is **low**. Provided that the existing controls presented in Section

6.5.1.2 will be implemented properly, the impact significance associated with dust and particulate matters generated during operation are considered to be **negligible** (Table 6-41).

Table 6-41 Impact Assessment for Air Quality: Operational Phase

Impact Category	Impact Assessment on air quality from operation related activities				
Impact Nature	Negative	Positive		Neutral	
	Elevated ambient concentrations of dust, PM ₁₀ and PM _{2.5} from operation related activities will have a negative impact on air quality.				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local	Regional		International	
Impact Scale	The scale of the impact is likely to be up to 350 m from the operation site boundary.				
Frequency	Impacts will arise continuously from operation related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium		High	
Impact Significance	Negligible	Minor	Moderate	Major	

1.8.1.53 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, it is expected that the residual impact significance would be **negligible**. As such, no additional mitigation measure is considered required.

6.5.2 Impacts to Ambient Noise

1.8.1.54 Source of Impact

The following activities can have impacts to ambient noise during the Operational Phase of the Project.

- Worker / equipment / material transport; and
- Maintenance dredging.

Noise will be generated from the traffic. Maintenance dredging activities may contribute to noise disturbance but will be occasional and / or seasonal and should be temporary. Sensitive receptors during the operation phase shall include workers and residents near the Project. The average number of permanent workers present during operation is expected to be approximately 80, including small numbers of additional staff for security, cleaning, technical assistance, and occasional maintenance.

1.8.1.55 Existing Controls / Mitigation Measures

Any existing controls / mitigation during operation will be similar to those discussed under the construction phase (Section 6.3.2.2). In addition, the controls to be implemented for the Project will include the following:

- Noise levels will comply to EQEG Noise Levels (General; Section 1.4 of the EQEG);
- Schedule transportation of materials evenly throughout the day (to minimize accumulative noise impact from multiple noise sources);
- Regular maintenance of equipment such as lubricating moving parts, tightening loose parts and replacing worn out components should be conducted;
- Avoid transportation of materials on- and off-site through existing community areas.
- Install noise barriers when possible;
- Record complaints under the Grievance Mechanism process and follow up by identifying the causes and responding appropriately within 48 hours of receiving the complaint to mitigate the disturbance; and
- Speed limits to its lowest as possible in local roads.

1.8.1.56 Significance of Impact

According to the traffic survey, it was found that local community use mostly their local road and most of heavy vehicles use Thilawa access road which is wider and convenient. Moreover, lower urbanisation level result in the noise level below guidelines during the monitoring period. Given the above, the receptor sensitivity is assessed to be **low**.

Noise emissions will be limited to the use of vehicles during operation and maintenance. As the impact magnitude is localised, the impact magnitude is expected to be **small**. With the existing controls and mitigation measures in place, the impact significance associated with noise due to operation are considered to be **negligible** (Table 6-42).

Table 6-42 Impact Assessment for Ambient Noise: Operational Phase

Impact Category	Impact Assessment on ambient noise from operation phase				
Impact Nature	Negative		Positive	Neutral	
	Potential noise impacts would be considered to be adverse (negative).				
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local		Regional	International	
Impact Scale	The scale of the impact is likely to be up to 500 m from the operation site boundary.				
Frequency	Impacts will arise continuously from operation activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large

Impact Category	Impact Assessment on ambient noise from operation phase			
Resource Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major

1.8.1.57 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, it is expected that the residual impact significance would be **negligible**. Therefore, it is considered no mitigation measures is warrant.

6.5.3 Impacts to Surface Water and Groundwater Quality

1.8.1.58 Source of Impact

The following activities can have impacts on surface water and groundwater quality during the Operation Phase of the Project:

- Vessel operational discharges;
- Jetty terminal and tank farms discharges to river;
- Maintenance dredging; and
- Waste storage and disposal (including hazardous waste).

During the operation phase, potential surface water pollution may arise from domestic wastewater discharge, inappropriate waste storage and disposal, contaminated surface water runoff, erosion, and sedimentation. Pollutants characteristics are largely based on land use characteristics and vary with the duration and the intensity of rainfall events.

Another source of wastewater can be originated from the carriers where contaminated water which contain oil and other types of lubricants used for the carrier operation can be accidentally washed overboard from storm water or deck cleaning.

In addition, surface water contamination can also be originated from maintenance dredging which is expected to occur every two years at the volume of 1,100 m³ per time.

1.8.1.59 Existing Controls / Mitigation Measures

The controls to be implemented for the Project will include the following:

- All discharges will be in compliance with Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (General; Section 1.2 of the EQEG) and EQEG Site Runoff and Effluent Levels (for Roads; Section 2.7.8 of the EQEG);
- Survey the water depth and consider the requirement of dredging, rather than the fixed schedule;
- Limit the dredging activities and its volume to its lowest as far as possible;
- Dispose the dredged materials only at location approved by the MPA;
- Provide oily water separator at the tie-in point of the existing drainage system. Oily wastewater separator is designed to treat the oily water from the tank farms and loading bays. The treated water will drain to public drains near the Project Site after treatment to meet the EQEQ standards.
- Storm water, industrial wastewater and sewage water will be collected and treated prior to discharge. Drains from all equipment containment drainage, spills, floor wash downs and fire

protection discharges will be led to oil-water separator. Oil/water separator will be designed for outdoor, underground in Reinforced Cement Concrete (RCC) construction;

- Sanitary wastewater will be treated by a package of sewage treatment units. The capacity of the system will be sufficient for simultaneous use by 25 people with three (3) water treatment units and each unit consist of septic tank, aerobic tank and sedimentation tank and air pump;
- All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly;
- Waste will be segregated on site and only the recyclable wastes will be transferred to designated waste collection points while non-recyclable and hazardous wastes will be handed over to an authorised waste collector;
- Prepare and implement **Operational Waste Management Plan**;
- No ballast water from the vessels will be discharge in the Yangon River.
- Incorporate drainage systems or oil traps into the carriers' design to reduce the amount of potential contaminated water runoff; and
- Collect any contaminated water on the vessels when possible, and send to certified contractor for disposal, to reduce potential contaminated water discharge into the Yangon River.

1.8.1.60 Significance of Impact

The impact on surface and ground water during operation is related to run off and waste management from the operation and maintenance works. The impact will be localised and short-term and with the above mentioned industry practice mitigation measures in place, the magnitude of the impact is considered to be **small**. The receptor sensitivity is considered **medium** given that the river is used for fishing by a number of family and the water quality is already degraded. The impact significance associated with surface water and groundwater during the operation is considered **minor** (Table 6-43).

Table 6-43 Impact Assessment for Surface Water and Groundwater quality: Operational Phase

Impact Category	Impact Assessment on surface water and groundwater from operation phase				
Impact Nature	Negative	Positive		Neutral	
	Surface water and groundwater quality impact from the operation activities is negative.				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local	Regional		International	
Impact Scale	Along the eastern and western riverbank and across Yangon river				
Frequency	Impacts will arise continuously from operation and maintenance related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large

Impact Category	Impact Assessment on surface water and groundwater from operation phase			
Resource Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major

1.8.1.61 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, it is expected that the residual impact significance would be **minor**. As such, no additional mitigation measure is considered require.

6.5.4 Impacts to Soil Quality

1.8.1.62 Source of Impact

The following activities can have impacts to soil quality during the Operation Phase of the Project.

- Waste storage and disposal (including hazardous waste)

Sources of pollutions are likely to be similar to the ones identified in the source of impacts to surface water – refer to section 6.5.3.1.

1.8.1.63 Existing Controls / Mitigation Measures

Effective implementation of mitigation measures mentioned in Section 6.5.3.2 will help mitigate the impacts on soil quality. The project will commit to the following mitigation:

- Project Proponent will prepare guidelines and procedures for immediate clean-up actions following any leaks;
- Use of spill or drip trays to contain leaks;
- Use of spill control kits to contain and clean small spills and leaks;
- Employee must be trained on emergency response procedure
- Appropriate management, storage and disposal of waste as per good international industry practices;
- All the waste will be segregated depending on their recyclability, hazard and biodegradability, and will dispose only at the municipal permitted locations; and
- Installation of skips and bins:
 - Skips and bins should be strategically placed within the Project Area.
 - The skips and bins should be adequately designed and covered to prevent access by vermin and minimise odour.
 - The skips and bins should be emptied regularly to prevent overfilling.
 - Disposal of the contents of the skips and bins should be done at an approved disposal site.

1.8.1.64 Significance of Impact

Impacts to soil during the operation will be long-term but localised. Provided that the existing controls and mitigation measures in Section 6.5.3.2 and Section 6.5.4.2 are implemented properly, the impacts are expected to be of **small** magnitude. The land is already modified and does not support diverse

habitat or populations. As such, the receptor sensitivity is expected to be **low**. Therefore, significance of impacts to soil quality is considered **negligible** (Table 6-44)

Table 6-44 Impact Assessment for Soil Quality - Operation Phase

Impact Category	Impact Assessment on soil quality impact from operation phase.				
Impact Nature	Negative	Positive		Neutral	
	Soil quality impact from the operation activities is negative.				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local	Regional		International	
Impact Scale	Impact scale is considered small given it is a localised Project.				
Frequency	Impacts will arise continuously from the operation related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium		High	
Impact Significance	Negligible	Minor	Moderate	Major	

1.8.1.65 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, it is expected that the significance of residual impacts would be **negligible** and no additional mitigation measure is considered.

6.5.5 Impacts to Aquatic Flora and Fauna

1.8.1.66 Source of Impact

The following activities can have impacts to aquatic flora and fauna during the Operation Phase of the Project.

- Maintenance dredging

Sources of pollutions are likely result from dredging and handling and disposing of dredged material which is expected to occur every two years with estimated volume of 1,100 m³ per time.

1.8.1.67 Existing Controls / Mitigation Measures

The existing controls and mitigation measures provided in Section 6.5.3.2 for surface water and groundwater and in Section 6.5.4.2 for soil quality will be relevant for mitigation of impacts to aquatic flora and fauna.

1.8.1.68 Significance of Impact

All 19 fish species identified during the surveys are listed as least concerned species. There are no species recorded that are listed as vulnerable or above on the IUCN Red List. Receptor sensitivity is considered **low** as the area does not include large numbers of range restricted or endangered species or species protected by law.

Provided that the existing controls and mitigation measures provided in Section 6.5.3. and Section 6.5.4.2 are implemented properly, the aquatic flora and fauna impacts from the Project are expected to be of **medium** magnitude as impacts will be limited in extent and short-term. As such, the significance of impacts to aquatic flora and fauna is considered **minor** (Table 6-45).

Table 6-45 Impact Assessment for Aquatic Flora and Fauna - Operation Phase

Impact Category	Impact Assessment on aquatic flora and fauna from operation phase				
Impact Nature	Negative	Positive		Neutral	
	Aquatic flora and fauna impact from maintenance dredging is negative.				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local	Regional		International	
Impact Scale	Impact scale is considered small given it is a localized Project.				
Frequency	Impacts will arise continuously from the operation related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium		High	
Impact Significance	Negligible	Minor	Moderate		Major

1.8.1.69 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures provided in Section 6.5.3. and Section 6.5.4.2, it is expected that the residual impact significance would be **minor**. No additional mitigation measure is considered required.

6.5.6 Impacts to Community Health and Safety

1.8.1.70 Source of Impact

The following activities can have impacts to community health and safety during the Operational Phase of the Project.

- Venting and fugitive emissions

- Vessel operational traffic
- Vessel operational discharges
- Jetty terminal and tank farms discharges to river
- Facilities presence at site and safety zone
- Maintenance dredging
- Worker / equipment / material transport
- Waste storage and disposal (including hazardous waste).

The transport sector is responsible for a large proportion of urban air pollution, which may impact on communities' health and may:

- Affect breathing and respiratory systems; and
- Decrease lung function and symptomatic effects, including acute bronchitis, particularly in children and asthmatics.

1.8.1.71 Existing Controls / Mitigation Measures

The control committed to be implemented for the Project will include the following:

- Provide access to workers to healthcare services (facilities) and medical care;
- Switch off machinery and equipment when not in operation;
- Dispose the dredged materials only at location approved by the MPA;
- Schedule transportation of materials evenly throughout the day (to minimize accumulative noise impact from multiple noise sources);
- Avoid transportation of materials on- and off-site through existing community areas;
- Speed limits to its lowest as possible in local roads;
- Implement **Traffic Management Plan**;
- Employee must be trained on emergency response procedure;
- Appropriate management, storage and disposal of waste as per good international industry practices;
- Waste will be segregated on site and only the recyclable wastes will be transferred to designated waste collection points while non-recyclable and hazardous wastes will be handed over to an authorised waste collector;
- Prepare and implement **Operational Waste Management Plan**;
- No ballast water from the vessels will be discharge in the Yangon River.
- Incorporate drainage systems or oil traps into the vessels' design to reduce the amount of potential contaminated water runoff;
- Collect any contaminated water on the vessels when possible, and send to certified contractor for disposal, to reduce potential contaminated water discharge into the Yangon River;
- Community grievances in relation to the conduct of security personnel and safety issues or activities should be addressed in accordance with the Project's established Grievance Procedure; and
- Ensure all safety measures are in place to protect the community from any risks associated from traffic and any maintenance work on the networks (i.e., clear signs, adequate containment of work

area, emergency response plan, work supervision, clear pedestrian path, work schedule, weather forecast, logistics, etc.).

1.8.1.72 Significance of Impact

The local villages are relatively remote from the Project Site and are expected to be of **medium** sensitivity. Vehicle traffic, noise emissions, and physical presence of the Project could all impact local communities and the impact is expected to be of **small** magnitude. The assessment has indicated that impacts associated with community health and safety are expected to be **minor** (Table 6-46).

Table 6-46 Impact Assessment for Community Health and Safety: Operational Phase

Impact Category	Impact Assessment on community health and safety from operation phase.				
Impact Nature	Negative	Positive	Neutral		
	Potential injury or death to humans or livestock would be a negative occurrence				
Impact Type	Direct	Indirect	Induced		
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local	Regional	International		
Impact Scale	Impact scale is considered small given it is a localized Project.				
Frequency	Impacts will arise continuously from operation related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium	High		
Impact Significance	Negligible	Minor	Moderate	Major	

1.8.1.73 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, it is expected that the residual impact significance would be **minor** and no additional mitigation measure is required.

6.5.7 Impacts to Landscape and Visual Character

1.8.1.74 Source of Impact

The topography at the Project Site suggests no elevation. The area surrounding the facility consists of mainly agricultural land and nearby villages. Nearby ward, Thida Myaing Ward, Chaung Wa Village and Tha Khut Pin Village on the other side of the River are considered to be the potential sensitive visual receivers. The following activities can have impacts to landscape and visual character during the Operational Phase of the Project.

- Facilities presence at site and safety zone

1.8.1.75 Existing Controls / Mitigation Measures

Visual impacts during operations will be caused by the physical presence of new facilities, as well as light emissions and human disturbance. The controls committed to be implemented for the Project will include the following:

- Create a diversity of planting palettes as a compensatory for any felled during construction;
- Include green corridors and green and blue streets to connect separated patches of habitat;
- Include green buffers in the Project Site;
- Minimise overall lighting use and manage lighting on site to consider minimisation of light pollution and horizon glow; and
- Maintain all structural facilities in good repair.

1.8.1.76 Significance of Impact

Both tank farm and jetty will be visible to the visual sensitive receivers (VSRs) in proximity to the Project Site; i.e., the households in existing villages in the Project Site and those in neighbouring townships (Thida Myaing Ward and Chaung Wa Village in Kyauktan Township and Tha Khut Pin Village in Kawhmu Township which are approximately at 3.9 km, 2.5 km and 3.4 km respectively). Given relatively remote locations of the VSRs from the Project Site, the sensitivity of the community to change in landscape character is considered **low**. The impacts will be of **medium** magnitude as they will be of long-term duration. As such, the significance of impacts due to change in landscape and visual character is considered to be **minor** (Table 6-47).

Table 6-47 Impact Assessment for Landscape and Visual Character: Operational phase

Impact Category	Impact Assessment on Landscape and Visual Character from operation phase				
Impact Nature	Negative	Positive		Neutral	
	Negative impacts to existing landscape and visual character				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local	Regional		International	
Impact Scale	The highest facilities on the Project Site is tank farm where the maximum height would be 18.7 m. So, the scenic impact is considered localised and limited with approximately 2 kilometres.				
Frequency	The physical presence of the Project is expected to last throughout the operation phase of 25 years.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium		High	
Impact Significance	Negligible	Minor	Moderate	Major	

1.8.1.77 *Significance of Residual Impact*

With the implementation of the above existing control and mitigation measures, it is expected that the residual impact significance would be **minor**. Therefore, no additional mitigation measure is considered.

6.5.8 *Impacts to Economy and Livelihood*

Impacts to economy and livelihood of land owners and users may occur due to land acquisition of the Project. Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation is not yet conducted. Public consultation and primary socio-economic data collection for EIA investigation will be conducted after situation allowed in order to have better participation by stakeholders, including land owner and land users affected by land acquisition of the Project. The EIA Report will be updated once the public consultation and primary socio-economic data collection for EIA investigation is done.

6.5.9 *Impacts to Occupational Health and Safety*

1.8.1.78 *Source of Impact*

The following activities can have impacts to occupational health and safety during the Operational Phase of the Project:

- Venting and fugitive emissions;
- Vessel operational traffic;
- Vessel anchoring ;
- Maintenance dredging;
- Worker / equipment / material transport; and
- Waste storage and disposal (including hazardous waste).

During operation phase, approximately 50 staff including security, cleaning and technical assistance on a normal working day scenario. They will be accommodated outside of the Site, in house or apartment in the area depending on the availability for rent. They will be educated to have good understanding of health and safety risks, in particular to communicable diseases.

Project activities likely to present a risk during operation are linked with light vehicle travel at site and maintenance operations, in particular at height or in confined space. Heat stress and hot surface, and chemical exposure also present a risks for workers during the operation phase of the Project. Unplanned event like fire and explosion also present a risk for workers during operation but are covered under the unplanned event section of this report.

The risk of injuries from vessel accidents will remain during operation activities of the jetty (including vessel operational discharge, vessel anchoring, and operation of vessels) associated with river way. Moreover, handling waste (including hazardous waste) poses risk to the workers and required good knowledge of their hazards.

1.8.1.79 *Existing Controls / Mitigation Measures*

The controls that committed to be implemented for the Project will include the following:

- The project will comply with Myanmar labour laws and EQEG standards;
- All staff will have medical check-ups prior to commencing work, where required; and
- Provide workers with the required and appropriate personal protective equipment (PPE) such as eye protection, work gloves and protective boots to undertake site activities.

1.8.1.80 Significance of Impact

The receptors are the workforce at the site who, with existing controls in place, are expected to be of **medium** sensitivity. There is assumed to be no confined space work but handling of flammable petroleum products pose risk to the workers. As such, the impact magnitude is expected to be **medium**. Therefore, the overall impact significance, with the existing controls in place, is considered to be of **moderate** significance (Table 6-48).

Table 6-48 Impact Assessment for Occupational Health and Safety: Operational phase

Impact Category	Impact Assessment on occupational health and safety from operation phase				
Impact Nature	Negative	Positive		Neutral	
	Negative impacts from risk of injury or fatality.				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local	Regional		International	
Impact Scale	Localised to the Project Area.				
Frequency	For the duration of the Project.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major	

1.8.1.81 Additional Mitigation, Management and Monitoring

The significance of impacts is expected to be **moderate** through the implementation of the existing control and mitigation measures. In order to reduce the impact to its practicable lowest level, the following additional mitigation, management, and monitoring measures are recommended:

- The Project will prepare and implement **Risk Assessment Procedure** in order to identify and mitigate any potential impact during the construction and operation phases;
- Prepare and implement **Safety, Security, Health and Environment Management Plan**. It will include mandatory health and safety training courses for all workers and contractors, including handling of hazardous material. This training will take place prior to work starting on operation. Training course attendance will be recorded and monitored by the Project. The plan shall be issued and approved prior to start any operational activity.
- Waste will be segregated on site and only the recyclable wastes will be transferred to designated waste collection points while non-recyclable and hazardous wastes will be handed over to an authorised waste collector; and

- Prepare and implement **Operational Waste Management Plan**;

1.8.1.82 *Significance of Residual Impact*

With the implementation of the above existing control and mitigation measures, as well as the above recommended additional mitigation and management measures, it is expected that the residual impact significance would be reduced to **minor**.

6.5.10 *Impacts to Infrastructure Services*

1.8.1.83 *Source of Impact*

The following activities can have impacts to infrastructure services during the Operation Phase of the Project.

- Vessel operational traffic;
- Maintenance dredging;
- Facilities presence at site and safety zone;
- Waste storage and disposal (including hazardous waste) ; and
- Waste, fuel, chemical, oils, gas storage, handling and disposal.

1.8.1.84 *Existing Controls / Mitigation Measures*

The controls committed to be implemented for the Project will include the following:

- The underground water will be used only after tested and approved by local authority, for only washing. Drinking water will be purchased from qualified drinking water provider;
- Prepare and implement **Operational Waste Management Plan**. All the waste will be segregated depending on their recyclability, hazard and biodegradability, and will dispose only at the municipal permitted locations;
- Limit the number of vehicles using public infrastructure and services whenever possible;
- Limit the number of the vessels and their loading/unloading time as far as possible;
- Speed limits to its lowest as possible in local roads and avoid using public road during the peak hours; and
- Implement **Traffic Management Plan**.

1.8.1.85 *Significance of Impact*

Existing infrastructure and services in the Project Area are considered sufficient for the present population. According to township profile (2019) by GAD, Kyauktan Township has 6 public hospitals and 47 rural health centres with adequate medical assistants. In terms of education, Kyauktan has more schools and lowest gender gap in literacy than its neighbouring townships.

In addition, the concrete road network in the Township is well developed and neighbouring Thilawa SEZ provides more accessibility to the community.

Given that the existing controls and mitigation measures provided in Section 6.5.10.2 for infrastructure services are implemented properly and only about 50 staff will be operating the Project which will not have influence on the basic infrastructure and services, the impact magnitude is considered **negligible**. The receptor sensibility is **medium** given there is one existing ward near the Project Site and they use local road for daily communication. The impact significance during the construction is considered **negligible** (Table 6-49).

Table 6-49 Impact Assessment on Infrastructure Services: Operation Phase

Impact Category	Impact Assessment on Infrastructure Services from operation phase				
Impact Nature	Negative		Positive	Neutral	
	Infrastructure services impacts from the construction activities are negative.				
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local		Regional	International	
Impact Scale	The scale of this impact is limited to the infrastructures that will be used by the Project.				
Frequency	Impacts will arise continuously from operation related activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium	High	
Impact Significance	Negligible		Minor	Moderate	Major

1.8.1.86 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, it is expected that the residual impact significance would be **negligible** and no additional mitigation measure is deemed required.

6.6 Unplanned / Accidental Events

Accidental events are considered during both the construction and operational phases together as the impacts and sources will be similar. Potential impacts from unplanned / accidental events are discussed in the following sections.

6.6.1 Impacts from Spills and Leaks

1.8.1.87 Source of Impact

Various hazardous materials will be used during the construction and operational phases. There is the potential for accidental release in the course of material storage, transferring and handling during construction and operation of the Project. The typical spill locations may include areas used for transferring of petroleum and LPG between vessels, tanks and vehicles and their maintenance, sewage tank area, chemical storage area, wastewater collection area, material and equipment laydown, and parking. Spills at these locations have the potential to impact the quality of surface water, groundwater, soil, and community and occupational health and safety.

Standard operating procedures and good site management (e.g. regular equipment inspections, careful storage of construction liquids and materials away from the River and drainage channels, careful

disposal of all construction wastes, careful movement of material around the construction site etc.) will prevent most incidents but it may not be possible to prevent all accidents in this way.

Extreme weather events, poor maintenance, and operational errors are the most likely causes of accidental discharges from the Project Site to the surface waters. Storm water flows could cause the site run-off and drainage management systems to overflow untreated into the Yangon River. This could affect water quality and ecosystems by introducing a surge of particulate matter, nutrients, and contaminants into the water column. The decomposition of this material can deplete concentrations of dissolved oxygen, with the potential to kill aquatic species. Site wastewaters may contain silt-loaded site run-off, fuels, oils, lubricants, cement, grout, water proofing chemicals, abraded materials from construction machinery and activities (including rubber, metals, and dust), and sewage effluent. Wastewater sources may include equipment washing processes, equipment and vehicle maintenance, spills of vehicle fuels and oils, and the release of wastewater from firefighting. Water used for extinguishing fires may contain ash and sediments, hydrocarbons, and fire suppressant chemicals.

1.8.1.88 Existing Controls / Mitigation Measures

The controls committed to be implemented for the Project will include the following:

- The Project will follow the Petroleum Products Regulatory Department (PPRD)'s framework and regulation to prevent oil pollution;
- Transferring, maintenance and refuelling of equipment and vehicles should be carried out in designated areas on hardstand to prevent seepage of any spillages to ground and water. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hard standing;
- Use of spill control kits to contain and clean small spills and leaks. Spill control kits should be available on site at all time;
- Store chemicals, fuel, oil and hazardous waste in adequately bunded impervious areas, as per good international industry practices in order to minimise the potential for damage or contamination of materials;
- Implement a training program to familiarise staff with emergency procedures and best practices;
- Oils, fuels and chemicals should only be used and stored in designated areas, which have pollution prevention facilities. The bund should be drained of rainwater after a rain event;
- The oil contaminated water will be collected and treated through oily water separator. Oily wastewater separator is designed to treat the oily water from the tank farms and loading bays. The treated water will drain to public drains near the Project Site after treatment to meet the EQEQ standards;
- Proper guidelines and procedures should be developed for immediate clean-up actions following any spillages of oil, fuel or chemicals;
- Standard operating procedures (SOPs) will be prepared to manage any chemical spills, leaks and/or seepages. SOPs will cover transport, handling, storage, use and disposal of chemicals. Operating personnel will be trained on the SOPs and monitored in their use on a daily basis;
- Storm water, industrial wastewater, sewage water and surface run-off will be collected and treated prior to discharge. Drains from all equipment containment drainage, spills, floor wash downs and fire protection discharges will be led to oil-water separator;
- Sanitary wastewater will be treated by a package of sewage treatment units;
- All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly; and

- All employees will have the appropriate training, qualification and certification to undertake the tasks required during the construction and operation phases.

1.8.1.89 Significance of Impact

Incidental spills of fuels and petroleum are infrequent but do occur. Spills most frequently occur due to malfunction of handling systems and poor handling practices during fuel transfers. Large releases of hazardous materials from equipment and storage are rare because those are designed and built specifically to prevent release applying the most advanced technology. Overall, it is unlikely that a spill would occur and this has therefore been factored into the assessment of impact significance.

Project activities with the potential to lead to accidental spills will generally be limited within the Project Site. The risk of a direct release to the surface water is therefore very unlikely. It is, however, possible that run-off from the Project Site could transport spilled materials on the ground and/or to the River depending on spill location and drainage patterns. The concentration of spilled materials released to surface water is expected to be very low given the existing mitigation measures such as spill containment provided by bunded area at places where spills are more likely to occur (e.g. storage and handling areas of hazardous materials). The impact magnitude is therefore considered **small** (as likelihood is low).

Sensitivity of the sensitive receiver (for surface water, groundwater, soil and community) is considered **high** given that nearby water sources is used for fishing and agricultural use even though usage for drinking and domestic purposes is rare.

The significance of impact associated with accidental spills and leaks is considered **moderate** (Table 6-50).

Table 6-50 Impact Assessment from Accidental Spills and Leaks during Construction and Operation Phases

Impact Category	Impact Assessment from accidental spills and leaks from the construction and operational phases.				
Impact Nature	Negative		Positive		Neutral
	Impacts on surface water quality, ground water quality, soil quality and community health and safety from the accidental spills and leaks are negative.				
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local		Regional		International
Impact Scale	The potential impacts would be limited within the local wards and villages.				
Frequency	N/A. The impact is not expected to occur.				
Likelihood	Unlikely		Possible		Likely
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High

Impact Significance	Negligible	Minor	Moderate	Major
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1.8.1.90 Additional Mitigation and Management

The significance of impacts is expected to be **moderate** through the implementation of the existing control and mitigation measures. In order to make sure that the Project reduce its impacts to its lowest possible level, a number of additional mitigation, management and monitoring measures are required throughout the construction and operation period. These additional mitigation, management, and monitoring measures are as follows:

- The Project will prepare and implement **Risk Assessment Procedure** in order to identify and mitigate any potential impact during the construction and operation phases;
- A **Spill Prevention and Response Plan** will be developed and implemented for the construction and operational phases of the Project.
- Development of an **Emergency Response Plan** for spills and leakages. Procedures for response to chemical spills will be included in the emergency response plan. This will include locations of spill containment and recovery equipment
- A detailed **Operational Waste Management Plan** (WMP) with types, volumes and disposal of wastes identified will be developed;
- Install bund/ dike around chemical storage area to contain the chemicals in case of chemicals in case of leakage or spill. The capacity of bund/ dike should be sufficient to contain 110% of the chemicals from the largest tank;
- Ensure that there is sufficient and appropriate spill response supplies in the Project Site;
- Do not store chemicals in unsuitable containers or containers made of incompatible material;
- Provide dedicated storage areas for construction materials to minimise the potential for damage or contamination of the materials;
- Waste storage areas will be equipped with secondary containment and spill control measures;
- Liquid wastes such as waste oil, etc. will be collected and stored for recycling in cemented areas;
- All drainage/tanks, etc. will be positioned on concrete hard standing to prevent any seepage into ground or surface water;
- Disposal sites to be designed for hazardous and non-hazardous waste, including sludge disposal;
- Hazardous waste storage areas will comply with good international industry practices;
- Keep a register for all hazardous substances on site and relevant Material Safety Data Sheets (MSDSs) readily accessible for reference;
- Store and handle all hazardous substances in accordance with their MSDS;
- Chemical storage areas will be sited on sealed areas and provided with locks to prevent unauthorized entry;
- Provide enough space to allow for inspection between waste containers so as to identify any leaks or spills; and
- Prepare safety procedures for loading/ unloading of petroleum and LPG.

1.8.1.91 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, as well as the above recommended additional mitigation and management measures, it is expected that the residual impact significance would be reduced to be **minor**.

6.6.2 Impacts from Vehicle Collision

1.8.1.92 Source of Impact

The construction and operation of the Project will cause an increase of traffic, which could result in a higher incidence of collision with people, other vehicles / vessels, and fauna. The vehicle collision locations will include access roads, parking spaces, and storage sites around the Project Site while vessel collision location will include navigation channel in the River. In this section, both vehicle and vessel collision will be discussed under the name of vehicle collision. Vehicle collision at these locations have the potential to impact community health and safety, and occupational health and safety.

1.8.1.93 Existing Controls / Mitigation Measures

The controls committed to be implemented for the Project will include the following:

- Signalling buoys will be installed around the alignment of the safety zone to indicate the restricted area to other vessels. Navigation and fishing activities will be restricted beyond the safety zone while the vessel is loading/unloading.
- Inform workers of sensitive traffic areas, e.g., location of schools, shrines, temples, mosques, health clinics, hospitals etc. Reduce speed limits for these areas;
- Avoid haulage tasks during peak traffic periods and school drop-off and pick-up times;
- Maintain pedestrian access wherever possible, including access to any settlements and other facilities;
- Notify the local communities about proposed changes to local traffic access due to construction/ maintenance activities and providing clear signage of changed traffic conditions;
- Limit the number of vehicles using public infrastructure and services whenever possible;
- Use only licensed and experienced drivers and transport companies;
- Implement “No Night Driving Policy” (10pm-7am; and 10pm-10am for public holidays) for construction vehicles (during construction phase) when possible;
- All Project vehicles shall use designated roads only, and avoid traveling off roads; and
- Maintain pedestrian access wherever possible, including access to any settlements and other facilities.
- **Traffic Management Plan** (TMP) is developed and the Project will be implemented as per the mitigation described in the Management Plan.

1.8.1.94 Significance of Impact

Potential impacts due to accidents during transport may occur during the multiple project stages: site preparation and construction, and operation. Transportation accidents associated with the Project may occur during transportation of equipment and personnel, and operation. The consequence of collision depend on characteristics of vehicle, the speed and number of crew on board. It could lead to the ship structural damage, injury or fatality of staff/public, and release of hazardous materials into the environment. Therefore, accidents may cause impacts to public health and safety, and occupational health and safety.

Vehicle collisions are infrequent but do occur. Vehicle collisions most frequently occur due to poor traffic management. Overall, it is unlikely that a vehicle collision would occur and this has therefore been factored into the assessment of impact significance.

Project activities with the potential to lead to vehicle collision will generally be limited within the Project Site. During the construction period, there might be a number of heavy machines such as bulldozers, backhoes/ excavators, and dump trucks within the Project Site with a number of activities, such as

dredging, piling and platform construction on the river. Considering the existing mitigation measures and its likelihood of the event, the impact magnitude is considered to be **medium**.

Sensitivity of the sensitive receiver is considered **medium** given that there are no villagers living in close proximity to the Project Site but a number of vessels are using the River for commercial transportation.

The significance of impact associated with vehicle collision is considered **moderate** (Table 6-51).

Table 6-51 Impact Assessment of Vehicle Collision during Construction and Operation Phases

Impact Category	Accidental spills and leaks from operational works.					
Impact Nature	Negative		Positive		Neutral	
	Impacts on community health and safety, and occupational health and safety from vehicle collisions are negative.					
Impact Type	Direct		Indirect		Induced	
Impact Duration	Temporary	Short-term		Long-term	Permanent	
Impact Extent	Local		Regional		International	
Impact Scale	Impact scale is considered small as the incident is likely to occur only a very small number of vehicles.					
Frequency	Accidental event					
Likelihood	Unlikely		Possible		Likely	
Impact Magnitude	Positive	Negligible	Small		Medium	Large
Resource Sensitivity	Low		Medium		High	
Impact Significance	Negligible		Minor		Moderate	Major

1.8.1.95 Additional Mitigation, Management and Monitoring

The significance of impacts is expected to be moderate through the implementation of the existing control and mitigation measures. In order to make sure that the Project reduces the impacts to its lowest possible level, a number of additional mitigation, management and monitoring measures are required throughout the construction and operation period. These additional mitigation, management, and monitoring measures are as follows:

- **Emergency Response Plan** will set out the management procedures to be put in place by the Project Administrator and contractor to prevent and mitigate the potential impacts due to transportation accidents. It will also include the medical procedures for the injured.

1.8.1.96 Significance of Residual Impact

With the implementation of the above existing control and mitigation measures, as well as the above recommended additional mitigation and management measures, it is expected that the residual impact significance would be reduced to **minor**.

6.6.3 Fire and Explosion

1.8.1.97 Source of Impact

There is the inherent potential for explosion or fire within the Project Site. Fire and explosion during project operation could cause the serious accident or, even catastrophic accidents. The potential sources of major fire and explosion are likely considered from the vessels/vehicles and tanks especially when transferring and handling take place. The impact area covers Project Site, nearby agricultural lands, and river with no residence in the area. The affected people are Project workers, including permanent staffs, security team, contract staffs, maintenance team, and marine vessels operators. The damage is considered severe within the affected area. Impacts to community health and safety, and occupational health and safety might arise from fire and explosion.

1.8.1.98 Existing Controls / Mitigation Measures

The controls committed to be implemented for the Project will include the following:

- Develop a preventive maintenance program for process equipment and pipeline connection in order to avoid failures and implement program regularly;
- Ensure the staff working to standard and strictly follow working procedures in order to prevent any incident;
- Install leak detecting and alarming system in transferring and handling areas in tank farm and jetty;
- Install fire protection and firefighting system including but limited following items:
 - **Gas detection system** (particularly for LPG tanks): gas detector and fire alarm devices will be installed in potential leakage area of toxic chemicals and flammable substances like large size valves, flanges, major rotating equipment and high temperature fluctuation area;
 - **Fire water system**: fire water pond and pumps will distribute fire water to all plants in the Project Site via fire water pipeline;
 - **Water firefighting system in all facilities**: water hydrants, water monitors, fixed water spray system;
 - **Foam firefighting system in Tank Farm area**: foam monitors, foam chamber equipped at heavy hydrocarbon storage tanks;
 - **Fire extinguishing system**: portable fire extinguishers (foam, powder and CO₂) in plants and buildings at appropriate locations;
 - **Inert gas fire suppression system**: Inert gas total flooding fire extinguishing system will be provided in some areas such as control rooms and substations; and
 - **Fire alarm system** (automatic fire detectors and manual fire call points) will be provided in required areas.
- All fire prevention and firefighting systems shall be routinely inspected and maintained the by responsible persons;
- Proper communication equipment of either station or mobile type will be provided such as hot (emergency) line telephones, trunk radios, paging, inter-com and different alarm tones correspondence with each kind of situation;
- Restrict the usage of mobile/cellular phone on the Project Site due to the danger of spark by electromagnetic waves;
- Restrict smoking to controlled areas only;

- Apply for any applicable permit relating to the importation, transportation, storage and handling of explosives from the Ministry of Electrical Power and Energy and Myanmar Fire Services Department;
- Implement all required safety and management requirements relating to the transportation, storage and handling of explosives;
- Fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. Establishment of secondary containment for fuel storage and hazardous materials, which have pollution prevention facilities. The bund should be drained of rainwater after a rain event.
- Induction training for personnel is recommended to include a mandatory segment on fire safety and actions in the event of a fire;
- Provide training for local communities on the danger of explosion and fire;
- Provide instructions and procedures about safety precautions and emergency evacuations for local communities; and
- Provide workers with helmets and other PPE such as eye protection, work gloves and protective boots. Ensure all staff wear appropriate PPE.

1.8.1.99 Significance of Impact

Explosions and fire could potentially have significant impacts on the environmental and social receptors. The impact magnitude is expected to be **medium** and the likelihood is low with the existing controls in place. Receptors/ resources, including local communities, labourers, terrestrial flora and fauna are of **medium** sensitivity. The impact from explosion and fire would be of **moderate** significance (Table 6-52).

Table 6-52 Impact Assessment of Fire and Explosion during Construction and Operation Phases

Impact Category	Impact Assessment of fire and explosion during construction and operational phases				
Impact Nature	Negative	Positive		Neutral	
	Impacts on community health and safety, and occupational health and safety are negative				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term	Permanent	
Impact Extent	Local	Regional		International	
Impact Scale	Project Area and its vicinity				
Frequency	Accidental event				
Likelihood	Unlikely	Possible		Likely	
Impact Magnitude	Positive	Negligible	Small	Medium	Large

Resource Sensitivity	Low	Medium	High	
Impact Significance	Negligible	Minor	Moderate	Major

1.8.1.100 *Additional Mitigation, Management and Monitoring*

The significance of impacts is expected to be **medium** through the implementation of the existing control and mitigation measures. In order to reduce the impact to its lowest possible level, a number of additional mitigation, management and monitoring measures are required throughout the construction and operation period. These additional mitigation, management, and monitoring measures are as follows:

- The Project will prepare and implement **Risk Assessment Procedure** in order to identify and mitigate any potential impact during the construction and operation phases;
- Prepare and implement **Safety, Security, Health and Environment Management Plan**. It will include mandatory health and safety training courses for all workers and contractors, including handling of hazardous material. This training will take place prior to work starting on operation. Training course attendance will be recorded and monitored by the Project. The plan shall be issued and approved prior to start any operational activity.
- An **Emergency Response Plan** is developed to reduce the likelihood of explosions or fire and to ensure response actions are implemented in the event of an incident; and
- Pre-communicate and coordinate with local firefighting brigade/station.

1.8.1.101 *Significance of Residual Impact*

With the implementation of the above existing control and mitigation measures, as well as the above recommended additional mitigation and management measures, it is expected that the residual impact significance would be reduced to **minor**.

7 CUMULATIVE IMPACT ASSESSMENT

7.1 Methodology and Approach

Cumulative impacts encompass impacts that result from the incremental impact, on areas or resources used or directly impacted by the Project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted. The IFC (2012) defines cumulative impacts as those generally recognised as important on the basis of scientific concerns and or concerns from affected communities³.

Cumulative impacts in this section refer to the additional impacts that may be generated by other developments or activities in the vicinity of the Project Site, that when added to the impacts of the construction and operation of the proposed Project combine to cause a greater impact. Such impacts may arise due to spatial overlap (e.g. overlap in spatial extent of air quality changes) or temporal overlap (e.g. noise impacts caused by construction activities at the same time from different sources).

7.2 Cumulative Impact Assessment

At this time, there is limited information on the other planned projects for the area and, as such, the cumulative impacts from subsequent projects should be considered as and when their development is confirmed. Any cumulative impacts discussed at this stage would be speculative and based on hearsay of projects that are yet to be confirmed by the relevant authorities. Such impacts might be expected to be similar in nature as the ones discussed in this Environmental Impact Assessment report. Likewise, the mitigation measures, including the planned environmental and social management procedures associated with the Project, are expected to contribute to mitigating the Project's contribution to potential cumulative impacts. Nevertheless, BE is committed to undertake the cumulative impact assessment should information of nearby projects become publicly available.

³ IFC Performance Standards on Environmental and Social Sustainability, January 2012, International Finance Corporation, World Bank Group

8 ENVIRONMENTAL MANAGEMENT PLAN

This Section provides the Environmental Management Plan (EMP) for the planning and operation of the Project. This EMP provides the procedures and processes, which will be applied to the Project activities to check and monitor compliance and effectiveness of the mitigation measures to which BE has committed. In addition, this EMP is used to ensure compliance with statutory requirements and corporate sustainability policies.

8.1 Project Description

Brighter Energy Company, Ltd. (BE) is developing the Petroleum Terminal and Storage Project in Thilawa of Myanmar (“the Project”). The Project Site is located in Kyauktan Township in Yangon which covers an area of approximately 112.5 acres which includes the jetty terminal area of 13.5 acres and land area of 99 acres. The Project is composed of three (3) key components as follows:

- Jetty terminal;
- Tank Farm (Diesel, Gasoline, LPG); and,
- Interconnecting pipelines and advanced utilities.

8.2 Summary of Impacts and Mitigation Measures

The EIA has assessed the potential impacts and proposed mitigation to reduce the level of the impact. These potential impacts are summarised in Table 8-1.

Through the Project development and the EIA process, BE has made commitments to ensure appropriate environmental and social performance. The schedule and responsibility for implementation of these mitigation measures are identified as necessary. The commitments are summarised in Table 8-2.

Table 8-1 Summary of Impacts and Mitigation Measures

Potential Impact/Issue	Significance of Impact	Significance of Residual Impact
Pre-Construction Phase		
Impact to Economy and Livelihood	<p>The land used for the project is owned by the Myanmar Business Corporation.</p> <p>Due to Covid-19 pandemic and current situation of Myanmar, local people are facing with economy and livelihood problems. Actually, this problem is national-wide impact and not to be focused as local issues.</p> <p>The situation should improve soon as the covid-19 disease is now under control. At that time, the economy and livelihood of the local people will improve.</p> <p>The project may cause difficulties for some local</p>	<p>Impacts to economy and livelihood of land owners and users may occur due to land acquisition of the Project. Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation is not yet conducted. Public consultation and primary socio-economic data collection for EIA investigation will be conducted after situation allowed in order to have better participation by stakeholders, including land owner and land users affected by land acquisition of the</p>

Potential Impact/Issue	Significance of Impact	Significance of Residual Impact
	fishermen by losing their fishing plots. The project owner has to follows statutory regulation; thought Follow the laws and coordinate with the fisheries department and local fishermen in order to fulfil their loss.	Project. The EIA Report will be updated once the public consultation and primary socio-economic data collection for EIA investigation is done.
Construction Phase		
Impact to Ambient Air Quality	Minor	Minor
Impact Ambient Noise	Minor	Minor
Impact to Surface Water and Groundwater Quality	Major	Minor
Impact to Soil Quality and Topography	Minor	Minor
Impacts to Aquatic Flora and Fauna	Minor	Minor
Impact to Community Health & Safety	Minor	Minor
Impact to Economy& Livelihood	Moderate	Minor
Impact to Occupational Health & Safety	Moderate	Minor
Impact to Infrastructure Services	Moderate	Minor
Operational Phase		
Impact to Ambient Air Quality	Negligible	Negligible
Impact to Ambient Noise	Negligible	Negligible
Impact to Surface Water and Groundwater Quality	Minor	Minor
Impact to Soil Quality	Negligible	Negligible
Impact to Aquatic Flora and Fauna	Minor	Minor
Impacts to Community Health and Safety	Minor	Minor
Impacts to Landscape and Visual Character	Minor	Minor
Impacts to Economy and Livelihood	Minor	Minor
Impacts to Occupational Health and Safety	Moderate	Minor
Impacts to Infrastructure and Services	Negligible	Negligible
Unplanned Events		
Spills and Leaks	Moderate	Minor
Vehicle Collision	Moderate	Minor
Fire and Explosion	Moderate	Minor

Table 8-2 Summary of Mitigation Measures (Commitment Table) – Construction Phase

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.1	Air Quality	<ul style="list-style-type: none"> All air emissions will comply with EQEG Air Emissions (General; Section 1.2 of the EQEG). 	EPC Contractor	Construction Phase	Six-Monthly Environmental Monitoring Report
C.2	Air Quality	<ul style="list-style-type: none"> Establish and implement a Grievance Mechanism; 	BE	Prior to Construction Phase	Grievance Mechanism
C.3	Air Quality	<ul style="list-style-type: none"> Ensure stockpiles are located as far as possible from receptors; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.4	Air Quality	<ul style="list-style-type: none"> Cover and/or water stockpiles of friable/dusty materials such as excavated spoils, dredged materials, filling materials to avoid fugitive dust. Enclose any skip hoist for material transport with impervious sheeting; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.5	Air Quality	<ul style="list-style-type: none"> Implement a watering and sprinkling regime in particular during the dry season, when and where necessary (e.g. prior to truck entering the site in the morning and in the afternoon, watering in area with loose soil and fine sediment; the number of watering trucks will be assigned due to practical demand); 	EPC Contractor	Construction Phase	Monthly HSE Report
C.6	Air Quality	<ul style="list-style-type: none"> Ensure regular maintenance of all diesel-powered equipment to reduce emissions of NO_x and SO₂; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.7	Air Quality	<ul style="list-style-type: none"> Switch off machinery and equipment when not in operation; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.8	Air Quality	<ul style="list-style-type: none"> Use low sulphur fuels in heavy good vehicles (HGVs) and diesel powered equipment in collaboration with best management practices for construction phase; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.9	Air Quality	<ul style="list-style-type: none"> Use alternative fuels and fuel mixes where possible; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.10	Air Quality	<ul style="list-style-type: none"> Prohibit the burning of waste or vegetation on site; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.11	Air Quality	<ul style="list-style-type: none"> Maintain speed limit at 20 kilometres per hour (km/h), where possible; 	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.12	Air Quality	<ul style="list-style-type: none"> Domestic and construction waste storage area will be located away from receptors. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.13	Ambient Noise	<ul style="list-style-type: none"> Noise levels will comply to EQEG Noise Levels (General; Section 1.4 of the EQEG). 	EPC Contractor	Construction Phase	Six-Monthly Environmental Monitoring Report
C.14	Ambient Noise	<ul style="list-style-type: none"> Select equipment with lower Sound Power Levels (SPL) that comply to EQEG Noise Levels (General; Section 1.4 of the EQEG) where possible; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.15	Ambient Noise	<ul style="list-style-type: none"> Where necessary, install acoustic enclosures / mufflers for equipment casing radiating noise; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.16	Ambient Noise	<ul style="list-style-type: none"> Ensure equipment is maintained as per operating standards. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.17	Ambient Noise	<ul style="list-style-type: none"> Limit the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community. Shut down or throttled down between work periods for machines and construction plant items (e.g. trucks) that may be in intermittent use. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.18	Ambient Noise	<ul style="list-style-type: none"> Reduce the number of equipment operating simultaneously as far as practicable. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.19	Ambient Noise	<ul style="list-style-type: none"> Orientate equipment known to emit noise strongly in one direction so that the noise is directed away from receptors as far as practicable. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.20	Ambient Noise	<ul style="list-style-type: none"> Locate noisy equipment (such as hydraulic hammer and lorry mounted concrete pump) as far away from receptors whenever possible. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.21	Ambient Noise	<ul style="list-style-type: none"> Avoid transportation of materials in and out site through existing community areas as far as logistically possible. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.22	Ambient Noise	<ul style="list-style-type: none"> Use material stockpiles and other structures, where practicable, to screen noise sensitive receptors from on-site construction activities. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.23	Ambient Noise	<ul style="list-style-type: none"> Silencers, mufflers, or acoustic enclosures shall be installed to reduce sound power level of noisy equipment if deemed necessary. 	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.24	Ambient Noise	<ul style="list-style-type: none"> Any activity that has the potential to generate impulsive noise will be avoided where possible when in close proximity to noise sensitive receptors. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.25	Ambient Noise	<ul style="list-style-type: none"> During the works, unnecessary noise due to idling diesel engines and fast engine speeds will be avoided when lower speeds are sufficient. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.26	Ambient Noise	<ul style="list-style-type: none"> Normal working hours of the contractor should be in line with Myanmar legal requirements. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.27	Ambient Noise	<ul style="list-style-type: none"> Noise barriers such as berms and vegetation shall be installed to limit noise at plant boundary, if deemed necessary following noise modelling. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.28	Ambient Noise	<ul style="list-style-type: none"> Maintenance works should be conducted during the daytime only. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.29	Surface and Ground Water	<ul style="list-style-type: none"> All discharges will be in compliance with Wastewater, storm Water Runoff, Effluent and Sanitary Discharges (General; Section 1.2 of the EQEG) and EQEG Site Runoff and Effluent Levels (for Roads; Section 2.7.8 of the EQEG) 	BE	Construction Phase	Six-Monthly Monthly HSE Report
C.30	Surface and Ground Water	<ul style="list-style-type: none"> Install silt trap to treat surface run-off from bunded areas prior to discharge to the storm water drainage; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.31	Surface and Ground Water	<ul style="list-style-type: none"> Liquid effluents arising from construction activities will be treated prior to discharge to public drainage 	EPC Contractor	Construction Phase	Monthly HSE Report
C.32	Surface and Ground Water	<ul style="list-style-type: none"> Provision of channels, earth bunds or sand bag barriers on site to direct storm water to silt removal facilities 	EPC Contractor	Construction Phase	Monthly HSE Report
C.33	Surface and Ground Water	<ul style="list-style-type: none"> Design drainage pipes and culverts for the controlled release of storm flows 	EPC Contractor	Construction Phase	Monthly HSE Report
C.34	Surface and Ground Water	<ul style="list-style-type: none"> Wastewater collected from canteen kitchens, including that from basins, sinks and floor drains, should be discharged into sanitary sewers via grease traps 	EPC Contractor	Construction Phase	Monthly HSE Report
C.35	Surface and Ground Water	<ul style="list-style-type: none"> Oil-contaminated water, if any, will be collected and handled by local licensed wastewater sub-contractors 	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.36	Surface and Ground Water	<ul style="list-style-type: none"> ■ Earthworks to form the final surfaces should be followed up with surface protection and drainage works to prevent erosion caused by rainstorms 	EPC Contractor	Construction Phase	Monthly HSE Report
C.37	Surface and Ground Water	<ul style="list-style-type: none"> ■ Design and construct a road drainage system meet changing conditions expected with climate change: <ul style="list-style-type: none"> - A flood control system will be set up and the constructed land will be placed above the flood line. ■ Flood control and drainage works will consider the topography of the Project Area and measures will be taken to reduce the runoff as far as possible 	EPC Contractor	Construction Phase	Monthly HSE Report
C.38	Surface and Ground Water	<ul style="list-style-type: none"> ■ Site drainage facilities should be developed following the design basis below: <ul style="list-style-type: none"> - Provide oily water separator at the tie-in point of the existing drainage system. - Convey surface runoff and roof drainage away from the equipment and buildings 	EPC Contractor	Construction Phase	Monthly HSE Report
C.39	Surface and Ground Water	<ul style="list-style-type: none"> - All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.40	Surface and Ground Water	<ul style="list-style-type: none"> ■ Sanitary facilities, including toilets with septic tanks will be provided for the use of construction workforce. Sewage will be discharged into leak proof septic tank. The septic tank will be adequately sized and placed in a sheltered impervious bund/containment (to prevent external deposition of solids or ingress of rain). 	EPC Contractor	Construction Phase	Monthly HSE Report
C.41	Surface and Ground Water	<ul style="list-style-type: none"> ■ Grey water from showers and canteen kitchens (including that from basins, sinks and floor drains) should be discharged into soaking pit equipped with grease traps. Grease will be treated as oil waste. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.42	Surface and Ground Water	<ul style="list-style-type: none"> ■ Domestic, construction and hazardous waste as well as sewage will be disposed of by a registered and licensed waste vendor to approved landfill and / or treatment facility. 	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.43	Surface and Ground Water	■ Use of spill or drip trays to contain spills and leaks.	EPC Contractor	Construction Phase	Monthly HSE Report
C.44	Surface and Ground Water	■ Storage of chemicals, fuel, and oil in adequately bunded impervious areas, as per international bunding and storage requirements.	EPC Contractor	Construction Phase	Monthly HSE Report
C.45	Surface and Ground Water	■ Debris and refuse generated on-site should be collected, handled, and disposed of properly to avoid entering the receiving waters. Stockpiles of cement and other construction materials should be kept covered when not being used.	EPC Contractor	Construction Phase	Monthly HSE Report
C.46	Surface and Ground Water	■ Vehicles, trucks, equipment wash, and maintenance activities shall be undertaken on protected ground (and sheltered area when possible) with appropriate drainage to collect wastewater and avoid surface runoff.	EPC Contractor	Construction Phase	Monthly HSE Report
C.47	Surface and Ground Water	■ Assess the possibility to re-use water for dust suppression activities and allowing groundwater recharge. Water treatment methods for reducing suspended solids or turbidity on site include water filtration systems easily implemented on site such as but not limited to silt socks, geobags, and settling tanks or ponds.	EPC Contractor	Construction Phase	Monthly HSE Report
C.48	Surface and Ground Water	■ Construction Waste Management Plan is developed and the Project will be implemented as per the measures include in the Plan	Third Party	Construction Phase	Six-Monthly Environmental Monitoring Report
C.49	Surface and Ground Water	■ Exposed soil surfaces should be protected by paving or fill material as soon as possible to reduce the potential of soil erosion.	EPC Contractor	Construction Phase	Monthly HSE Report
C.50	Surface and Ground Water	■ Open stockpiles of construction material or construction waste on-site should be covered with tarpaulin or similar fabric during rainstorms where necessary, depending on the material/waste.	EPC Contractor	Construction Phase	Monthly HSE Report
C.51	Surface and Ground Water	■ Use methods for minimising sediment runoff, as appropriate to the conditions on-site, such as wheel cleaning facilities.	EPC Contractor	Construction Phase	Monthly HSE Report
C.52	Surface and Ground Water	■ Protect temporary trafficked areas on-site with coarse stone ballast or equivalent.	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.53	Surface and Ground Water	<ul style="list-style-type: none"> Regularly, and particularly following rainstorms, inspect and maintain drainage systems and erosion control and silt removal facilities to ensure proper and efficient operation at all times. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.54	Surface and Ground Water	<ul style="list-style-type: none"> Mulch to stabilise exposed areas, where practicable and appropriate. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.55	Surface and Ground Water	<ul style="list-style-type: none"> Re-vegetate areas promptly, where practicable and appropriate. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.56	Surface and Ground Water	<ul style="list-style-type: none"> Provide measures to prevent the washing away of construction materials, soil, silt or debris into any drainage system of open stockpiles of construction materials. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.57	Surface and Ground Water	<ul style="list-style-type: none"> Trailer suction hopper dredgers shall not allow mud to overflow. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.58	Surface and Ground Water	<ul style="list-style-type: none"> Use of Lean Material Overboard (LMOB) systems shall be prohibited. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.59	Surface and Ground Water	<ul style="list-style-type: none"> Mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.60	Surface and Ground Water	<ul style="list-style-type: none"> Barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.61	Surface and Ground Water	<ul style="list-style-type: none"> Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.62	Surface and Ground Water	<ul style="list-style-type: none"> Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.63	Surface and Ground Water	<ul style="list-style-type: none"> Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.64	Surface and Ground Water	<ul style="list-style-type: none"> Adequate freeboard shall be maintained. 	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.65	Surface and Ground Water	<ul style="list-style-type: none"> All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.66	Surface and Ground Water	<ul style="list-style-type: none"> Single layer silt curtains shall be applied around works areas when feasible. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.67	Surface and Ground Water	<ul style="list-style-type: none"> The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.68	Soil Quality and Topography	<ul style="list-style-type: none"> Reuse of topsoil as backfill where ever possible 	EPC Contractor	Construction Phase	Monthly HSE Report
C.69	Soil Quality and Topography	<ul style="list-style-type: none"> Excess inert soils and sub-soils excavated that is not required or use as fill on site will be recovered off-site to an authorised site 	EPC Contractor	Construction Phase	Monthly HSE Report
C.70	Soil Quality and Topography	<ul style="list-style-type: none"> Any fill material excavated at the site, which is deemed to be contaminated (i.e, non-hazardous or hazardous) will be stored separately to the inert material, sampled and tested, in order to appropriately classify the material as non-hazardous or hazardous in accordance with local regulation which establishes the criteria for the acceptance of waste at landfills before being transported to an appropriately authorized facility by permitted contractors 	EPC Contractor	Construction Phase	Monthly HSE Report
C.71	Soil Quality and Topography	<ul style="list-style-type: none"> Schedule activities (as far as possible) to avoid extreme weather event such as heavy rainfall and high winds 	EPC Contractor	Construction Phase	Monthly HSE Report
C.72	Soil Quality and Topography	<ul style="list-style-type: none"> Re-vegetate areas with temporary land use, conducting 'progressive rehabilitation 	EPC Contractor	Construction Phase	Monthly HSE Report
C.73	Soil Quality and Topography	<ul style="list-style-type: none"> Minimise the amount of soil handling 	EPC Contractor	Construction Phase	Monthly HSE Report
C.74	Soil Quality and Topography	<ul style="list-style-type: none"> If bedrock is encountered during excavations, it will either be crushed on site and used for infill during construction or be removed from the site by appropriately permitted waste collectors 	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.75	Soil Quality and Topography	<ul style="list-style-type: none"> Stabilise exposed areas 	EPC Contractor	Construction Phase	Monthly HSE Report
C.76	Soil Quality and Topography	<ul style="list-style-type: none"> Cover or spray water on stockpiles of excavated material or backfill 	EPC Contractor	Construction Phase	Monthly HSE Report
C.77	Soil Quality and Topography	<ul style="list-style-type: none"> Reduce or prevent sediment runoff through use of settlement ponds, silt fences 	EPC Contractor	Construction Phase	Monthly HSE Report
C.78	Soil Quality and Topography	<ul style="list-style-type: none"> Demarcate routes for movement of heavy vehicles 	EPC Contractor	Construction Phase	Monthly HSE Report
C.79	Soil Quality and Topography	<ul style="list-style-type: none"> Strip and placing soils when dry, and not when wet 	EPC Contractor	Construction Phase	Monthly HSE Report
C.80	Soil Quality and Topography	<ul style="list-style-type: none"> Restrict the height of topsoil stockpiles to minimise compaction, restricted to 2 m 	EPC Contractor	Construction Phase	Monthly HSE Report
C.81	Soil Quality and Topography	<ul style="list-style-type: none"> Appropriate management of black and grey wastewater 	EPC Contractor	Construction Phase	Monthly HSE Report
C.82	Soil Quality and Topography	<ul style="list-style-type: none"> Appropriate management, storage and disposal of waste as per good international industry practices 	EPC Contractor	Construction Phase	Monthly HSE Report
C.83	Soil Quality and Topography	<ul style="list-style-type: none"> Waste will be segregated on site and only the recyclable wastes will be transferred to designated waste collection points while non-recyclable wastes will be handed over to an authorised waste collector 	EPC Contractor	Construction Phase	Monthly HSE Report
C.84	Soil Quality and Topography	<ul style="list-style-type: none"> Waste which are suitable for reuse will be used for construction purposes where possible 	EPC Contractor	Construction Phase	Monthly HSE Report
C.85	Soil Quality and Topography	<ul style="list-style-type: none"> Implementation of a periodic soil and groundwater management programme (including daily inspection of chemicals storage area, waste storage area, and sewage storage area) 	EPC Contractor	Construction Phase	Monthly HSE Report
C.86	Soil Quality and Topography	<ul style="list-style-type: none"> On-site storage of any hazardous wastes produced will be minimized with off-site removal organized on a regular basis 	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.87	Soil Quality and Topography	<ul style="list-style-type: none"> ■ Appropriate management of chemicals by implementing good international industry standards 	EPC Contractor	Construction Phase	Monthly HSE Report
C.88	Soil Quality and Topography	<ul style="list-style-type: none"> ■ Store chemicals, fuel, and oil in adequately sheltered and impervious bund as per international best practices 	EPC Contractor	Construction Phase	Monthly HSE Report
C.89	Soil Quality and Topography	<ul style="list-style-type: none"> ■ Ensure spill kits are available on site at all time and located at strategic areas (e.g., refuelling area, chemical storage area, waste areas, etc.) 	EPC Contractor	Construction Phase	Monthly HSE Report
C.90	Soil Quality and Topography	<ul style="list-style-type: none"> ■ Bulk storage of fuels and oils should be in clearly marked containers (tanks/drums etc.) indicating the type and quantity being stored. In addition, these containers should be surrounded by bunds to contain the volume being stored in case of accidental spillage 	EPC Contractor	Construction Phase	Monthly HSE Report
C.91	Soil Quality and Topography	<ul style="list-style-type: none"> ■ Installation of skips and bins: <ul style="list-style-type: none"> - Skips and bins should be strategically placed within the campsite and construction site. - The skips and bins at the construction campsite should be adequately designed and covered to prevent access by vermin and minimise odour. - The skips and bins at both the construction campsite and construction site should be emptied regularly to prevent overfilling. ■ Disposal of the contents of the skips and bins should be done at an approved disposal site. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.92	Soil Quality and Topography	<ul style="list-style-type: none"> - Implement Construction Waste Management Plan 	Third Party	Construction Phase	Six-Monthly Environmental Monitoring Report
C.93	Aquatic Flora and Fauna	<ul style="list-style-type: none"> ■ The existing controls and mitigation measures provided in Section 6.4.3.2 for surface water and groundwater will be relevant to aquatic flora and fauna 	Refer to Construction Phase - Surface and Groundwater	Refer to Construction Phase - Surface and Groundwater	Refer to Construction Phase - Surface and Groundwater
C.94	Aquatic Flora and Fauna	<ul style="list-style-type: none"> ■ Undertake sampling to determine the physical and chemical properties of material to be dredged to ensure the appropriate type dredge is used 	EPC Contractor	Construction Phase	-

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.95	Aquatic Flora and Fauna	<ul style="list-style-type: none"> Limit the dredging activities as far as possible 	EPC Contractor	Construction Phase	Monthly HSE Report
C.96	Aquatic Flora and Fauna	<ul style="list-style-type: none"> Seek the opportunities of beneficial use of dredged material as a resource, either on-site or off-site (e.g. agricultural use, industrial/commercial use or recreational use) as per the guidelines of MPA depending on the contamination of the dredged material 	EPC Contractor	Construction Phase	Monthly HSE Report
C.97	Aquatic Flora and Fauna	<ul style="list-style-type: none"> The excess dredged materials from the working platform will be disposed at Myanmar Port Authority (MPA)'s approved location 	EPC Contractor	Construction Phase	Monthly HSE Report
C.98	Community Health and Safety	<ul style="list-style-type: none"> All workers, except those based in Project Area, will be accommodated in the labour camp during construction 	EPC Contractor	Construction Phase	Monthly HSE Report
C.99	Community Health and Safety	<ul style="list-style-type: none"> Provide training on the most common communicable diseases to all workers to raise awareness of the likely diseases, symptoms, preventative measures, transmission routes, and treatment 	EPC Contractor	Construction Phase	Monthly HSE Report
C.100	Community Health and Safety	<ul style="list-style-type: none"> Ensuring health check-ups of all labourers employed to screen pre-existing communicable diseases 	EPC Contractor	Construction Phase	Monthly HSE Report
C.101	Community Health and Safety	<ul style="list-style-type: none"> Provide access for workers to healthcare services (facilities) and medical care 	EPC Contractor	Construction Phase	-
C.102	Community Health and Safety	<ul style="list-style-type: none"> Community grievances in relation to the conduct of security personnel and safety issues or activities should be addressed in accordance with the Project established Grievance Procedure 	EPC Contractor	Construction Phase	Monthly HSE Report
C.103	Community Health and Safety	<ul style="list-style-type: none"> The Project should employ at least 65% Myanmar nationals to work on the construction phase 	EPC Contractor	Construction Phase	Monthly HSE Report
C.104	Community Health and Safety	<ul style="list-style-type: none"> As part of the stakeholder engagement activities, communities near the Project Area should be informed about the risks and consequences of trespassing. Such engagement should start prior to the start of construction activities 	EPC Contractor	Construction Phase	Monthly HSE Report
C.105	Community Health and Safety	<ul style="list-style-type: none"> Speed limit of 20 km/h shall be enforced within the construction site 	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.106	Community Health and Safety	<ul style="list-style-type: none"> Security team to monitor entrance to the construction site 	EPC Contractor	Construction Phase	Monthly HSE Report
C.107	Community Health and Safety	<ul style="list-style-type: none"> Implement Construction Waste Management Plan 	Third Party	Construction Phase	Six-Monthly Environmental Monitoring Report
C.108	Community Health and Safety	<p>Traffic Management Plan (TMP) is developed and the Project will be implemented as per the mitigation described in the Management Plan.</p>	EPC Contractor	Construction Phase	Monthly HSE Report
C.115	Occupational Health and Safety	<ul style="list-style-type: none"> The project will comply with Myanmar labour laws 	EPC Contractor	Construction Phase	Monthly HSE Report
C.116	Occupational Health and Safety	<ul style="list-style-type: none"> All staff will have medical check-ups prior to commencing work, where required; 	EPC Contractor	Construction Phase	Monthly HSE Report
C.117	Occupational Health and Safety	<ul style="list-style-type: none"> Create and implement an environmental management system for the project. It will include mandatory health and safety training courses for all workers and contractors, including handling of hazardous material. This training will take place prior to work starting on operation. Training course attendance will be recorded and monitored by the Project. The plan shall be issued and approved prior to start any construction activity 	EPC Contractor	Prior to Construction Phase	Safety, Security, Health and Environmental Management Plan
C.118	Occupational Health and Safety	<ul style="list-style-type: none"> Provide workers with the required and appropriate personal protective equipment (PPE) such as eye protection, work gloves and protective boots to undertake site activities 	EPC Contractor	Construction Phase	Monthly HSE Report
C.119	Occupational Health and Safety	<ul style="list-style-type: none"> The Project will develop and implement a Safety, Security, Health and Environmental Management Plan which will be a subset of the overall EMP system, tailored to the needs of the project. This plan will set standards that will be met by all contractors and subcontractors 	EPC Contractor	Prior to Construction Phase	Safety, Security, Health and Environmental Management Plan
C.120	Occupational Health and Safety	<ul style="list-style-type: none"> Monitoring, recording and reporting of Health, Safety and Environmental (HSE) matters as per good international industry practice shall be done on a monthly basis 	EPC Contractor	Construction Phase	Monthly HSE Report
C.121	Occupational Health and Safety	<ul style="list-style-type: none"> Ensure activities are supervised by trained personnel 	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.122	Occupational Health and Safety	<ul style="list-style-type: none"> Suitable training is required for all employees who work at height. Employees should be trained in working on different pieces of equipment and surfaces, such as how to work safely on scaffolding, ladders, and roofs 	EPC Contractor	Construction Phase	Monthly HSE Report
C.123	Occupational Health and Safety	<ul style="list-style-type: none"> Minimise the consequences of a fall when applicable, for example by providing a safety net 	EPC Contractor	Construction Phase	Monthly HSE Report
C.124	Occupational Health and Safety	<ul style="list-style-type: none"> Avoid working at height where possible. (e.g., assemblage on ground level) 	EPC Contractor	Construction Phase	Monthly HSE Report
C.125	Occupational Health and Safety	<ul style="list-style-type: none"> Provide walkways that are clearly designated as walkways, having good conditions underfoot, and being well lit 	EPC Contractor	Construction Phase	Monthly HSE Report
C.126	Occupational Health and Safety	<ul style="list-style-type: none"> Implement good housekeeping practice as such keeping work and storage areas tidy and designating specific areas for waste collection 	EPC Contractor	Construction Phase	Monthly HSE Report
C.127	Occupational Health and Safety	<ul style="list-style-type: none"> Cordless tools should be used where possible. If this is not possible, cables should be run at high levels 	EPC Contractor	Construction Phase	Monthly HSE Report
C.128	Occupational Health and Safety	<ul style="list-style-type: none"> If a surface is slippery with mud, it should be treated with stone. Any areas that are slippery should be signposted, and footwear with a good grip should be worn 	EPC Contractor	Construction Phase	Monthly HSE Report
C.129	Occupational Health and Safety	<ul style="list-style-type: none"> Construction workers should be given appropriate protection when using vibrating tools, and equipment should be well maintained 	EPC Contractor	Construction Phase	Monthly HSE Report
C.130	Occupational Health and Safety	<ul style="list-style-type: none"> Where duties involve manual handling, adequate training must be provided 	EPC Contractor	Construction Phase	Monthly HSE Report
C.131	Occupational Health and Safety	<ul style="list-style-type: none"> Consider the kind of support that is best suited for the trench, ensure the trench is fully secure and regularly inspect the trench both before and during the work shift 	EPC Contractor	Construction Phase	Monthly HSE Report
C.132	Occupational Health and Safety	<ul style="list-style-type: none"> Reversing movements of vehicles and mobile plant should be minimized by providing, where possible, drive through circulation routes. Where reversing is unavoidable, turning heads should be provided and banksmen should be deployed to guide reversing vehicles and plant where necessary; and steps should be taken to ensure that 	EPC Contractor	Construction Phase	Monthly HSE Report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
		banksmen wear high-visibility safety vests and use walkie-talkie or similar equipment for effective communication			
C.133	Occupational Health and Safety	<ul style="list-style-type: none"> Safety reversing devices such as reversing video device (RVD), cross view mirror, parking sensor, and reversing alarm and warning light shall be used when applicable 	EPC Contractor	Construction Phase	Monthly HSE Report
C.134	Occupational Health and Safety	<ul style="list-style-type: none"> Ensure height and stock pile location are in line with good international industry practices 	EPC Contractor	Construction Phase	Monthly HSE Report
C.135	Occupational Health and Safety	<ul style="list-style-type: none"> Ensure excavation of trenches are undertaken as per good international industry practices 	EPC Contractor	Construction Phase	Monthly HSE Report
C.136	Occupational Health and Safety	<ul style="list-style-type: none"> Ensure loading and unloading of material is undertaken as per good international industry practices. 	EPC Contractor	Construction Phase	Monthly HSE Report
C.137	Infrastructure Services	<ul style="list-style-type: none"> Before commencement of jetty construction, a notice to mariners will be issued to inform navigator of the activities of the Project for navigation safety and will be limited to the minimum period possible 	EPC Contractor	Construction Phase	Monthly HSE Report
C.138	Infrastructure Services	<ul style="list-style-type: none"> Duration for jetty construction will be reduced by practicing prefabrication and assembly methods 	EPC Contractor	Construction Phase	Monthly HSE Report
C.139	Infrastructure Services	<ul style="list-style-type: none"> Reuse topsoil and dredged materials wherever possible and reduce the amount of dredge to be disposed 	EPC Contractor	Construction Phase	Monthly HSE Report
C.140	Infrastructure Services	<ul style="list-style-type: none"> Limit the number of vehicles using public infrastructure and services whenever possible 	EPC Contractor	Construction Phase	Monthly HSE Report
C.141	Infrastructure Services	<ul style="list-style-type: none"> Dispose of the waste generated by the Project at licensed landfill sites by registered and licensed waste management vendor 	EPC Contractor	Construction Phase	Monthly HSE Report
C.142	Infrastructure Services	<ul style="list-style-type: none"> Site reinstatement and rehabilitation will be performed including repairing any damage caused as part of the construction activities and reinstating existing access roads when needed 	EPC Contractor	Construction Phase	Monthly HSE Report
C.143	Infrastructure Services	<ul style="list-style-type: none"> Record complaints under the Grievance Mechanism process and follow up by identifying the causes and responding appropriately within 48 hours of receiving the complaint to mitigate the disturbance 	BE	Construction Phase	Grievance Mechanism

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
C.144	Infrastructure Services	Traffic Management Plan is developed and the Project will be implemented as per the mitigation described in the Management Plan.	EPC Contractor	Construction Phase	Monthly HSE Report
C.145	Infrastructure Services	<ul style="list-style-type: none"> Implement Construction Waste Management Plan 	Third Party	Construction Phase	Six-Monthly Environmental Monitoring Report

Table 8-3 Summary of Mitigation Measures (Commitment Table) – Operational Phase

No.	Receptor	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
O.1	Ambient Air	<ul style="list-style-type: none"> All air emissions will comply with EQEG Air Emissions (General; Section 1.2 of the EQEG) 	BE	Operation Phase	Six-Monthly Environmental Monitoring Report
O.2	Ambient Air	<ul style="list-style-type: none"> Maintain roadside vegetation barriers 	BE	Operation Phase	Monthly HSE Report
O.3	Ambient Air	<ul style="list-style-type: none"> Ensure regular maintenance of all diesel-powered equipment to reduce emissions of NO_x and SO₂ 	BE	Operation Phase	Monthly HSE Report
O.4	Ambient Air	<ul style="list-style-type: none"> Switch off machinery and equipment when not in operation 	BE	Operation Phase	Monthly HSE Report
O.5	Ambient Air	<ul style="list-style-type: none"> Use low sulphur fuels in heavy good vehicles (HGVs) and diesel powered equipment in collaboration with best management practices 	BE	Operation Phase	Monthly HSE Report
O.6	Noise	<ul style="list-style-type: none"> Noise levels will comply to EQEG Noise Levels (General; Section 1.4 of the EQEG) 	BE	Operation Phase	Six-Monthly Environmental Monitoring Report
O.7	Noise	<ul style="list-style-type: none"> Schedule transportation of materials evenly throughout the day (to minimize accumulative noise impact from multiple noise sources); 	BE	Operation Phase	Monthly HSE Report
O.8	Noise	<ul style="list-style-type: none"> Regular maintenance of equipment such as lubricating moving parts, tightening loose parts and replacing worn out components should be conducted 	BE	Operation Phase	Monthly HSE Report

No.	Receptor	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
O.9	Noise	<ul style="list-style-type: none"> Avoid transportation of materials on- and off-site through existing community areas 	BE	Operation Phase	Monthly HSE Report
O.10	Noise	<ul style="list-style-type: none"> Install noise barriers when possible 	BE	Operation Phase	Monthly HSE Report
O.11	Noise	<ul style="list-style-type: none"> Record complaints under the Grievance Mechanism process and follow up by identifying the causes and responding appropriately within 48 hours of receiving the complaint to mitigate the disturbance; 	BE	Operation Phase	Grievance Mechanism
O.12	Noise	<ul style="list-style-type: none"> Speed limits to its lowest as possible in local roads 	BE	Operation Phase	Monthly HSE Report
O.13	Surface and groundwater	<ul style="list-style-type: none"> All discharges will be in compliance with Wastewater, storm Water Runoff, Effluent and Sanitary Discharges (General; Section 1.2 of the EQEG) and EQEG Site Runoff and Effluent Levels (for Roads; Section 2.7.8 of the EQEG); 	BE	Operation Phase	Six-Monthly Environmental Monitoring Report
O.14	Surface and groundwater	<ul style="list-style-type: none"> Survey the water depth and consider the requirement of dredging, rather than the fixed schedule 	EPC Contractor	Operation Phase	Monthly HSE Report
O.15	Surface and groundwater	<ul style="list-style-type: none"> Limit the dredging activities and its volume to its lowest as far as possible 	EPC Contractor	Operation Phase	Monthly HSE Report
O.16	Surface and groundwater	<ul style="list-style-type: none"> Dispose the dredged materials only at location approved by the MPA 	EPC Contractor	Operation Phase	Monthly HSE Report
O.17	Surface and groundwater	<ul style="list-style-type: none"> Provide oily water separator at the tie-in point of the existing drainage system. Oily wastewater separator is designed to treat the oily water from the tank farms and loading bays. The treated water will drain to public drains near the Project Site after treatment to meet the EQEQ standards 	EPC Contractor	Operation Phase	Monthly HSE Report
O.18	Surface and groundwater	<ul style="list-style-type: none"> Storm water, industrial wastewater and sewage water will be collected and treated prior to discharge. Drains from all equipment containment drainage, spills, floor wash downs and fire protection discharges will be led to oil-water separator. Oil/water separator will be designed for outdoor, underground in Reinforced Cement Concrete (RCC) construction 	EPC Contractor	Operation Phase	Monthly HSE Report

No.	Receptor	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
O.19	Surface and groundwater	<ul style="list-style-type: none"> Sanitary wastewater will be treated by a package of sewage treatment units. The capacity of the system will be sufficient for simultaneous use by 25 people with three (3) water treatment units and each unit consist of septic tank, aerobic tank and sedimentation tank and air pump 	EPC Contractor	Operation Phase	Monthly HSE Report
O.20	Surface and groundwater	<ul style="list-style-type: none"> All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly 	EPC Contractor	Operation Phase	Monthly HSE Report
O.21	Surface and groundwater	<ul style="list-style-type: none"> Waste will be segregated on site and only the recyclable wastes will be transferred to designated waste collection points while non-recyclable and hazardous wastes will be handed over to an authorised waste collector 	EPC Contractor	Operation Phase	Monthly HSE Report
O.22	Surface and groundwater	<ul style="list-style-type: none"> Prepare and implement Operational Waste Management Plan 	EPC Contractor	Prior to Operation Phase	Operational Waste Management Plan
O.23	Surface and groundwater	<ul style="list-style-type: none"> No ballast water from the vessels will be discharge in the Yangon River 	BE/EPC Contractor	Operation Phase	Monthly HSE Report
O.24	Surface and groundwater	<ul style="list-style-type: none"> Incorporate drainage systems or oil traps into the carriers' design to reduce the amount of potential contaminated water runoff; 	BE/EPC Contractor	Operation Phase	Monthly HSE Report
O.25	Surface and groundwater	<ul style="list-style-type: none"> Collect any contaminated water on the vessels when possible, and send to certified contractor for disposal, to reduce potential contaminated water discharge into the Yangon River 	BE/EPC Contractor	Operation Phase	Monthly HSE Report
O.26	Soil Quality	<ul style="list-style-type: none"> Project Proponent will prepare guidelines and procedures for immediate clean-up actions following any leaks 	BE	Operation Phase	Monthly HSE Report
O.27	Soil Quality	<ul style="list-style-type: none"> Use of spill or drip trays to contain leaks 	BE	Operation Phase	Monthly HSE Report
O.28	Soil Quality	<ul style="list-style-type: none"> Use of spill control kits to contain and clean small spills and leaks 	BE	Operation Phase	Monthly HSE Report
O.29	Soil Quality	<ul style="list-style-type: none"> Employee must be trained on emergency response procedure 	BE	Prior to Operation Phase	Monthly HSE Report

No.	Receptor	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
O.30	Soil Quality	<ul style="list-style-type: none"> ■ Appropriate management, storage and disposal of waste as per good international industry practices 	BE	Operation Phase	Monthly HSE Report
O.31	Soil Quality	<ul style="list-style-type: none"> ■ All the waste will be segregated depending on their recyclability, hazard and biodegradability, and will dispose only at the municipal permitted locations 	BE	Operation Phase	Monthly HSE Report
O.32	Soil Quality	<ul style="list-style-type: none"> ■ Installation of skips and bins: <ul style="list-style-type: none"> - Skips and bins should be strategically placed within the Project Area. - The skips and bins should be adequately designed and covered to prevent access by vermin and minimise odour. - The skips and bins should be emptied regularly to prevent overfilling. ■ Disposal of the contents of the skips and bins should be done at an approved disposal site 	BE	Operation Phase	Monthly HSE Report
O.33	Aquatic Flora and Fauna	<ul style="list-style-type: none"> - The existing control measures provided for surface and ground water and soil quality will be relevant for mitigation of impacts to aquatic flora and fauna 			
O.34	Community Health and Safety	<ul style="list-style-type: none"> ■ Provide access to workers to healthcare services (facilities) and medical care 	BE	Operation Phase	Monthly HSE Report
O.35	Community Health and Safety	<ul style="list-style-type: none"> ■ Switch off machinery and equipment when not in operation 	BE	Operation Phase	Monthly HSE Report
O.36	Community Health and Safety	<ul style="list-style-type: none"> ■ Dispose the dredged materials only at location approved by the MPA 	EPC Contractor	Operation Phase	Monthly HSE Report
O.37	Community Health and Safety	<ul style="list-style-type: none"> ■ Schedule transportation of materials evenly throughout the day (to minimize accumulative noise impact from multiple noise sources) 	BE	Operation Phase	Monthly HSE Report
O.38	Community Health and Safety	<ul style="list-style-type: none"> ■ Avoid transportation of materials on- and off-site through existing community areas 	BE	Operation Phase	Monthly HSE Report

No.	Receptor	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
O.39	Community Health and Safety	<ul style="list-style-type: none"> Speed limits to its lowest as possible in local roads 	BE	Operation Phase	Monthly HSE Report
O.40	Community Health and Safety	<ul style="list-style-type: none"> Implement Traffic Management Plan 	BE	Operation Phase	Monthly HSE Report
O.41	Community Health and Safety	<ul style="list-style-type: none"> Employee must be trained on emergency response procedure 	BE	Prior to Operation Phase	Monthly HSE Report
O.42	Community Health and Safety	<ul style="list-style-type: none"> Appropriate management, storage and disposal of waste as per good international industry practices 	BE	Prior to Operation Phase	Monthly HSE Report
O.43	Community Health and Safety	<ul style="list-style-type: none"> Waste will be segregated on site and only the recyclable wastes will be transferred to designated waste collection points while non-recyclable and hazardous wastes will be handed over to an authorised waste collector 	BE	Operation Phase	Monthly HSE Report
O.44	Community Health and Safety	<ul style="list-style-type: none"> Prepare and implement Operational Waste Management Plan 	BE	Operation Phase	Operational Waste Management Plan
O.45	Community Health and Safety	<ul style="list-style-type: none"> No ballast water from the vessels will be discharge in the Yangon River 	BE/EPC Contractor	Operation Phase	Monthly HSE Report
O.46	Community Health and Safety	<ul style="list-style-type: none"> Incorporate drainage systems or oil traps into the vessels' design to reduce the amount of potential contaminated water runoff 	BE/EPC Contractor	Operation Phase	Monthly HSE Report
O.47	Community Health and Safety	<ul style="list-style-type: none"> Collect any contaminated water on the vessels when possible, and send to certified contractor for disposal, to reduce potential contaminated water discharge into the Yangon River 	BE/EPC Contractor	Operation Phase	Monthly HSE Report
O.48	Community Health and Safety	<ul style="list-style-type: none"> Community grievances in relation to the conduct of security personnel and safety issues or activities should be addressed in accordance with the Project's established Grievance Procedure 	BE	Operation Phase	Community Grievance Procedure
O.49	Community Health and Safety	<ul style="list-style-type: none"> Ensure all safety measures are in place to protect the community from any risks associated from traffic and any maintenance work on the networks (i.e., clear signs, adequate containment of work area, emergency response plan, work supervision, clear pedestrian path, work schedule, weather forecast, logistics, etc.) 	BE	Operation Phase	Monthly HSE Report

No.	Receptor	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
O.50	Landscape and Visual Character	<ul style="list-style-type: none"> Create a diversity of planting palettes as a compensatory for any felled during construction 	BE	Prior to Operation Phase	Monthly HSE Report
O.51	Landscape and Visual Character	<ul style="list-style-type: none"> Include green corridors and green and blue streets to connect separated patches of habitat 	BE	Prior to Operation Phase	Monthly HSE Report
O.52	Landscape and Visual Character	<ul style="list-style-type: none"> Include green buffers in the Project Site 	BE	Prior to Operation Phase	Monthly HSE Report
O.53	Landscape and Visual Character	<ul style="list-style-type: none"> Minimise overall lighting use and manage lighting on site to consider minimisation of light pollution and horizon glow 	BE	Prior to Operation Phase	Monthly HSE Report
O.54	Landscape and Visual Character	<ul style="list-style-type: none"> Maintain all structural facilities in good repair 	BE	Operation Phase	Monthly HSE Report
O.62	Occupation Health and Safety	<ul style="list-style-type: none"> The project will comply with Myanmar labour laws and EQEG standards 	BE	Operation Phase	Monthly HSE Report
O.63	Occupation Health and Safety	<ul style="list-style-type: none"> All staff will have medical check-ups prior to commencing work, where required 	BE	Operation Phase	Monthly HSE Report
O.64	Occupation Health and Safety	<ul style="list-style-type: none"> Provide workers with the required and appropriate personal protective equipment (PPE) such as eye protection, work gloves and protective boots to undertake site activities 	BE	Operation Phase	Monthly HSE Report
O.65	Occupation Health and Safety	<ul style="list-style-type: none"> The Project will prepare and implement Risk Assessment Procedure in order to identify and mitigate any potential impact during the construction and operation phases 	BE	Operation Phase	Monthly HSE Report
O.66	Occupation Health and Safety	<ul style="list-style-type: none"> Prepare and implement Safety, Security, Health and Environment Management Plan. It will include mandatory health and safety training courses for all workers and contractors, including handling of hazardous material. This training will take place prior to work starting on operation. Training course attendance will be recorded and monitored by the Project. The plan shall be issued and approved prior to start any operational activity. 	BE	Operation Phase	Safety, Security, Health and Environmental Management Plan
O.67	Occupation Health and Safety	<ul style="list-style-type: none"> Waste will be segregated on site and only the recyclable wastes will be transferred to designated waste collection points while non- 	BE	Operation Phase	Monthly HSE Report

No.	Receptor	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
		recyclable and hazardous wastes will be handed over to an authorised waste collector			
O.68	Occupation Health and Safety	<ul style="list-style-type: none"> Prepare and implement Operational Waste Management Plan 	BE	Operation Phase	Operational Waste Management Plan
O.69	Infrastructure Services	<ul style="list-style-type: none"> The underground water will be used only after tested and approved by local authority, for only washing. Drinking water will be purchased from qualified drinking water provider 	BE	Operation Phase	Monthly HSE Report
O.70	Infrastructure Services	<ul style="list-style-type: none"> Prepare and implement Operational Waste Management Plan. All the waste will be segregated depending on their recyclability, hazard and biodegradability, and will dispose only at the municipal permitted locations 	BE	Operation Phase	Operational Waste Management Plan
O.71	Infrastructure Services	<ul style="list-style-type: none"> Limit the number of vehicles using public infrastructure and services whenever possible 	BE	Operation Phase	Monthly HSE Report
O.72	Infrastructure Services	<ul style="list-style-type: none"> Limit the number of the vessels and their loading/unloading time as far as possible 	BE	Operation Phase	Monthly HSE Report
O.73	Infrastructure Services	<ul style="list-style-type: none"> Speed limits to its lowest as possible in local roads and avoid using public road during the peak hours 	BE	Operation Phase	Monthly HSE Report
O.74	Infrastructure Services	<ul style="list-style-type: none"> Implement Traffic Management Plan 	BE	Operation Phase	Traffic Management Plan
O.75	Cumulative Impact Assessment	<ul style="list-style-type: none"> The Project commits to contribute or take part in doing Cumulative Impact Assessment and fully comply with the requirements or conditions proposed by the assessment in order to make sure that the environment is maintained under its threshold limits and the community has the least social impact due to the developments in their proximity. 	BE	Operation Phase	

Table 8-4 Summary of Mitigation Measures (Commitment Table) – Unplanned Events (All Phases)

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
U.1	Spills and Leaks	<ul style="list-style-type: none"> The Project will follow the Petroleum Products Regulatory Department (PPRD)'s framework and regulation to prevent oil pollution 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.2	Spills and Leaks	<ul style="list-style-type: none"> Transferring, maintenance and refuelling of equipment and vehicles should be carried out in designated areas on hardstand to prevent seepage of any spillages to ground and water. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hard standing 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.3	Spills and Leaks	<ul style="list-style-type: none"> Use of spill control kits to contain and clean small spills and leaks. Spill control kits should be available on site at all time 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.4	Spills and Leaks	<ul style="list-style-type: none"> Store chemicals, fuel, oil and hazardous waste in adequately banded impervious areas, good international industry practices in order to minimise the potential for damage or contamination of materials 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.5	Spills and Leaks	<ul style="list-style-type: none"> Implement a training program to familiarise staff with emergency procedures and best practices 	BE	Prior to Construction / Operation Phase	Monthly HSE report
U.6	Spills and Leaks	<ul style="list-style-type: none"> Oils, fuels and chemicals should only be used and stored in designated areas, which have pollution prevention facilities. The bund should be drained of rainwater after a rain event 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.7	Spills and Leaks	<ul style="list-style-type: none"> The oil contaminated water will be collected and treated through oily water separator. Oily wastewater separator is designed to treat the oily water from the tank farms and loading bays. The treated water will drain to public drains near the Project Site after treatment to meet the EQEQ standards 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.8	Spills and Leaks	<ul style="list-style-type: none"> Proper guidelines and procedures should be developed for immediate clean-up actions following any spillages of oil, fuel or chemicals 	BE	Prior to Construction / Operation Phase	Spill Response Plan
U.9	Spills and Leaks	<ul style="list-style-type: none"> Standard operating procedures (SOPs) will be prepared to manage any chemical spills, leaks and/or seepages. SOPs will cover transport, handling, storage, use and disposal of chemicals. Operating personnel will be trained on the SOPs and monitored in their use on a daily basis; 	BE	Throughout Lifecycle of the Project	Monthly HSE report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
U.10	Spills and Leaks	<ul style="list-style-type: none"> Storm water, industrial wastewater, sewage water and surface run-off will be collected and treated prior to discharge. Drains from all equipment containment drainage, spills, floor wash downs and fire protection discharges will be led to oil-water separator 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.11	Spills and Leaks	<ul style="list-style-type: none"> Sanitary wastewater will be treated by a package of sewage treatment units 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.12	Spills and Leaks	<ul style="list-style-type: none"> All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.13	Spills and Leaks	<ul style="list-style-type: none"> All employees will have the appropriate training, qualification and certification to undertake the tasks required during the construction and Maintenance of the roads. 	BE	Prior to Construction / Operation Phase	Monthly HSE report
U.14	Spills and Leaks	<ul style="list-style-type: none"> The Project will prepare and implement Risk Assessment Procedure in order to identify and mitigate any potential impact during the construction and operation phases 	BE	Prior to Construction / Operation Phase	Monthly HSE report
U.15	Spills and Leaks	<ul style="list-style-type: none"> A Spill Response Plan will be developed and implemented for the construction and operational phases of the Project 	BE	Prior to Construction / Operation Phase	Spill Response Plan
U.16	Spills and Leaks	<ul style="list-style-type: none"> Development of an Emergency Preparedness and Response Plan for spill. Procedures for response to chemical spills will be included in the emergency response plan. This will include locations of spill containment and recovery equipment 	BE	Prior to Construction / Operation Phase	Spill Response Plan; Emergency Response Plan
U.17	Spills and Leaks	<ul style="list-style-type: none"> A detailed Operational Waste Management Plan (WMP) with types, volumes and disposal of wastes identified will be developed 	BE	Prior to Construction / Operation Phase	Operational Waste Management Plan
U.18	Spills and Leaks	<ul style="list-style-type: none"> Install bund/ dike around chemical storage area to contain the chemicals in case of chemicals in case of leakage or spill. The capacity of bund/ dike should be sufficient to contain 110% of the chemicals from the largest tank 	BE	Prior to Construction / Operation Phase	Monthly HSE report
U.19	Spills and Leaks	<ul style="list-style-type: none"> Ensure that there is sufficient and appropriate spill response supplies in the Project area 	BE	Throughout Lifecycle of the Project	Monthly HSE report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
U.20	Spills and Leaks	<ul style="list-style-type: none"> Do not store chemicals in unsuitable containers or containers made of incompatible material 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.21	Spills and Leaks	<ul style="list-style-type: none"> Provide dedicated storage areas for construction materials to minimise the potential for damage or contamination of the materials 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.22	Spills and Leaks	<ul style="list-style-type: none"> Waste storage areas will be equipped with secondary containment and spill control measures 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.23	Spills and Leaks	<ul style="list-style-type: none"> Liquid wastes such as waste oil, etc., will be collected and stored for recycling in cemented areas 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.24	Spills and Leaks	<ul style="list-style-type: none"> All drainage/tanks, etc. will be positioned on concrete hard standing to prevent any seepage into ground or surface water 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.25	Spills and Leaks	<ul style="list-style-type: none"> Waste storage sites to be designed for hazardous and non-hazardous waste, including sludge disposal; 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.26	Spills and Leaks	<ul style="list-style-type: none"> Hazardous waste storage areas will comply with good international industry practices 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.27	Spills and Leaks	<ul style="list-style-type: none"> Keep a register for all hazardous substances on site and relevant Material Safety Data Sheets (MSDSs) readily accessible for reference. 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.28	Spills and Leaks	<ul style="list-style-type: none"> Store and handle all hazardous substances in accordance with their MSDS 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.29	Spills and Leaks	<ul style="list-style-type: none"> Chemical storage areas will be restricted to trained (chemical handling) workers only; 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.30	Spills and Leaks	<ul style="list-style-type: none"> Provide enough space to allow for inspection between waste containers so as to identify any leaks or spills 	BE	Throughout Lifecycle of the Project	Monthly HSE report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
U.31	Spills and Leaks	<ul style="list-style-type: none"> Prepare safety procedures for loading/ unloading of petroleum and LPG 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.32	Vehicle Collision	<ul style="list-style-type: none"> Signalling buoys will be installed around the alignment of the safety zone to indicate the restricted area to other vessels. Navigation and fishing activities will be restricted beyond the safety zone while the vessel is loading/unloading. 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.33	Vehicle Collision	<ul style="list-style-type: none"> Inform workers of sensitive traffic areas, e.g., location of schools, shrines, temples, mosques, health clinics, hospitals etc. Reduce speed limits for these areas; 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.34	Vehicle Collision	<ul style="list-style-type: none"> Avoid haulage tasks during peak traffic periods and school drop-off and pick-up times 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.35	Vehicle Collision	<ul style="list-style-type: none"> Maintain pedestrian access wherever possible, including access to any settlements and other facilities 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.36	Vehicle Collision	<ul style="list-style-type: none"> Notify the local communities about proposed changes to local traffic access due to construction/ maintenance activities and providing clear signage of changed traffic conditions 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.37	Vehicle Collision	<ul style="list-style-type: none"> Limit the number of vehicles using public infrastructure and services whenever possible 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.38	Vehicle Collision	<ul style="list-style-type: none"> Use only licensed and experienced drivers and transport companies 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.39	Vehicle Collision	<ul style="list-style-type: none"> Implement “No Night Driving Policy” (10pm-7am; and 10pm-10am for public holidays) for construction vehicles (during construction phase) when possible 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.40	Vehicle Collision	<ul style="list-style-type: none"> All Project vehicles shall use designated roads only, and avoid traveling off roads 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.41	Vehicle Collision	<ul style="list-style-type: none"> Maintain pedestrian access wherever possible, including access to any settlements and other facilities 	BE	Throughout Lifecycle of the Project	Monthly HSE report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
U.42	Vehicle Collision	<ul style="list-style-type: none"> A Traffic Management Plan is developed and the Project will be implemented as per the mitigation described in the Management Plan. 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.43	Vehicle Collision	<ul style="list-style-type: none"> Emergency Response Plan will set out the management procedures to be put in place by the Project Administrator and contractor to prevent and mitigate the potential impacts due to transportation accidents. It will also include the medical procedures for the injured 	BE	Throughout Lifecycle of the Project	Emergency Response Plan
U.44	Fire and Explosion	<ul style="list-style-type: none"> Develop a preventive maintenance program for process equipment and pipeline connection in order to avoid failures and implement program regularly 	BE	Operation Phase	Monthly HSE Report
U.45	Fire and Explosion	<ul style="list-style-type: none"> Ensure the staff working to standard and strictly follow working procedures in order to prevent any incident 	BE	Prior to Construction / Operation Phase	Monthly HSE report
U.46	Fire and Explosion	<ul style="list-style-type: none"> Install leak detecting and alarming system in transferring and handling areas in tank farm and jetty 	BE	Operation Phase	Monthly HSE Report
U.47	Fire and Explosion	<ul style="list-style-type: none"> Establish an Emergency Centre with 24 hours standby staff and firemen. 	BE	Throughout Lifecycle of the Project	Emergency Response Plan
U.48	Fire and Explosion	<ul style="list-style-type: none"> Install fire protection and firefighting system including but limited following items: <ul style="list-style-type: none"> - Gas detection system (particularly for LPG tanks): gas detector and fire alarm devices will be installed in potential leakage area of toxic chemicals and flammable substances like large size valves, flanges, major rotating equipment and high temperature fluctuation area; - Fire water system: fire water pond and pumps will distribute fire water to all plants in the Project Site via fire water pipeline; - Water firefighting system in all facilities: water hydrants, water monitors, fixed water spray system; 	BE	Throughout Lifecycle of the Project	Monthly HSE report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
		<ul style="list-style-type: none"> - Foam firefighting system in Tank Farm area: foam monitors, foam chamber equipped at heavy hydrocarbon storage tanks; - Fire extinguishing system: portable fire extinguishers (foam, powder and CO2) in plants and buildings at appropriate locations; - Inert gas fire suppression system: Inert gas total flooding fire extinguishing system will be provided in some areas such as control rooms and substations; and - Fire alarm system (automatic fire detectors and manual fire call points) will be provided in required areas. 			
U.49	Fire and Explosion	<ul style="list-style-type: none"> ■ All fire prevention and firefighting systems shall be routinely inspected and maintained the by responsible persons 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.50	Fire and Explosion	<ul style="list-style-type: none"> ■ Proper communication equipment of either station or mobile type will be provided such as hot (emergency) line telephones, trunk radios, paging, inter-com and different alarm tones correspondence with each kind of situation 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.51	Fire and Explosion	<ul style="list-style-type: none"> ■ Restrict the usage of mobile/cellular phone on the Project Site due to the danger of spark by electromagnetic waves 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.52	Fire and Explosion	<ul style="list-style-type: none"> ■ Restrict smoking to controlled areas only 	BE	Prior to Construction / Operation Phase	Monthly HSE report
U.53	Fire and Explosion	<ul style="list-style-type: none"> ■ Apply for any applicable permit relating to the importation, transportation, storage and handling of explosives from the Myanmar Ministry of Energy and Myanmar Fire Services Department 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.54	Fire and Explosion	<ul style="list-style-type: none"> ■ Implement all required safety and management requirements relating to the transportation, storage and handling of explosives 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.55	Fire and Explosion	<ul style="list-style-type: none"> ■ Fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. Establishment of secondary containment for fuel storage and hazardous materials, which have 	BE	Throughout Lifecycle of the Project	Monthly HSE report

No.	Potential Impacts	Mitigation Measures	Responsible Party	Frequency / Duration	Reporting
		pollution prevention facilities. The bund should be drained of rainwater after a rain event			
U.56	Fire and Explosion	<ul style="list-style-type: none"> Induction training for personnel is recommended to include a mandatory segment on fire safety and actions in the event of a fire. 	BE	Prior to Construction / Operation Phase	Monthly HSE report
U.57	Fire and Explosion	<ul style="list-style-type: none"> Provide training for local communities on the danger of explosion and fire 	BE	Operation Phase	Monthly HSE report
U.58	Fire and Explosion	<ul style="list-style-type: none"> Provide instructions and procedures about safety precautions and emergency evacuations for local communities 	BE	Operation Phase	Monthly HSE report
U.59	Fire and Explosion	<ul style="list-style-type: none"> Provide workers with helmets and other PPE such as eye protection, work gloves and protective boots. Ensure all staff wear appropriate PPE 	BE	Throughout Lifecycle of the Project	Monthly HSE report
U.60	Fire and Explosion	<ul style="list-style-type: none"> The Project will prepare and implement Risk Assessment Procedure in order to identify and mitigate any potential impact during the construction and operation phases 	BE	Prior to Construction / Operation Phase	Emergency Response Plan
U.61	Fire and Explosion	<ul style="list-style-type: none"> Prepare and implement Safety, Security, Health and Environment Management Plan. It will include mandatory health and safety training courses for all workers and contractors, including handling of hazardous material. This training will take place prior to work starting on operation. Training course attendance will be recorded and monitored by the Project. The plan shall be issued and approved prior to start any operational activity 	BE	Throughout Lifecycle of the Project	Safety, Security, Health and Environment Management Plan
U.62	Fire and Explosion	<ul style="list-style-type: none"> An Emergency Response Plan is developed to reduce the likelihood of explosions or fire and to ensure response actions are implemented in the event of an incident 	BE	Prior to Construction / Operation Phase	Emergency Response Plan
U.63	Fire and Explosion	<ul style="list-style-type: none"> Pre-communicate and coordinate with local firefighting brigade/station 	BE	Throughout Lifecycle of the Project	Monthly HSE report

8.3 Overall Budget for Implementing the EMP

The budget for undertaking the commitments of the EIA is included in the construction and O&M budget of the Project, excluding monitoring and reporting. Monitoring of impacts (per year during the construction phase) is estimated to be approximately 100,000-200,000 USD.

8.4 Management and Monitoring Sub-Plans

A number of management plans will be developed and implemented in order to reduce the residual impacts from the Project to no greater than moderate significance. Management plans will be created in full prior to construction and operation of the Project by, respectively to the project phases, Contractor and BE. The Contractor and BE shall ensure the HSE team includes (but not limited to) a qualified Environmental Manager, qualified Environmental coordinators and a registered third party consultant in order to implement the management and monitoring sub-plans in the following sections.

The Project will prepare the following Management Plans covering the Construction and Operational Phases:

- Operational Waste Management Plan;
- Safety, Security, Health and Environmental Management Plan;
- Emergency Response Plan;
- Spill Prevention and Response Plan;
- Stakeholder Engagement Plan; and
- Environmental Monitoring Plan.

8.4.1 Waste Management Plan (Operational)

8.4.1.1 Objectives

The Waste Management Plan (WMP) provides the procedures and processes which will be applied to the Project activities to check and monitor compliance and effectiveness of the mitigation measures to which BE has committed to minimise environmental impacts to minimise environmental impacts through the appropriate management of waste generated during Project lifecycle.

The WMP shall be developed and updated to ensure the relevance with project's activities for operation phase.

The objectives of the WMP are:

- Ensure waste is managed in a controlled and environmentally sound manner (i.e., storage, transfer, and disposal);
- Comply with all statutory and contractual requirements concerning the management of waste;
- Ensure resources are recovered where possible and safe to do so, for re-use and recycling;
- Ensure appropriate recording and tracking occurs for all wastes generated.

The WMP shall address, but not limited to, the following:

- Staffing;
- Project's activities Vs waste identification;
- Waste segregation (i.e., wood, glass, plastic, cardboard & paper, metal, insulation material, concrete and masonry, food & organic material, and non-recyclable);
- Hazardous waste;

- Storage area;
- Coordination with waste vendors (for transport and disposal);
- Records Management;
- Housekeeping;
- Waste minimisation; and
- Training.

8.4.1.2 Legal Requirements

The WMP will align with National Environment Policy (1994), Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental Impact Assessment Procedure (2015), Environmental Quality (Emissions) Guidelines (EQEG) (2015), Myanmar Climate Change Policy (2019), Conservation of Water Resources and Rivers Law (2006), and Yangon City Development Committee Law (2014) (Table 3.1).

8.4.1.3 Implementation Schedule

The WMP will be implemented during operational phase of the Project.

8.4.1.4 Management Actions

The following will be implemented for wastes generated from the operational phase of the Project. These have been respectively extracted from **Table 1-5**, **Table 8-5** and **Table 8-6** for construction, operation, and unplanned activities and are summarised below:

- Good housekeeping practices for waste storage and handling referencing GIIP;
- A waste inventory developed in the planning stage, in discussion with the engineers, to establish the types of wastes (hazardous and non-hazardous) expected to identify appropriate disposal routes;
- Materials should be managed in a way to avoid over-ordering, poor storage and maintenance, mishandling as well as improper operation procedures;
- Wastes should be separated into reusable items and materials to be disposed of or recycled whenever possible;
- Waste suitable for reuse should be stored on site and reintroduced to the construction process as and when required;
- The WMP should identify disposal routes (including transport options and disposal sites) for all wastes generated;
- A hazardous waste management system covering waste classification (including hazardous chemical waste), separation, collection, storage, transfer and disposal should be set up and operated. The waste management system should comply with applicable regulation of the government, if any, or in its absence, GIIP;
- Hazardous waste should be stored in such a way as to prevent and control accidental release to the environment (e.g. secondary containment, sealed containers);
- Waste should be collected regularly by reputable waste collectors;
- Recyclables such as scrap steel, metals, plastics, and paper items should be collected for recycling wherever possible;
- Disposal of waste in or off the construction site / Project facilities should be prohibited;
- Chain of custody documents should be used for all wastes to monitor disposal;

- Waste segregation should be practiced at the labour camp and Operation and Maintenance Building with an emphasis placed on reducing, reusing and recycling of waste streams as appropriate; and
- Chain of custody documents should be used for all wastes to monitor disposal. BE should record the waste type, volume and disposal method, which should be reported in the Environmental Monitoring Report to be submitted to MONREC every six months.

8.4.1.5 Monitoring Plans

Waste quantities and disposal routes will be recorded and reported in the 6-monthly Environmental Monitoring Report. The full monitoring plan is provided in Section 8.4.16.

8.4.1.6 Projected Budgets and Responsibilities

The cost of the management actions is included in the overall budget for the EMP.

8.4.2 Safety, Security, Health and Environmental Management Plan

8.4.2.1 Objectives

The objective of the Safety, Security, Health and Environmental Management Plan (SSHEMP) is to provide the procedures and processes to check and monitor compliance and effectiveness of the mitigation measures.

8.4.2.2 Legal Requirements

The SSHEMP will align with Myanmar Investment Law (2016), Myanmar Investment Rules (2017), Myanmar Fire Force Law (2015), The Protection and Prevention of Communicable Disease Law (1995), Employment and Skill Development Law (2013), The Settlement of Labour Dispute Law (2012), The Workmen Compensation Act (2005), Labour Organisation Law (2011), Minimum Wages Law (2013), Payment of Wages Law (2016), Leaves and Holidays Act (1951), Social Security Law (2012), and Law Protecting Ethnic Right (2015). It will also refer to the World Bank's IFC Performance Standard 2: Labour and Working Conditions (IFC, 2012).

8.4.2.3 Implementation Schedule

The SSHEMP will be implemented during the construction and operation phases of the Project.

8.4.2.4 Management Actions

The following will be implemented for occupational health and safety generated from the construction and/or operation phases of the Project. These have been respectively extracted from **Table 1-5**, **Table 8-5** and **Table 8-6** for construction, operation, and unplanned activities and are summarised below:

- The project will comply with Myanmar labour laws and EQEG standards;
- All staff will have medical check-ups prior to commencing work, where required;
- Create and implement an environmental management system for the project. It will include mandatory health and safety training courses for all workers and contractors, including handling of hazardous material. This training will take place prior to work starting on operation. Training course attendance will be recorded and monitored by the Project. The plan shall be issued and approved prior to start any construction activity;
- Provide workers with the required and appropriate personal protective equipment (PPE) such as eye protection, work gloves and protective boots to undertake site activities;

- The Project will develop and implement a Safety, Security, Health and Environmental Management Plan which will be a subset of the overall EMP system, tailored to the needs of the project. This plan will set standards that will be met by all contractors and subcontractors;
- Monitoring, recording and reporting of Health, Safety and Environmental (HSE) matters as per good international industry practice shall be done on a monthly basis;
- Ensure activities are supervised by trained personnel;
- Suitable training is required for all employees who work at height. Employees should be trained in working on different pieces of equipment and surfaces, such as how to work safely on scaffolding, ladders, and roofs;
- Minimise the consequences of a fall when applicable, for example by providing a safety net;
- Avoid working at height where possible. (e.g., assemblage on ground level);
- Provide walkways that are clearly designated as walkways, having good conditions underfoot, and being well lit;
- Implement good housekeeping practice as such keeping work and storage areas tidy and designating specific areas for waste collection;
- Cordless tools should be used where possible. If this is not possible, cables should be run at high levels;
- If a surface is slippery with mud, it should be treated with stone. Any areas that are slippery should be signposted, and footwear with a good grip should be worn;
- Construction workers should be given appropriate protection when using vibrating tools, and equipment should be well maintained;
- Where duties involve manual handling, adequate training must be provided;
- Consider the kind of support that is best suited for the trench, ensure the trench is fully secure and regularly inspect the trench both before and during the work shift;
- Reversing movements of vehicles and mobile plant should be minimized by providing, where possible, drive through circulation routes. Where reversing is unavoidable, turning heads should be provided and banksmen should be deployed to guide reversing vehicles and plant where necessary; and steps should be taken to ensure that banksmen wear high-visibility safety vests and use walkie-talkie or similar equipment for effective communication;
- Safety reversing devices such as reversing video device (RVD), cross view mirror, parking sensor, and reversing alarm and warning light shall be used when applicable;
- Ensure height and stock pile location are in line with good international industry practices;
- Ensure excavation of trenches are undertaken as per good international industry practices;
- Ensure loading and unloading of material is undertaken as per good international industry practices;
- The Project will prepare and implement Risk Assessment Procedure in order to identify and mitigate any potential impact during the construction and operation phases; and
- Waste will be segregated on site and only the recyclable wastes will be transferred to designated waste collection points while non-recyclable and hazardous wastes will be handed over to an authorised waste collector.

8.4.2.5 *Monitoring Plans*

No additional monitoring is proposed for the management plan. However, any non-compliances with the management actions will be recorded.

8.4.2.6 *Projected Budgets and Responsibilities*

No cost is included in the overall budget of the EMP.

8.4.3 *Emergency Response Plan*

8.4.3.1 *Objectives*

The objective of the Emergency Response Plan (ERP) is to provide details of the response to all environmental incidents, which may occur during the project lifecycle. The procedure shall be relevant to the project phase and details the required responses to different environmental incidents including:

- Preparedness and planning for emergencies;
- Employee responsibilities;
- Emergency response procedures;
- Communication plan;
- Medical emergencies including medevac procedures;
- Natural disasters (e.g. flood, cyclone, earthquakes) related emergencies;
- Fire and electrical related emergencies; and
- Any other emergency response plan required by the Republic of the Union of Myanmar authorities.
- This Environmental Incident Procedure covers the following types of incidents:
 - Explosion / Fire;
 - Release of Excessive Dust/Bulk Powders;
 - Generation of Excessive Noise; and
 - Disturbance to habitat or notable species.

8.4.3.2 *Legal Requirements*

The ERP will align with Myanmar Fire Force Law (2015), Motor Vehicle Law (2015), Public Health Law (1972), The Workmen Compensation Act (2005), Social Security Law (2012) (Table 3.1) and World Bank's IFC Performance Standard 2: Labour and Working Conditions (IFC, 2012).

8.4.3.3 *Implementation Schedule*

The ERP will be implemented during the construction and operation phases of the Project

8.4.3.4 *Management Actions*

The following emergency response actions will be implemented during construction and/or operational phases. These have been respectively extracted from **Table 1-5**, **Table 8-5** and **Table 8-6** for construction, operation, and unplanned activities and are summarised below:

- Inform workers of sensitive traffic areas, e.g., location of schools, shrines, temples, mosques, health clinics, hospitals etc. Reduce speed limits for these areas;
- Avoid haulage tasks during peak traffic periods and school drop-off and pick-up times;
- Maintain pedestrian access wherever possible, including access to any settlements and other facilities;
- Notify the local communities about proposed changes to local traffic access due to construction/maintenance activities and providing clear signage of changed traffic conditions;
- Use only licensed and experienced drivers and transport companies;

- Implement “No Night Driving Policy” (10pm-7am; and 10pm-10am for public holidays) for construction vehicles (during construction phase) when possible;
- All Project vehicles shall use designated roads only, and avoid traveling off roads;
- Maintain pedestrian access wherever possible, including access to any settlements and other facilities;
- Maintenance and refuelling of equipment and vehicles should be carried out in designated areas on hardstand to prevent seepage of any spillages to ground. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hard standing;
- Use of spill control kits to contain and clean small spills and leaks. Spill control kits should be available on site at all time;
- Store chemicals, fuel, oil and hazardous waste in adequately bunded impervious areas, as per good international industry practices in order to minimise the potential for damage or contamination of materials;
- Implement a training program to familiarise staff with emergency procedures and best practices;
- Oils, fuels and chemicals should only be used and stored in designated areas, which have pollution prevention facilities. The bund should be drained of rainwater after a rain event;
- The oil contaminated water will be collected and handled by local licensed waste water sub-contractors (if available, to be determined at the later stage);
- On site oil-water separators and holding facilities should be installed to accommodate and unanticipated releases of oily water;
- Proper guidelines and procedures should be developed for immediate clean-up actions following any spillages of oil, fuel or chemicals;
- Standard operating procedures (SOPs) will be prepared to manage any chemical spills, leaks and/or seepages. SOPs will cover transport, handling, storage, use and disposal of chemicals. Operating personnel will be trained on the SOPs and monitored in their use on a daily basis;
- Surface run-off from bunded areas should pass through oil/water separators prior to discharge to the storm water system; and
- All employees will have the appropriate training, qualification and certification to undertake the tasks required during the construction and maintenance of the bridges.
- Install bund/ dike around chemical storage area to contain the chemicals in case of chemicals in case of leakage or spill. The capacity of bund/ dike should be sufficient to contain 110% of the chemicals from the largest tank;
- Ensure that there is sufficient and appropriate spill response supplies in the Project Area;
- Do not store chemicals in unsuitable containers or containers made of incompatible material;
- Provide dedicated storage areas for construction materials to minimise the potential for damage or contamination of the materials;
- Waste storage areas will be equipped with secondary containment and spill control measures;
- Liquid wastes such as waste oil, etc. will be collected and stored for recycling in cemented areas;
- All drainage/tanks, etc. will be positioned on concrete hard standing to prevent any seepage into ground or surface water;
- Disposal sites to be designed for hazardous and non-hazardous waste, including sludge disposal;
- Hazardous waste storage areas will comply with good international industry practices;

- Keep a register for all hazardous substances on site and relevant Material Safety Data Sheets (MSDSs) readily accessible for reference;
- Store and handle all hazardous substances in accordance with their MSDS.
- Chemical storage areas will be sited on sealed areas and provided with locks to prevent unauthorized entry;
- Provide enough space to allow for inspection between waste containers so as to identify any leaks or spills;
- Prepare safety procedures for loading/ unloading of chemicals;
- When not in use, fuel plant / equipment must be stored in a sheltered place and on a protected ground;
- Provide training for local communities on the danger of explosion and fire;
- Provide instructions and procedures about safety precautions and emergency evacuations for local communities;
- Provide workers with helmets and other PPE such as eye protection, work gloves and protective boots. Ensure all staff wear appropriate PPE;
- Carry out emergency drills;
- Fuel tank area should be bunded and set up away from the construction site offices, labour camps and residential areas, as per good international industry practice.
- Provide medic, first aid kit and first aid room;
- Pre-communicate and coordinate with local firefighting brigade/station;
- Restrict smoking to controlled areas only;
- Conduct fire training and response drills;
- Apply for any applicable permit relating to the importation, transportation, storage and handling of explosives from the Myanmar Ministry of Energy and Myanmar Fire Services Department;
- Implement all required safety and management requirements relating to the transportation, storage and handling of explosives;
- Fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. Establishment of secondary containment for fuel storage and hazardous materials, which have pollution prevention facilities. The bund should be drained of rainwater after a rain event.
- Fire protection / fighting system will be installed; and
- Induction training for personnel is recommended to include a mandatory segment on fire safety and actions in the event of a fire.

8.4.3.5 Monitoring Plans

Any incidents and non-compliances with the management actions will be recorded and reported to MONREC.

8.4.3.6 Projected Budgets and Responsibilities

The cost of the management actions is included in the overall budget for the EMP.

8.4.4 Spill Prevention and Response Plan

8.4.4.1 Objectives

The objective of the Spill Prevention and Response Plan (SPRP) is to describe the spill preventative measures and spill response procedures.

8.4.4.2 Legal Requirements

The SRP will align with Environmental Conservation Law (2012), Environmental Conservation Rules (2014) and Environmental Impact Assessment Procedure (2015) (Table 3.1), and refer to the World Bank's IFC Performance Standard 3: Resource Efficiency and Pollution Prevention (IFC, 2012).

8.4.4.3 Implementation Schedule

The SPRP will be implemented during the construction and operation phases of the Project.

8.4.4.4 Management Actions

The following will be implemented in spill prevention during construction and/or operational phases. These have been respectively extracted from **Table 1-5**, **Table 8-5** and **Table 8-6** for construction, operation, and unplanned activities and are summarised below:

- The Project will follow the Petroleum Products Regulatory Department (PPRD)'s framework and regulation to prevent oil pollution;
- Transferring, maintenance and refuelling of equipment and vehicles should be carried out in designated areas on hardstand to prevent seepage of any spillages to ground and water. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hard standing;
- Use of spill control kits to contain and clean small spills and leaks. Spill control kits should be available on site at all time;
- Store chemicals, fuel, oil and hazardous waste in adequately bunded impervious areas, as per good international industry practices in order to minimise the potential for damage or contamination of materials;
- Implement a training program to familiarise staff with emergency procedures and best practices;
- Oils, fuels and chemicals should only be used and stored in designated areas, which have pollution prevention facilities. The bund should be drained of rainwater after a rain event;
- The oil contaminated water will be collected and treated through oily water separator. Oily wastewater separator is designed to treat the oily water from the tank farms and loading bays. The treated water will drain to public drains near the Project Site after treatment to meet the EQEQ standards;
- Proper guidelines and procedures should be developed for immediate clean-up actions following any spillages of oil, fuel or chemicals;
- Standard operating procedures (SOPs) will be prepared to manage any chemical spills, leaks and/or seepages. SOPs will cover transport, handling, storage, use and disposal of chemicals. Operating personnel will be trained on the SOPs and monitored in their use on a daily basis;
- Storm water, industrial wastewater, sewage water and surface run-off will be collected and treated prior to discharge. Drains from all equipment containment drainage, spills, floor wash downs and fire protection discharges will be led to oil-water separator;
- Sanitary wastewater will be treated by a package of sewage treatment units;

- All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly;
- All employees will have the appropriate training, qualification and certification to undertake the tasks required during the construction and operation phases.
- The Project will prepare and implement **Risk Assessment Procedure** in order to identify and mitigate any potential impact during the construction and operation phases;
- A **Spill Prevention and Response Plan** will be developed and implemented for the construction and operational phases of the Project.
- Development of an **Emergency Response Plan** for spills and leakages. Procedures for response to chemical spills will be included in the emergency response plan. This will include locations of spill containment and recovery equipment
- A detailed **Operational Waste Management Plan** (WMP) with types, volumes and disposal of wastes identified will be developed;
- Install bund/ dike around chemical storage area to contain the chemicals in case of chemicals in case of leakage or spill. The capacity of bund/ dike should be sufficient to contain 110% of the chemicals from the largest tank;
- Ensure that there is sufficient and appropriate spill response supplies in the Project Site;
- Do not store chemicals in unsuitable containers or containers made of incompatible material;
- Provide dedicated storage areas for construction materials to minimise the potential for damage or contamination of the materials;
- Waste storage areas will be equipped with secondary containment and spill control measures;
- Liquid wastes such as waste oil, etc. will be collected and stored for recycling in cemented areas;
- All drainage/tanks, etc. will be positioned on concrete hard standing to prevent any seepage into ground or surface water;
- Disposal sites to be designed for hazardous and non-hazardous waste, including sludge disposal;
- Hazardous waste storage areas will comply with good international industry practices;
- Keep a register for all hazardous substances on site and relevant Material Safety Data Sheets (MSDSs) readily accessible for reference;
- Store and handle all hazardous substances in accordance with their MSDS;
- Chemical storage areas will be sited on sealed areas and provided with locks to prevent unauthorized entry;
- Provide enough space to allow for inspection between waste containers so as to identify any leaks or spills; and
- Prepare safety procedures for loading/ unloading of petroleum and LPG.

8.4.4.5 Monitoring Plans

Any incidents and non-compliances with the management actions will be recorded and reported to MONREC. As part the EIA Procedure, any spills will be reported to ECD.

8.4.4.6 Projected Budgets and Responsibilities

The cost of the management actions is included in the overall budget for the EMP.

8.4.5 Stakeholder Engagement Plan

8.4.5.1 Objectives

A Stakeholder Engagement Plan (SEP) is required to guide all the consultations and stakeholder interactions proposed during the Project; throughout the Project phase activities. Hence the objectives of this SEP are to:

- Support and contribute to the impact assessment process building the developer's understanding of the local context to inform future engagement and grievance processes;
- Inform stakeholders about the Developer and project activities and start building longer term relationships as a platform for future development; and
- Document the rationale for the approach to stakeholder engagement activity in support of a transparent approach to operating in a highly sensitive human rights context.

8.4.5.2 Legal Requirements

The SEP will align with the requirements of the EIA Procedure (2015) as well as good international practises (such as IFC EHS).

8.4.5.3 Tentative Implementation Schedule

The SEP will be implemented during the construction and operation phase of the project, particularly disclosing biannually information related to monitoring, any incompliance and corrective actions taken over previous periods and any significant change in operation and processes of the Project.

Apart from the scheduled engagement, BE will do additional engagements responding to the situation demands in order to build a rapport with community and have social support on the Project.

8.4.5.4 Management Actions

BE will comply with the following actions during the construction and/or operation phases of the Project. These have been respectively extracted from **Table 1-5**, **Table 8-5** and **Table 8-6** for construction, operation, and unplanned activities and are summarised below:

- Engagement will be guided by the detailed procedure and principles mentioned in Section 9.
- Great care will be taken in order to make sure that the engagement is a two-way dialogue which involve informing, listening and seeking inputs, as well as sharing and exchanging views.
- Engagement will encourage all relevant stakeholders have the voices to express their concerns and opinions towards the Project and related impacts on them but must be free of intimidation and coercion.
- BE will make arrangement to make sure that the vulnerable people, particularly disable, elderly, women and marginalized people have the opportunity to raise their voices and concerns regarding to the Project and BE make efforts to integrate these into management actions depending on the level of risks and probabilities.
- Conduct further disclosure of Project information and EIA Report, including opportunities to provide feedback;
- Engagement with relevant regional officials/authorities and government organizations on the outcomes of the EIA; and
- Ongoing communications with interested and potentially affected stakeholders during the construction and operation. While impacts on local communities, ongoing project information will be provided to local areas.

8.4.5.5 *Monitoring Plans*

The social team of BE will implement a supervision procedure to follow-up the progress of the management actions detailed in the SEP. The results of the SEP implementation should be recorded in a monthly report and submitted to the senior management.

8.4.5.6 *Projected Budgets and Responsibilities*

The cost is included in the overall budget for the EMP.

8.4.6 *Environmental Monitoring Plan*

Environmental monitoring will be conducted by a registered third party environmental consultant to ensure compliance with regulatory requirements as well as to evaluate the effectiveness of operational controls and other measures intended to mitigate potential impacts.

The Project Administrator shall be responsible to notify and identify in writing to MONREC any breaches of its obligations or other performance failures or violations of the ECC and the EMP as soon as reasonably possible. In respect of any breach that would have a serious impact or where the urgent attention of the MONREC is or may be required, within not later than 24 hours, and in all other cases within seven days of Project Administrator becoming aware of such incident.

The Environmental Monitoring Report will be submitted to the ECD every six months during the construction and operational phases to report monitoring findings and environmental and performance of the Project. The monitoring reports will include the followings:

- Documentation of compliance with all conditions;
- Progress made to date on implementation of the EMP against the submitted implantation 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 propose 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 Environmental Monitoring Plan is summarised in **Table 1-5**, **Table 8-5** and **Table 8-6** for the Pre-Construction, Construction and Operational Phases, respectively. The reporting requirements as per the EIA Procedure are provided in Table 8-7.

Table 8-5 Monitoring Programme for the Project (Construction Phase)

Environmental Aspect	Rationale for Monitoring Requirement	Number of Monitoring Locations	Selection of Monitoring Locations	Monitoring Methodology	Monitoring Parameters	Monitoring Standards for Comparison	Monitoring Frequency	Monitoring Duration (over Project Lifecycle)	Responsibility
Air Quality	This data will be used to assess the compliance of the Project with the relevant standards.	Four (4)	Sensitive receptors will be selected (households, schools, monasteries, etc.) within 350 m of the Project Area, labour camps, and auxiliary infrastructure. The selection will be based on the final Project design prior to Construction commencing.	As per Section 5.3.1.3 of the EIA Report	SOx, NOx, PM _{2.5} , PM ₁₀ and ozone	EQEG (General; Section 1.1)	Continuous monitoring over a 72 hour period and on a monthly basis.	The frequency of monitoring will be re-assessed after an initial six monthly period. If there are exceedances, the sampling should be repeated monthly for a three month period. The monitoring frequency will be reduced to three-monthly intervals during operation if no non-compliances for three months in a row.	BE
Noise	This data will be used to assess the compliance of the Project with the relevant standards.	Four (4)	Sensitive receptors will be selected (households, schools, monasteries, etc.) within 500 m of the Project Area, labour camps, and auxiliary infrastructure. The selection will be based on the final Project design prior to Construction commencing.	As per Section 5.3.1.3 of the EIA Report	The noise level will be measured in terms of the A-weighted equivalent continuous sound pressure level (Leq)	EQEG (General; Section 1.3) and Baseline data collected pre-construction	Continuous monitoring over a 48 hour period and on a monthly basis.	The frequency of monitoring will be re-assessed after an initial six monthly period. If there are exceedances, the sampling should be repeated monthly for a three month period. The monitoring frequency will be reduced to three-monthly intervals during operation if no non-compliances for three months in a row.	BE
Surface Water	This data will be used to assess the compliance of the Project with the relevant standards.	Three (3)	Locations will be identified 100 m upstream and downstream of any work activity affecting nearby natural creek, lake, stream, or pond (i.e., within 100 m of the site). The selection will be based on the final Project design prior to Construction commencing.	As per Section 5.3.1.3 of the EIA Report	pH, Total Suspended Solid, Total Cyanide, Ammonia, Nitrite, Nitrate, Reactive Phosphorus, Oil & Grease, Chemical Oxygen Demand, Biochemical Oxygen Demand, Phenols, Arsenic, Cadmium, Chromium, Copper, Mercury, Faecal Coliforms	EQEG (General; Section 1.2 for site-run off) and Baseline data collected pre-construction	Once a month	The frequency of monitoring will be re-assessed after an initial six monthly period. If there are exceedances, the sampling should be repeated monthly for a three month period. The monitoring frequency will be reduced to three-monthly intervals during operation if no non-compliances for three months in a row.	BE
Groundwater	This data will be used to assess the compliance of the Project with the relevant standards.	Four (4)	At wells located within 100 m of Project Area (including site office, workers' camp and Asphalt Concrete batching plant). The selection will be based on the final Project design prior to Construction commencing.	As per Section 5.3.1.3 of the EIA Report		EQEG (Sector Specific for Site Run-off and Effluent Discharges) and Baseline data collected pre-construction	Once a month	The frequency of monitoring will be re-assessed after an initial six monthly period. If there are exceedances, the sampling should be repeated monthly for a three month period. The monitoring frequency will be reduced to three-monthly	BE

Environmental Aspect	Rationale for Monitoring Requirement	Number of Monitoring Locations	Selection of Monitoring Locations	Monitoring Methodology	Monitoring Parameters	Monitoring Standards for Comparison	Monitoring Frequency	Monitoring Duration (over Project Lifecycle)	Responsibility
								intervals during operation if no non-compliances for three months in a row.	
Soil	This data will be used to assess the compliance of the Project with the relevant standards.	Four (4)	Locations within the footprint of the Project will be selected. The selection will be based on the final Project design prior to Construction commencing.	As per Section 5.3.1.3 of the EIA Report	pH, Iron (Fe), Cadmium (Cd), Lead (Pb), Zinc (Zn), Copper (Cu), moisture content	Baseline data collected pre-construction	Once a month	The frequency of monitoring will be re-assessed after an initial six monthly period. If there are exceedances, the sampling should be repeated monthly for a three month period. The monitoring frequency will be reduced to three-monthly intervals during operation if no non-compliances for three months in a row.	BE
Hazardous and Non-hazardous waste	This data will be used to assess the compliance of the Project with the relevant standards.	-	Waste storage / discharge / disposal areas	-	Daily waste logs including quantities and types of waste and discharge routes	Waste Management Legislation (such as Conservation of Water Resources and Rivers Law (2006), and Yangon City Development Committee Law (2014))	Throughout Construction Phase	Waste to be recorded monthly	BE
Audit of Mitigation and Management Measures	This data will be used to assess the compliance of the Project with the relevant standards.	-	Project Area	-	Conduct Audit of management measures implementation.	N/A	Monthly HSE Audit	Monthly	BE
Occupational Health and Safety	This data will be used to assess the compliance of the Project with the relevant standards.	-	Project Area	-	Record accidents or near misses generated during construction by identifying cause(s) and severity of impact(s), as well as operated mitigation measures; and Conduct summary report for accident investigation.	Occupational Health and Safety Law (2019)	Daily HSE inspections and recording incidents as required	As required	BE
Social	This data will be used to assess the compliance of the Project with the relevant standards.	-	Project Area and Area of Influence	-	Record complaint; Monitor, investigate and implement suitable solutions.	N/A	As required	As required	BE

Environmental Aspect	Rationale for Monitoring Requirement	Number of Monitoring Locations	Selection of Monitoring Locations	Monitoring Methodology	Monitoring Parameters	Monitoring Standards for Comparison	Monitoring Frequency	Monitoring Duration (over Project Lifecycle)	Responsibility
Environmental breaches	This data will be used to assess the compliance of the Project with the relevant standards.	-	Project Area and Area of Influence	-	Record of all spills / leaks / accidental emissions, etc., from the Project	Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental Impact Assessment Procedure (2015),	As required	As required	BE

Table 8-6 Monitoring Programme for the Project (Operational Phase)

Environmental Aspect	Rationale for Monitoring Requirement	Number of Monitoring Locations	Selection of Monitoring Locations	Monitoring Methodology	Monitoring Parameters	Monitoring Standards for Comparison	Monitoring Frequency	Monitoring Duration (over Project Lifecycle)	Responsibility
Hazardous and Non-hazardous waste	This data will be used to assess the compliance of the Project with the relevant standards.	-	Waste storage / discharge / disposal areas	-	Daily waste logs including quantities and types of waste and discharge routes	Waste Management Legislation (such as Conservation of Water Resources and Rivers Law (2006), and Yangon City Development Committee Law (2014))	Throughout Operation Phase	Waste to be recorded daily / weekly	BE
Audit of Mitigation and Management Measures	This data will be used to assess the compliance of the Project with the relevant standards.	-	Project Area	-	Conduct Audit of management measures implementation.	N/A	Monthly HSE Audit	Monthly	BE
Occupational Health and Safety	This data will be used to assess the compliance of the Project with the relevant standards.	-	Project Area	-	Record accidents or near misses generated during construction by identifying cause(s) and severity of impact(s), as well as operated mitigation measures; and Conduct summary report for accident investigation.	Occupational Health and Safety Law (2019)	Daily HSE inspections and recording incidents as required	As required	BE
Social	This data will be used to assess the compliance of the Project with the relevant standards.	-	Project Area and Area of Influence	-	Record complaint; Monitor, investigate and implement suitable solutions.	N/A	As required	As required	BE
Environmental breaches	This data will be used to assess the compliance of the Project with the relevant standards.	-	Project Area and Area of Influence	-	Record of all spills / leaks / accidental emissions, etc., from the Project	Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental Impact Assessment Procedure (2015),	As required	As required	BE

Table 8-7 Reporting Requirements to Myanmar Authorities (as per EIA Procedure)

Report	Requirements	Frequency	Reference
Monitoring Report	<p>The Project Proponent shall submit monitoring reports to the Ministry not less frequently than every six (6) months, as provided in a schedule in the EMP, or periodically as prescribed by the Ministry.</p> <p>The monitoring reports shall include:</p> <ul style="list-style-type: none"> a) documentation of compliance with all conditions; b) progress made to date on implementation of the EMP against the submitted implementation schedule; c) difficulties encountered in implementing the EMP and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar future difficulties; d) number and type of non-compliance with the EMP and proposed remedial measures and timelines for completion of remediation; e) accidents or incidents relating to the occupational and community health and safety, and the environment; and f) monitoring data of environmental parameters and conditions as committed in the EMP or otherwise required. 	Every 6 months	EIA Procedure, Article 108 and 109
Report in Case of Breach of ECC or EMP	<p>The Project Proponent shall notify and identify in writing to the Ministry any breaches of its obligations or other performance failures or violations of the ECC and the EMP as soon as reasonably possible.</p>	<p>In case of any, breach which would have a serious impact or where the urgent attention of the Ministry is or may be required, within not later than twenty-four (24) hours of Proponent becoming aware of such incident.</p> <p>In all other cases: within seven (7) days of Proponent becoming aware of such incident.</p>	EIA Procedure, Article 107
Report of Any Accident or Incident	<p>The Project Proponent shall notify and identify in writing to the Ministry any breaches of its obligations or other performance failures or violations of the ECC and the EMP as soon as reasonably possible.</p> <p>The monitoring reports shall include:</p> <ul style="list-style-type: none"> e) accidents or incidents relating to the occupational and community health and safety, and the environment. 	<p>In case of any, breach which would have a serious impact or where the urgent attention of the Ministry is or may be required, within no later than twenty-four (24) hours of</p>	EIA Procedure, Article 107 and 109

Report	Requirements	Frequency	Reference
		Proponent becoming aware of such incident. In all other cases: within seven (7) days of Proponent becoming aware of such incident. Every 6 months	
Additional Reporting Requirements as per ECC	The Ministry may prescribe conditions in the ECC. Such conditions may include additional reporting requirements, such as: <ul style="list-style-type: none"> ■ General management: (i) procedures and management systems to identify, control, prevent or minimize all Adverse Impacts; (ii) procedures to ensure compliance with all environmental and social commitments; (iii) procedures to implement the measures described in the EMP, Construction Phase EMP, and/or Operational Phase EMP, as the case may be; (iv) procedures to improve the environmental and social performance of the Project; (v) organization with qualified environmental and social personnel; and (vi) documentation, reporting and information disclosure procedures; ■ Emissions: (i) Emissions not allowed, (ii) Emission Limit Values in terms of types, substances, loads, concentrations, rates, timing, duration, frequency, seasons, and Project phase, (iii) Emission points, (iv) form and media, (v) recipients, (vi) contribution to Environmental Quality Standards, and (vii) statistical methods for determining compliance; ■ Use of energy and natural resources: amounts, type, origin of resource, rates, effectiveness of use, and waste generation; ■ Pollution Prevention: Effectiveness of production or construction methods or waste storage and treatment facilities to prevent or, where this is not practicable, to minimize pollution, and to prevent or minimize the risk of pollution; ■ Nature conservation and management: (i) protection and rehabilitation of sites, environments or species, (ii) effectiveness of environmental measures to prevent or minimize Adverse Impacts on certain environments or species; and (iii) biodiversity offsets; ■ Cultural resources: (i) protection of cultural heritage sites, structures and objects, and (ii) procedures for dealing with archaeological finds; ■ Hazardous or toxic materials including waste: (i) limits to the types, categories, and amounts; and (ii) methods and systems of collection, storage, handling, transport, treatment and disposal; ■ Waste management: (i) limits to the types, categories, and amounts of waste (liquid, solid, atmospheric) generated; (ii) methods and systems of collection, storage, handling, transport, treatment and disposal; and (iii) recycling or reuse of wastes; 	As per conditions of ECC	EIA Procedure, Article 91

Report	Requirements	Frequency	Reference
	<ul style="list-style-type: none"> ■ Transport and access: (i) access points; (ii) means of transport of materials and people to and from the Project; (iii) transport routes for products, materials or waste; and (iv) access control measures; ■ Decommissioning, rehabilitation, clean up and closure: (i) sites, areas/ environments and facilities; (ii) objectives and standards; (iii) site conditions and after use; (iv) timing; and (v) controls and monitoring; ■ Control measures: (i) prevention of accidents and responses to emergency conditions; (ii) measures and procedures in case of accidents, incidents, and operational irregularities; (iii) control and maintenance of pollution prevention/ minimization measures; and (iv) safety zones; ■ Monitoring: (i) parameters; (ii) methods; (iii) sampling and analyses; (iv) point of monitoring; (v) frequency; (vi) timing; (vii) data management; (viii) maintenance and control of monitoring equipment; and (ix) documentation and reporting; ■ Documentation and reporting: (i) parameters and issues that must be documented and reported; (ii) types and methods; (iii) frequency and timing; (iv) quality controls; and (v) recipients; ■ Financial guarantee: (i) type of guarantee; (ii) amount; (iii) timing; (iv) application; and (v) type and financial capacity of guarantor; ■ Funding of inspection by the Ministry: (i) amounts; (ii) payment procedure; and (iii) timing and frequency; and ■ Contributions to the Environmental Management Fund in accordance with Article 30 of the Rules: (i) pollution charges (emissions, waste), and (ii) charges on the use of natural resources and benefits from ecosystem services 		

9 PUBLIC CONSULTATION AND DISCLOSURE

Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation is not allowed intinally. Public consultation and primary socio-economic data collection for EIA investigation will be conducted after situation allowed in order to have better participation by stakeholders, including land owner and land users affected by land acquisition of the Project. The EIA Report will be updated once the public consultation and primary socio-economic data collection for EIA investigation is done.

The following approach and procedure will be carried out as the guiding principles when doing public consultation at later stage.

9.1 Methodology and Approach

9.1.1 Purpose of the Consultation

The specific objectives for stakeholder engagement are to:

- Inform relevant stakeholders about the project and its planned Project activities;
- Identify stakeholders and communities potentially affected by Project activities;
- Gather baseline information on the social and biological environment; and
- Engage with potentially affected groups to understand potential Project impacts, perceptions and concerns, and discuss appropriate mitigation measures.

9.1.2 Stakeholder Engagement Principles

The following principles have been identified for driving and guiding the stakeholder engagement activities:

- The engagement strategy has been designed and implemented in a manner that is appropriate and cognisant of the specific economic, social, and cultural context of Myanmar, and specifically Yangon Region;
- Information disclosure has been weighed risks and benefits. Considerations for non-disclosure have been weighed against the need for transparency and stakeholder groups to be informed;
- Engagement will be a two-way dialogue which involve informing, listening and seeking inputs, as well as sharing and exchanging views;
- Engagement will be free of intimidation and coercion;
- The Project will make ensure that it appropriately provides updates to potentially affected and relevant stakeholders. The frequency of these updates will also commensurate to Project risks and any changes to the Project; and
- The Project will provide a feedback / grievance mechanism and opportunities to incorporate received feedback into the Project. The feedback/grievance mechanism will be disclosed to impacted stakeholders.

In summary, the main principles are:

- Inclusive: The consultations will be organised to ensure representation of potentially affected and interested stakeholders;
- Sharing of information: At the township and village level consultations, special emphasis will be given to build community level understanding of the Project and all the information are provided in Myanmar language; and

- Participatory: Stakeholders are encouraged to participate in the consultations and are always given the opportunity to ask questions.

9.1.3 Identification of Relevant Stakeholders and Potential Issues

The process of identifying potentially affected stakeholders has started with scoping which was conducted to identify relevant issues and select the townships and villages potentially impacted. The scoping exercise involved both desk-based and preliminary consultation with a number of stakeholders including government authorities.

ERM's previous experience of stakeholder engagement in the Region was utilised to inform the stakeholder selection. This information is based on discussions with General Administrative Department (GAD) representatives as well as previous project experience.

Stakeholder engagement is an ongoing process and as such new stakeholders may emerge as the Project progresses. If an additional stakeholder engagement activity is to be undertaken for the Project, BE will inform all the stakeholders.

Information on the Project will be disclosed on BE's website (<https://brighterenergy.com/news-press-releases/>) and via GADs in Kyauktan, Dala and Kawhmu townships when situation allows. This will include phone numbers to receive feedbacks from the stakeholders, community and the public.

9.1.3.1 National Authorities

This group of stakeholders include relevant ministries and governmental departments who regulate the Project. The authorities, which are likely to have the maximum influence on the Project, include the following:

- Ministry of Electricity and Energy (MOEE);
- Ministry of Agriculture, Livestock and Irrigation (MOALI);
- Ministry of Industry;
- Ministry of Transport and Communication;
- Ministry of Construction;
- Ministry of Planning, Finance and Industry;
- Ministry of Natural Resources and Environmental Conservation (MONREC);
- Directorate of Water Resources and Improvement of River Systems (DWIR);
- Environmental Conservation Department (ECD);
- Petroleum Products Regulatory Department (PPRD);
- Myanmar Port Authority (MPA); and
- Myanmar Investment Commission (MIC).

Engagement with the national authorities is expected to fulfil the following objectives:

- Seek clarity on the expectations on stakeholder engagement and disclosure;
- Get necessary permission to engage with government departments at different levels as well as to hold consultations in the Project Area of Influence; and
- Get access to useful data from national as well as regional offices.

9.1.3.2 Regional and Local Authorities

These stakeholder groups are defined as those agencies of the government, at the regional and district levels, who have the power to regulate or otherwise influence the Project. Their influence includes;

establishing policy, granting permits and approvals for the Project, monitoring and enforcing compliance with the applicable rules and regulations, and making available the necessary infrastructure and resources for the Project. These departments are also storehouses of relevant information both for the impact assessment as well as to help implement management plans.

Engagement with the regional authorities is expected to fulfil the following needs:

- Seek expectations on stakeholder engagement and disclosure;
- Get necessary permission to engage with regional government departments as well as hold consultations in the Project Area of Influence;
- Provide introductory letters to meet various regional/local government departments and agencies;
- Obtain regional level data and information; and
- Get specific contacts of people to meet in the region, as well as necessary instructions

Engagement with the local level administration is aimed at the following:

- Obtain necessary local permissions for meetings;
- Seek an understanding of the specific issues and stakeholder concerns at the local level. For example, information on any important development or conflict could be important intelligence to obtain;
- Obtain district and township level social and environmental data;
- Provide introductions to key people at the township and village tract level;
- Provide introductions to representatives of the administration to join; and observe the consultation process; and
- Provide guidance on local security do's and don'ts.

Some of the key authorities at the regional and local level include the following:

- Yangon Regional Government (YRG);
- Yangon City Development Committee (YCDC);
- District and Township General Administration Department (GAD);
- Regional Petroleum Products Regulatory Department (PPRD);
- Regional Environmental Conservation Department;
- Regional Members of Parliament;
- Thilawa SEZ Management Committee;
- Myanmar Port Authority;
- Regional Directorate of Water Resources and Improvement of River Systems;
- Directorate of Industrial Supervision & Inspection;
- Department of Fisheries;
- Department of Land Registration and Statistics;
- Department of Rural Development; and
- Department of Public Health.

9.1.3.3 *Projected Affected Communities and Individuals*

This group includes people who may be directly or indirectly affected by the Project's presence and activities and their representatives (leaders and other influential people).

This group includes (but not be limited to) the following:

- Ward Leaders;
- Village Tract Leaders;
- Village Leaders;
- Civil Society Organizations (CSOs), Non-Governmental Organizations (NGOs) and
- Vulnerable groups, including but not limited to subsistence farmers, fishers, migrant workers, minority communities, and women.

Following the same procedure during Scoping Stage, the various stakeholder groups will be engaged directly as well as through their representatives, including traditional leaders, elected representatives, opinion leaders, and other influential entities. In addition, the Project will consulted specifically with people representing potentially vulnerable or marginalised groups such as women, young people, landless people, the sick and disabled, and, potentially, ethnic minorities.

Previously, ERM had undertaken previous stakeholder consultations as part of the EIA Study for various projects in Yangon Region. The three townships located near the Project are identified in the Project Area of Influence: Kyauktan, Kawhmu and Dala Townships. The corresponding village tract / villages of these three townships were then selected for engagement based on potential interaction with the Project’s activities. The proposed village level engagement was confirmed, and therefore was revised, with local stakeholders during the scoping engagement and with MONREC.

A list of the relevant townships and villages for the stakeholder consultation during EIA investigation stage is presented in Table 9-1 with their location shown in Figure 9.1.

Table 9-1 List of Townships and Villages Engaged for the Project

Township / Village	Included in Engagement and Rationale
Kyauktan Township	Yes, this is required to inform the township and villages as the Project will be located in Kyauktan Township.
Kawhmu Township	Yes, this is required to inform township and wards as the Project will be located on the opposite side of Yangon River.
Dala Township	Yes, this is required to inform the township and villages as some households do fishing in the River as their main source of income.
Thidar Myaing Ward, Kyauktan Township	Yes, this is required to inform and get their involvement in the engagement as the Project falls in the wards and acquire the land for the Project.
Tha Khut Pin and Sat Su Villages, Kawhmu Township	Yes, this is required to inform township and wards as the Project will be located on the opposite side of Yangon River and it was asked during Scoping to include these villages as some families do fishing in the River for their income.

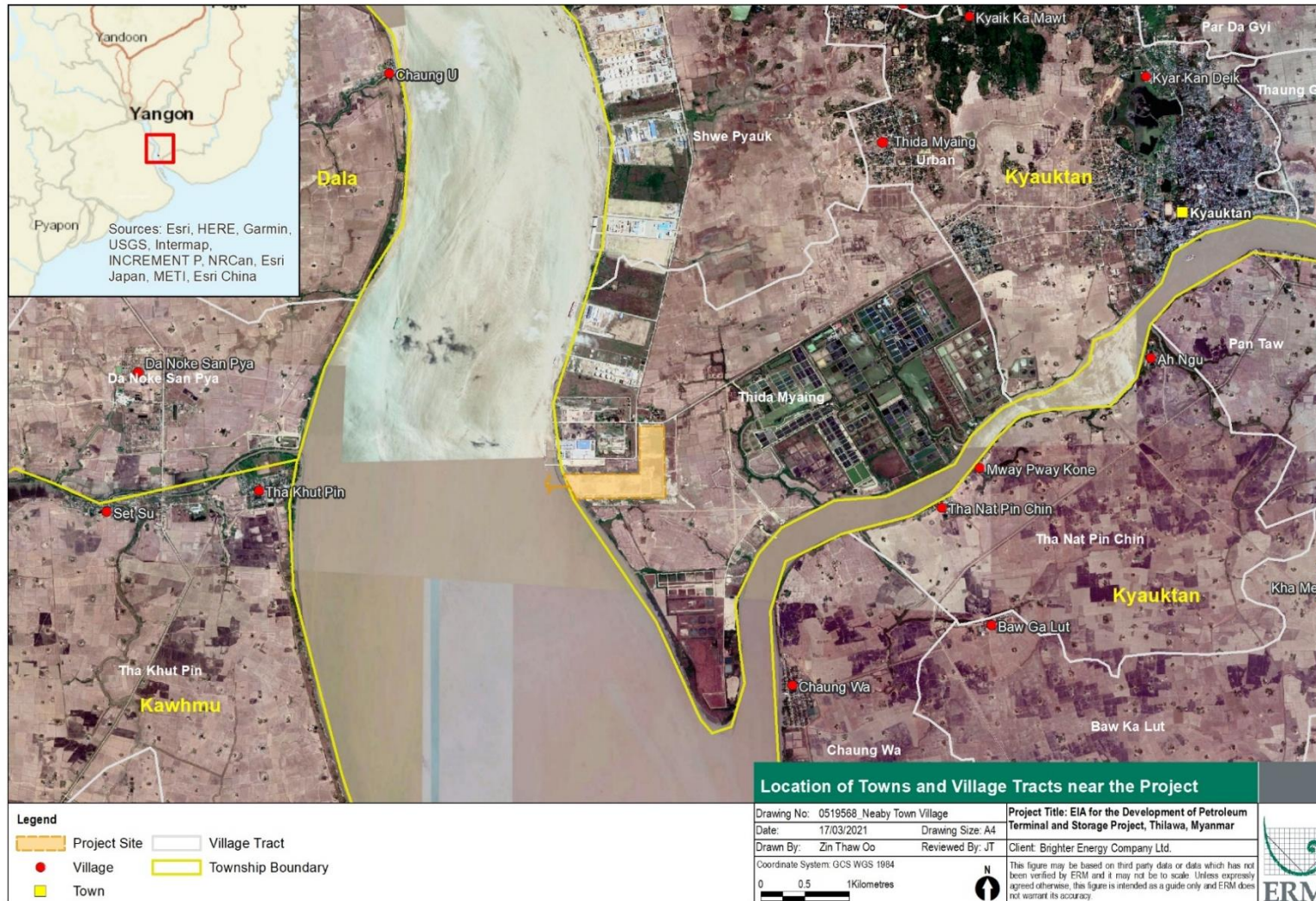


Figure 9.1 Location of Townships and Village Tracts near the Project

9.1.3.4 *NGOs and CSOs*

This group includes those who may have an interest in the Project and its social and environmental aspects and non-governmental organizations representing their interests. It includes members of the wider public in the state and region such as; civil society organizations professional associations, cultural groups, citizens' associations, environmental and social groups, and universities and other academic and research institutions undertaking work relevant to the Project. These groups may have views on the Project or information that will be useful for the assessment of Project impacts.

Some national/international NGOs/CSOs that have local presence in Yangon Region include:

- Myanmar Centre for Responsible Business (MCRB);
- World Wildlife Fund (WWF);
- Wildlife Conservation Society (WCS);
- Flora and Fauna International (FFI);
- Myanmar Green Network (MGN);
- Myanmar Alliance for Transparency and Accountability (MATA);
- Earth Rights International (ERI);
- EcoDev;
- International Commission of Jurists;
- Myanmar Environmental Rehabilitation-conservation Network (MERN);
- Myanmar Women Affairs Federation;
- Myanmar Maternal and Child Welfare Association;
- Youth Empowerment Association;
- Water, Research and Training Centre (WRTC);
- Water Mothers;
- Oxfam;
- Paung Ku;
- PLAN;
- Land Core Group;
- GRET; and
- Person with Disability Network.

9.1.3.5 *Media*

Usage of media and engagement is required during the EIA stage and for the purpose of disclosure and information dissemination.

9.1.3.6 *Project Partners and Contractors*

Other development investors may be active on the western part of Yangon River. This may lead to cumulative impacts from these project activities. Therefore, it is essential to liaise with other investors to reduce and mitigate potential cumulative impacts associated with other activities in the area.

9.1.4 Stakeholder Mapping Matrix

The matrix shown in Figure 9.2 has been used to map the stakeholders.

INTEREST	<p>HIGH</p> <ul style="list-style-type: none"> - Local CSOs; - Village Tract Leaders; - National and International NGOs; - Department of Land Registration and Statistics; - Directorate of Water Resources and Improvement of River Systems; - Directorate of Industrial Supervision & Inspection; and, - Department of Rural Development. <p style="text-align: right;"><i>Keep informed</i></p>	<ul style="list-style-type: none"> - Project Affected People; - Project Partners; - Yangon Regional Government; - Yangon City Development Committee; - Township Authorities; - Ministry of Natural Resources and Environmental Conservation; and - Regional Parliament Representatives. <p style="text-align: right;"><i>Engaged, managed closely</i></p>
	<p style="text-align: right;"><i>Monitor</i></p> <ul style="list-style-type: none"> - Media; and - Other Government Departments. <p>LOW</p>	<p style="text-align: right;"><i>Keep satisfied, engaged</i></p> <ul style="list-style-type: none"> - Ministry of Transport and Communication; - Ministry of Electricity & Energy; - Environmental Conservation Department (Yangon Regional representative); - Department of Petroleum Products Regulatory; and - Contractors retained for managing the social aspects of the Project. <p style="text-align: right;">HIGH</p>
	INFLUENCE	

Figure 9.2 Stakeholder Mapping Matrix

9.1.5 Key Engagement Activities

The stakeholder consultation meetings are structured as followed:

- Introduction and information disclosure: Introduce the Project Proponent, the EIA, the proposed stakeholder engagement process, the potential environmental and social impacts and mitigations to help the stakeholders understand the Project and the Project Proponent's intentions for engagement.
- Question and answer session for all stakeholders in the village tract and township meetings to raise concerns, comments or ask questions to which the Project Proponent can directly respond.
- Data collection: Collection of more in-depth information through household interviews with key stakeholder groups in the village tracts.

All information collected will be summarised and confirmed with stakeholders at the end of the discussions. Stakeholders will also be given time to share their concerns and views and any further clarifications they required at the end of the meetings. All queries raised by the stakeholders will be responded to, and noted to feed into the management and monitoring plans committed in the EIA report. The presentation and handout to be used in EIA public consultation are described in **Appendix G** and the questionnaires to be used to collect the socio-economic status of the Project area are provided in **Appendix H**.

9.1.6 Overall Approach and Scope

A stakeholder engagement will be conducted across administrative levels, subject to permissions of responsible authorities. Figure 9.3 provides an overview of the levels engaged including National Government, Regional and township and village tract levels.

Engagement, as specified in the Myanmar EIA Procedure, will be undertaken in two phases where Scoping Stage engagement was conducted in October, 2020 and EIA Stage engagement will be carried out as soon as the situation allows. A consultation team consisting of ERM and the BE representatives will hold meetings and consultations at the administrative levels and the village tract level. To ensure village level representation, a request will be made to the Township GAD offices and village tract leaders for the community and interested organizations from the potentially impacted villages to be present.

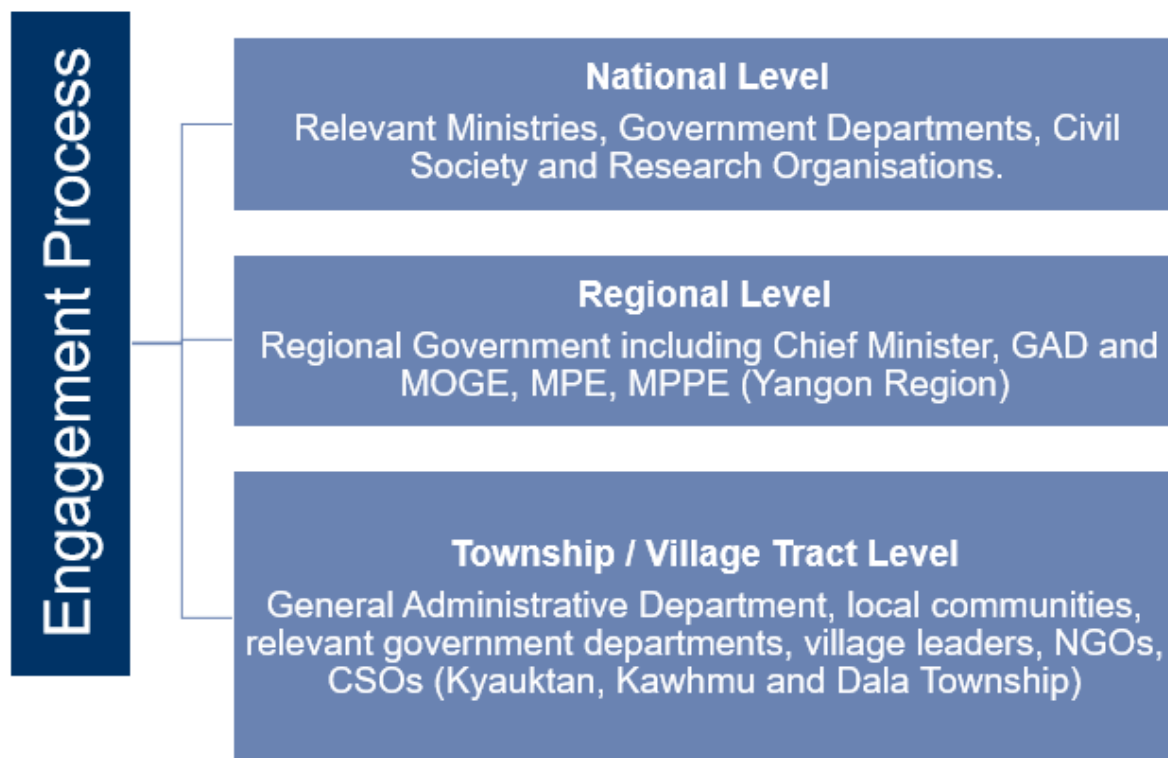


Figure 9.3 Engagement at Three Levels with Key Stakeholders

In keeping with the engagement tools identified and the profile of the stakeholder groups, the following schedule for engagement has planned for the present stage of EIA. It should be noted that the engagement would continue on an active basis through the life of the Project. The purpose of this would be to allow the most effective and appropriate methods to be employed for maintaining a two-way dialogue with the relevant stakeholders.

The engagement plan of the initial public consultation engagement is shown in Table 9-2.

Table 9-2 Initial Public Consultation Engagement Schedule

Level	Stakeholder Group	Purpose of Engagement	Key communication material & Method of Engagement
National	<ul style="list-style-type: none"> Ministry of Electricity and Energy (MOEE); Environmental Conservation Department (ECD); Ministry of Natural Resources and Environmental Conservation (MONREC); Ministry of Industry; Ministry of Transport and Communication 	<ul style="list-style-type: none"> Seek clarity on the expectations on stakeholder engagement and disclosure; Get necessary permission and contacts to engage with government departments at different levels as well as to hold consultations in the Project Area of Influence; and Get access to useful data from national as well as regional offices. 	<p>Key Communication material:</p> <ul style="list-style-type: none"> Presentation on Project; and Seeking permission from relevant stakeholders <p>Methods of meeting:</p> <ul style="list-style-type: none"> Meetings and Semi Structured Interviews.

Level	Stakeholder Group	Purpose of Engagement	Key communication material & Method of Engagement
State / Regional	<ul style="list-style-type: none"> ■ Yangon Regional Government (YRG); ■ Yangon City Development Committee (YCDC); ■ General Administration Department (GAD); ■ Township Development Committee; ■ Environmental Conservation Department; ■ Department of Rural Development; ■ Regional Members of Parliament; ■ Department of Petroleum Products Regulatory ■ Directorate of Water Resources and Improvement of River Systems; and ■ Directorate of Industrial Supervision & Inspection. 	<ul style="list-style-type: none"> ■ Seek expectations on stakeholder engagement and disclosure; ■ Seek introductory letters to meet various state/regional government departments and agencies; ■ Seek clarity on the range of permissions and approvals required at different levels of regional government; ■ Obtain regional level data and information; and ■ Seek an understanding of the requirements and plan for government presence/participation in the consultation process. 	<p>Key Communication material:</p> <ul style="list-style-type: none"> ■ Presentation on Project; ■ Presentation on EIA process and Stakeholder engagement; and ■ Sharing of Project Information Document with contact information. <p>Methods of Engagement:</p> <ul style="list-style-type: none"> ■ Meetings and Semi Structured Interviews.
Townships in Project Influence Areas	<ul style="list-style-type: none"> ■ Administrators GAD; ■ Township Development Committees; and ■ Local CSOs and NGOs. 	<ul style="list-style-type: none"> ■ Obtain necessary local permissions for meetings; ■ Provide an understanding of the specific issues and stakeholder concerns at the local level; ■ Obtain district and township level social and environmental data; ■ Provide introductions to key people at the township and village tract level; and ■ Provide guidance on local security do's and don'ts. 	<p>Key Communication material:</p> <ul style="list-style-type: none"> ■ Presentation on Project; ■ Presentation on EIA process and Stakeholder engagement; and ■ Sharing of Project Information Document with contact information. <p>Methods of Engagement:</p> <ul style="list-style-type: none"> ■ Town Hall Meetings, Focus Group Discussions.
Village / Ward	<ul style="list-style-type: none"> ■ Village Tract / Ward Leaders, ■ Village Leaders & Opinion Leaders; ■ Farmers; ■ Women, ■ Local Community; and ■ Village representatives of Schools, Hospitals, etc. 	<ul style="list-style-type: none"> ■ To make the community aware of the Project; ■ To discuss potential impacts and mitigation; ■ To communicate the next steps in the Study and public consultations; and ■ Obtain village tract and village level social and environmental data. 	<p>Key Communication material:</p> <ul style="list-style-type: none"> ■ Presentation on Project & engagement; and ■ Sharing of Project Information Document with contact information. <p>Methods of Engagement:</p> <ul style="list-style-type: none"> ■ Village Meetings, Focus Group Discussions Project affected people, and Interviews.

9.1.7 National Level

Stakeholder engagement at the national level is focused on government agencies with regulatory and policymaking responsibility. The purpose of early engagement is to introduce the Project and the Project Proponent, to seek clarity on the EIA process and expectations on stakeholder engagement and disclosure. The opportunity is also used to obtain required permissions for engagement with agencies at regional and township level and get access to data and information for the EIA Study.

9.1.8 Regional Level

Stakeholder engagement at the Regional Level is focused on obtaining required permission for engagement activities at the township level and get access to information on local communities in the Area of Influence. At the Regional level, the Project met with a representative for the Chief Minister of Yangon, Regional level ECD and GAD, and Members of Yangon Region Hluttaw.

9.1.9 Township Level

Meetings are planned to conduct in the Townships of Kyauktan, Kawhmu and Dala. The purpose of engagement is to make the township levels aware of the Project, seek an understanding of specific issues and stakeholder concerns, discuss potential impacts and mitigation measures and obtain village and township level social and environmental data.

The key stakeholders to be engaged are:

- GAD (District and Township);
- Village Tract/ Ward Leaders;
- Farmers;
- Civil society organizations (CSOs); and
- Non-Governmental Organisation (NGOs).

These stakeholder groups and the relevant stakeholder are provided in Table 9-3.

Table 9-3 Stakeholder Groups Consulted/planned to Consult

Stakeholder Group	Stakeholders
Government (GAD and Village Tract/Ward Leaders)	Yangon Regional Government, District and Township General Administration Department, Member of Parliament, ECD, Department of Agricultural, land Management and Statistics, Rural Development Committee, Department of Livestock, Breeding and Veterinary, Department of Information and Public Relations, Department of Public Health, Myanmar Police Force, and Township and Village Tract Leaders.
Local Communities	Village Leaders, Community Leaders, Village and Ward Patrons, Development Committee, Women, Fishermen, Farmers, Public Workers, , Township and Village Representative of schools, hospitals and monasteries, etc.
NGOs and CSOs	Village Development Committee, Women Association, Free Funeral Services and Local Charity Groups

9.2 Summary of Consultation and Activities Undertaken

During February and November 2020, consultation meetings were held with various relevant stakeholders at Yangon regional level and township levels. The purpose of the scoping consultations was to present information of the Project, gather information on potentially affected people, and gather information on the potential data gaps. Scoping consultation involved both face-to-face and virtual meetings with a range of stakeholders including a representative for the Chief Minister of Yangon, Regional level ECD and GAD, Members of Yangon Region Hluttaw, Member of Pyithu Hluttaw, and Township GADs from the Project Area.

Scoping consultation at the township level was not able to conduct physically due to COVID measures and stay home practices in Yangon. However, BE and ERM held virtual meetings with Kyauktan and Kawhmu Townships in October and November 2020 in line with ECD guidance for public consultation meetings for the project during COVID-19 pandemic. The consultation helped the Project to gather information on potentially affected community, and on potential data gaps and how these can be closed out in the EIA Report. Scoping consultation involved virtual online meetings with a range of stakeholders including local communities, ward administrators, regional parliament representatives and other related government departments. The meetings were attended and consisting of local communities, GADs, other representatives from related departments, NGOs and CSOs.

The date, stakeholders, and purpose of each meeting is provided in Table 9-4 and some photos of the scoping meetings are also provided in Figure 9-4.

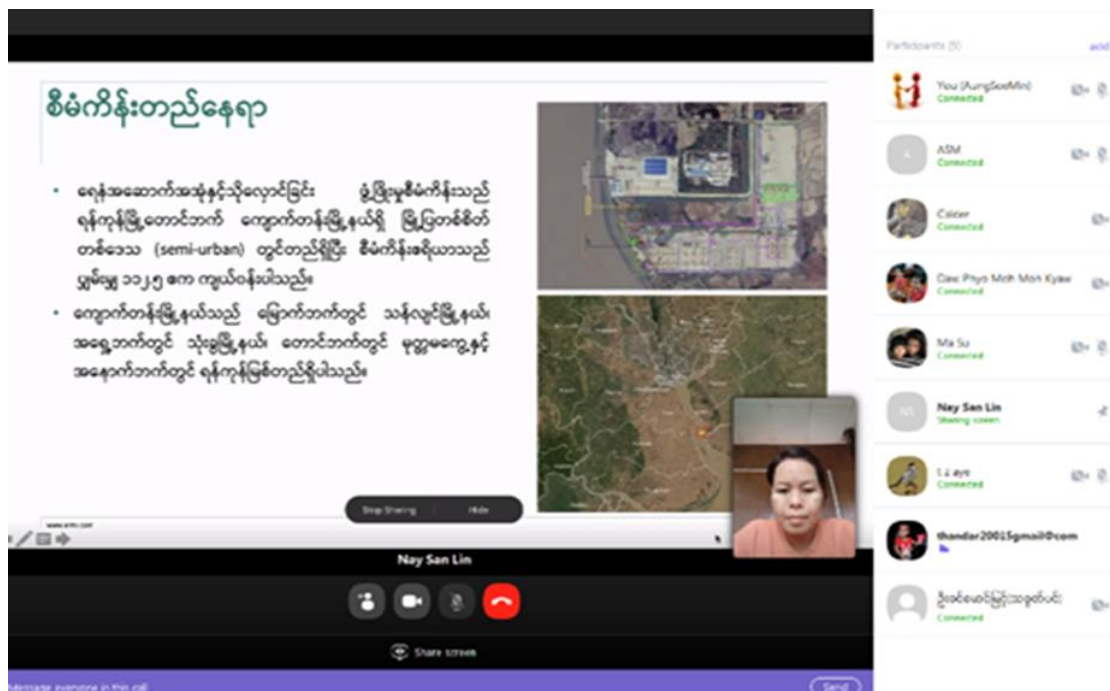
Table 9-4 Scoping Consultation Activities Undertaken

Date	Stakeholder / Location	Purpose of Engagement
25 th February, 2020 (Tuesday)	Chief Minister Office Meeting	<ul style="list-style-type: none"> ■ Present information on the Project; ■ Get approval for township/ward and village level meetings; and ■ Gather concerns and suggestions from stakeholders.
28 th October, 2020 (Wednesday)	Kawhmu Township GAD, Regional Parliament Representative, Township Land Registration and Statistics, Tha Khut Pin VT Leader (Virtual Meeting)	<ul style="list-style-type: none"> ■ Present Project information to local government, ward administrators, local communities and other interested parties; ■ Gather concerns and suggestions from stakeholders

Date	Stakeholder / Location	Purpose of Engagement
4 th November, 2020 (Wednesday)	Thidar Myaing Ward Leader, 100 Household Leader and Ward Patrons (Virtual Meeting)	<ul style="list-style-type: none"> ■ Present Project information to local government, ward administrators, local communities and other interested parties; ■ Gather concerns and suggestions from stakeholders



Public Consultation Meeting with the Yangon Regional Government on 25th February, 2020



Public Consultation Virtual Online Meeting with Kawhmu Township Organizations on 28th October, 2020



Public Consultation Virtual Online Meeting with Thidar Myaing Ward local communities, Kyauktan Township 4th November, 2020

Figure 9.4 Photos from Consultation Meetings

EIA Engagement was planned to be conducted in February 2021 virtually due to the ongoing COVID Situation. BE reached out to the Chief Minister’s office to have permission to arrange the township level meetings. Unfortunately, due to unexpected political situation and unsettled developments, the meetings were postponed and considered to resume only the situation allows better in order to have more inclusive and better participation of key stakeholders as it was considered the present development would deter some key stakeholders to commute and participate in the consultations.

BE will disclosed the project information and EIA report on BE’s website (<https://brighterenergy.com/news-press-releases/>) and distributed the handout to GADs (Kyauktan, Dala and Kawhmu) with the contact details to collect the feedback and comments.

9.3 Results of Consultation

The following section summarises the key issues raised in the previous scoping public consultation meetings and Table 9-5. presents the responses concerned with these issues.

Table 9-5 Key Questions Raised During Scoping Public Consultation

Questions	Responses	EIA Consideration
Project Information and Environment		
Suggest that the company should allow construction vehicles to park within the Project boundary. Some other Projects in area do not allow construction trucks to park into their construction sites and these trucks park on the main road. This can lead to complaints by daily commuters who utilise the road.	The project includes an area of 75 square feet as a designated parking lot and resting facility for drivers.	The impacts to local infrastructure and services will be included in the EIA Study.
Suggest that BE consider influx of construction workers and consider having food canteen/centre as one of their facilities during construction. At the moment, some communities nearby open small restaurants, which cause some social issues.	An area of 68 acres will not be utilised in the construction area currently; this will be considered to be used for a canteen.	The impacts to local communities from worker influx will be included in the EIA Study.
Grievance Mechanism		
Suggest BE to include details of the grievance mechanism.	The project will include in the EIA Study.	A grievance mechanism will be included in the EIA Study.
Livelihoods		
Concerns on the impact of fishing in Tha Kut Pin Village; as the majority of villagers are engaged in fishing.	A detailed social survey and social impact assessment, will be conducted including fishing and river transportation.	Impacts to fishing and livelihoods will be considered in the EIA Study.
Waste Management		
Queries on how waste will be managed and if any disposal in the river	There will be a Waste Management Plan in the EIA report in line with Environmental Quality Guidelines. All the waste produced will be segregated and only non-hazardous will be disposed at designated municipal dumping site while all the hazardous wastes will be handed over to the third party waste management facilities. No waste will be discharged to river.	Impacts from waste will be considered in the EIA Study.

9.4 Further Ongoing Consultations

Stakeholder consultation undertaken to date confirmed that potential impacts as a result of Project activities will be small in scale and of limited extent.

Future engagement activities will consist of the following and are shown in detail in Table 9-5.

As soon as the situation permits, EIA stage engagement with key stakeholders will be resumed and based on the comments and suggestion received, reviewing and updating the monitoring and management plans committed in this EIA Report will be done to reflect the perception of the community on the Project;

- Further disclosure of Project information and EIA Report, including opportunities to provide feedback;
- Engagement with relevant regional officials/authorities and government organizations on the outcomes of the EIA; and
- Ongoing communications with interested and potentially affected stakeholders during the operation. While impacts on local communities, ongoing project information will be provided to local areas.

BE have provided an activity update in the notice to villagers prior to the start of the Project. A grievance mechanism will be in place during operation, in line with the steps required under the EIA Procedure, as well as international good practice.

If significant issues, concerns or impacts are identified, further stakeholder consultation with relevant, interested or affected stakeholders may be undertaken during operation.

Table 9-6 Stakeholder Communication and Notification

Timing	Purpose	Stakeholder / Group	Method of communication / notification
As soon as the situation permits	EIA Stage Engagement	<ul style="list-style-type: none"> ■ Relevant Government organizations; ■ Villagers; ■ Other relevant stakeholders; and ■ General public. 	<ul style="list-style-type: none"> ■ Make sure the stakeholders are informed before the engagement; ■ Disclosing the Project Information and its impacts and mitigation measures; ■ Consultation Meeting along with receiving perception and suggestion on the Project; ■ FGDs with key stakeholders;
Following lodgement of EIA for assessment	Disclose EIA Report	<ul style="list-style-type: none"> ■ Relevant regional officials/ authorities; ■ Relevant Government organizations; ■ Villagers; ■ Other relevant stakeholders; and ■ General public. 	<ul style="list-style-type: none"> ■ Hardcopy EIA executive summary (Myanmar) made available in Yangon; ■ Publish Project information on signboards at the site; ■ Regional and national advertising – via newspapers; and ■ EIA (English) and executive summary (Myanmar and English) available on BE's website.
During the Project activities	Address any community concerns that may arise during Project activities	Implement the Grievance Mechanism	Grievance mechanism disclosed to local community and government

9.5 Disclosure

As per the requirements Article 50 of the EIA Procedure, BE will disclose information on the Project in two newspapers (one in English and one in Myanmar). Project information will be available on BE's website and signboards will be posted at the site office.

The advertisements for the scoping stage that were announced in The Global New Light of Myanmar (English) and The Mirror (Burmese) are provided in Figure 9-6 and Figure 9-7.

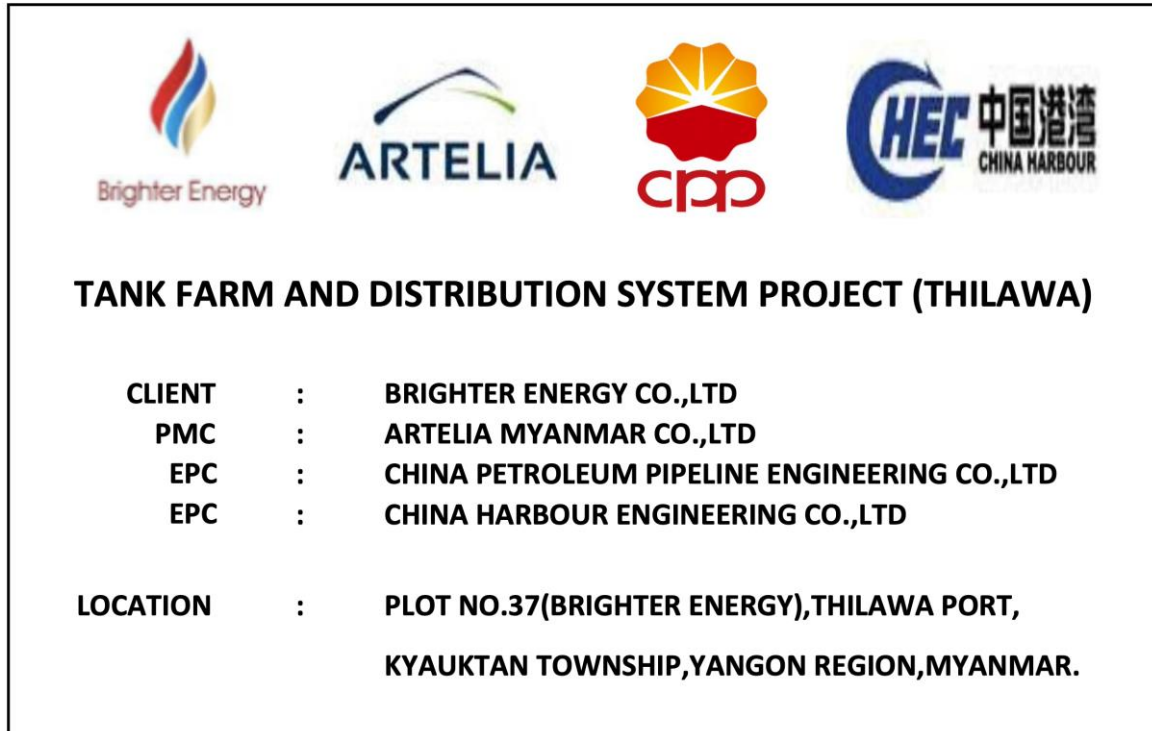


Figure 9.5 Signboard used for Public Consultation Meetings

Scoping of EIA for the development of Petroleum Terminal and Storage Project in Kyauk Tan Township (Near Thilawa SEZ) by Brighter Energy Company Ltd. (BE)

Brighter Energy Company Ltd. (BE) is developing the Petroleum Terminal and Storage Project located at the semi-urban in the Kyauktan Township to the south of Yangon and covers a total of approximately 112.5 acres. The project includes Jetty Terminal, Tank Farm (Diesel, Gasoline, LPG), and Interconnecting pipelines and advanced utilities.

Under the Environmental Conservation Law and Environmental Conservation Rules of the Republic of the Union of Myanmar, BE is required to undertake an Environmental Impact Assessment (EIA) study to obtain an Environmental Compliance Certificate (ECC) for the proposed activities. On behalf of BE, Environmental Resources Management (ERM) and Resource & Environment Myanmar (REM), are currently undertaking an EIA Study in accordance with the Myanmar EIA Procedure (2015), which includes Scoping Study that has been completed in July and August.

Information on the project is available at BE's webpage

<https://brighterenergy.com/news-press-releases/>. Any queries, comments, or suggestions on the Project and the EIA Study can be provided in writing to rathapon.p@brighterenergymm.com / saiayechan@brighterenergymm.com.

Figure 9.6 English version of the Public Consultation advertisement published on Global New Light of Myanmar newspaper

Brighter Energy Company Limited(BE)မှ ကျောက်တန်းမြို့နယ်အတွင်းရှိ (သီလဝါအထူးစီးပွားရေးဇုန်အနီး) Petroleum Terminal and Storage စီမံကိန်းဆောင်ရွက်ခြင်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (နယ်ပယ်တိုင်းတာခြင်းဆိုင်ရာလေ့လာချက်)

Brighter Energy Company Ltd.(BE)သည် Petroleum Terminal and Storage စီမံကိန်းကိုအကောင်အထည်ဖော် ဆောင်ရွက်လျက်ရှိပြီး ရန်ကုန်မြို့တောင်ဘက်အရပ် ကျောက်တန်းမြို့နယ်ရှိ မြို့ပြတစ်စိတ်တစ်ဒေသ(semi-urban)တွင်တည်ရှိကာ စီမံကိန်းဧရိယာမှာ ပျမ်းမျှ ၁၁၂.၅ ဧကခန့် ကျယ်ဝန်းပါသည်။ စီမံကိန်းတွင် ဆိပ်ခံတံတား၊ သို့လောင်ကန် (ဒီဇယ်၊ဓာတ်ဆီ၊ရေနံဓာတ်ငွေ့ရည်)၊ ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများ ပါဝင်ပါသည်။

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံ၏ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေနှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေတို့အရ BE သည် ထိုအဆိုပြု စီမံကိန်းများအတွက် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ လိုက်နာဆောင်ရွက်မှု သက်သေခံလက်မှတ်(ECC)ကို ရရှိစေရန်အလို့ငှာ ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း(EIA)ကို ဆောင်ရွက်ရန်လိုအပ်ပါသည်။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း(EIA)ကို Environmental Resources Management (ERM)နှင့် Resource & Environment Myanmar(REM)တို့မှ BEကိုယ်စား မြန်မာနိုင်ငံပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅)အတိုင်း ဆောင်ရွက်လျက်ရှိပြီး နယ်ပယ်တိုင်းတာခြင်းဆိုင်ရာ လေ့လာဆောင်ရွက်ခြင်းအား ဇူလိုင်လနှင့် ဩဂုတ်လတို့တွင် ဆောင်ရွက်ထားပြီး ဖြစ်ပါသည်။

စီမံကိန်းနှင့်သက်ဆိုင်သော သတင်းအချက်အလက်များကို BE၏ ဝက်ဆိုက်ဖြစ်သော <https://brighterenergy.com/news-press-releases/>တွင် လေ့လာကြည့်ရှုနိုင်ပါသည်။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအတွက် အခြားသော မေးမြန်းစုံစမ်းလိုခြင်းနှင့် ဝေဖန်အကြံပြု လိုခြင်းများရှိပါက rathapon.p@brighterenergymm.com/saiayechan@brighterenergymm.com သို့ ဆက်သွယ်ပေးပို့ အကြံပြုနိုင်ပါသည်။

Figure 9.7 Myanmar version of the Public Consultation advertisement published on The Mirror newspaper

9.6 Feedback Process and Grievance Mechanism

One of the most important aspects of the stakeholder engagement process is to provide feedback to the stakeholders. The intent and purpose of providing feedback is to ensure that relevant stakeholders, especially the local communities, are clearly communicated the process/stages/channels through which they will be informed about the Project.

9.6.1 Feedback Process during EIA Stage

- Disclosure of the Scoping Findings: After submission of the Scoping Report to MONREC, information of the Project was disclosed via newspaper adverts (one English and one Myanmar language) as described in New Light of Myanmar Newspaper English version and The Mirror newspaper Myanmar version and on BE’s website (<https://brighterenergy.com/news-press-releases/>).
- Disclosure of EIA report at Township Level: After submission of the EIA report for approval, the Executive Summary of EIA report will be distributed at the Office of Yangon Regional Government and GAD offices where consultation meetings have taken place.
- Disclosure of approved EIA report: The final EIA report will be made available at BE office and website. Information that the EIA Report is being disclosed will be published in one English and one Myanmar newspaper.

9.6.2 Operations Phase

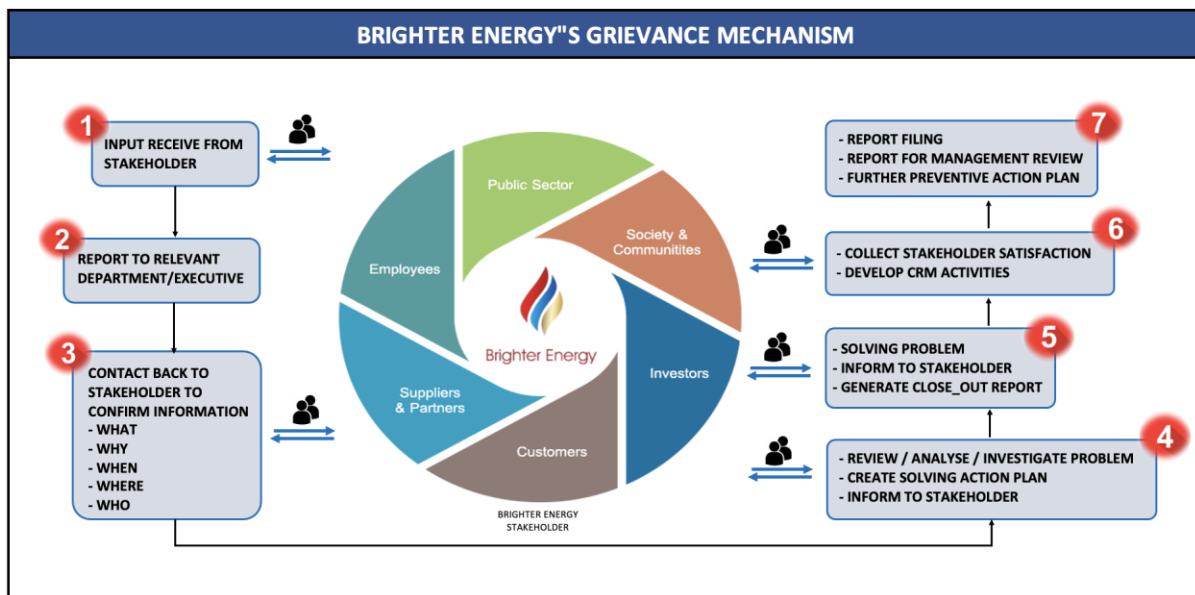
For the operations phase, a more detailed stakeholder engagement protocol will be developed. The most appropriate method for communication will be identified through the consultation process and the EIA.

9.6.3 Community Grievance Mechanism

A grievance mechanism will be created by BE so that stakeholders can raise questions or concerns with the Project and have the concerns addressed in a prompt and respectful manner.

The purpose of the grievance redress mechanism will be to provide a forum to the community and other relevant stakeholders to voice their concerns, queries, and issues with the Project. Such a mechanism would provide the stakeholders with one Project personnel or one channel through which their queries will be managed as well as ensure timely responses to each query. The detailed procedure will be formulated with detailed processes of receiving and recording grievances, assessing their validity, the timeframe in which the grievances have to be resolved, the roles and responsibilities for the implementation of the procedure and the documentation and monitoring and review process. The overall BE's grievance redress mechanism procedure is provided in Figure 9-8.

Figure 9.8 BE's Grievance Redress Mechanism Procedure



9.7 Social Impact Assessment

9.7.1 Project Background

The project site is located at the semi-urban in Kyauktan Township to the south of Yangon. Kyauktan Township borders area Thanlyin Township to the North, Thongwa to the east, Gulf of Mottama Gulf of Martaban to the South and Yangon River to the West (Figure 1.1). The Project site covers an area of 112.5 acres which includes the jetty terminal area of 13.5 acres and land area of acres.

The Project include the following key components:

- Jetty terminal;
- Tank farm (Diesel, Gasoline, LPG); and
- Interconnecting Pipelines and advanced utilities.

9.7.2 Jetty Terminal

The Jetty Terminal is designed for up to 25000 DWT (deadweight tonnage) tankers and 2000 DWT barges. There will be are working platform with four (4) mooring dolphins, which will be connected to the shore through a 9m x 249.5m trestle. A retaining wall (revetment) will be built along the shore for coastal protection. The water depth at the jetty and the turning basin will be approximately- 10.7 m chart datum (CD).

9.7.3 Tank farm (diesel, Gasoline, LPG)

The tank farm is located along the southern site of the Project Site. There will total of six (6) gasoline tanks with a total storage capacity of 25.68 million gallon, six (6) diesel tanks with a total storage capacity of 22.95 million gallons and three (3) LPG tanks with a total storage capacity of four, 500 metric tons (MT). There will also be a fire water tank with a capacity of ~ 1.585 million gallons.

9.7.4 Interconnecting Pipelines and advanced utilities

With the project site, there will be interconnecting pipelines for materials transfer and advanced utilities; e.g. drainage system and fire protection system to support Project operation. The pipelines will be mainly above ground on pipe racks.

The truck loading sheds are located next to the tank farm area for loading petroleum products for further distribution.

The pump sheds for the petroleum products and fire water are located next to the respective storage tanks.

The utilities buildings supporting daily operation of the Project are mainly located on the north eastern portions of the Project Site near the Liquefied Petroleum Gas (LPG) sphere tanks.

A Green belt area for landscape purpose will be established around the utilities buildings area.

An underground oily water separate unit will be constructed next to the area between the gasoline tank area and the revetment for treatment of oily wastewater to meet the EQEG standards before discharge. Drainage will also be built around the Project Site to direct the storm water runoff, which will be discharge off-site after removal of sit to meeting EQEQ standards by silt removal equipment.

9.7.5 Social Impact Assessment and Mitigation

Resource & Environment Myanmar (REM) team comprises of 7 members of experts surveyed the project area and environs, having public meetings and analyzed the potential impacts. Mitigation measures are proposed to incorporate in the environmental management plan.

Table 9-7 Social Impact Assessment Team

No	Name	Gender	Duty	Responsibility
1	Mr. Win Naing Tun	M	Principal Consultant	Social and Cultural
2	Ms. Khin Ohnmar Htwe	FM	Principal Consultant	Social Impact
3	Daw May Thazin	FM	Consultant	Social Impact
4	Daw Haymar Htet Naing	FM	Consultant	Social Impact
5	U Nyein Chan Naing	M	Consultant	Social Impact
6	Dr. Ye Naing	FM	Consultant	Health Impact
7	Daw Ei Ei Win Myat	FM	Consultant	Legal

9.7.6 Social Environment

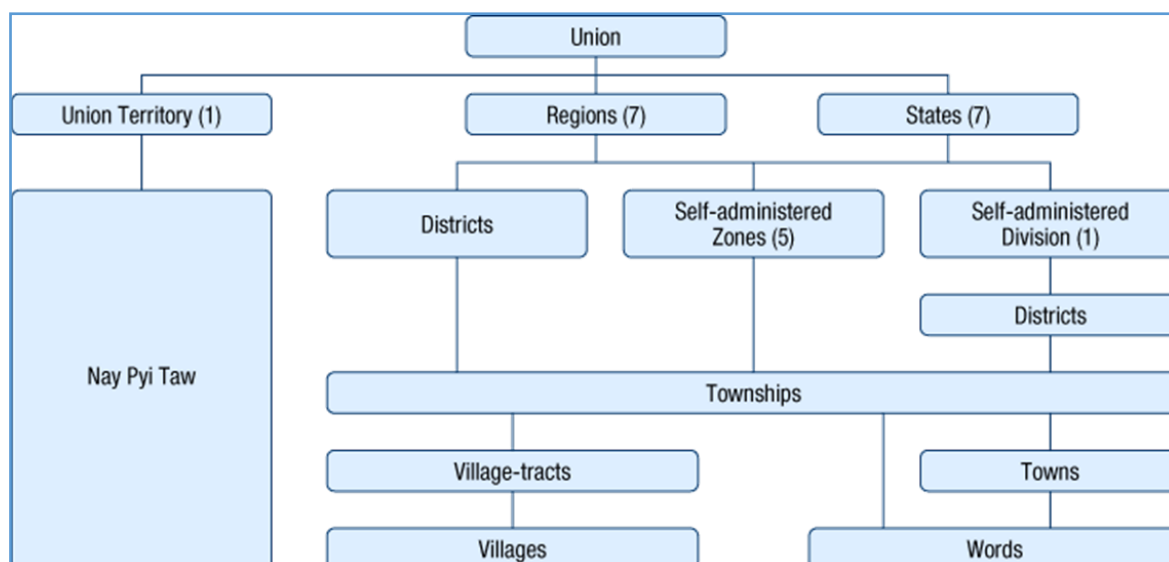
9.7.6.1 General Background of Administrative Organization and Limits in Myanmar

Myanmar is located as a potential land bridge between South and Southeast Asia. The total land area is 676,578 sq. km. It stretches for 936 km from east to west and 2051 km from north to south. At present, the total population of Myanmar is 54.4 million, and the 2014 Census revealed that the population is 51.48 million; the population density is 76 per square kilometer, and just under 30% of the population lives in urban areas.

Myanmar is a union of 135 ethnic groups with their own languages and dialects. The eight major national ethnic races are: Kachin, Kayah, Kayin, Chin, Mon, Bamar, Rakhine, and Shan. According to the administration of Myanmar, the country consists of 7 regions, 7 states, 1 union territory, 5 self-administered zones, and 1 self-administered division. The regions are: Ayeyarwaddy, Bago, Magway, Mandalay, Sagaing, Tanintharyi and Yangon. The States are: Chin, Kachin, Kayin, Kayah, Mon, Rakhine and Shan. The new capital city is Naypyidaw since November 2005 and other two large cities are Yangon and Mandalay.

9.7.6.2 Administrative Structure of Myanmar

Regions where mainly Bamar resides have the same status with states where mainly ethnic minorities reside. A region or a state is consisted of districts; and a district basically is consisted of villages, words, towns, and village-tracts. The administrative divisions and area of the country are shown in Table 5.4-1 and Figure 5.4-2. The lowest levels of government offices are generally located in the townships. These in turn report to the government offices at the district and region levels. The regions are governed by a Chief Minister appointed by the President, who is turn is supported by a unicameral legislative assembly.



Source: Ministry of National Planning and Economic Development and Ministry of Construction

Figure 9.9 Myanmar Administrative Structure

Table 9-8 Area and Administrative Unit by Region and State of Myanmar

	Area (km ²)	District	Township	City/Town	Ward	Village Tract	Village
Union	676,578.00	74	330	442	3,301	13,588	63,798
Ayeyarwaddy	35,136.05	6	26	43	292	1,920	11,910
Bago	39,403.00	4	28	51	325	1,410	6,441
Chin	36,017.58	3	9	15	46	469	1,363
Kachin	89,038.58	4	18	30	160	596	2,547
Kayah	11,731.10	2	7	8	37	74	56
Kayin	30,381.67	4	7	18	86	376	2,097
Magway	44,818.96	5	25	30	184	1,535	4,781
Mandalay	29,954.33	7	28	28	271	1,415	4,779
Mon	12,296.19	2	10	16	100	368	1,153
Rakhine	36,776.72	5	17	26	170	1,035	3,738
Sagaing	94,621.07	10	37	46	238	1,754	6,000
Shan	155,795.72	13	55	85	505	1,566	14,334
Tanintharyi	43,343.34	3	10	17	87	264	1,228
Yangon	10,170.89	4	45	21	743	619	2,126
Naypyidaw	7,067.50	2	8	8	57	187	795

Source: Socio-Economic Atlas of Myanmar, 2017

The region assemblies can legislate on matters of land revenue, municipal taxes on buildings and land as well as the sales, lease and other matters involving property of the region or state.

9.7.6.3 Location of Project Area

The project area is located near Thilawa Special Economic Zone, Kyauktan Township, Thanlyin District, Yangon Region which covers an area of approximately 112.5 acres that includes the jetty terminal area of 13.5 acres and land area of 99 acres.

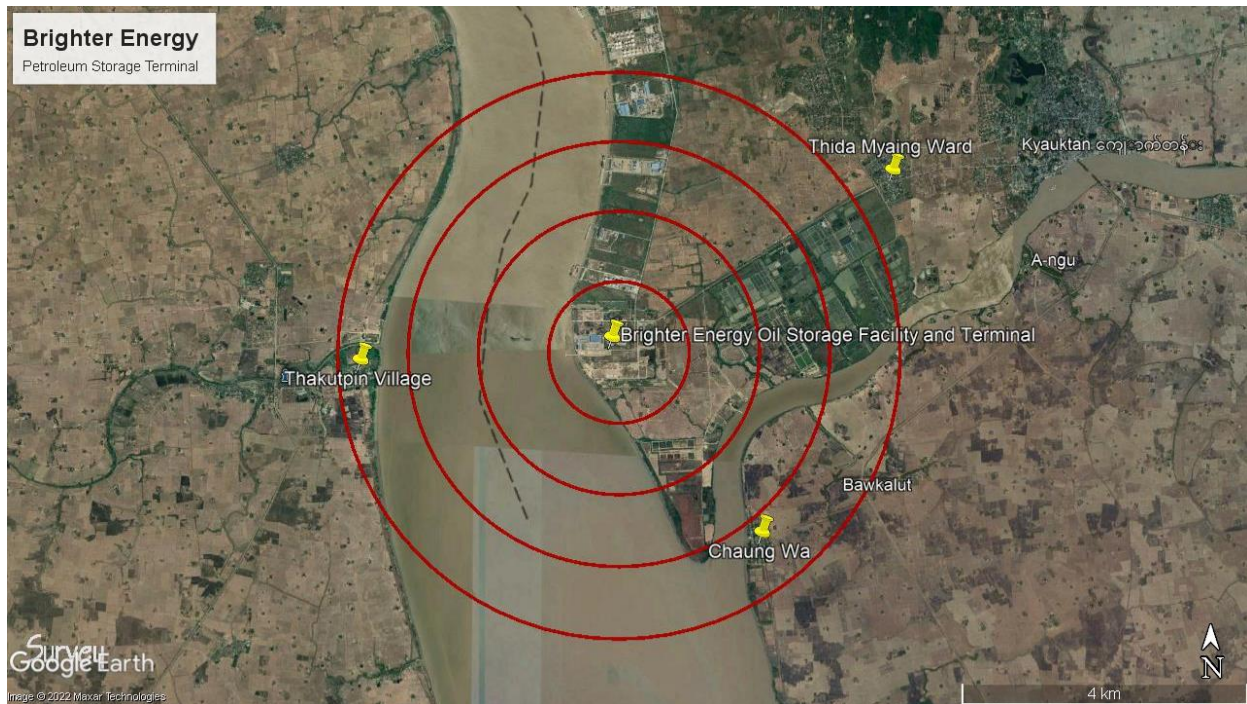


Figure 9.10 The Project Area within 5 km radius

Kyauktan Township lies between North Latitude between 26° 22' and 26° 42' and East Longitude between 96° 22' and 96° 30'. It adjoins Yangon River and Kyauktan Township on the east, Toe River and Maubin Township on the west, Twantay Township on the north, Kungyankone Township on the south, and has an area 325.760 square miles. It comprises of 13 Wards, 45 Village Tracts. The project affected ward and village within 4 km radius are Thida Myint Ward and Chaung Wa Village. **(Figure 9.10 and 9.11)**



Figure 9.11 Location of Kyauktan Township and Study Ward and Village

9.7.6.4 Kawhmu Township, Yangon Region

Kawhmu Township lies between North Latitude between 16° 28' and 16° 32.5' and East Longitude between 95° 00' and 96° 00'. It adjoins Yangon River and Kyauktan Township on the east, Toe River and Maubin Township on the west, Twanty Township on the north, Kungyankone Township on the south, and has an area 241.07 square miles. It comprises of 7 Wards, 55 Village Tracts and 130 villages. The project affected village within 4 km radius is Tha Kyut Pin Village. (**Figure 9.12**)

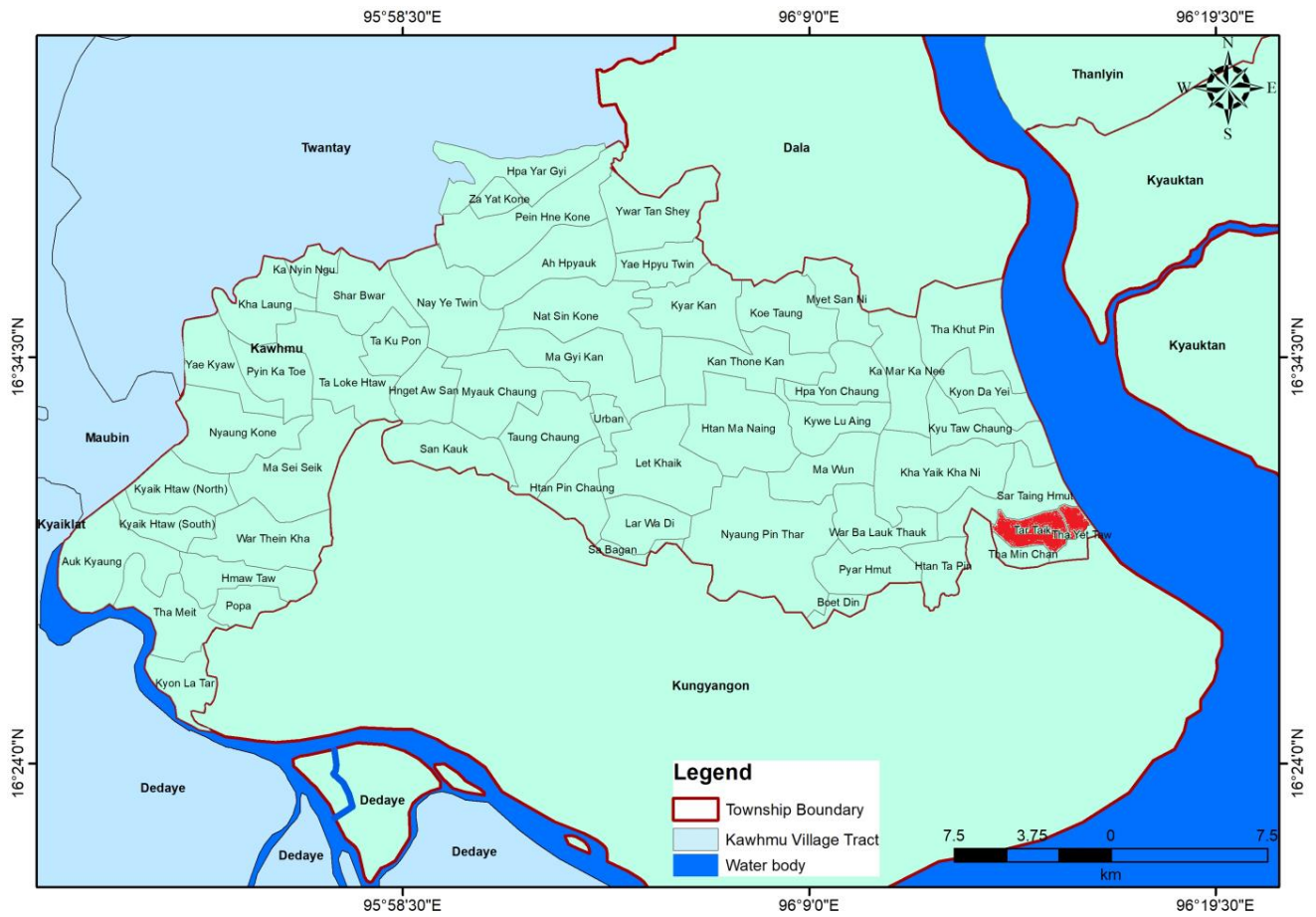


Figure 9.12 Location of Kawhmu Township and Study Village

9.7.6.5 Methodology

Stakeholders Meetings, Semi-structured Interviews and Questionnaire Distribution were done with respondents' coverage for the Head of Village Tracts and village elderly persons. There are 400 respondents in the survey, and the survey focused to measure on potential impacts of the project to surrounding residential area.

The ESIA teams will engage key local stakeholders including the affected communities through quantitative and qualitative baseline study, focus group discussions and other participatory exercise as follows:

- Data collection including acquirement of the location map with updated demarcation of the household and land use/ownership type within the AOI ("social maps") at Township level.
- Individual household interview (Questionnaire-based household survey).
- Focused group discussions (FGD) of particular interest groups among the project affected people, including: Shipyard business community, fishing community and women.
- Review activities conducted in the field and initial analysis of findings and feedbacks from key stakeholders and Project affected persons and other key local stakeholders
- Data analysis including data entry, data cleaning, data processing, recording, feedback to key project staffs

a. Secondary Data Collection: Baseline data gathered from the regional government (YRG) and other appropriate government and public organizations, academics and other experts in relevant fields, etc. The secondary data sources included reports, field documents,

monographs, information leaflets/booklets, manuals, written order and instruction, statement of the government organization, among others.

- b. **Primary data Collection:** Primary data collection through direct observations, interviews, individual/target group consultation (FGDs) to collect and verify the socio-economic conditions (demography/residence), economic status (by age, sex, education, occupation, ethnical group and income, expenditure, loan and household assets and poverty status). The social survey will be participatory in nature and carry out a series of focus group discussion (FGDs). The survey tools and methodologies considered will be developed and reviewed by the consultant (REM) before implementation. The study also reflects the comments and concerns in the EIA raised by the survey respondents, participants in FGDs, interviews and other consultation activities (including the public consultation workshops).

A questionnaire-based survey for socio-economic conditions will be carried out during field surveys. About 145 households will be selected as sample for the study with sufficient representation of each of 2 Townships sections on the basis of the systematic sampling method.

Table 9-9 Study Limits, Indicators and Survey Methods

Survey Item	Study Limits	Indicators	Survey Methods
Demography	1.Nationwide 2.Yangon Region 3. Kyauktan and Kawhmu Townships	Total population/ ethnic/religious/age/gender composition/ education level (incl. literacy rate)/ income source, level /occupational composition etc.	1.Secondary data gathering 2.Household-based Socioeconomic survey (Respondents: 145)
LandUse Status	1.Nationwide 2.Yangon Region 3. Kyauktan and Kawhmu Townships	- Public/private & different types of land - Land use type categorization	1.Data gathering from: Survey Department, 2.Household-based Socioeconomic survey
Socioeconomic	1.Nationwide 2.Yangon Region 3. Kyauktan and Kawhmu Townships	1.Industry composition 2 Access to public utilities (electricity, water (incl. drinking water), schools, hospitals, religious service, public transport facilities etc.) 3.Community facilities & community activities 4. Demography (Population, education, income, etc.)	1.Secondary and primary data gathering 2.Household-based Socioeconomic survey

Identification of Project Affected Households (PAFs) & persons (PAPs) (including vulnerable groups),	1. Directly affected areas 2. Indirectly affected areas	1. Identification of directly and indirectly affected persons and households (affected by physical, economic, direct, indirect, permanent and temporary dislocation and other types of impacts) 2. Identification of (informal settlers (squatters, encroachers of public land etc.) 3. Identification of female-headed households, the elderly without family support, ethnic minorities etc. among PAPs/PAFs) 4. Public and private organizations and entities whose land and properties are likely to be affected by the project implementation either permanently or temporarily	1. Secondary data gathering 2. Household-based Socio-economic survey
Physical cultural heritages, archaeological and historical assets	2. Yangon Region 3. Kyauktan and Kawhmu Townships	Identification of physical cultural, archaeological and religious assets (including maps of the locations of the items identified)	1. Secondary data gathering 2. Consultation meeting with relevant government entities (both national and regional(sub-national)) 3. socio-economic survey

9.7.7 Social Profile

The region and the township level information pertaining to the socio-economic profile of the country are limited and the baseline review has been undertaken on the basis of the limited secondary information available from reliable sources.

The collection of baseline information on social profile covered the project site is in the administrative area of Kyauktan and Kawhmu Townships in Yangon Region. These two villages in 2 Townships may be affected to some extent by the project through environmental disturbances caused by construction and material transport activities, and inaccessibility to the river.

9.7.7.1 Demography

As of 2017, it was estimated that the population of Myanmar was approximately 54.67 million, with an annual growth rate of approximately 1% (CIA 2015). The population in the Mandalay Region is estimated to be 6.2 million, making it the second largest region in the country in terms of population, behind Yangon, which has a population of approximately 7.3 million. Population is one of the important socio-economic conditions of a township.

Table indicates population and its annual average growth rate in census years. The population of Myanmar increased at the rate of 0.89% per annum between 2003 and 2014. During 40 years from 1973 to 2014, population of Myanmar had almost doubled from 29 million to 51 million. The growth rate is getting lower from 2.0 during 1973-1983 to 0.89% in 2014. Distribution of population among regions/states is indicated in Table 4.8-2. Percentage of population distribution does not change so much in all regions and states during 1973 and 2014. Comparing the proportion of the population by State and Region, Yangon Region ranks as number one. Ayeyarwaddy and Mandalay Regions had a higher population than Yangon Region in the 1983 and 1973 censuses. Until 2014, the percentage share of population is increasing in Shan, Kachin, Kayah, Kayin, and Rakhine States and Tanintharyi Region. Kayah and Chin still remain the States with the least proportion of the population. Percentage share of population is decreasing in Chin and Mon States and Sagaing, Bago, Magway, Mandalay, and Ayeyarwaddy Regions.

From 2014 to 2016, proportion of population distribution slightly changed in all regions and states.

Table 9-10 Population and Annual Average Growth Rate in Census Years

Year	1973	1983	2014
Total Population	28,921,226	35,306,913	51,486,253
Annual Average Growth Rate (%)	2.0	2.0	0.89

Source: Myanmar Statistical Yearbook, 2017

Table 9-11 Population Distribution among Regions/States

Regions/States	Proportion of the Total Population			
	1973	1983	2014	2016
UNION	100	100	100	100
Kachin	2.6	2.6	3.3	3.4
Kayah	0.4	0.5	0.6	0.57
Kayin	3.0	3.0	3.1	3.0
Chin	1.1	1.0	0.9	0.95
Sagaing	10.8	10.9	10.3	10.3
Tanintharyi	2.5	2.6	2.7	2.74
Bago	11.0	10.8	9.5	9.28
Magway	9.1	9.2	7.6	7.45
Mandalay	12.7	13.0	12.0	11.96
Mon	4.5	4.8	4.0	3.82
Rakhine	5.9	5.8	6.2	6.2
Yangon	11.0	11.2	14.3	14.67
Shan	11.0	10.5	11.3	11.52
Ayeyawady	14.4	14.1	12.0	11.84
Nay Pyi Taw	-	-	2.3	2.3

Note: Provinces do not exist at that time in blank cells.

Source: Myanmar Statistical Yearbook, 2017

According to Myanmar Statistical Yearbook 2017, the estimated population (2016-2017) of Myanmar was 52 million and the sex ratio (the number of males per 100 females) was 92.66. In the proportion of people, the age group of 15-59 years was 62.44%. The crude birth rate per 1000 person was 20.2% and the crude death rate was 9.1%. In terms of population distribution, 70% of total population lived in rural areas and 30 % live in urban areas.

9.7.7.2 Population of the affected townships

Population is one of the important socio-economic conditions of a township. The total population of affected Townships is shown in Table 9-14, whereas most are living in a rural area where the population size is categorized into above 18- year age and under 18-year age.

Table 9-12 Total Population of Affected Townships along the project site

Township		Above 18-year Age			Under 18-year Age			Total		
		Male	Fem	Tot	Mal	Fem	Tota	Mal	Female	Total
Kyauktan	Urban	15,299	16,960	32,259	6,347	6,116	12,463	21,646	23,076	44,722
	Rural	41042	42990	84032	20671	20234	40905	61713	63224	124937
	Total	56341	59950	116291	27018	26350	53386	83359	86300	169659
Kawhmu	Urban	3,723	4,280	8,003	1,291	1,175	2,466	5,014	5,455	10,469
	Rural	44,327	47,098	91,425	17,064	16,378	33,442	61,391	63,476	124,867
	Total	48,050	51,378	99,428	18,355	17,553	35,908	66,405	68,931	135,336

In 2019, houses, households and total population of the affected townships as shown in Table Table 9-12 and Figure 9-13. Among the affected 2 townships, Kyauktan Township is the highest with 169,659 persons and 37,675 houses.

Table 9-13 Affected Townships of House, Household and Total Population

Region	Township	House	Household	Total Population
Yangon	Kyauktan	37,675	42,816	169,659
	Kawhmu	30,212	33,104	135,336

Source: General Administration Department, 2019

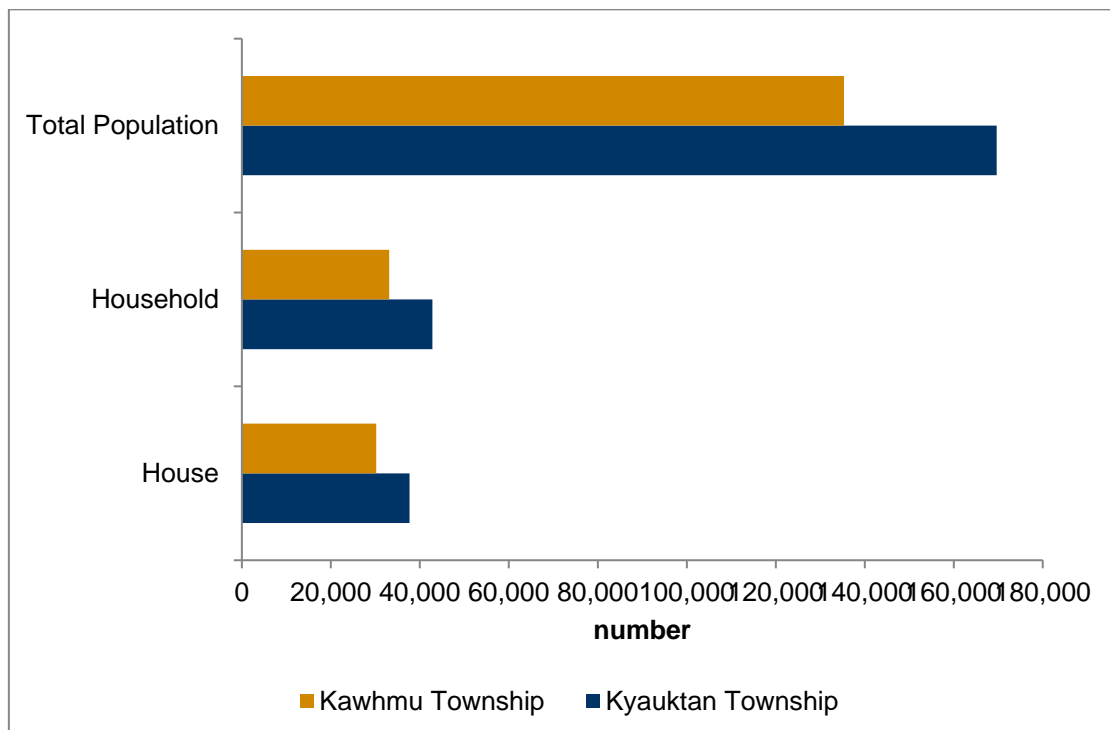


Figure 9.13 Affected Townships of House, Household and Total Population

9.7.7.3 Household Survey Results

The petroleum terminal and storage project of the household surveys were undertaken 2 villages in 2 Townships. 145 and households responded to the survey with 43 male (45%) and 52 female (55%) respondents in Kyauktan Township and with 38 male (76%) and 12 female (24%) respondents in Kawhmu Township in Yangon Region respectively. More males responded than females as the most part of the survey was carried out during daytime when the survey time is in daytime. The following table (9-14) shows the detail information of the ward and villages in the survey area.

Table 9-14 Demographic Profile of Affected Townships

Township	Ward/ Village	Respondents		
		Male	Female	Total
Kyauktan	Thida Myaing Ward and Chaung Wa Village	76%	24%	100%
Kawhmu	Tha Kyut Pin and Sat Su Village	45%	55%	100%

Source: REM Survey Team, 2022

9.7.7.4 Communities

The total household of affected townships in Urban areas and rural areas (Table 9-15). According to September, 2019 data. There is a Number of Houses, Households, Wards, Village Tract, and Villages in urban and rural areas of study townships is shown in the following table.

Table 9-15 Houses, Households, Wards, Average Household Size, Ward and Villages by Urban and Rural Areas

Township Name		Number of Houses	Number of Households	Number of Wards	Number of Village Tract	Number of Villages
Kyauktan	Urban	9,720	10,960	13	-	-
	Rural	27,955	31,856	-	45	80
	Total	37,675	42,816	13	45	80
Kawhmu	Urban	2,275	2,744	7	-	-
	Rural	27,937	30,360	-	55	130
	Total	28,997	32,700	7	55	130

The results of Socio-economic Survey indicated that almost all households living in the project area were speaking, read and write Myanmar language fluently. Number of family members at each household living in the project areas in Table 9-16.

Table 9-16 Household Size of the respondents

Township	Ward/ Village	Applicable PAHs (No.)		
		1 to 3 persons	4 to 6 persons	>6 persons
Kyauktan	Thida Myaing Ward and Chaung Wa Village	40%	54%	6%
Kawhmu	Tha Kyut Pin and Sat Su Village	32%	58%	10%

Source: REM Survey Team, 2022

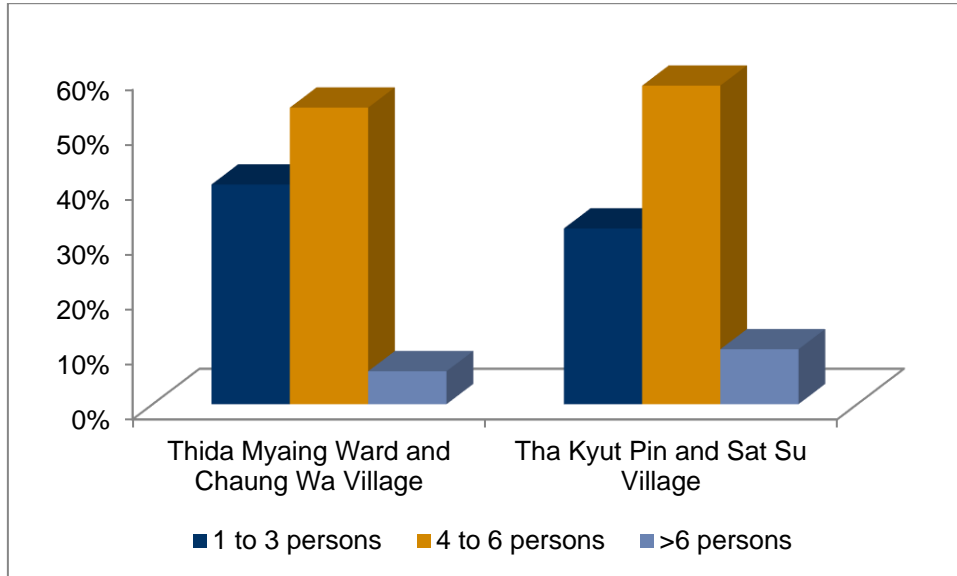


Figure 9.14 Household size of respondents

The social support networks exist in ward and villages. Most of the ward and villages have associations for religious and social affairs in their communities. (Table 9-17)

Table 9-17 Social Networks Communities in Affected Townships

Township	Ward/Village	Social Networks Communities in affected village Tracts
Kyauktan	Thidamyaing	There is a team to provide social and cultural events.
	Chaung Wa	There are religious association, women association and social association in the village.
Kawhmu	Ta Kyut Pin	There is a team to provide social and cultural events. There are religious association, women association and social association in the village.

9.7.7.5 Education

There are four types of schools in Myanmar: (i) approved/main schools; (ii) branch schools; (iii) affiliated schools and (iv) self-help schools. Among them, affiliated schools and self-help schools, each of which is administratively attached to the main school, have to prepare and manage all school facilities and teacher arrangements by themselves, and students in these affiliated and self-help schools are reported as students at the main schools. Most of the expenses including the cost of teachers' salaries should be borne by the entity which established the school (mostly communities, monasteries and other ministries are bearing the cost). Since administering examinations at the affiliated school is not allowed in many cases, students must take examinations at the main school. The educational institutions in affected Townships are shown in the following Table 9-18.

Table 9-18 Number of University and Schools in affected Townships

Townships	No. of School, Teacher and Students	University	High School	High school (affiliated)	Middle School	Middle School (affiliated)	Post Primary School	Primary School	Preliminary School	Monastic School
Kyauktan	No. of school	-	8	7	9	15	16	77	17	5
	No. of Teacher	-	275	141	116	138	127	341	29	68
	No. of Student	-	8,621	4,015	1,516	3,544	3,288	5,635	369	1,528
	Teacher: Student	-	1:31	1:28	1:25	1:25	1:26	1:17	1:13	1:22
Kawhmu	No. of school	-	11	7	5	11	16	79	4	5
	No. of Teacher	-	307	120	53	108	136	372	7	58
	No. of Student	-	8,726	2,605	1,296	2,387	2,884	4,570	108	791
	Teacher: Student	-	1:28	1:22	1:24	1:21	1:21	1:15	1:15	1:13

Source: General Administration Department, 2019

The literacy rate of those aged 15 and over in affected Townships is 95 percent as shown in **Table 9-19**.

Table 9-19 Population in conventional households 15 years old and above Literacy Rate in affected Township

Township	Township Population	15 Years Old and Above	No. of Literate	Literacy rate (%)
Kyauktan	159,916	147,637	147,637	100%
Kawhmu	135,336	94,897	94,897	100%

Source: General Administration Department, 2019

About 55 per cent of the respondents have primary school levels of education in Kyauktan Township whereas 25 per cent of respondents have middle school education level. However, 56 per cent of respondents have primary school levels and 32 per cent of respondents have middle school level of education in Kawhmu respectively. Education level is important in the assessment for the awareness of the respondents on existing project. (Table 9-20 and Figure 9-15)

Table 9-20 Education Level of respondents (%)

Township	Ward/Village	Primary	Middle	High	University	Monastery
Kyauktan	Thida Myaing Ward and Chaung Wa Village	55	25	15	3	2
Kawhmu	Tha Kyut Pin and Sat Su Village	56	32	12	0	0

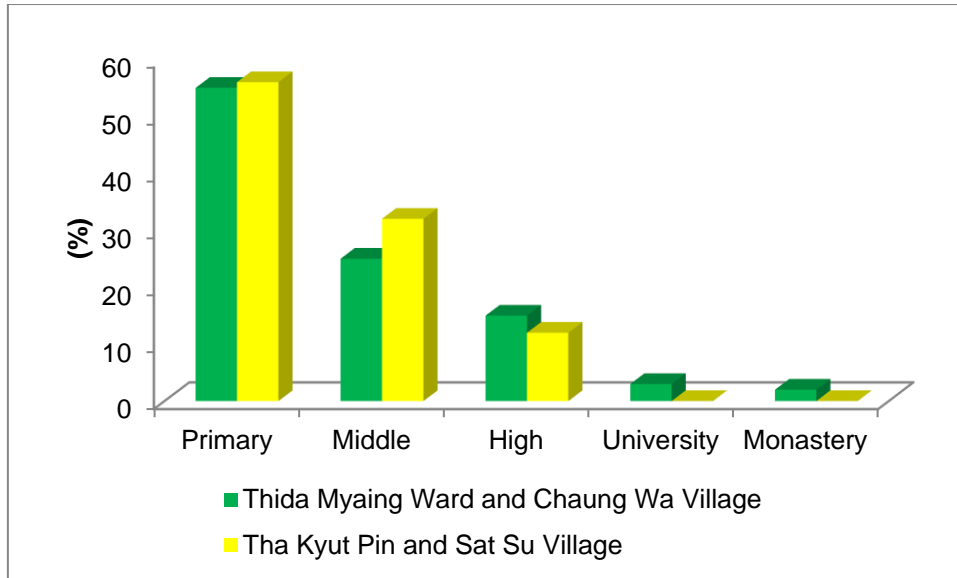


Figure 9.15 Education Level of respondents (%)

9.7.7.6 Vulnerable groups

Following to the international practice, households under the poverty lines, headed by single parent or disabled person are regarded as the vulnerable groups. Regarding the poverty lines, WB issued Technical Poverty Estimation Report (Myanmar Poverty and Living Conditions Survey) in December 2017, and this report defined 1,303 kyats per adult equivalent per day or 1,241 kyats in per capita terms as the new poverty lines. A household is considered as a poor if it lives below these lines. Average 5 households classified as the elderly headed households in Kyauktan Township and 4 households have working persons in a household apart from the household-heads in Kawhmu Township. It means that the elderly is regarded as a household- head, but there are income sources of his/her child generation.

9.7.7.7 5.4.9 Ethnic Minorities

The affected township along with the project site, Burma is the majority of the affected township and reaches about 91% of the total population as shown in Table 9-21.

Table 9-21 Ethnic group of affected townships along with the project site

Township Name		Kachin	Kayah	Kayin	Chin	Mon	Burma	Rakhine	Shan
Kyauktan	Residential	3	2	224	12	8	164,581	90	3
	Township Population (%)	0.002	0.001	0.13	0.007	0.005	97	0.053	0.002
	Total Township Population	169,659	169,659	169,659	169,659	169,659	169,659	169,659	169,659
Kawhmu	Residential	-	-	20,740	-	-	114,267	8	109
	Township Population (%)	-	-	15.32	-	-	84.43	0.005	0.08
	Total Township Population	135,336	135,336	135,336	135,336	135,336	135,336	135,336	135,336

Most of the respondents (97% and 84.43%) are Bamar ethnic groups in Kyauktan and Kawhmu Townships and 100% surveyed respondents were classified as Bamar ethnic groups in majority households in the survey area. Thus, it is possible to consider that they have already assimilated into Burmese society and would not be required special attention to their living style.

9.7.7.8 Gender Situation

In general men and women are equal in Myanmar. Therefore, there are no gender issues within the study area. Roles, work division and decision making between men and women are determined by physical condition, social structure and norms. Decision making on some aspects are on a joint or sharing by both male and female.

9.7.7.9 Religion

Buddhism is the only religious adopted by the villagers. Most of the respondents (145) are Buddhist.

9.7.7.10 Economic Profile

Most townships are mainly engaged in agriculture and livestock. The main local products are rice, fish, betel nut, and beans. These products are exported and sold to Yangon and other cities. Most of the townships have good transportation links and can travel to other cities by roadways and waterways.

Table 9-22 Production rate of main crops

Type of Crop	Kyauktan	Kawhmu
Rice	7,226,153	7,195,415
Beans (Pedisein)	656,801	269
Betel Nut	4,050	71,072
coconut	2,458,335	16,752
Sunflower	104	25
Banana	101,250	-

Note: "Tin" is only the volume measured by a standard basket; 1 Tin = ~ 38.5 Liters
Source: Township Profile (2019), Township General Administration Department

In addition to the formal fisheries, aquatic organisms (fish, crab, mollusks, shrimp, etc.) provide essential livelihood support, in particular to the landless and the poorest elements of the population. Many marginal farmers engage in fishing and crabbing. Those who fish typically do own fishing gear or boats and depend on fish traders for such resources. It was noted during the site visits that villages along the stream and river were involved in fishing activities, and a large proportion of the village houses bordering the river east of the Project site were involved in making or trading fishing gear, such as fishing nets. The labor force in each occupation is shown in Table 9-23.

Table 9-23 Labour Force in Each Occupation

Township	Government Staff	Services	Agriculture	Livestock	Buying/ Selling	Industries	Manual Labor	Fishery	Other	Total
Kyauktan	2,0	11,205	10,1	10,08	8,521	5,472	15,320	285	31,4	94,518
Kawhmu	2,2	55	16,7	40	8,638	3,615	3,446	826	9,56	76,190

Source: General Administration Department, 2019

9.7.7.11 Employment

According to the Township Profile prepared by Township General Administration Department Office, the occupational status of each affected township was described in Table 9-24.

Table 9-24 Occupational Status of Affected Townships

Township	Occupational Status	Person	%
Kyauktan	Workable person	109,208	50%
	Employed person	94,518	43%
	Unemployed person	14,690	7%
Kawhmu	Workable person	78,995	50%
	Employed person	76,190	48%
	Unemployed person	2,805	2%

There are seven types of occupation among the respondents in which 40 per cent of respondents are dependent in Thida Myaing ward and Chaung Wa Village, Kyauktan Township and 34% of respondents are manual labour in Tha Kyut Pin and Sat Su villages in Kawhmu Township. Most of the respondents' occupation is manual labour workers and second one is farming. This occupation structure showed the variation of awareness by respondents on the project. (Table 9-25)

Table 9-25 Type of occupation of respondents (%)

Ward/Village	Dependent	Factory	Manual labour	Seller	Farming	Fishing	Others
Thida Myaing Ward and Chaung Wa Village	40	7	26	7	6	4	10
Tha Kyut Pin and Sat Su Village	8	0	34	18	16	12	12

Source: REM Survey Team, 2022

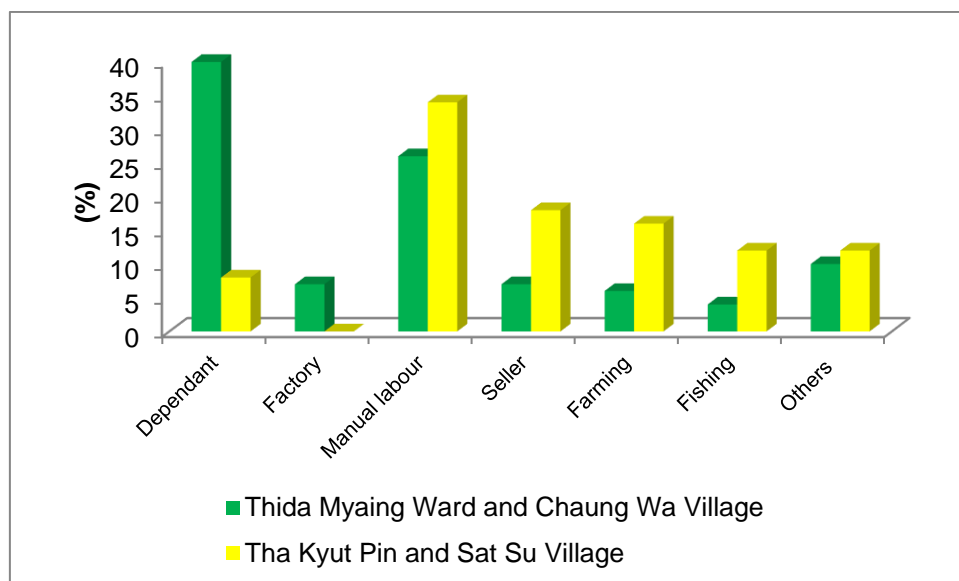


Figure 9.16 Type of occupation of respondents (%)

9.7.7.12 Household Income

Based on the secondary data received from related GAD offices, the income of the person of the year from 2016 to 2019 could be identified in Table 9-26.

Table 9-26 Annual Income per Person for affected Township

Township	Year		
	2016-2017	2017-2018	2018-2019
Kyauktan	1,629,000	1,812,653	1,664,844
Kawhmu	1,125,415	1,198,702	1,358,450

Source: General Administration Department, 2019

Thida Myaing Ward and Chaung Wa Village in Kyauktan Township of the respondents have average monthly income is 150,400 kyats. From Tha Kyut Pin and Sat Su Villages in Kawhmu Township of the respondents received monthly income 160,000 kyats. Therefore, most of the respondents did not have enough income for high quality of living standard. Mainly Source of income is farming and manual labour.

9.7.7.13 Cost of Living

Type of expenditure sources are food, health related, school fees and others. Most of the respondents' expenditure monthly is food. Most of the respondents spend more than 2 lakh (kyats) for their family expenditure. About 93 percent of respondents have expenditure over 3 lakh (kyats). All respondents own their houses. Type of houses found in the affected villages is Pucca (Reinforced Concrete), Semi-pucca, wooden and huts. Most of the respondents owned motorcycles and mobile phones.

9.7.7.14 Health Profile

The overall condition of the health including life expectancy (male/female), morbidity/ major disease, and Infant mortality rates are defined in Table 30. According to the health index per 1,000 people in affected Townships, birth rate, maternal mortality rate, and infant mortality rate are shown in the following table 9-27. Thus, reducing infant mortality and abortion rate, health education for pregnancy period and infant health care is important.

Table 9-27 Health condition of Affected Townships

No.	Total Population	Mother Population	Population of Children	(1000) people				Major Disease (person)			
				% of Birth rate	% of Mother Death	% of Infant Mortality	Abortion Rate	Diarrhea	TB	Malaria	Hepatitis
2	135,336	2,060	2,038	11.8	1.3	2.7	48.	782	228	2	1

Source: Township Profile (2019), Township General Administration Department

According to General Administration Department records, the number of health care facilities, number of clinics and types of treatments, number of rural health centers, number of doctors, nurses, health assistants, and related ratios in affected townships are shown in Table 9-28, Table 9-29, Table 9-30, and Table 32.

Table 9-28 Number of Hospital and Number of Beds in Affected Townships

Hospitals	Kyauktan		Kawhmu	
	No. of Township Hospital	No. of Sub township Hospital	No. of Township Hospital	No. of Sub township Hospital
Number of Hospital Government	1	5	1	2
Number of Hospital Private	-	-	-	-
Number of Beds	50	16	25	16
Number of Clinics (Government)	1	1	-	-
Number of RHCs/ Sub-RHCs	10	37	22	-
Number of Clinics (private)	6	-	16	-

Source: General Administration Department, 2019

Table 9-29 Number of Doctors, Nurses, Health Assistants and Related Ratios in Affected Township

Township	Township Population	Doctors' Health Care Status		Nurses' Health Care Status		Health Assistants' Health Care Status	
		No. of Doctors	Doctor: Population	No. of Nurses	Nurse: Population	No. of Health Assistant	Health Assistant: Population
Kyauktan	159,916	6	1:26653	16	1:9994	12	1:23326
Kawhmu	135,336	7	1:19,333	28	1:4,833	6	1:15,037

Source: General Administration Department, 2019

9.7.7.15 Drinking Water

The public drinking water supply in the affected township areas was described in **Table 35**.

Table 9-30 Drinking Water Distribution

Township	Water Distribution	Water Distributed Household	Gallons per Day	Type of Water
Kyauktan	2	43	12,177	Underground water
Kawhmu	1	1,000	150,000	Underground Water

To collect the baseline information on health conditions of the houses around the project area, present survey was conducted based on the questionnaires for 145 representative households. Most of the respondents (11%) faced the health problems last 1 year ago. Remaining respondents (89%) didn't face the health problem. (Figure 9-17)

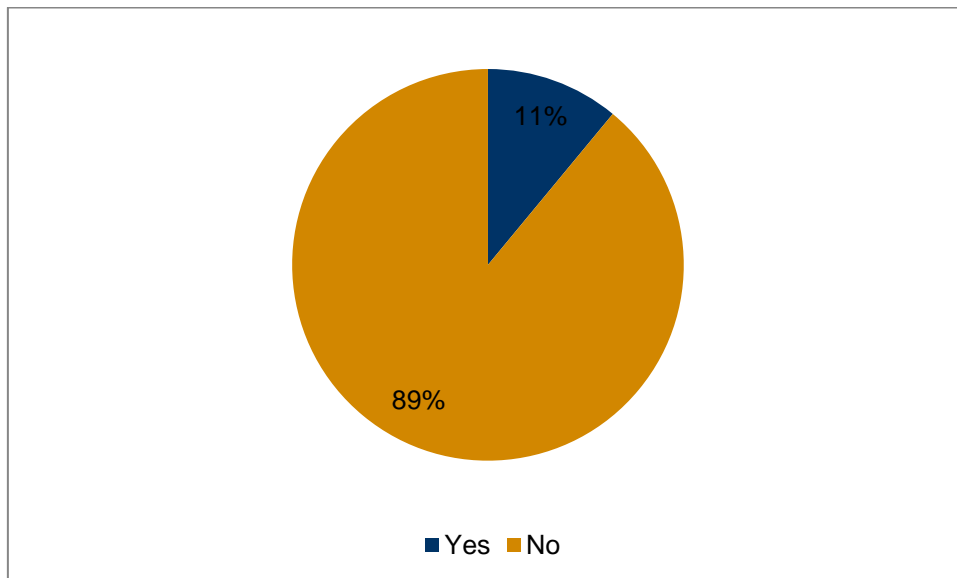


Figure 9.17 Health conditions of respondents

Health condition is determined on the basis of population, level of education, livelihood and income, water and sanitation systems, health knowledge and its application, health facility and utilization, usage of alcohol, tobacco and medical history etc. Majority of the people in the area in and around the project site are farming. Daily regular income of them is in the range of Kyats 8000 to 10,000. Income is a dependent of Health as poor people cannot take proper investigation or treatment if they have disease.

Most of the respondents (30%) answered they like to chew the betel and at least 24% of the people drink also alcohol regularly and 29% take tobacco in all affected townships. Usage of alcohol cause hypertension and reduce control of high blood pressure, so susceptible to get stroke. In this area, many people have hypertension. Usage of tobacco smoking causes coronary artery disease, hypertension, stroke, CA lips, tongue, esophagus, stomach, bladder, etc. In this area, the most common disease other than common cold is hypertension which is most probably due to smoking and alcohol drinking.

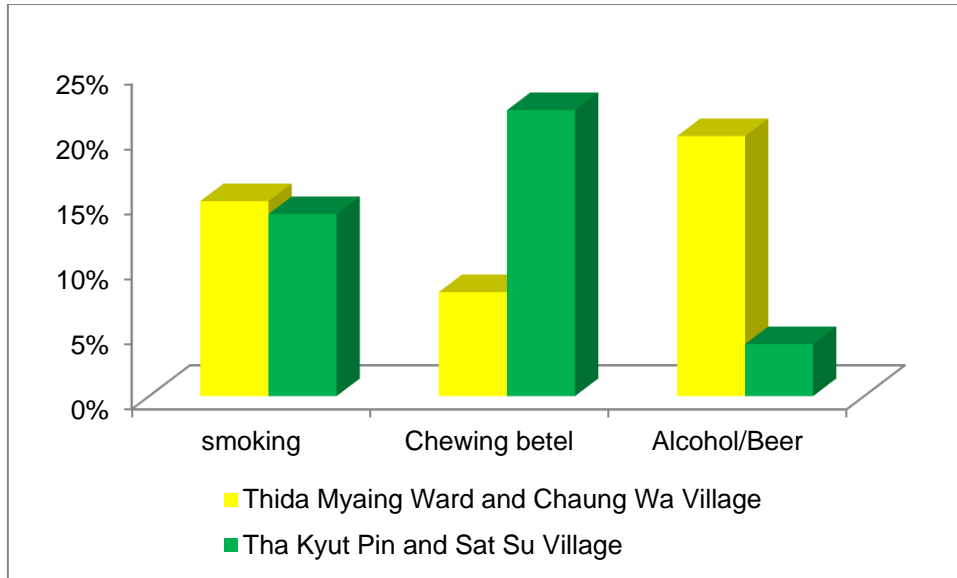


Figure 9.18 Usage of Alcohol, Chewing betel and Tobacco of respondents

For Covid -19 infection, most of the respondents don't feel the Covid-19 infection. Among them, 20 respondents per total respondents felt the Covid-19 infection. Most of the respondents (99%) already dosed the Covid-19 vaccine. In this area, most people could suffer common cold and 10% of the health problem is hypertension. Most of the respondents drink the river water naturally. Some of the respondents drink the boiling water. All of the respondents have the fly-proof toilets. Environmental sanitation seems to be moderate to high. Drinking water system is moderate as they have substantial knowledge for quality of drinking water.

9.7.7.16 Energy Sources

Most of the respondents use for cooking is fire wood because most of the respondents have the electricity.

9.7.7.17 Public Transportation

The townships throughout the project have good transport links. Townships can be transported by road and waterways. Each of the townships has public transportations such as railways, roads, waterways, and bridges as shown in Table 9-31.

Table 9-31 Public Access Railway Station, Roads, Bridges

Township	Air port	Navigation Channel	Railway Station	Rail Road Length (mile)	Car Gates	Road	Township Linked Road	Bridges (Above 180ft)	Bridges (Under 180ft)
Kyauktan	-	-	-	-	3	3	5	2	20
Kawhmu	-	1	-	-	5	3	2	-	11

Source: General Administration Department, 2019

9.7.7.18 Opinions upon the Project and Source of Information

It is also important to survey whether the people in the project area know about the project or not. If they know about the project they can prepare and provide proper opinion for the impacts of the project. The survey results showed that most of the respondents have already known about the project.

The survey also stressed on the sources of information about the project from which the respondents received. There are 4 main sources of information about the project received by the respondents. These are;

1. Information from head of village,
2. Information from neighbours,
3. Information from public media, and
4. Information from Developer

The result of the survey showed that information about the project is rarely came from head of village tracts and neighbours. Therefore, it is necessary to give proper information about the project to the people who are living around the project area for transparency and full cooperation.

9.7.7.19 Opinion towards the mitigation measures of the Project

According to the survey results, most of the respondents believed that the project will not have prominent negative, environment, ecological, social and health impacts on their livelihood and surrounding region. However, high percentage of respondents from all villages considered that the project will be gave the job opportunities and community development. 94 percent of respondents from the respondents believed the project but 6 percent of respondents were environmental impact of the project would be expected because they worried about the air, noise pollution and the gas spreading. For Ecological impact, 95 percent of respondents from the villagers believed the project but 5 percent of respondents worried about the decreasing the fishes. 93 percent of the respondents liked the project but 8 percent of respondents worried about the loss of their livelihood especially fishing. For health impact opinion, 98 percent of the respondents believed the project but some respondents are worried about the gas spreading during the operation phase. (Figure 9-19)

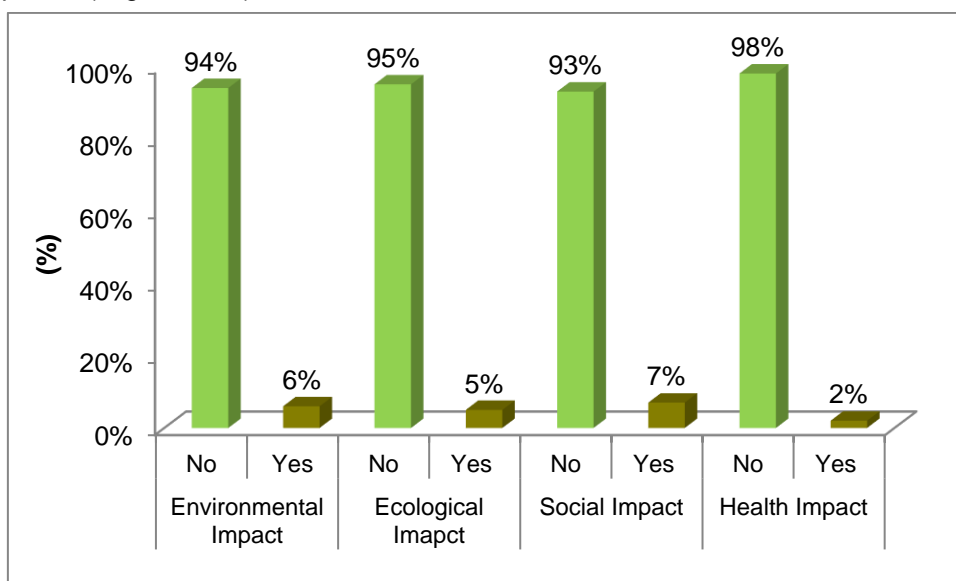


Figure 9.19 for the impact of the project

9.7.7.20 Concerns about the project and respondents' opinions

Concerns about the project and respondents' opinions are shown in the Table 9-32.

Table 9-32 Concerns and opinions of the respondents

Township	Ward/Village	Concerns about the project	Opinion
Kyauktan	Thidar Mying and Chaung Wa	1.Worried about the gas leakage	-There will be more positive effect of the project than negative impacts. Therefore, the project is acceptable. - The local people can get more job opportunities from the project - This project should support job opportunities and local development.
Kawhmu	Tha Kyut Pin and Sat Su	1.Impact on fishing activities during the operation 2. Impact on their livelihood	-There will be no impact of the project which is far and located on the other bank of the river. -The project can support for the country's energy requirements. So, it is acceptable. The project will also support local development and job opportunities

9.7.7.21 Requirements of Community Development for the project area

Head of Ward/Villages answered the requirements of community development in Key informant survey are as shown in Table 9-33.

Table 9-33 Requirements of Community Development for the village tracts

Township	Ward/Villages	Requirements of Community Development			
		1	2	3	4
Kyauktan	Thidar Myaing	To create job opportunities for local villagers	Health support for poor villagers	To provide road improvement	To provide CSR programs
	Chaung Wa	Want to get job opportunities for Villagers	To support educational facilities	To need Healthcare facilities	Drinking water for villagers
Kawhmu	Tha Kyut Pin/ Sat Su	To create job opportunities Road improvements	To support education sector (scholarship program)	Necessity of road repairing	To build the small jetty for villagers

9.7.7.22 Cultural Components

The quantity of religious buildings such as pagoda, monastery and other religious buildings are described in **Table 9-34**, and the historical building in affected Townships is described in **Table 9-35**.

All affected townships are no impact of cultural impact because the pipeline will across the virgin land village land.

Table 9-34 Religious buildings in affected Township along with the project site

Township	Pagoda	Monastery	Nunnery	Religious Hall	Church	Mosque	Hindu Temple	Chinese Temple
Kyauktan	148	164	61	157	2	2	6	1
Kawhmu	135	163	1	62	6	1	-	-

Source: General Administration Department, 2019

Table 9-35 Type and number of Historic buildings in affected townships

Township	Number of Historic pagodas	Name of Historic pagodas
Kyauktan	3	Kyaikmawwin, Pardargyi and Man Aung Yadanar
Kawhmu	-	-

Source: General Administration Department, 2019

9.8 Public Consultations and Disclosure

9.8.1 Introduction

The objective of this task is to conduct project disclosure and public consultation in order to obtain the suggestions/ concerns for developing the appropriate ESIA Study and Environmental and social Management Plan, while ensuring to inform the key stakeholders including the affected communities and the public of the project in a timely manner. In this way, the proposed project could obtain social acceptance by the public and the other stakeholders, which will ensure smooth implementation of the project ahead.

More specifically, Public Consultation Meeting conducted as a part of the Scoping Stage and EIA investigation of this Project has three objectives:

- I. To inform the stakeholders about the Project, its potential positive and negative environmental and social impacts related to the project implementation and preliminary mitigation measures to minimize environmental and social impacts;
- II. To seek views and opinions of the stakeholders on the Project, anticipated impacts and according mitigation measures; and;
- III. To ensure participation of and partnership with the key stakeholders through which identify major concerns and suggested/agreed solutions jointly for effective environmental and social management of the proposed project. The feedbacks need to be duly reflected in the ESIA and the ESMP, of which the final output need to be disclosed to the stakeholders in a timely manner.

9.8.2 Methodology and Approach

Project Proponent developed a preliminary Stakeholder Engagement Plan (SEP) which contained an overview of the relevant stakeholder groups to be consulted and the estimate schedule for engagement activities. During the EIA stage, information will be disclosed to various stakeholders, which included:

- Project Description
- EIA Overview
- Public Consultation Process
- Environmental Baseline Survey and Modeling Studies
- Impact Assessment Overview
- Key Impacts & Mitigation Measures
- Monitoring Program
- Contact Details

The main steps in a successful stakeholder consultation are as follows. Stakeholder identification and analysis, which consists of identification of the various stakeholders who are affected or likely to be affected (directly or indirectly) by the project.

- Public Consultation Meeting plan, which defines how to communicate with the identified stakeholders, will be handled throughout project preparation and implementation.
- Information disclosure provides awareness and helps stakeholder understand the project description and possible impacts and opportunities for the affected persons.

9.8.3 Consultations during Project Scoping and EIA Stages

Public consultation and information disclosure will be conducted in compliance with the EIA Procedure of Myanmar (2015). The Procedure requires two rounds of public consultation and information disclosure activities by the project proponent in the course of the EIA process: First during the scoping stage and the second round during the EIA preparation stage.

Once the EIA report is completed and submitted by the project proponent to MONREC-EMB, a review and approving body of the EIA, another round of the public information disclosure session is required in coordination with the local government and other GADs.

Relevant provisions of the EIA Procedure (2015) on the public consultation and information disclosure are quoted in the left column of the table below: the right column indicates the actual activities carried out by the project proponent with the EIA Study Team's technical support for the proposed project.

All the listed activities were carefully documented and recorded. The details of each of the activities are presented in the following Sections as well as their respective annexes.

9.9 Summary of Public Consultation Meeting (PCM) at the Scoping and EIA stages

9.9.1 Summary of Public Consultation Meeting (PCM) at the Scoping

9.9.2 Scoping Stage Public Consultation

During February and November 2022, consultation meetings were held with various relevant stakeholders at Yangon regional level and township levels. The purpose of the scoping consultations was to present information of the Project, gather information on potentially affected people, and gather information on the potential data gaps. Scoping consultations involved face-to-face and virtual meetings with a range of stakeholders including a representative for the Chief Minister of Yangon, Regional level ECD and GAD, Members of Yangon Region Hluttaw, Member of Pyithu Hluttaw, and Township GADS from the Project Area.

Scoping consultation at the township level was not conducted physically due to COVID measures and stay home practices in Yangon. However, BE and ERM held virtual meetings with Kyauktan and Kawhmu Township in October and November 2020 in line with ECD guidance for public consultation meetings of the project during COVID-19 pandemic. The consultation helped the Project to gather information on potentially affected community, and on potential data gaps and how these can be closed out in the EIA Report. Scoping consultation involved virtual online meetings with a range of stakeholders including local communities, ward administrators, regional parliament representatives and other related government departments. The meetings were attended and consisting of local communities, GADs, other representatives from related department.

Due to COVID-19 pandemic and ongoing situation in Myanmar, public consultation and primary socio-economic data collection for EIA investigation is not yet conducted. Public consultation and primary socio-economic data collection for EIA investigation will be conducted after situation allowed in order to have better participation by stakeholders, including land owner and land users affected by land acquisition of the Project. The EIA Report will be updated once the public consultation and primary socio-economic data collection for EIA investigation is done.

The date, stakeholder and location and purpose of engagement of each meeting are summarized in Table 9-36.

Table 9-36 Scoping Consultation Activities Undertaken

Stage	Myanmar EIA Procedure (2015)	Activities carried out for the Proposed Project
Scoping Stage	<p>"Article 50. As part of the Scoping, the Project Proponent shall ensure that the following public consultation and participation process is carried out:</p> <p>a) disclose information about the proposed Project to the public and civil society through posting on the Project or Project Proponent's website(s) and local media, including by means of the prominent posting of legible sign boards and advertising boards at the Project site which are visible to the public; and</p> <p>b) Arrange the required complement of consultation meetings as advised by the Ministry, with local communities, potential PAPs, local authorities, community based organizations, and civil society</p>	<p>1) One public consultation meeting with Townships GADs (25 February 2022, 28 October 2022 and 4 November 2022) including presentation slides (PPT) of the project description and EIA processes, study and purpose of the consultation</p>
2.EIA Stage (draft)	<p>"Article 61. As part of the EIA investigations, the Project Proponent shall undertake the following consultation process:</p> <p>a) Timely disclosure of all relevant information about the proposed Project and its likely Adverse Impacts to the public and civil society.</p>	<p>1) One public consultation meetings with Kyauktan Township (6 October 2022) including presentation slides (PPT) of the project overview and preliminary survey results of the expected environmental and social impacts.</p> <p>2) FGDs with the affected villagers in Kawhmu and Kyauktan Townships (22th September 2022 and 25th September 2022)</p> <p>3) Household perception survey conducted against total 145 affected households between (22th September 2022 and 25th September 2022) mainly asking the following:</p> <ul style="list-style-type: none"> -Degree of project awareness - The sources of information - Expected benefits and adverse impacts of the project - Further comments, opinions, and suggestions

3. After submission of EIA Report to ECD	"Article 65. Not later than fifteen (15) days after submission of the EIA Report to the Department, the Project Proponent shall disclose the EIA Report to civil society, PAPs, local communities and other concerned stakeholders: (i) the website(s) of the Project or Project Proponent; (iii) at public meeting places (e.g. libraries, community halls); and (iv) at the offices of the Project Proponent."	This process will take place in the future once the EIA report is completed and submitted to the MONREC-ECD. The project information is available for public in the Brighter Energy' director' email: saiayechan@brighterenergymm.com
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The date, stakeholder and location and purpose of engagement of each meeting are summarized in Table 9-37.

Table 9-37 EIA Consultation Activities Undertaken

Date	Stakeholder/Location	Purpose of Engagement
25 February,2022 (Tuesday)	Chief Minister Office Meetings	Present information on the Project; Get approval for township/ward and village level meetings; and Gather concerns and suggestions from stakeholders.
28 October,2022 (Wednesday)	Kawhmu Township GAD, Regional Parliament Representative, Township Land Registration and Statistics, Tha Khut Pin VT Leader (Virtual Meeting)	Present Project information to local government, ward administrators, local communities and other interested parties; Gather concerns and suggestions from stakeholders
4 November,2022 (Wednesday)	Thidar Myaing Ward Leader, 100 Household Leader and Ward Patrons (Virtual Meetings)	Present Project information to local government, ward administrators, local communities and other interested parties. Gather concerns and suggestions from stakeholders

Below points summarized the key questions and concerns raised in pervious scoping public consultation meetings.

- Project Information and Environment
 - The company should allow construction vehicles to park within the Project boundary.

- The company should consider influx of construction workers and consider having food canteen/center as one their facilities during construction.
- Grievance Mechanism
 - The company to include details of the grievance mechanism.
- Livelihoods
 - Concerns on the impact of fishing in Tha Kyut Pin Village.
- Waste Management
 - How wastes will be managed and if there will be any disposal into the river.
 - As per the requirements Article 50 of the EIA Procedure, BE will disclose information on the Project in two newspapers (one in English and one in Myanmar). Project information will be available on BE's website and signboards will be posted at the site office. The advertisements for the for the scoping stage were announced in The Global New Light of Myanmar (English) and The Mirror (Burmese) and EIA stage will be announced after the submission of the EIA report to ECD.

9.9.3 EIA Stage Public Consultation

Brighter Energy Company together with REM Consultant Team conducted the 2nd public consultation meeting on 6th October 2022 with local officials for Kyauktan Township. Representatives were invited to attend the 2nd Public Consultation Meetings.

The Project Proponent developed a preliminary Stakeholder Engagement Plan (SEP) which contained an overview of the relevant stakeholder groups to be consulted and the estimate schedule for engagement activities. During the EIA stage, information will be disclosed to various stakeholders.

- The presentation and brochures were prepared and explained in Myanmar language. The suggestions and opinions from the participants were received in the question and answer session.

9.10 Results of Consultation Meeting for Petroleum Terminal and Storage Project, Thilawa, Myanmar

9.10.1 Meeting of Minutes at Kyauktan Township, Yangon Region

Table 9-38 Main Discussion Points at Kyauktan Township

Suggestion/Question	Explanation and Response
Heads of Thidar Myaing Ward, Chaung Wa and Tha Kyut Pin Villages They have no questions and they said that they are satisfied that project.	
Daw Win Win Maw (AD, ECD from Thilawa Special Economic Zone)	U Sai Aye Chan (BE Co.,) Oily water separate system will be used for waste water disposed. Only water will be disposed into the river and residual oil will be disposed in assigned area.

It is observed that waste water will be disposed into the river. What are the techniques and equipment to utilize for waste water and disposal from the project?

In the social impact assessment, job opportunity section should be emphasized on both before and after the implementation of the project.

Daw Win Win Maw (AD, ECD from Thilawa Special Economic Zone)

Water mixed with residue oil is a hazardous water. It should be checked before the operation. Otherwise there would be some impacts on aquatic ecosystem.

Daw Thin Thin Nu (AD, ECD, Yangon South District)

Evaporators should be used in the project and waste disposed system should also be considered.

U Khin Win (Officer, Fishery Department, Kyauktan Township)

If the buoys are set up in the river, fishing plots will be lost for local fishermen. Chemical residues from the oil tanks will also make impacts on aquatic ecosystem.

Daw Khin Ohnmar Htwe (REM Co.,)

In S.I.A job opportunity sector will be studied for both before and after the project implementation. Some systems for job creation will be suggested in the EIA reports.

U Sai Aye Chan (BE Co.,)

The company will follow the standard producers.

U Sai Aye Chan (BE Co.,)

The company will discuss with related government sectors for waste disposals. There will be stacks for evaporation. Monitoring system will also be set up in the project. There will be CSR programs in the project.

U Sai Aye Chan (BE Co.,)

The company will follow the systematic EIA producers, for fishing, the company needs the maps showing fishing plots of the local fishermen.





Figure 9.20 Public Participation Meeting Photos

9.11 Further ongoing Consultations

Further ongoing consultation throughout Petroleum Terminal and Storage Project is essential in order to identify and address the future impacts and the mitigation measurement through stakeholder comments and complaints. Public Consultations will be promoted the increased understanding between the project owner and project affected persons (PAPs) and can result in all stakeholder's acceptance of the project.

A Grievance Readdress Mechanism has been established in the form of Complaint process that is provided Environmental and Social Management Plan. Community Liaison Officer will be assigned to facilitate the grievance process and to give the information to the local communities.

9.12 Disclosure

Brighter Energy Company will distribute the executive summary in Myanmar version to respective townships and village tracts and suggestion or comments can be made until it gets ECC approval from ECD. If required, the suggestion boxes will also be provided to collect the feedback and suggestion from stakeholders.

The project disclosure required for the Environmental Impact Assessment, EIA was conducted in compliance with the EIA Procedure. Project disclosure was undertaken during the scoping and EIA stages. The Brighter Energy company of project disclosure is using the representative of Brighter Energy Company' email is saiayechan.brighterenergymm.com and Office' address is No.337, Pyay Road, Sanchaung Township, Yangon, Republic of the Union of Myanmar.

APPENDIX A BRIGHTER ENERGY COMPANY REGISTRATION



ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်
Certificate of Incorporation

အလင်းတန်းစွမ်းအင်ကုမ္ပဏီလီမိတက်
BRIGHTER ENERGY COMPANY LIMITED
Company Registration No. 107328637

မြန်မာနိုင်ငံကုမ္ပဏီများအက်ဥပဒေ ၁၉၁၄ ခုနှစ် အရ
အလင်းတန်းစွမ်းအင်ကုမ္ပဏီလီမိတက်
အား ၂၀၁၇ ခုနှစ် မတ်လ ၁၇ ရက်နေ့တွင်
အစုရှယ်ယာအားဖြင့် တာဝန်ကန့်သတ်ထား သည့် အများနှင့်မသက်ဆိုင်သောကုမ္ပဏီ
အဖြစ် ဖွဲ့စည်းမှတ်ပုံတင်ခွင့် ပြုလိုက်သည်။

This is to certify that
BRIGHTER ENERGY COMPANY LIMITED
was incorporated under the Myanmar Companies Act 1914 on 17 March
2017 as a Private Company Limited by Shares.

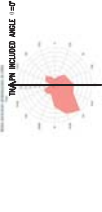
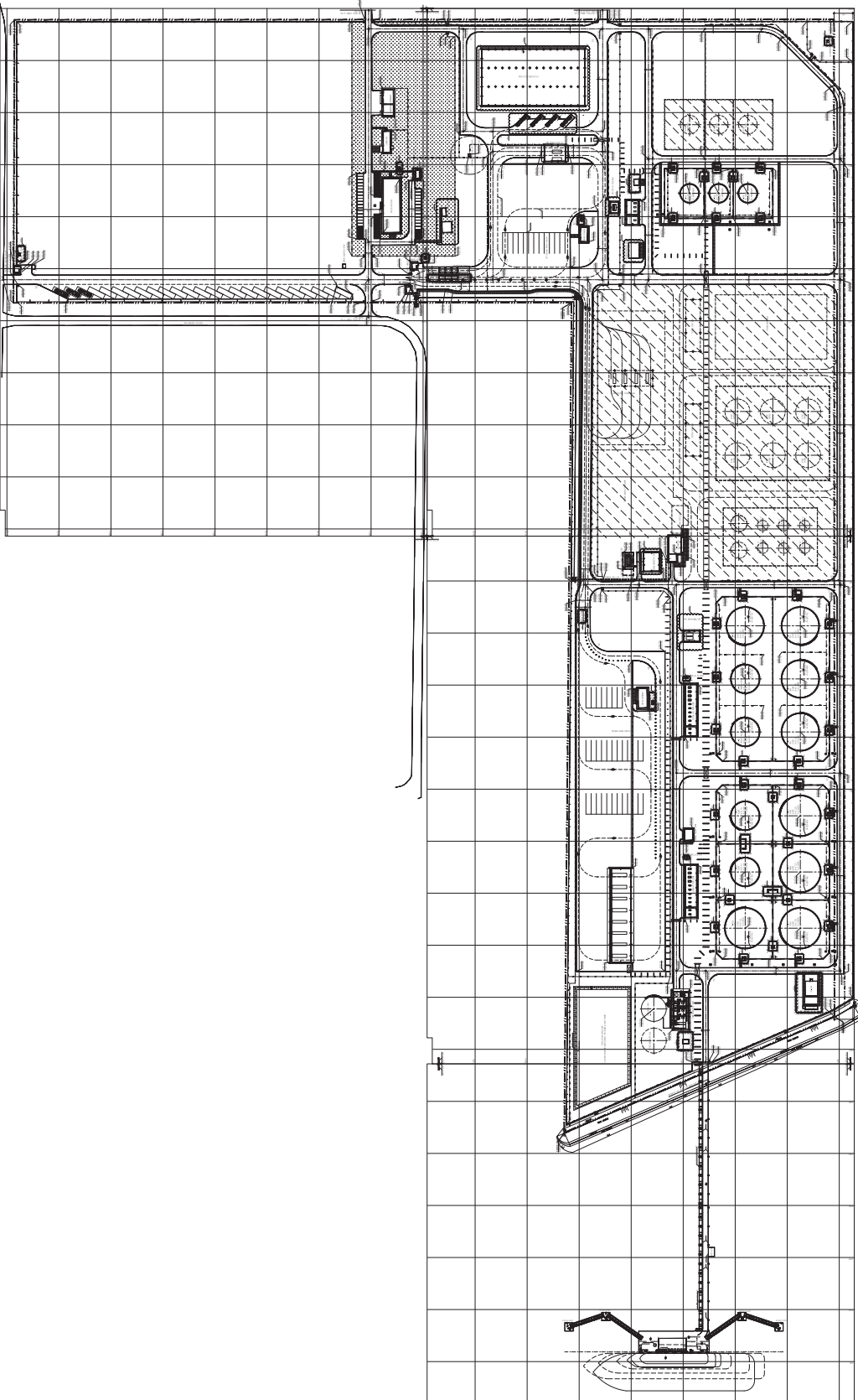
ကုမ္ပဏီမှတ်ပုံတင်အရာရှိ
Registrar of Companies

ရင်းနှီးမြုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန
Directorate of Investment and Company Administration



Former Registration No. 5646/2016-2017(YGN)

APPENDIX B PROJECT DRAWING LAYOUT PLAN



CONTROL POINT		
No.	NO	NO
1	183703.00	5200.00
2	183703.00	5200.00
3	183703.00	5200.00
4	183703.00	5200.00
5	183703.00	5200.00
6	183703.00	5200.00
7	183703.00	5200.00
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46	183703.00	5200.00
47	183703.00	5200.00
48	183703.00	5200.00
49	183703.00	5200.00
50	183703.00	5200.00

- NOTES**
1. ALL DIMENSIONS IN THIS DRAWING ARE AT THE CENTER OF THE ROOF, FENCE AND BOND WALL AND AT THE AXIS OF BUILDINGS AND STRUCTURES.
 2. ALL COORDINATES, ELEVATIONS AND DIMENSIONS ARE IN M UNLESS OTHERWISE NOTED.
 3. ALL DIMENSIONAL SYSTEMS ARE REFERRED TO WGS-84, THE REFERENCE SYSTEM IS UNIVERSAL TRANSVERSE MERCATOR AND THE CURVED AREA IS IN DEGREES.
 4. THE CALCULATION BETWEEN THE "N", "E" COORDINATES AND THE "X", "Y" COORDINATES SHALL BE AS FOLLOWS:

$$N = 1000000 + (X - 100000) \times (Y - 100000)$$

$$E = 1000000 + (X - 100000) \times (Y - 100000)$$

$$X = 100000 + (N - 1000000) / (Y - 100000)$$

$$Y = 100000 + (E - 1000000) / (X - 100000)$$
 5. THE CONTROL POINT (MIDDLE POINT) OF CONSTRUCTION COMMAND SYSTEM IS ESTABLISHED AT THE CONTROL POINT (CP).
 6. SETTING AND TRUSTEES SHALL REFER TO SETTING OF TRUSTEES SHOWN IN THIS DRAWING.
 7. THIS DRAWING IS FOR APPROVAL ONLY. THE BUILDINGS MARKED BY THE CLOUD LINE SHALL NEED TO BE UPDATED.

- LEGENDS**
- BRIDGES AND STRUCTURES
 - ROADS
 - CONCRETE ROAD AND DRIVE
 - BOUNDARY LINE
 - CHIMNEY
 - CHIMNEY LINE
 - CHIMNEY LINE (FRAGMENT)
 - CHIMNEY LINE (FRAGMENT)
 - BOND WALL
 - PIPE BACK
 - FENCE GATE
 - PERMITS FOR THE FACT
 - SOFTWALK
 - WORKING AREA
 - FORMING AREA
 - CONCRETE
 - ROAD FENCE (PERMITS)
 - RAINAGE DITCH
 - CHIMNEY
 - CHIMNEY LINE
 - CHIMNEY LINE (FRAGMENT)
 - CHIMNEY LINE (FRAGMENT)
 - BOND WALL
 - PIPE BACK
 - FENCE GATE

REFERENCE DRAWINGS

No.	Date	Description
1	18.05.2020	Issued for Approval
2	23.02.2020	Issued for Approval
3	06.06.2018	Issued for Approval
4	04.12.2017	Issued for Approval

PROJECT INFORMATION

CLIENT
Brighter Energy Company Limited

CONTRACTOR
China Petroleum Pipeline Engineering Co., Ltd.

PROJECT TITLE
Tank Farm & Distribution System Project of WEC Jand (Thailand)

DRAWING TITLE
GENERAL FLOOR PLAN

SCALE
1:1000

DATE
18.05.2020

NO.
01

APPENDIX C ENVIRONMENTAL BASELINE SURVEY REPORTS AND RESULTS

Environmental Baseline Survey for Brighter Energy Oil Terminal Project

1. Introduction

The environmental baseline survey was conducted as part of the Environmental and Social Impact Assessment (ESIA) for the “Brighter Energy Oil Terminal Project” located in the Kyauktan Township, Yangon Region, to know the existing environmental condition around the project site.

There are 4 locations of air quality, noise, ground water and soil, 3 location of surface water, sediment and traffic volume were surveyed. 3 benthos samples were also collected. Biodiversity study around project site were carried out.

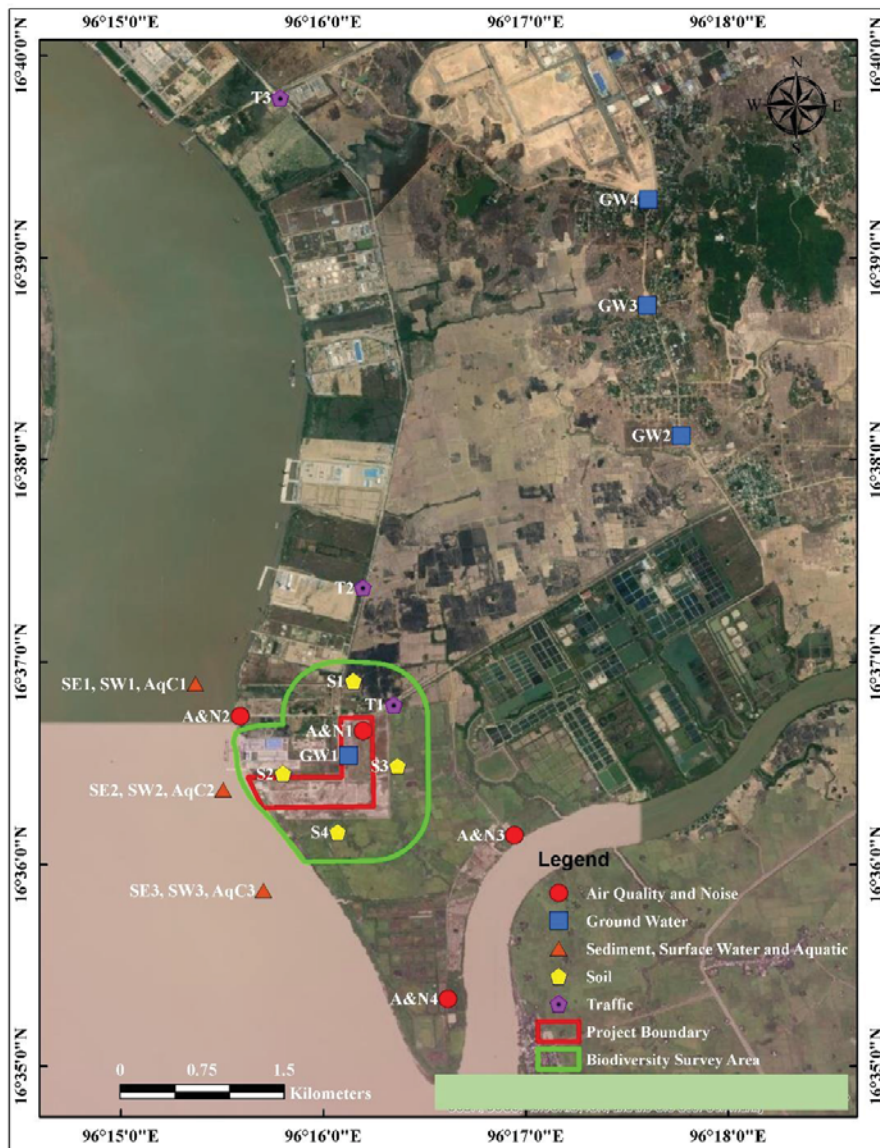


Figure 1-1 Location map of survey points

Table 1-1 Survey items for environmental baseline survey

Survey Item	Location	Duration
Air Quality	4 stations	24-hours
Noise Level	4 stations	24 hours
Traffic Volume	3 stations	Daytime for 1 weekday and 1 weekend
Surface Water Quality	3 stations	-
Ground Water Quality	4 stations	-
Soil Quality	4 stations	-
Sediment Quality	3 stations	-
Biodiversity	Project site and surrounding	-

1.1 Air Quality

Survey Item

The parameters for air quality survey are SO₂, NO₂, CO, PM_{2.5}, and PM₁₀.

Survey Location

The brief description of air quality monitoring point is presented in Table 1.1-1.

Table 1.1-1 Location of air quality survey

Sampling Point	Coordinates	Site Description
A&N1	16°36'31.92"N 96°16'8.28"E	It was monitored in the project site. The car road (from Kyauktan to ship breaking compound) is located at the north of this station about 350m in away. The nearest residential area is the Thidar Myaing Quarter (of Kyauktan Township) and far about 4km from the project site. Possible emission sources are from the vehicles and machines of construction activities at the project site.
A&N2	16°36'44.01"N 96°15'35.24"E	It was monitored at the area between the western boundary of ship breaking compound and the eastern bank of Yangon River. It is distanced about 600m from the western boundary of the project site. Possible emission sources are from the construction activities at the project site as well as the vessels in Yangon River.
A&N3	16°36'7.78"N	It was monitored at the opened space area located about 800m at the southeast of project site. Car road (to

	96°16'56.53"E	Myanmar Economic Corporation-MEC compound) is located at the north of A&N3, about 150m away. This station is also closed to Hmaw Wun Chaung. Possible emission sources are from the traffic activities along the car road.
A&N4	16°35'20.09"N 96°16'36.92"E	It was monitored in the MEC compound and distanced about 1.2 km from the project site. This station is very closed to the car road. Possible emission sources are from the traffic activities along the car road.

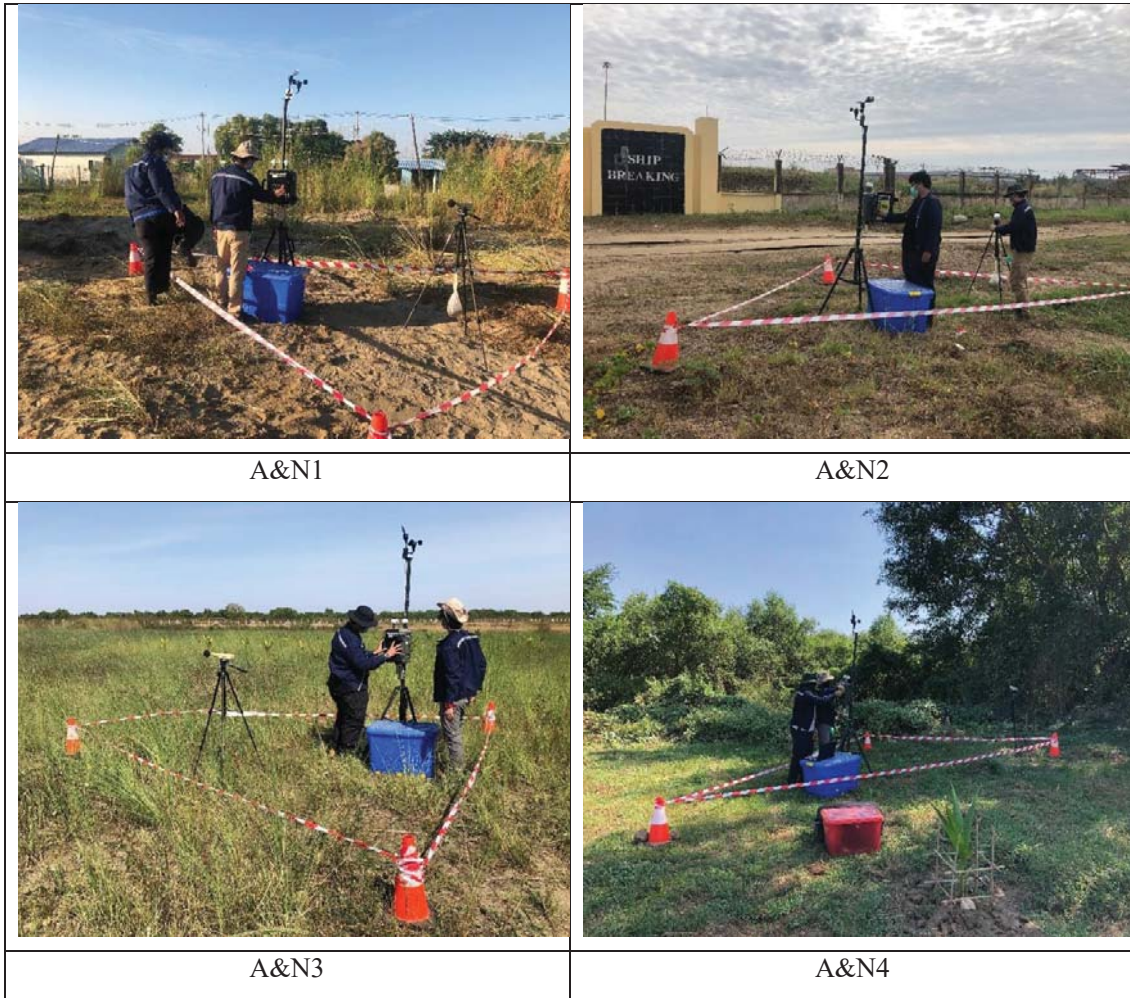


Figure 1.1-1 Air quality survey

Survey Period

Air quality survey was conducted for 24-hour continuous at each location during 21st to 27th December, 2020. The measurement duration is shown in Table 1.1-2.

Table 1.1-2 Survey duration for air quality survey

Sampling Point	Sampling Duration
A&N1	24.12.2020-25.12.2020
A&N2	26.12.2020-27.12.2020
A&N3	22.12.2020-23.12.2020
A&N4	21.12.2020-22.12.2020

Survey Methodology

Sampling and analysis of ambient air quality were conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S.EPA). The Haz-Scanner Environmental Perimeter Air Station (EPAS) was used to collect ambient air survey data. Sampling rate or air quality data were measured automatically and directly read and recorded onsite for measured parameters as shown in Table 1.1-3.

Table 1.1-3 Sampling and analysis method for air quality

No.	Parameter	Analysis Method
1	Sulfur dioxide (SO ₂)	On site reading
2	Nitrogen dioxide (NO ₂)	On site reading
3	Carbon Monoxide (CO)	On site reading
4	Particulate matter 2.5 (PM _{2.5})	On site reading
5	Particulate matter 10 (PM ₁₀)	On site reading



Figure 1.1-2 Haz-Scanner Environmental Perimeter Air Station

Survey Result

Table 1.1-4 presents the ambient air quality results with a 24-hour averaging period for parameters which have relevant Myanmar National Environmental Quality (Emission) guidelines (NEQEG) and USEPA guideline. While PM_{2.5} concentration is lower than the applied standard, 24-hours concentration of PM₁₀ at A&N1, A&N2 and A&N3 are higher than NEQEG target value. High concentration of PM₁₀ at A&N1 and A&N2 may be caused by the construction activities at the project site. There is a large sand pile near A&N3 as well as high wind speed was also observed during monitoring, and that process may cause the high concentration of PM₁₀ at A&N3.

SO₂ concentration of A&N1 is higher than the applied standard but other stations are complied with the applied standard. High concentration of SO₂ at A&N1 is caused by the vehicles and machines of construction activities at the project site.

As there is no 24-hours guideline value for NO₂ and CO in NEQEG, the target value of NO₂ was applied by the 1-hour guideline of NEQEG as well as CO by 12-hour average concentration of Thailand Standard. According to the results, 1-hour concentration of NO₂ and 24-hour average concentration of CO is also lower than the applied standards.

Table 1.3.4 Ambient air quality result

Sampling Point	NO ₂ 1-hour (µg/m ³)	CO 12-hour (mg/m ³)	PM _{2.5} 24-hour (µg/m ³)	PM ₁₀ 24-hour (µg/m ³)	SO ₂ 24-hour (µg/m ³)
A&N1	58	0.21	13	55	40
A&N2	80	0.16	14	60	14
A&N3	77	0.13	10	62	19
A&N4	74	0.11	8	25	14
Target Value	200	10.26	25	50	20

Source: Myanmar: National Environmental Quality (Emission) Guidelines (December, 2015).

Thailand: Notifications of National Environmental Board No.10, B.E 2538 (1995), No. 24, B.E. 2547 (2004), No. 28, B.E 2550 (2007), No. 33, B.E 2552 (2009), No. 36, B.E 2553 (2010) under the Enhancement and Conservation of National Environmental Quality Act B.E.2535 (1992).

1.2 Noise Level

Survey Item

Myanmar government issued the National Environmental Quality (Emission) Guidelines in 2015 and thus the survey result was evaluated by comparing with this standard.

Table 1.2-1 Survey parameters for noise level

No.	Parameter	Unit	Environmental Standard (Myanmar)		
			Category	Day time 7:00-22:00	Night time 22:00-7:00
1	A-weighted loudness equivalent (L _{Aeq})	dB	Residential, educational, institutional	55	45
			Industrial, commercial	70	70

Source: National Environmental Quality (Emission) Guidelines, 2015

Survey Location

The locations of noise level survey are as same as air quality monitoring points.

Survey Period

The survey duration of noise level is as same as air quality monitoring survey.

Survey Method

Measurement of environmental sound level was conducted by referring to the recommendation of International Organization for Standardization (ISO), i.e. ISO 1996-1:2003 and ISO 1996-2:2007. The instrumentation used for noise quality survey is shown in the following Table 1.2-2 and Figure 1.2-1. Noise meter was set up to record the log as one minutes intervals during survey period. One day noise level L_{Aeq} was calculated by using the following array formula:

$$L_{eq} = 10 \log \frac{1}{T} \left[\sum_{i=1}^n 10^{L_{eq}/10} \right]$$

L_{eq} = Equivalent continuous noise level (dB)(A)
 i = Time at each hour
 T = Total time over which the L_{eq} is required (Hours)

Table 1.2-2 Instrumentation for noise survey

Instrumentation	Description

Sound level meter	Sound level meter with SD Card (Brand - Lutron; Model - SL-4023SD)
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Figure 1.2-1 Lutron Sound Level Meter

Survey Result

The noise level results were compared against day time and night time limits of Myanmar National Environmental Quality (Emission) Guideline for industrial commercial receptors, i.e., 70 dB(A) for daytime and 70 dB(A) for nighttime. According to the results, noise level of N-1, N-3, N-4 are lower than the applied standard. Observed noise sources around the monitoring station were described in table 1.2-4.

Table 1.2-3 Daytime and Nighttime noise level results

	N1		N2		N3		N4	
Result	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime
		46	44	51	49	45	49	54
Target Value	70	70	70	70	70	70	70	70

Table 1.2-4 Observe noise emission sources

Monitoring Station	Exceedance (if any)	Noise Sources Observed
N-1	Daytime and Nighttime	Traffic activity
N-2	Daytime and Nighttime	River Transportation

N-3	Daytime and Nighttime	Residential activity
N-4	Daytime and Nighttime	Construction activity, residential activity, traffic

1.3 Traffic Volume

Survey Item

The survey items for traffic volume survey are number of vehicles and types of vehicles when vehicles pass through the survey point.

Survey Location

Traffic volume survey was conducted at three locations as described in the following table.

Table 1.3-1 Location of traffic volume survey point

Survey point	Coordinates	Description
T1	16°36'47.35"N 96° 16'20.88"E	Beside car road from Kyauktan Town to the project site or ship breaking compound. About 200m from northeast corner of project site.
T2	16°37'22.12"N 96° 16'11.77"E	Beside car road from Thilawa SEZ Class A to the project site or ship breaking compound. About 1.2km from northern boundary of project site.
T3	16°39'47.46"N 96° 15'47.24"E	Beside car road from Thilawa SEZ Class A to the project site or ship breaking compound and in front of Thilawa sub-station. About 6km from northern boundary of project site.

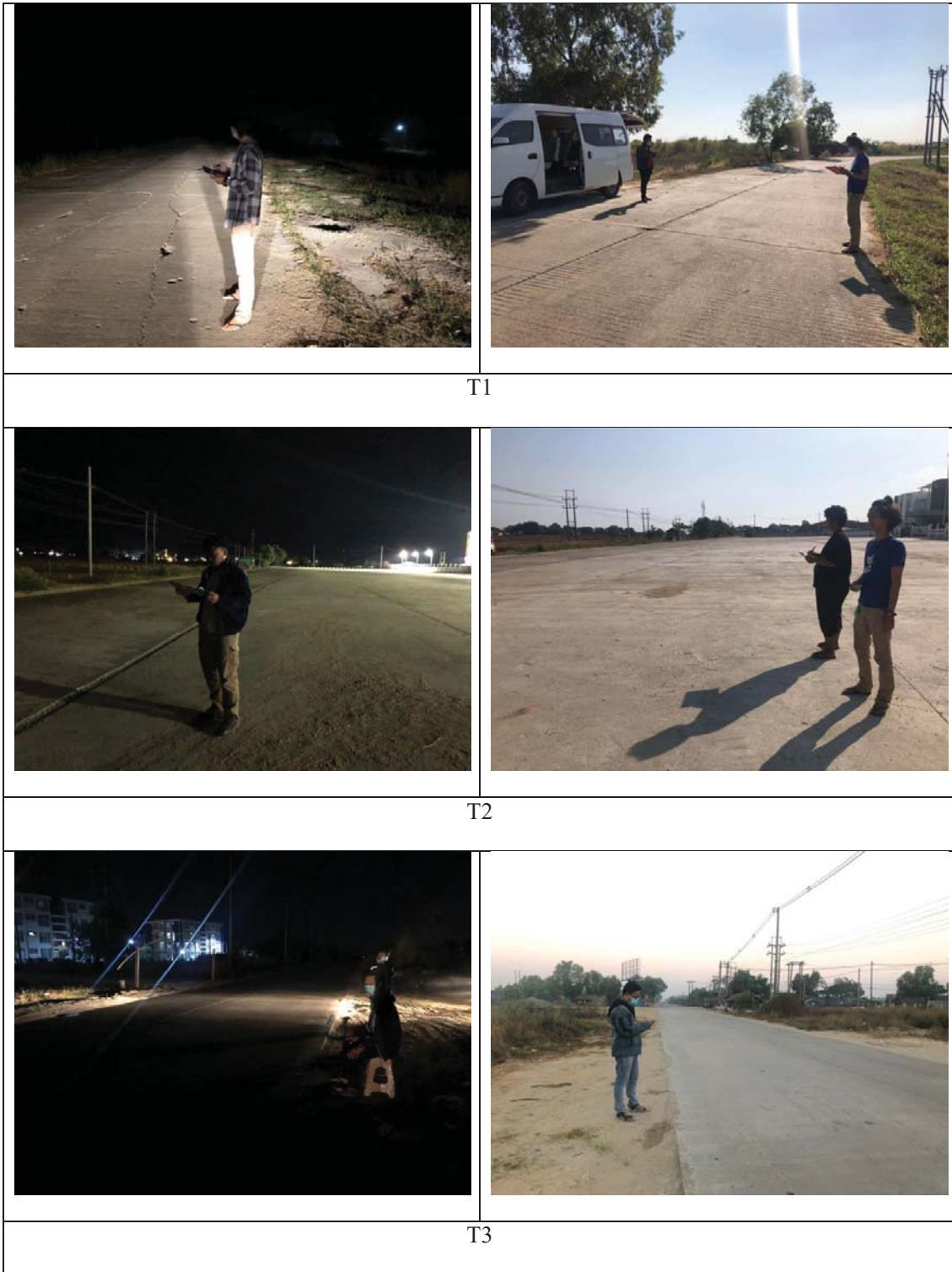


Figure 1.3-1 Traffic volume survey

Survey Period

The vehicle traffic survey was conducted for 4 durations within daytime and evening (5:00-7:00; 8:00-11:30; 15:00-18:30; 20:30-22:30) for one weekday and one weekend during 5th to 10th January 2021. Detail of the survey period is shown in the following table.

Table 1.3-2 Survey Period for traffic volume survey

Survey Point	Survey Period (Weekday)	Survey Period (Weekend)
T1	5 January 2021	9 January 2021
T2	6 January 2021	9 January 2021
T3	7 January 2021	10 January 2021

Survey Method

Manual direct observation and recording using tally counters were conducted to count the number of vehicles moving in both direction at each station. Type of vehicles was also recorded concurrently. All vehicles were classified into three types as detailed in Table 1.3-3. For specified durations, quantities of each type of vehicle recorded by the tally counters were summarized and then the tally counters were reset for counting again.

Table 1.3-3 Classification of vehicle types

No.	Classification	Description
1	Two-wheeled vehicle	Motorbike
2	Four-wheeled light vehicle	Sedan/pickups, small trucks (2-axles) and minibus
3	Four-wheeled heavy vehicle	Medium trucks (3-axles), larger trucks (4-axles and more) and bus/express
4	Other	Local tractor

Survey Result

Traffic volume recorded at the survey point is presented in Table 1.3-4. The table shows that the number of all types of vehicle recorded each duration. Among four types of vehicles, two-wheel vehicle is highest because of local people mostly use the motorbike. Comparing between four-wheeled vehicles, the volume of four-wheeled light vehicle is also higher than heavy vehicles at all survey points.

Table 1.3-4 Vehicle traffic volume

Survey Point	Date	Survey Period	Two-wheeled vehicle	Four-wheeled light vehicle	Four-wheeled heavy vehicle	Others	Total
T1	Weekday	05:00-07:00	97	6	15	3	121

Survey Point	Date	Survey Period	Two-wheeled vehicle	Four-wheeled light vehicle	Four-wheeled heavy vehicle	Others	Total
	(5.1.2021)	8:00-11:30	312	67	5	13	397
		15:00-18:30	284	61	3	7	355
		20:30-22:30	13	4	0	0	17
	Weekend (9.1.2021)	05:00-07:00	51	4	0	9	64
		8:00-11:30	197	55	5	5	262
		15:00-18:30	264	68	15	8	355
	20:30-22:30	8	3	0	0	11	
T2	Weekday (6.1.2021)	05:00-07:00	57	9	5	0	71
		8:00-11:30	181	125	10	4	320
		15:00-18:30	201	111	7	9	328
		20:30-22:30	6	3	0	2	11
	Weekend (9.1.2021)	05:00-07:00	74	6	6	13	99
		8:00-11:30	168	89	17	6	280
15:00-18:30		223	95	23	9	350	
	20:30-22:30	11	7	3	0	21	
T3	Weekday (7.1.2021)	05:00-07:00	95	14	27	3	139
		8:00-11:30	290	307	240	3	840
		15:00-18:30	385	337	212	5	939
		20:30-22:30	44	13	19	0	76
	Weekend (10.1.2021)	05:00-07:00	101	15	20	2	138
		8:00-11:30	209	122	149	8	488
15:00-18:30		333	201	98	3	635	
	20:30-22:30	10	2	2	0	14	

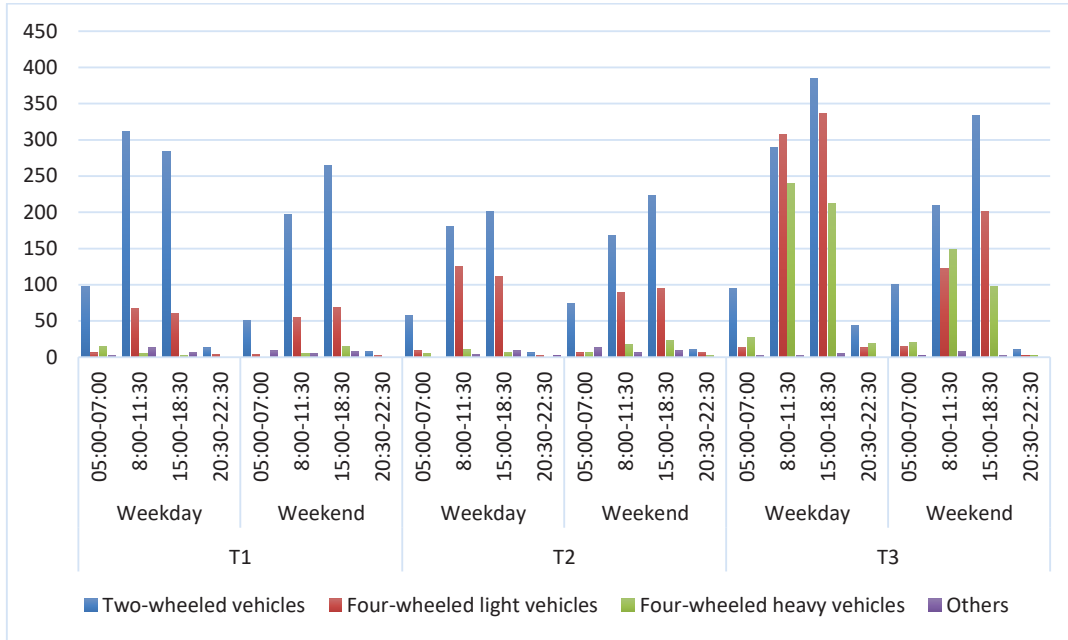


Figure 1.3-2 Vehicle traffic volume

1.4 Water Quality

Survey Item

Parameters for water quality including both groundwater and surface water survey are determined so as to cover the parameters of existing environmental standards. There are 4 ground water sampling points around project site as well as 3 surface water sampling points in Yangon River.

Survey Location

The description of surface water sampling point is presented in Table 1.4-1.

Table 1.4-1 Sampling point of water quality

Sampling Point	Coordinates	Site Description
SW1	16°36'53.52"N 96°15'22.09"E	Yangon River, upstream of project site, about 1km from proposed jetty area. Water depth is 20m. The water is low transparency and highly turbidite.
SW2	16°36'22.03"N 96°15'30.29"E	Yangon River, middle stream of project site, at proposed jetty area. Water depth is 20m. The water is low transparency and highly turbidite.

SW3	16°35'52.24"N 96°15'42.28"E	Yangon River, downstream of project site, about 1km from proposed jetty area. Water depth is 20m. The water is low transparency and highly turbidite.
GW1	16° 36' 32.32"N 96° 16' 7.58"E	Tube well located in the project site. The depth of tube well is 60m. The water is transparent and utilized for washing, cooking and plantation.
GW2	16° 38' 7.25"N 96° 17' 46.13"E	Tube well in residential compound, Shwe Pyi Tharyar Quarter, Kyauktan Township, about 4km north of project site. The depth of tube well is 15m. The water is transparent and utilized for washing, cooking and plantation.
GW3	16° 38' 45.92"N 96° 17' 36.13"E	Tube well in residential compound, Shwe Pyi Tharyar Quarter, Kyauktan Township, about 5km north of project site. The depth of tube well is 37m. The water is transparent and utilized for washing, cooking and plantation.
GW4	16° 39' 17.31"N 96° 17' 36.46"E	Tube well in residential compound, Aye Mya Thida Quarter, Kyauktan Township, about 5.5km north of project site. The depth of tube well is 110m. The water is transparent and utilized for washing, cooking and plantation.





Figure 1.4-1 Water quality survey

Survey Period

Surface water and ground water quality survey was conducted on 23 December, 2020.

Survey Method

Water samples were taken by Alpha horizontal water sampler and collected in sterilized sample containers. All sampling was in strict accordance with recognized standard procedures. All samples were kept in the iced box and transported to the laboratory and stored at 2-4 °C refrigerators.

Water samples were sent to REM-UAE Laboratory in Yangon and UAE Thailand for laboratory analysis.

Survey Result

Results of surface water quality survey are shown in following table.

Table 1.4-2 Results of water quality

No.	Parameter	SW1	SW2	SW3	GW1	GW2	GW3	GW4
1	pH	6.9	7.2	7.3	6.9	7.6	7.1	7.1
2	Ammonia (mg/l)	ND	ND	ND	3.08	ND	ND	ND
3	Arsenic (mg/l)	0.0038	0.0025	0.0019	0.0013	0.0010	0.0012	0.0006
4	Biochemical Oxygen Demand (mg/l)	2.9	ND	1.5	1.5	1.2	ND	1.2
5	Cadmium (mg/l)	ND	ND	ND	ND	ND	ND	ND
6	Chemical Oxygen Demand (mg/l)	74	58	45	51	53	26	29
7	Chromium (mg/l)	0.019	0.014	ND	ND	ND	ND	ND
8	Copper (mg/l)	0.004	ND	ND	ND	ND	ND	ND
9	Fecal Coliforms (MPN/100ml)	920	79	350	<1.8	4.5	2.0	4.5
10	Mercury (mg/l)	ND	ND	ND	ND	ND	ND	ND
11	Nitrate (mg/l)	0.44	0.53	1.24	11.1	ND	2.44	0.62
12	Nitrite (mg/l)	ND	ND	ND	ND	ND	ND	ND
13	Oil & Grease (mg/l)	ND	ND	ND	ND	ND	ND	ND
14	Phenols (mg/l)	ND	ND	ND	0.009	ND	ND	ND
15	Reactive Phosphorus (mg/l)	0.03	0.03	0.02	0.02	0.23	0.18	0.03
16	Total Cyanide (mg/l)	ND	ND	ND	20	ND	ND	ND

No.	Parameter	SW1	SW2	SW3	GW1	GW2	GW3	GW4
17	Total Suspended Solid (mg/l)	214	126	78.7	158	213	6.5	14.4

1.5 Soil Quality

Survey Item

There are four sampling points for soil quality in the study area.

Summary Location

The description of sampling points is shown in following table.

Table 1.5-1 Sampling points for soil Quality Survey

Sampling Point	Coordinates	Description of Sampling Point
S1	16°36'52.60"N 96°16'8.37"E	About 300m from northern boundary of project site. The soil is fine grained, light grey colored silty clay.
S2	16°36'26.95"N 96°15'48.09"E	About 30m from northwestern boundary of project site. The soil is fine grained, yellowish brown colored silty clay.
S 3	16°36'29.18"N 96°16'22.02"E	About 400m from eastern boundary of project site. The soil is fine to medium grained, light grey colored silty clay.
S 4	16°36'9.57"N 96°16'4.22"E	About 440m from southern boundary of project site. The soil is fine to medium grained, light grey colored silty clay.



Figure 1.5-1 Soil quality survey

Survey Period

Soil quality survey was conducted on 23 December, 2020.

Survey Method

For soil sampling, the standard environmental sampler (soil auger) was applied. The sampler is a stainless-steel tube that is sharpened on one end and fitted with a long, T-shaped handle. This tube is approximately three inches inside diameter. In order to refrain from contamination, about 0-50 cm of top soil was removed by the sampler before sampling. Most of samples were taken and collected from 50-70 cm depth. The soil sample sampling, firstly find the original coordinate point where it is referred S-01A and other two points (S-01B/S-01C) were taken triangle shape by distance interval about 10 m depend on ground condition. And then, three soil samples were mixed and taken equal ratio by one

sample of a point. During sample collection, wear the glove, rinse glove and soil auger with clean water. Then sample was taken and collected in cleaned plastic bag. Chemical preservation of soil not generally recommended. Samples were cooled in an ice box which temperature was under 4°C. Samples were protected from sunlight to minimize any potential reaction.

Field equipment used on site is also shown in the Table 1.5-2.

Table 1.5-2 Field equipment for soil quality survey

No.	Equipment	Originate Country	Model
1	Soil Auger (Hand held)	U.S. A	AMS

Survey Result

Chemical analysis for soil quality was tested in the laboratory of United Analyst and Engineering Consultant Co., Ltd. in Thailand. Soil quality result is presented in table 1.5-3. Most of the results are complied with the proposed standard value of contamination whereas soil result is lower than the applicable guideline.

Table 1.5-3 Laboratory analysis result for soil quality

No.	Parameter	S1	S2	S3	S4
1	pH	6.8	6.8	6.7	7.4
2	Moisture (%)	24.1	22.3	18.0	18.2
3	Cadmium (mg/kg)	ND	ND	ND	ND
4	Copper (mg/kg)	31.6	26.5	27.7	24.3
5	Iron (mg/kg)	50,101	41,018	43,999	33,407
6	Lead (mg/kg)	27.6	20.3	19.3	18.3
7	Zinc (mg/kg)	111	86.6	95.0	90.1

1.6 Sediment Quality and Benthos

Survey Item

Three samples of sediment and benthos were collected during the survey.

Survey Location

The sampling locations are same as the surface water quality sampling points SW1, SW2 and SW3.



Figure 1.6-1 River sediment and benthos sampling

Survey Period

Sediment and benthos sampling were conducted on 24th December, 2020.

Survey Method

At each station, river sediment was taken by the Grab Sampler and collected in an amber glass bottle and plastic bag.

Regarding benthos sampling, 3 replicates or grabs (1 grab = 3.14 kg) of benthic samples at each station were collected in a plastic basin. Each benthic sample was then slowly washed through a sieve with mesh sizes of 0.5 and 1 mm. The specimens and coarse sediment retained in the sieve were collected in a plastic bottle and preserved in 37% formalin solution for laboratory analyses.

Survey Result

(i) River Sediment

Physical and chemical parameter of sediments were analyzed in the UAE laboratory, Thailand. The results of sediment quality survey are shown in Table 1.6-1.

Table 1.6-1 Laboratory analysis result for soil quality

No.	Parameter	SE1	SE2	SE3
1	Particle Size Distribution	Silty Clay	Silty Clay	Silty Clay
2	Total Petroleum Hydrocarbon (mg/kg)	ND	ND	ND
3	Total Organic Carbon (mg/kg)	6,340	5,887	7,907
4	Oil & Grease (mg/kg)	372	376	306
5	Arsenic (mg/kg)	10.9	11.4	13.7
6	Barium (mg/kg)	48.6	33.9	53.8
7	Cadmium (mg/kg)	2.94	2.56	2.90
8	Chromium (mg/kg)	78.2	60.8	74.2
9	Copper (mg/kg)	29.1	22.0	31.0
10	Iron (mg/kg)	41,623	35,833	42,729
11	Lead (mg/kg)	20.3	15.3	22.4
12	Manganese (mg/kg)	966	754	981
13	Mercury (mg/kg)	ND	ND	ND
14	Nickel (mg/kg)	91.8	74.4	87.3
15	Selenium (mg/kg)	ND	ND	ND
16	Zinc (mg/kg)	80.9	64.0	78.9

(ii) Benthos

The samples were sent to SGS (Thailand) Limited Laboratory. The laboratory analysis results revealed that total family of 3 benthos species are recorded. There were no globally threatened species of fauna by referring to the IUCN Red list of threatened species (2019).

1.7 Biodiversity

Scope and Purpose

The scope and purpose of the ecological baseline study are:

1. To provide comprehensive and accurate information on the ecological baseline;
2. To identify and predict potential ecological impacts;

3. To evaluate the significance of the impacts identified;
4. To recommend effective and practicable alternatives and mitigation measures; and
5. To recommend the need for and the scope of an appropriate monitoring and audit programme.

Site Reconnaissance

A targeted site reconnaissance was conducted from 27th December to 28th December, 2020 to ground-truth information gathered and supplements it with site observations, data and photographs. The site reconnaissance targeted the following specific ecological objectives:

- To name, describe and map vegetation communities and habitats present within the Project Area at a suitable scale, using existing community nomenclature where possible;
- To identify, describe and map other ecologically sensitive areas within the Project Area such as springs, watercourses and other water bodies;
- To the extent possible within the survey time frame and season, determine if species of conservation significance known or predicted likely to be present in the Study Area are actually present within the Project Area;
- To identify opportunities for future ecological monitoring and enhancement within the framework of the proposed project.

Methodology

(i) Desktop Study

Publicly available sources of information were analyzed to build an outline of known and likely ecological values for the Study Area. Aerial imagery was used to build a more complete spatial understanding of the pattern of vegetation communities and human uses on the site, and to map access routes and internal tracks. In addition, ecologists with experience of the Study Area were consulted where possible to obtain information about species known to be present or previously recorded from the site, and other ecological values considered by them to be relevant.

(ii) Field Observation

A Global Positioning System was used to navigate and mark coordinates around the study area. Field observation was conducted in and around the project area. During the field survey period, plotless sampling method was used. Plotless sampling methods are based on the random selection of points within a particular survey area. In addition, all trees, shrubs, herbs and cultivated crops were recorded and listed. Identification of plants and animal species was conducted with assistances of skilled local

people. The identified species and families were translated to scientific name with assistance of a checklist of trees, shrubs, herbs and climbers of Myanmar.

Table 1.7-1 List of Fauna Methodology

<p>Mammal</p>	<p>Mammals surveys were conducted through transect count during daytime survey. As mammals usually occur at low densities, in addition to direct observation, any observation of signs of mammal activity, such as tracks, scats or burrows will be actively sought.</p> <p>Indirect survey was conduct interview from local people.</p>
<p>Herpetology</p>	<p>Herpeto fauna surveys was conducted through direct observation and active searching in all major representative habitat types and in potential hiding places such as among leaf litter, inside holes and under stones and logs within the study area. Visual observations, documented where possible by photographs were made of some captured specimens that were not collected for preservation. Photo records were taken by digital.</p>
<p>Butterflies</p>	<p>Butterflies of different habitats within the study area were surveyed using point count method subject to the on-site conditions. Butterflies species were identify in field so that we took photo and identify the species with reference book.</p>
<p>Bird</p>	<p>Random Point count method was used for the bird survey and took the photo for species identification, observed numbers and habitat utilization. Species identification was done by using the field guide books, with help of the binoculars, camera and GPS. Nocturnal birds were observed when it becomes dusk. Point count and opportunistic methods were used to census the species richness and point counting was used to get the relative measure of bird abundance.</p>
<p>Aquatic</p>	<p>Pond and River identified within the Study Area was surveyed for freshwater fish. These surveyed through indirect sampling, observation at interview with fishermen about kinds of fishes and quality of fishery product.</p>

(iii) Interviewing Survey

In addition to the field observation, secondary data was also surveyed by interviewing from local residents and literature reviewing. In the interview survey, the surveyor visited the residents in and around the survey area and interviewed the name of plants and animals existing in and around the area. Also, the past situation of flora and fauna, and the change on biodiversity and ecosystem in the area was interviewed for examination.



Figure 1.7-1 Interview survey with local people

(iii) Habitat Mapping

To obtain the habitat map, there is combination between field observation and secondary image from Google Earth and generate it applying in GIS software. At first, the field observations were performed for habitat survey at site collecting the data with the Garmin GPS and upload it in Map Info Software. On the other hand, the Google image was visually digitized based on the primary field survey. Finally, the habitat map was analyzed based on both of field survey and secondary image data using the Map Info software.

Survey Area

The location of the survey area is within 500m of project location as shown in figure 1.7-2.

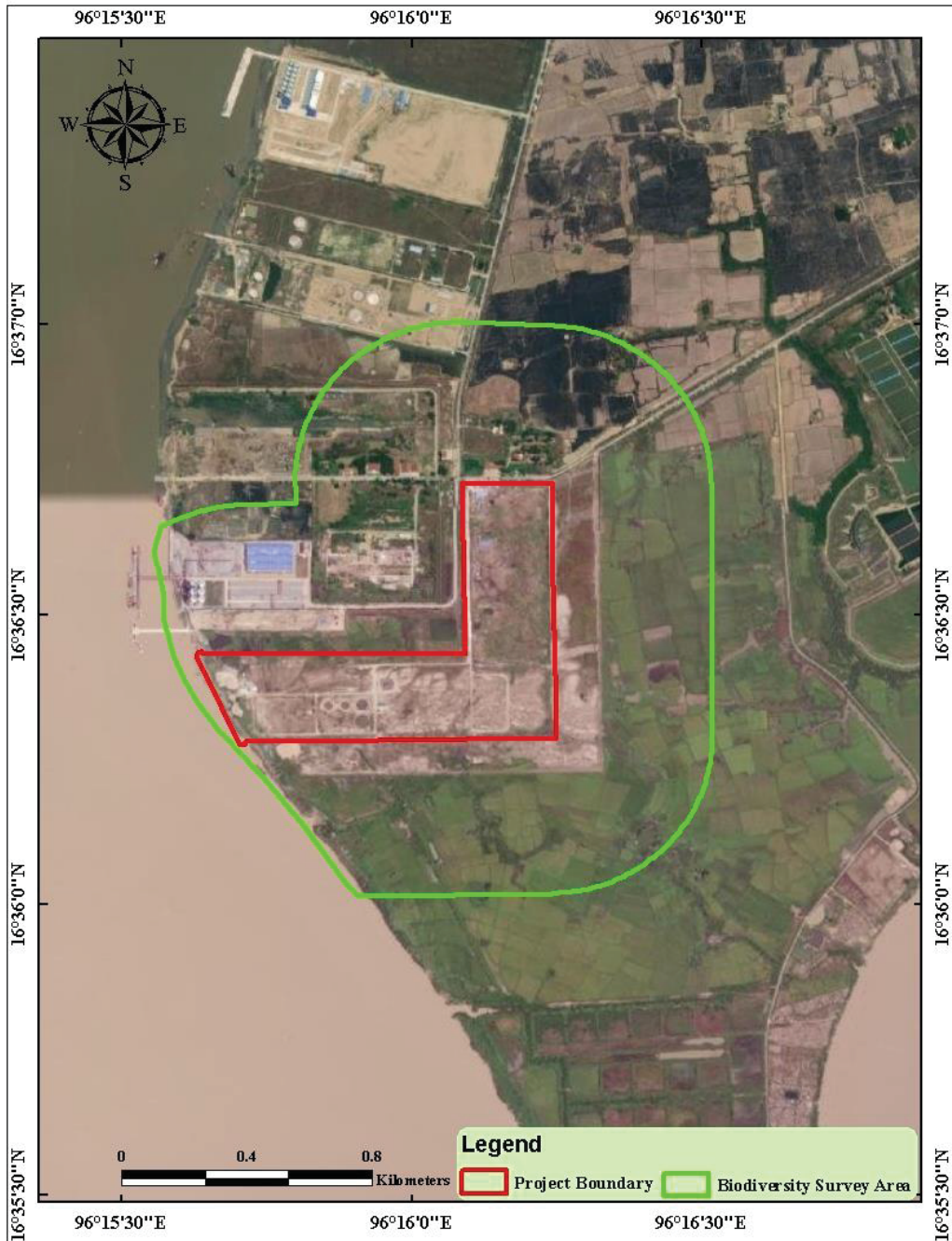


Fig: 1.7-2 Biological study area around project site

Survey Result

(i) Flora

Flora survey were conducted to obtain an understanding of the diversity of flora taxa group. A total of 44 flora species identified during the survey. 2 species is Endangered species were classified and 19 species of least concern. 2 Data Deficient and 21 species of Not Yet Assessed on the IUCN Red List.

There was no endemic species in this area.

Htan or Palmyrah palm (*Borassus flabelifer*) is identified as Endangered on IUCN Red List and is found in India and Myanmar and Cambodia. It is economically important flora species and the part of the plant such as root, leaves, seeds and fruit are used for various purpose. The exploration of natural resources and expansion of agricultural and human settlement are the main threats to the species.

Padauk (*Pterocarpus macrocarpus*) which is list as Endangered on the IUCN Red List. This species is native to Indochina peninsula. Where is grow within Lao PDR, Myanmar, Thailand and Cambodia. In Myanmar the species is most common in Shan State. The species is threatened by over exploitation for its timber and overlogged.

Table 1.7-2 Flora species recorded during survey

No.	Family Name	Scientific Name	Common Name	Habitat	Distribution	IUCN
1.	Mimosaceae	<i>Albizia lebbek</i>	Kokko	T	Reported from Myanmar	LC
2.	Fabaceae	<i>Acacia mangium</i>	Mangansha	T	Cultivated	LC
3.	Fabaceae	<i>Crotalaria sericea</i>	Taw-pike-san	S	Wide	LC
4.	Myrtaceae	<i>Psidium guajava</i>	Malaka	ST	Cultivated	LC
5.	Asteraceae	<i>Chromolaena odorata</i>	Bezatz	S	Wide	NE
6.	Caesalpiniaceae	<i>Tamarindus indica</i>	Magyi	T	Cultivated	LC
7.	Combretaceae	<i>Terminalia catappa</i>	Banda	T	Cultivated	LC
8.	Anacardiaceae	<i>Mangifera indica</i>	Thayet	T	Wide	DD
9.	Nyctaginaceae	<i>Bougainvillea spectabilis</i>	Sekku-pan	Cl/Cr	Cultivated	NE
10.	Acanthaceae	<i>Acanthus ebracteatus</i>	Khaya	S	Ayeyarwady, Rakhine, Tanintharyi	LC
11.	Areaceae	<i>Nypa fruticans</i>	Dani	T	Ayeyarwady	LC
12.	Lythraceae	<i>Sonneratia caseolaris</i>	Lamu	T	Ayeyarwady, Bago, Taninthayi	LC
13.	Casuarinaceae	<i>Casuarina equisetifolia</i>	Pinle-kabwe	T	Cultivated	LC
14.	Malvaceae	<i>Thespesia lampas</i>	Thaman-shaw	S	Chin, Mandalay, Tanintharyi, Yangon	NE
15.	Mimosaceae	<i>Pithecellobium dulce</i>	Kala-magyi	T	Magway, Mandalay	LC
16.	Mimosaceae	<i>Mimosa pudica</i>	Tikayone	H	Wide	NE
17.	Moringaceae	<i>Moringa aleifera</i>	Dantalon	T	Cultivated	NE
18.	Caricaceae	<i>Carica papaya</i>	Thinbaw	ST	Cultivated	DD
19.	Mimosaceae	<i>Acacia auriculiformis</i>	Malaysia-padauk	ST	Cultivated	LC

No.	Family Name	Scientific Name	Common Name	Habitat	Distribution	IUCN
20.	Verbenaceae	<i>Tectona grandis</i>	Kyun	T	Wide	NE
21.	Fabaceae	<i>Pterocarpus macrocarpus</i>	Padauk	T	Bago, Mandalay, Sagaing, Tanintharyi	EN
22.	Arecaceae	<i>Cocas nucifera</i>	Ohn	T	Cultivated	NE
23.	Annonaceae	<i>Miliusa velutina</i>	Thabut-gyi	T	Mandalay, Bago, Yangon	NE
24.	Moraceae	<i>Ficus religiosa</i>	Bawdi-nyaung	T	Cultivated	NE
25.	Myrtaceae	<i>Syzygium syzygioides</i>	Thabye	T	Tannthayi, Yangon	NE
26.	Arecaceae	<i>Borassus flabellifer</i>	Htan	T	Bago, Mandalay, Sagaing, Tanintharyi	EN
27.	Rhamnaceae	<i>Ziziphus jujuba</i>	Zi	T	Cultivated	LC
28.	Mimosaceae	<i>Albizia procera</i>	Sit	T	Reported from Myanmar	LC
29.	Musaceae	<i>Musa sapientum</i>	Nget-pyaw	H	Cultivated	NE
30.	Sapotaceae	<i>Manikara hexandra</i>	Khayay	T	Cultivated	NE
31.	Fabaceae	<i>Sesbania grandiflora</i>	Paukpan-byu	ST	Cultivated	NE
32.	Boraginaceae	<i>Heliotropium indium</i>	Sin-hna-maung	H	Yangon	NE
33.	Convolvulaceae	<i>Ipomoea aquatica</i>	Ye-kazun	Cl/Cr	Wide	LC
34.	Acanthaceae	<i>Eranthemum macrophyllum</i>	Ta-myet-si	S	Bago, Mandalay, Tanintharyi	NE
35.	Poaceae	<i>Mnesithea striata</i>	Kaing	G	Reported from Myanmar	NE
36.	Poaceae	<i>Setaria forbesiana</i>	Katsi-hne	G	Mandalay	NE
37.	Fabaceae	<i>Maghania strobilifera</i>	Gaung-onsa	S	Wide	NE
38.	Fabaceae	<i>Sesbania cannabina</i>	Nyan	H	Wide	LC
39.	Cyperaceae	<i>Cyperus pangorei</i>	Wet-la	H	Kachin, Yangon	LC
40.	Euphorbiaceae	<i>Flueggea virosa</i>	Chin-ya	ST	Wide	NE

No.	Family Name	Scientific Name	Common Name	Habitat	Distribution	IUCN
41.	Malvaceae	<i>Urena lobata</i>	Wetchi-pane	S	Bago, Chin, Mandalay, Tanintharyi, Yangon	LC
42.	Amaranthaceae	<i>Alternanthera sessilis</i>	Pazun-sa	H	Yangon	LC
43.	Tiliaceae	<i>Corchorus aestuans</i>	Pilaw-kha	S	Ayeyarwady, Bago, Sagaing, Tanintharyi, Yangon	NE
44.	Convolvulaceae	<i>Argyreia nervosa</i>	Kazun-gyi	Cr	Reported from Myanmar	NE

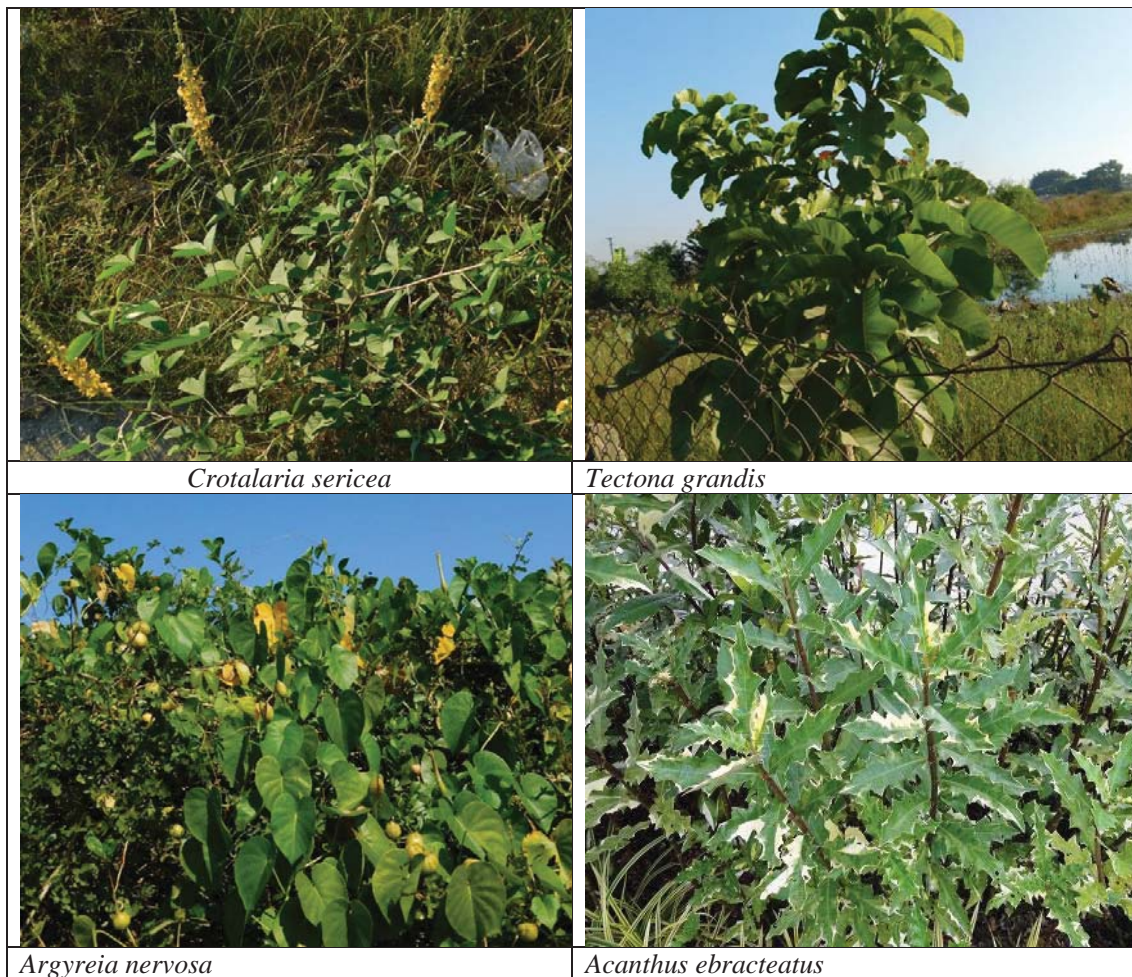


Figure 1.7-3 Observed flora species during survey

(a) Habitat

In and around the Area of proposed project area, three major habitat types were observed namely (1)

some extent of trees in mangrove area, (2) agricultural land and (3) Shrub land (green area). Habitat Map of proposed project area was shown in Figure 1.7-4.

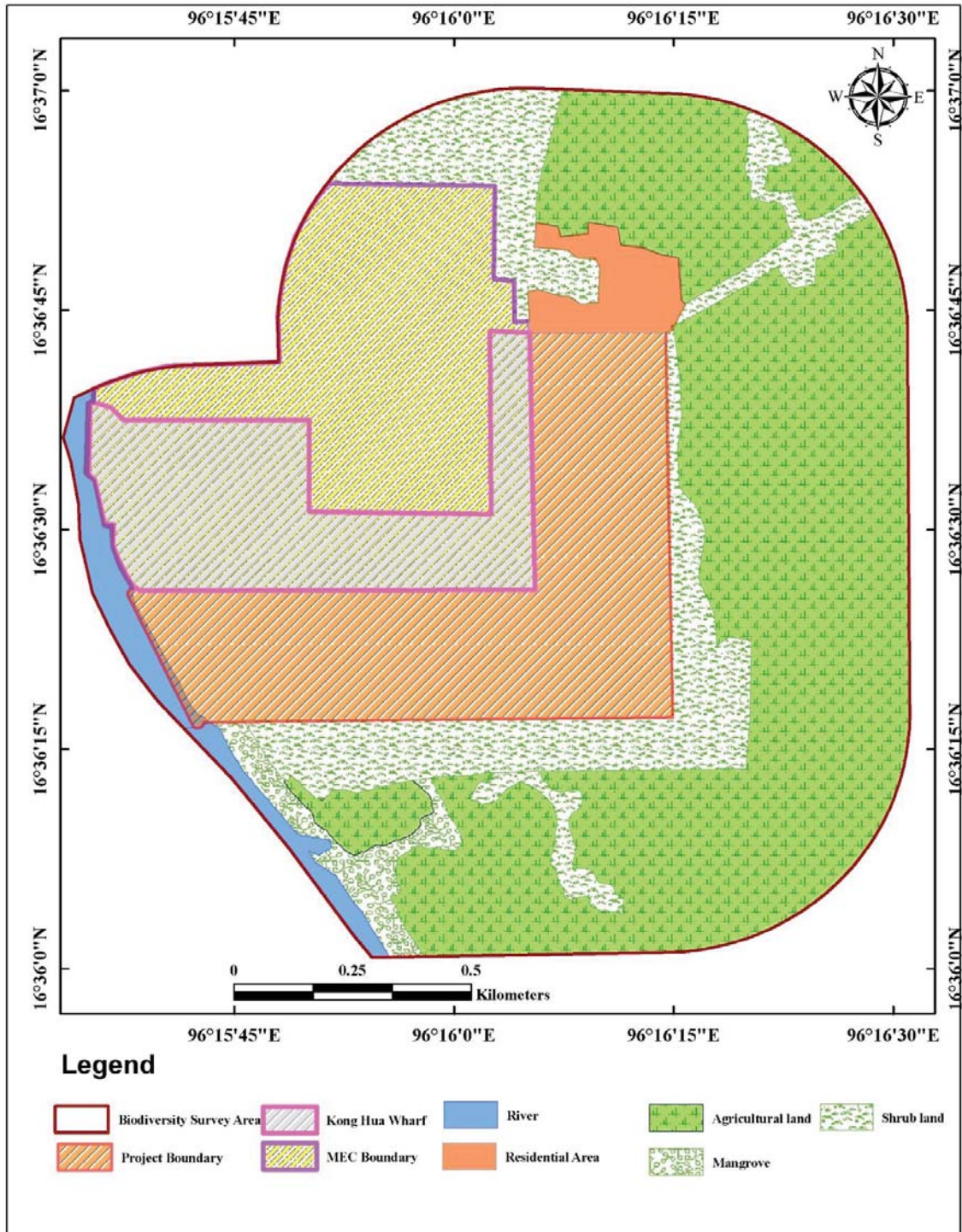





Figure 1.7-4 Habitat map of surrounding area of project site

(c) Vegetation Communities

In and around the project area, agricultural land, shrub land and along the river side some extent of sand bank were found.

Table 1.7-3 Vegetation community description

Community Name	Description	Nature/ Modified	Photo
Agriculture Land	Agricultural land is typically land devoted to agriculture, the systematic and controlled use of other forms of life— particularly the rearing of livestock and production of crops—to produce food for humans. It is thus generally synonymous with both farmland or cropland, as well as pasture or rangeland.	Modified	
Woodland	Woodland is a low-density forest forming open habitats with plenty of sunlight and limited shade. Woodlands may support an understory of shrubs and herbaceous plants including grasses.	Natural	

Community Name	Description	Nature/ Modified	Photo
Mangrove	Mangrove can be found in low altitude coastal and sub -coastal area along river bank. A mangrove is a tree, shrub,palm or ground fern , generally exceeding one half meter in height that normally grows above sea level in the intertidal zone of marine coastal environment and Eurasian margins. A mangrove is also tidal habitat comprising such tree and shrub.	Natural	

(ii) Fauna

A biodiversity survey was conducted that covered a range of fauna species including mammals, birds, fish, reptiles, butterflies. The fauna survey was conducted via direct observation in the field observation of track and sign such as footprint and feeding signs in their natural habitats and interview survey were local communities. Fauna species were found Least concern and Not Evaluated. There was no threatened species recorded during survey.

Table 1.7-4 Number of fauna species recorded during survey

Fauna Group	Total Number of Species
Mammal	2
Bird	30
Fish	19
Butterflies	8
Reptiles	6
Total	65

(a) Mammal

Mammal were identified through direct observation and interview survey one mammal species were recorded. One species was interview from local people in survey area. According to the IUCN Red List of threatened species, all species was least concerned and there was no threatened and no endemic species.

Table 1.7-5 Mammal species recorded during survey

No	Common Name	Scientific Name	Family Name	Observation /Status	IUCN/2020
1	Java Mongoose	<i>Herpestes javanicus</i>	Herpestidae	Interview	LC
2	Greater Bandicoot	<i>Bandicota indica</i>	Muridae	observed	LC

LC - Least concerned

(b) Herpetology

A total of 6 reptile species was identified during the survey. Three species were recorded and three species were interview from local people in survey area. According to IUCN Red List of threatened species, there was no threatened species and endemic species in this area. All species classified as 5 species were Not Evaluated and one species was least concern.

Table 1.7-6 Herpetology species recorded during survey

No	Common Name	Scientific Name	Family Name	IUCN	Observation / Status
1	Indian Rat Snake	<i>Ptyas mucosa</i>	Colubridae	NE	Interview
2	Garden Lizard	<i>Calotes versicolor</i>	Agamidae	NE	Observed
3	Common Sun Skink	<i>Eutropis multifasciata</i>	Scincidae	NE	Observed
4	Chequered Keelback Water Snake	<i>Xenochrophis piscator</i>	Colubridae	NE	Observed
5	Russell's Viper	<i>Daboia russelii</i>	Viperidae	NE	Interview
6	Monocled Cobra	<i>Naja kauuthia</i>	Elapidae	LC	Interview

LC - Least concerned

NE - Not Evaluated



	
Garden Lizard (<i>Calotes versicolor</i>)	Chequered Keelback Water Snake (<i>Xenochrophis piscator</i>)

Figure 1.7-5 Herpetology species recorded during survey

(C) Bird

A total of 30 bird species were recorded during the survey. All species classified as least concerned by IUCN Red List 2020. One endemic species “White_throated Babbler” was observed in the survey area. There was no threatened species. Among 30 bird species recorded, 10 species are classified as migratory birds as according to Bird Life international 2020.

Table 1.7-7 Birds species recorded during survey

No.	Common Name	Scientific Name	Family Name	IUCN	Migratory
1	White_throated Kingfisher	<i>Halcyon smyrnensis</i>	Halcyonidae	LC	
2	Oriental Magpie Robin	<i>Copsychus saularis</i>	Muscicapidae	LC	
3	White Wagtail	<i>Motacilla alba</i>	Motacillidae	LC	Y
4	Little Cormorant	<i>Microcarbo niger</i>	Phalacrocoracidae	LC	Y
5	Common Sandpiper	<i>Actitis hypoleucos</i>	Scolopacidae	LC	Y
6	Brahminy Kite	<i>Haliastur indicus</i>	Accipitridae	LC	
7	Indian Pond Heron	<i>Ardeola grayii</i>	Ardeidae	LC	Y
8	Little Egret	<i>Egretta garzetta</i>	Ardeidae	LC	Y
9	Barn Swallow	<i>Hirundo rustica</i>	Hirundinidae	LC	Y
10	House Crow	<i>Corvus splendens</i>	Corvidae	LC	
11	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	LC	Y
12	Spotted Dove	<i>Streptopelia chinensis</i>	Colubidae	LC	Y

No.	Common Name	Scientific Name	Family Name	IUCN	Migratory
13	Rock Pigeon	<i>Columba livia</i>	Colubidae	LC	
14	Red_collared Dove	<i>Streptopelia tranquebarica</i>	Colubidae	LC	
15	House Sparrow	<i>Passer domesticus</i>	Passeridae	LC	
16	Common Myna	<i>Acridotheres tristis</i>	Sturnidae	LC	
17	Jungle Myna	<i>Acridotheres fuscus</i>	Sturnidae	LC	
18	Asian Pied Starling	<i>Gracupica contralis</i>	Sturnidae	LC	
19	Vinous_breasted Myna	<i>Acridotheres burmannicus</i>	Sturnidae	LC	
20	Red_whiskered Bulbul	<i>Pycnonotus jocosus</i>	Pycnonotidae	LC	
21	Red_vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	LC	
22	Streak_eared Bulbul	<i>Pycnonotus conradi</i>	Pycnonotidae	LC	
23	White_throated Babbler	<i>Argya gularis</i>	Leiothrichidae	LC/endemic	
24	Indian Roller	<i>Coracias benghalensis</i>	Coraciidae	LC	
25	Asian Palm Swift	<i>Cypsiurus balasiesis</i>	Apodidae	LC	
26	Brown Shrike	<i>Lanius cristatus</i>	Laniidae	LC	Y
27	Lesser spotted Woodpecker	<i>Dryobates minor</i>	Picidae	LC	
28	Little Green Bee Eater	<i>Merops orientalis</i>	Meropidae	LC	Y
29	Plain Prinia	<i>Prinia inornata</i>	Cisticolidae	LC	
30	Grey breasted Prinia	<i>Prinia hodgsonii</i>	Cisticolidae	LC	

LC - Least concerned

Y - Yes (Migratory Bird)







	
<p>White_throated Babbler (<i>Argya gularis</i>)</p>	<p>Red_whiskered Bulbul(<i>Pycnonotus jocosus</i>)</p>
	
<p>Common Sandpiper (<i>Actitis hypoleucos</i>)</p>	<p>Little Cormorant (<i>Microcarbo niger</i>)</p>
	
<p>Asian Pied Starling (<i>Gracupica contralis</i>)</p>	<p>Lesser spotted Woodpecker (<i>Dryobates minor</i>)</p>

Fig 1.7-6 Bird species recorded during survey

(d) Butterflies

A total of 8 species with 7 genera of butterflies under the order Lepidoptera belonging to 2 families were recorded. The family Nymphalidae and Pieridae were found dominant. According to the IUCN Red List of (2020-3), *Junonia almana* is least concern and there were not under any major threatened.

Table 1.7-8 Butterflies species recorded during survey

No	Common Name	Scientific Name	Family Name	IUCN
1	Common Emigrant	<i>Catopsilia pomona</i>	Pieridae	NE
2	Common Jezebel	<i>Delias eucharis</i>	Pieridae	NE
3	Common Grass Yellow	<i>Eurema hecabe</i>	Pieridae	NE
4	Plain Tiger	<i>Danaus chrysippus</i>	Nymphalidae	NE
5	Blue Tiger	<i>Tirumala limniace</i>	Nymphalidae	NE
6	Leopard lacewing	<i>Cethosia cyane</i>	Nymphalidae	NE
7	Grey Pansy	<i>Junonia atlites</i>	Nymphalidae	NE
8	Peacock Pansy	<i>Junonia almana</i>	Nymphalidae	LC

LC - Least Concern

NE - Not Evaluated

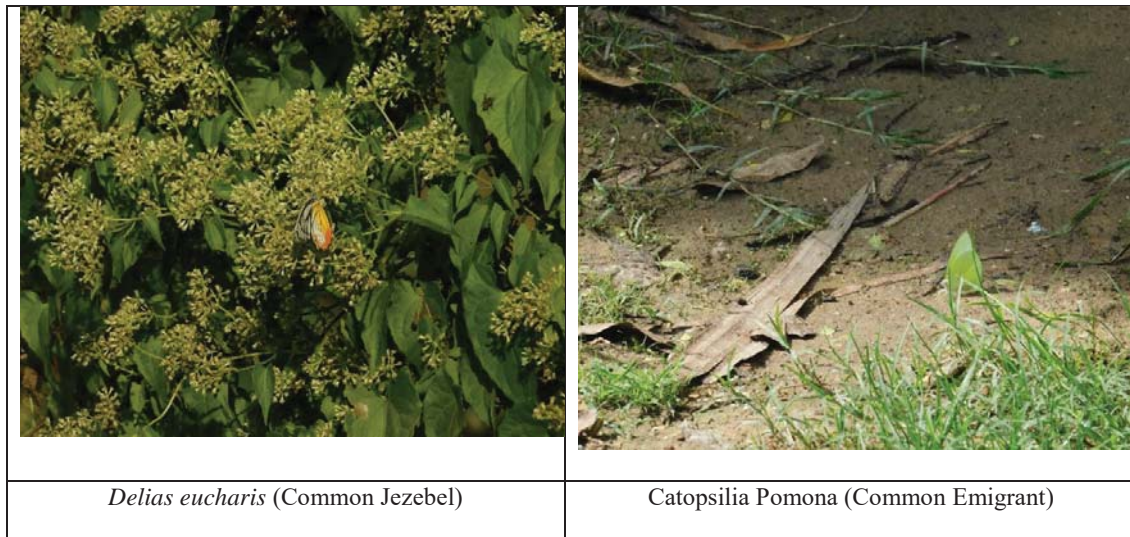


Fig 1.7-7 Butterflies species recorded during survey

(e) Fish

Field survey and interview with local fishermen who lived near the study area were conducted during the collection of the specimens. Fishing activities are mostly traditional method. Fishermen were interviewed with regard to fishery process. A total of 19 species distributed 14 family were identified and recorded around the proposed jetty area and in Yangon River. The most occurrence species are

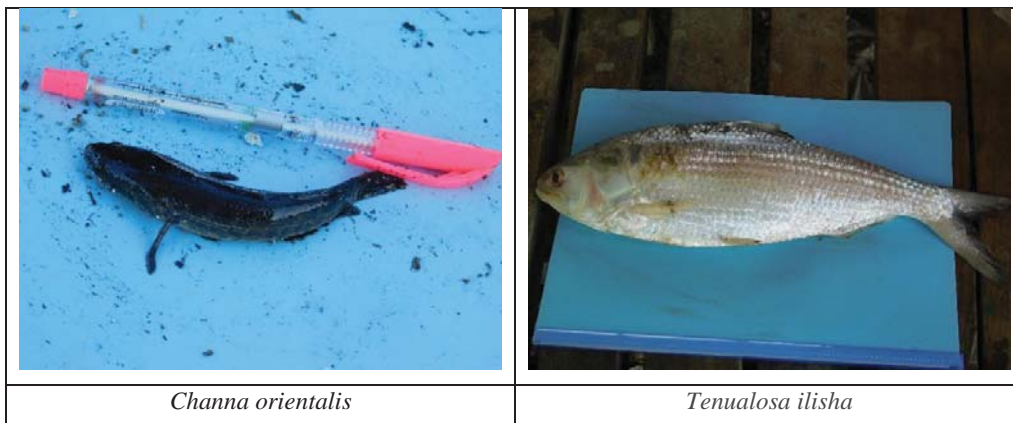
Puntius ticto, *Channa orientalis*. The dominant Family is Cyprinidae. According to the IUCN Red List of threatened species, all species were least concerned and one species was Not Evaluated.

Table 1.7-9 Fish Species recorded during survey

No	Scientific Name	Family	Common Name	IUCN
1	Notopteridae	<i>Notopterus notopterus</i>	Grey feather-back	LC
2	Cyprinidae	<i>Catla catla</i>	Catla	NE
3	Cyprinidae	<i>Puntius ticto</i>	Ticto barb	LC
4	Cyprinidae	<i>Cirrhinus mrigala</i>	Mrigal	LC
5	Cyprinidae	<i>Labeo angra</i>	Angra labeo	LC
6	Cyprinidae	<i>Labeo boga</i>	Boga labeo	LC
7	Belontiidae	<i>Colisa labiosa</i>	Stripled gourami	LC
8	Bagridae	<i>Mystus cavasius</i>	Gangetic mystus	LC
9	Bagridae	<i>Mystus leucophasis</i>	Sittang mystus	LC
10	Belonidae	<i>Xenentodon cancila</i>	Freshwater garfish	LC
11	Anabantidae	<i>Anabas testudineus</i>	Climbing perch	DD
12	Channidae	<i>Channa orientalis</i>	Asiatic snakehead	LC
13	Latidae	<i>Lates calcarifer</i>	Seabass	LC
14	Pangasiidae	<i>Pangasius pangasius</i>	Pangas Catfish	LC
15	Sciaenidae	<i>Otolithoides pama</i>	Croaker	LC
16	Polynemidae	<i>Polynemus paradiseus</i>	Indian salmon	LC
17	Polynemidae	<i>Eleutheronema tetradactylum</i>	King fish	LC
18	Clupeidae	<i>Tenualosa ilisha</i>	Hilsa	LC
19	Palaemonidae	<i>Macrobrachium malcolmsonii</i>	Monsoon River Prawn	LC

LC - Least Concern

NE - Not Evaluated



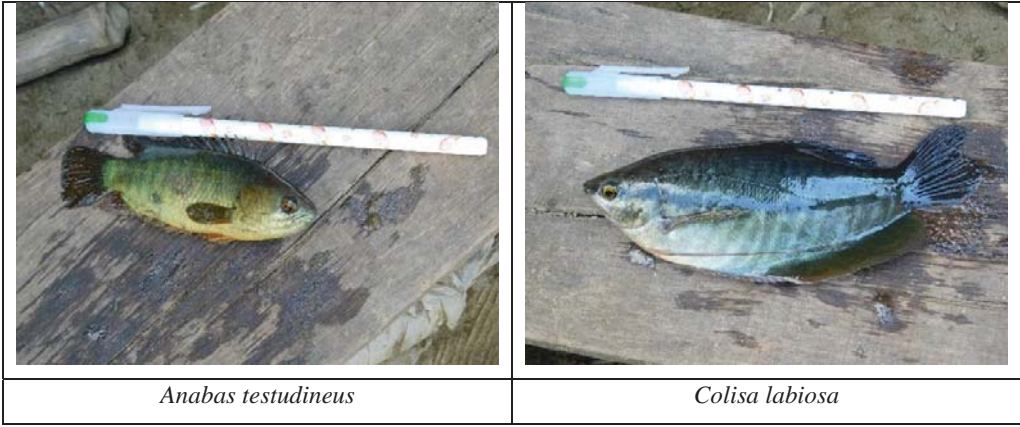


Figure 1.7-8 Fish species recorded during survey

Report No. : 2021-5001063/ 001 (Page 1 of 1)

Issued date : February 4, 2021


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Analysis Report

PROJECT NAME : Brighter Energy Oil Terminal Project **SAMPLING DATE :** December 24, 2020
SAMPLE DESIGNATED AS : Benthos Identification and Biomass **SAMPLING BY :** Client
SAMPLING METHOD : Grab sampling (Van Veen grab) **SAMPLING LOCATION :** Kyauktan Township, SE-1

Scientific Classification	Benthos	
	Abundance (Individuals/m ²)	Biomass (g/m ²)
Phylum Annelida Class Clitellata Subclass Oligochaeta Order Haplotaenida Family Naididae <i>Tubifex</i> sp.	25	0.10
Phylum Arthropoda Class Insecta Order Diptera Family Chironomidae <i>Chironomus</i> sp.	50	0.18
Order Plecoptera Family Perlodidae <i>Isoperla transmarina</i>	-	-
Total Family of Benthos (Family)	2	-
Total Density of Benthos (Individuals/m²)	75	-
Species Richness Index^{1/}	0.23	-
Evenness Index^{2/}	0.92	-
Diversity Index^{3/}	0.64	-
Total Biomass of Benthos (g/m²)^{4/}	-	0.28

Remarks :
 1/ The species richness was calculated by using the Margalef's Index.
 2/ The evenness index was calculated by using the Pielou's Index.
 3/ The diversity index was calculated by using the Shannon-Wiener's Index.
 4/ Biomass was calculated by Anastasios Eleftheriou and Alasdair Mcintyre, 2005


 (Siriporn Imwilaiwan)
 Environmental Monitoring Manager




 (Thepsan Yommana)
 Technical Manager

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Report No. : 2021-5001063/ 002 (Page 1 of 1)

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Analysis Report

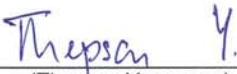
PROJECT NAME : Brighter Energy Oil Terminal Project **SAMPLING DATE :** December 24, 2020
SAMPLE DESIGNATED AS : Benthos Identification and Biomass **SAMPLING BY :** Client
SAMPLING METHOD : Grab sampling (Van Veen grab) **SAMPLING LOCATION :** Kyauktan Township, SE-2

Scientific Classification	Benthos	
	Abundance (Individuals/m ²)	Biomass (g/m ²)
Phylum Annelida Class Clitellata Subclass Oligochaeta Order Haplotaxida Family Naididae <i>Tubifex</i> sp.	25	0.15
Phylum Arthropoda Class Insecta Order Diptera Family Chironomidae <i>Chironomus</i> sp.	75	0.27
Order Plecoptera Family Perlodidae <i>Isoperla transmarina</i>	25	0.11
Total Family of Benthos (Family)	3	-
Total Density of Benthos (Individuals/m²)	125	-
Species Richness Index^{1/}	0.41	-
Evenness Index^{2/}	0.86	-
Diversity Index^{3/}	0.95	-
Total Biomass of Benthos (g/m²)^{4/}	-	0.53

Remarks :
^{1/} The species richness was calculated by using the Margalef's Index.
^{2/} The evenness index was calculated by using the Pielou's Index.
^{3/} The diversity index was calculated by using the Shannon-Wiener's Index.
^{4/} Biomass was calculated by Anastasios Eleftheriou and Alasdair Mcintyre, 2005


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Report No. : 2021-5001063/ 003 (Page 1 of 1)

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Analysis Report


PROJECT NAME : Brighter Energy Oil Terminal Project **SAMPLING DATE :** December 24, 2020
SAMPLE DESIGNATED AS : Benthos Identification and Biomass **SAMPLING BY :** Client
SAMPLING METHOD : Grab sampling (Van Veen grab) **SAMPLING LOCATION :** Kyauktan Township, SE-3

Scientific Classification	Benthos	
	Abundance (Individuals/m ²)	Biomass (g/m ²)
Phylum Annelida Class Clitellata Subclass Oligochaeta Order Haplotaxida Family Naididae <i>Tubifex</i> sp.	25	0.13
Phylum Arthropoda Class Insecta Order Diptera Family Chironomidae <i>Chironomus</i> sp.	50	0.21
Order Plecoptera Family Perlodidae <i>Isoperla transmarina</i>	25	0.16
Total Family of Benthos (Family)	3	-
Total Density of Benthos (Individuals/m²)	100	-
Species Richness Index^{1/}	0.43	-
Evenness Index^{2/}	0.95	-
Diversity Index^{3/}	1.04	-
Total Biomass of Benthos (g/m²)^{4/}	-	0.50

Remarks :
 1/ The species richness was calculated by using the Margalef's Index.
 2/ The evenness index was calculated by using the Pielou's Index.
 3/ The diversity index was calculated by using the Shannon-Wiener's Index.
 4/ Biomass was calculated by Anastasios Eleftheriou and Alasdair Mcintyre, 2005


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ANALYSIS REPORT

PROJECT NAME	: BRIGHTER ENERGY OIL TERMINAL PROJECT	RECEIVED DATE	: JANUARY 4, 2021
CUSTOMER NAME	: RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.	ANALYTICAL DATE	: JANUARY 4-25, 2021
ADDRESS	: B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR	REPORT NO.	: 2021-U04486
CONTACT INFORMATION	: TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net	WORK NO.	: 2020-009200
SAMPLING SOURCE	: KYAUKTAN TOWNSHIP	ANALYSIS NO.	: T21AA024-0001
SAMPLE TYPE	: SEDIMENT		
SAMPLING DATE	: DECEMBER 24, 2020		
SAMPLING TIME	: -		
SAMPLING METHOD	: -		
SAMPLING BY	: CUSTOMER		
ANALYZED BY	: MISS CHOMTHANAN APHIPATPAPHA		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	
			SE-1 T21AA024-0001	DETECTION LIMIT
TOTAL ORGANIC CARBON	mg/kg (dry weight)	HIGH-TEMPERATURE COMBUSTION METHOD (SM: 5310 B)	6,340	-
FAT OIL AND GREASE	mg/kg (dry weight)	SOXHLET EXTRACTION METHOD (SM: 5520 E)	372	100
TPH (C ₁₀ -C ₁₄)	mg/kg (dry weight)	ULTRASONIC EXTRACTION AND GAS CHROMATOGRAPHIC (FID) METHOD (US EPA 2007:3550 C AND 2003:8015 D)	ND	0.05
TPH (C ₁₅ -C ₂₅)	mg/kg (dry weight)	ULTRASONIC EXTRACTION AND GAS CHROMATOGRAPHIC (FID) METHOD (US EPA 2007:3550 C AND 2003:8015 D)	ND	0.16
TPH (C ₂₅ -C ₃₅)	mg/kg (dry weight)	ULTRASONIC EXTRACTION AND GAS CHROMATOGRAPHIC (FID) METHOD (US EPA 2007:3550 C AND 2003:8015 D)	ND	0.08
METALS				
ARSENIC (As)	mg/kg (dry weight)	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	10.9	0.100
MERCURY (Hg)	mg/kg (dry weight)	ACID DIGESTION AND COLD VAPOUR AAS METHOD (US EPA 2007: 7471B)	ND	0.100
SELENIUM (Se)	mg/kg (dry weight)	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	ND	0.100
BARIUM (Ba)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	48.6	0.250
CADMIUM (Cd)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	2.94	0.050
CHROMIUM (Cr)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	78.2	0.150
COPPER (Cu)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	29.1	0.050
IRON (Fe)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	41,623	0.150
LEAD (Pb)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	20.3	0.150



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	
			SE-1 T21AA024-0001	DETECTION LIMIT
MANGANESE (Mn)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	966	0.150
NICKEL (Ni)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	91.8	0.150
ZINC (Zn)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	80.9	0.150
PARTICLE SIZE (SC)				
GRAVEL (>2.00 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	1.1	-
SAND (0.063-2.00 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	8.5	-
SILT (0.002-0.063 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	26.5	-
CLAY (< 0.002 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	63.9	-
SAMPLE CONDITION			GREY SEDIMENT	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

ND : NON-DETECTABLE.

SC : THE TEST WAS SUBCONTRACTED TO THE ANOTHER LABORATORY.

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(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JANUARY 29, 2021

ANALYSIS REPORT

PROJECT NAME	: BRIGHTER ENERGY OIL TERMINAL PROJECT	RECEIVED DATE	: JANUARY 4, 2021
CUSTOMER NAME	: RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.	ANALYTICAL DATE	: JANUARY 4-25, 2021
ADDRESS	: B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR	REPORT NO.	: 2021-U04487
CONTACT INFORMATION	: TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net	WORK NO.	: 2020-009200
SAMPLING SOURCE	: KYAUKTAN TOWNSHIP	ANALYSIS NO.	: T21AA024-0002
SAMPLE TYPE	: SEDIMENT		
SAMPLING DATE	: DECEMBER 24, 2020		
SAMPLING TIME	: -		
SAMPLING METHOD	: -		
SAMPLING BY	: CUSTOMER		
ANALYZED BY	: MISS CHOMTHANAN APHIPATPAPHA		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	
			SE-2 T21AA024-0002	DETECTION LIMIT
TOTAL ORGANIC CARBON	mg/kg (dry weight)	HIGH-TEMPERATURE COMBUSTION METHOD (SM: 5310 B)	5,877	-
FAT OIL AND GREASE	mg/kg (dry weight)	SOXHLET EXTRACTION METHOD (SM: 5520 E)	376	100
TPH (C ₁₀ -C ₃₄)	mg/kg (dry weight)	ULTRASONIC EXTRACTION AND GAS CHROMATOGRAPHIC (FID) METHOD (US EPA 2007:3550 C AND 2003:8015 D)	ND	0.05
TPH (C ₁₅ -C ₂₈)	mg/kg (dry weight)	ULTRASONIC EXTRACTION AND GAS CHROMATOGRAPHIC (FID) METHOD (US EPA 2007:3550 C AND 2003:8015 D)	ND	0.16
TPH (C ₂₀ -C ₃₆)	mg/kg (dry weight)	ULTRASONIC EXTRACTION AND GAS CHROMATOGRAPHIC (FID) METHOD (US EPA 2007:3550 C AND 2003:8015 D)	ND	0.08
METALS				
ARSENIC (As)	mg/kg (dry weight)	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	11.4	0.100
MERCURY (Hg)	mg/kg (dry weight)	ACID DIGESTION AND COLD VAPOUR AAS METHOD (US EPA 2007: 7471B)	ND	0.100
SELENIUM (Se)	mg/kg (dry weight)	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	ND	0.100
BARIUM (Ba)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	33.9	0.250
CADMIUM (Cd)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	2.56	0.050
CHROMIUM (Cr)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	60.8	0.150
COPPER (Cu)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	22.0	0.050
IRON (Fe)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	35,833	0.150
LEAD (Pb)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	15.3	0.150



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SE-2 T21AA024-0002	
MANGANESE (Mn)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	754	0.150
NICKEL (Ni)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	74.4	0.150
ZINC (Zn)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	64.0	0.150
PARTICLE SIZE (SC)				
GRAVEL (>2.00 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	0.0	-
SAND (0.063-2.00 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	8.9	-
SILT (0.002-0.063 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	28.9	-
CLAY (< 0.002 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	62.2	-
SAMPLE CONDITION			GREY SEDIMENT	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

ND : NON-DETECTABLE.

SC : THE TEST WAS SUBCONTRACTED TO THE ANOTHER LABORATORY.

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Benjawan V.

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JANUARY 29, 2021

ANALYSIS REPORT

PROJECT NAME	: BRIGHTER ENERGY OIL TERMINAL PROJECT	RECEIVED DATE	: JANUARY 4, 2021
CUSTOMER NAME	: RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.	ANALYTICAL DATE	: JANUARY 4-25, 2021
ADDRESS	: B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR	REPORT NO.	: 2021-U04488
CONTACT INFORMATION	: TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net	WORK NO.	: 2020-009200
SAMPLING SOURCE	: KYAUKTAN TOWNSHIP	ANALYSIS NO.	: T21AA024-0003
SAMPLE TYPE	: SEDIMENT		
SAMPLING DATE	: DECEMBER 24, 2020		
SAMPLING TIME	: -		
SAMPLING METHOD	: -		
SAMPLING BY	: CUSTOMER		
ANALYZED BY	: MISS CHOMTHANAN APHIPATPAPHA		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SE-3 T21AA024-0003	
TOTAL ORGANIC CARBON	mg/kg (dry weight)	HIGH-TEMPERATURE COMBUSTION METHOD (SM: 5310 B)	7,907	-
FAT OIL AND GREASE	mg/kg (dry weight)	SOXHLET EXTRACTION METHOD (SM: 5520 E)	306	100
TPH (C ₁₀ -C ₁₄)	mg/kg (dry weight)	ULTRASONIC EXTRACTION AND GAS CHROMATOGRAPHIC (FID) METHOD (US EPA 2007:3550 C AND 2003:8015 D)	ND	0.05
TPH (C ₁₅ -C ₂₈)	mg/kg (dry weight)	ULTRASONIC EXTRACTION AND GAS CHROMATOGRAPHIC (FID) METHOD (US EPA 2007:3550 C AND 2003:8015 D)	ND	0.16
TPH (C ₂₉ -C ₃₆)	mg/kg (dry weight)	ULTRASONIC EXTRACTION AND GAS CHROMATOGRAPHIC (FID) METHOD (US EPA 2007:3550 C AND 2003:8015 D)	ND	0.08
METALS				
ARSENIC (As)	mg/kg (dry weight)	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	13.7	0.100
MERCURY (Hg)	mg/kg (dry weight)	ACID DIGESTION AND COLD VAPOUR AAS METHOD (US EPA 2007: 7471B)	ND	0.100
SELENIUM (Se)	mg/kg (dry weight)	ACID DIGESTION AND HYDRIDE GENERATION AAS METHOD (US EPA 1996: 3050B AND 1992: 7061A)	ND	0.100
BARIUM (Ba)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	53.8	0.250
CADMIUM (Cd)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	2.90	0.050
CHROMIUM (Cr)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	74.2	0.150
COPPER (Cu)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	31.0	0.050
IRON (Fe)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	42,729	0.150
LEAD (Pb)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	22.4	0.150



PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SE-3 T21AA024-0003	
MANGANESE (Mn)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	981	0.150
NICKEL (Ni)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	87.3	0.150
ZINC (Zn)	mg/kg (dry weight)	ACID DIGESTION AND INDUCTIVELY COUPLED PLASMA (ICP) METHOD (US EPA 1996: 3050B AND 2018: 6010D)	78.9	0.150
PARTICLE SIZE (SC)				
GRAVEL (>2.00 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	0.0	-
SAND (0.063-2.00 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	0.0	-
SILT (0.002-0.063 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	31.6	-
CLAY (< 0.002 mm)	%	SIEVE ANALYSIS AND HYDROMETER METHOD	68.4	-
SAMPLE CONDITION			BROWN SEDIMENT	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

ND : NON-DETECTABLE.

SC : THE TEST WAS SUBCONTRACTED TO THE ANOTHER LABORATORY.

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(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JANUARY 29, 2021

ANALYSIS REPORT

PROJECT NAME : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net
SAMPLING SOURCE : KYAUKTAN TOWNSHIP
SAMPLE TYPE : SOIL **RECEIVED DATE** : JANUARY 4, 2021
SAMPLING DATE : DECEMBER 23, 2020 **ANALYTICAL DATE** : JANUARY 4-12, 2021
SAMPLING TIME : - **REPORT NO.** : 2021-U02132
SAMPLING METHOD : - **WORK NO.** : 2020-009198
SAMPLING BY : CUSTOMER **ANALYSIS NO.** : T21AA020-0001 - T21AA020-0002
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT		DETECTION LIMIT
			1 T21AA020-0001	2 T21AA020-0002	
pH (1:1)	-	ELECTROMETRIC METHOD (US EPA 2004: 9045D)	6.8 (25°C)	6.8 (25°C)	-
MOISTURE	%	ASTM D2974 - 14	21.4	22.3	-
METALS					
CADMIUM (Cd)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	ND	ND	0.300
COPPER (Cu)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	31.6	26.5	0.300
IRON (Fe)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	50,101	41,018	0.500
LEAD (Pb)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	27.6	20.3	1.55
ZINC (Zn)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	111	86.6	0.350
SAMPLE CONDITION			BROWN SOIL	BROWN SOIL	

RESULT 1 : S-1

RESULT 2 : S-2

ND : NON-DETECTABLE.

SAMPLE (S) ANALYSED ON AS RECEIVED BASIS. RESULT (S) REPORTED ON A DRY WEIGHT BASIS.

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LABORATORY SUPERVISOR

FEBRUARY 19, 2021



ANALYSIS REPORT

PROJECT NAME : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net
SAMPLING SOURCE : KYAUKTAN TOWNSHIP
SAMPLE TYPE : SOIL **RECEIVED DATE** : JANUARY 4, 2021
SAMPLING DATE : DECEMBER 23, 2020 **ANALYTICAL DATE** : JANUARY 4-12, 2021
SAMPLING TIME : - **REPORT NO.** : 2021-U02133
SAMPLING METHOD : - **WORK NO.** : 2020-009198
SAMPLING BY : CUSTOMER **ANALYSIS NO.** : T21AA020-0003 - T21AA020-0004
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT		DETECTION LIMIT
			1 T21AA020-0003	2 T21AA020-0004	
pH (1:1)	-	ELECTROMETRIC METHOD (US EPA 2004: 9045D)	6.7 (25°C)	7.4 (25°C)	-
MOISTURE	%	ASTM D2974 - 14	18.0	18.2	-
METALS					
CADMIUM (Cd)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	ND	ND	0.300
COPPER (Cu)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	27.7	24.3	0.300
IRON (Fe)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	43,999	33,407	0.500
LEAD (Pb)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	19.3	18.3	1.55
ZINC (Zn)	mg/kg	ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (US EPA 1996: 3050B AND 2007: 7000B)	95.0	90.1	0.350
SAMPLE CONDITION			BROWN SOIL	BROWN SOIL	

RESULT 1 : S-3

RESULT 2 : S-4

ND : NON-DETECTABLE.

SAMPLE(S) ANALYSED ON AS RECEIVED BASIS. RESULT(S) REPORTED ON A DRY WEIGHT BASIS.

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LABORATORY SUPERVISOR

FEBRUARY 19, 2021



ANALYSIS REPORT

PROJECT NAME : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net
SAMPLING SOURCE : KYAUKTAN TOWNSHIP
SAMPLE TYPE : SURFACE WATER **RECEIVED DATE** : JANUARY 4, 2021
SAMPLING DATE : DECEMBER 23, 2020 **ANALYTICAL DATE** : JANUARY 4-11, 2021
SAMPLING TIME : - **REPORT NO.** : 2021-U01704
SAMPLING METHOD : - **WORK NO.** : 2020-009199
SAMPLING BY : CUSTOMER **ANALYSIS NO.** : T21AA023-0001
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SW-1 T21AA023-0001	
AMMONIA	mg/L NH ₃	PHENATE METHOD (SM: 4500-NH ₃ F)	ND	0.05
CYANIDE	mg/L CN ⁻	DISTILLATION, PYRIDINE-BARBITURIC ACID METHOD (SM: 4500-CN ⁻ C AND 4500-CN ⁻ E)	ND	0.001
NITRATE	mg/L NO ₃ ⁻	CADMIUM REDUCTION METHOD (SM: 4500-NO ₃ ⁻ E)	0.44	0.09
NITRITE	mg/L NO ₂ ⁻	NED COLOURIMETRIC METHOD (SM: 4500-NO ₂ ⁻ B)	ND	0.07
PHENOLS	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	ND	0.005
PHOSPHORUS	mg/L P	ASCORBIC ACID METHOD (SM: 4500-P E)	0.03	0.01
METALS				
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: 3114 C)	0.0038	0.0003
CADMIUM	mg/L Cd	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
CHROMIUM	mg/L Cr	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	0.019	0.010
COPPER	mg/L Cu	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	0.004	0.003
MERCURY	mg/L Hg	COLD VAPOUR AAS METHOD (SM: 3112 B)	ND	0.0002
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			YELLOW/TURBID	
SEDIMENT			BROWN	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

ND : NON-DETECTABLE.

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(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JANUARY 12, 2021



ANALYSIS REPORT

PROJECT NAME : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net
SAMPLING SOURCE : KYAUKTAN TOWNSHIP
SAMPLE TYPE : SURFACE WATER **RECEIVED DATE** : JANUARY 4, 2021
SAMPLING DATE : DECEMBER 23, 2020 **ANALYTICAL DATE** : JANUARY 4-11, 2021
SAMPLING TIME : - **REPORT NO.** : 2021-U01705
SAMPLING METHOD : - **WORK NO.** : 2020-009199
SAMPLING BY : CUSTOMER **ANALYSIS NO.** : T21AA023-0002
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SW-2 T21AA023-0002	
AMMONIA	mg/L NH ₃	PHENATE METHOD (SM: 4500-NH ₃ F)	ND	0.05
CYANIDE	mg/L CN ⁻	DISTILLATION, PYRIDINE-BARBITURIC ACID METHOD (SM: 4500-CN ⁻ C AND 4500-CN ⁻ E)	ND	0.001
NITRATE	mg/L NO ₃ ⁻	CADMIUM REDUCTION METHOD (SM: 4500-NO ₃ ⁻ E)	0.53	0.09
NITRITE	mg/L NO ₂ ⁻	NED COLOURIMETRIC METHOD (SM: 4500-NO ₂ ⁻ B)	ND	0.07
PHENOLS	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	ND	0.005
PHOSPHORUS	mg/L P	ASCORBIC ACID METHOD (SM: 4500-P E)	0.03	0.01
METALS				
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: 3114 C)	0.0025	0.0003
CADMIUM	mg/L Cd	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
CHROMIUM	mg/L Cr	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	0.014	0.010
COPPER	mg/L Cu	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
MERCURY	mg/L Hg	COLD VAPOUR AAS METHOD (SM: 3112 B)	ND	0.0002
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			YELLOW/TURBID	
SEDIMENT			BROWN	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

ND : NON-DETECTABLE.

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(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JANUARY 12, 2021



ANALYSIS REPORT

PROJECT NAME : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net
SAMPLING SOURCE : KYAUKTAN TOWNSHIP
SAMPLE TYPE : SURFACE WATER **RECEIVED DATE** : JANUARY 4, 2021
SAMPLING DATE : DECEMBER 23, 2020 **ANALYTICAL DATE** : JANUARY 4-11, 2021
SAMPLING TIME : - **REPORT NO.** : 2021-U01706
SAMPLING METHOD : - **WORK NO.** : 2020-009199
SAMPLING BY : CUSTOMER **ANALYSIS NO.** : T21AA023-0003
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			SW-3 T21AA023-0003	
AMMONIA	mg/L NH ₃	PHENATE METHOD (SM: 4500-NH ₃ F)	ND	0.05
CYANIDE	mg/L CN ⁻	DISTILLATION, PYRIDINE-BARBITURIC ACID METHOD (SM: 4500-CN ⁻ C AND 4500-CN ⁻ E)	ND	0.001
NITRATE	mg/L NO ₃ ⁻	CADMIUM REDUCTION METHOD (SM: 4500-NO ₃ ⁻ E)	1.24	0.09
NITRITE	mg/L NO ₂ ⁻	NED COLOURIMETRIC METHOD (SM: 4500-NO ₂ ⁻ B)	ND	0.07
PHENOLS	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	ND	0.005
PHOSPHORUS	mg/L P	ASCORBIC ACID METHOD (SM: 4500-P E)	0.02	0.01
METALS				
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: 3114 C)	0.0019	0.0003
CADMIUM	mg/L Cd	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
CHROMIUM	mg/L Cr	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.010
COPPER	mg/L Cu	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
MERCURY	mg/L Hg	COLD VAPOUR AAS METHOD (SM: 3112 B)	ND	0.0002
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			YELLOW/TURBID	
SEDIMENT			BROWN	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

ND : NON-DETECTABLE.

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Benjawan V.

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JANUARY 12, 2021



ANALYSIS REPORT

PROJECT NAME	: BRIGHTER ENERGY OIL TERMINAL PROJECT	RECEIVED DATE	: JANUARY 4, 2021
CUSTOMER NAME	: RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.	ANALYTICAL DATE	: JANUARY 4-11, 2021
ADDRESS	: B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR	REPORT NO.	: 2021-U01707
CONTACT INFORMATION	: TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net	WORK NO.	: 2020-009199
SAMPLING SOURCE	: KYAUKTAN TOWNSHIP	ANALYSIS NO.	: T21AA023-0004
SAMPLE TYPE	: GROUNDWATER		
SAMPLING DATE	: DECEMBER 23, 2020		
SAMPLING TIME	: -		
SAMPLING METHOD	: -		
SAMPLING BY	: CUSTOMER		
ANALYZED BY	: MISS CHOMTHANAN APHIPATPAPHA		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			GW-1 T21AA023-0004	
AMMONIA	mg/L NH ₃	PHENATE METHOD (SM: 4500-NH ₃ F)	3.08	0.05
CYANIDE	µg/L CN ⁻	DISTILLATION, PYRIDINE-BARBITURIC ACID METHOD (SM: 4500-CN ⁻ C AND 4500-CN ⁻ E)	20	5
NITRATE	mg/L NO ₃ ⁻	CADMIUM REDUCTION METHOD (SM: 4500-NO ₃ ⁻ E)	11.1	0.09
NITRITE	mg/L NO ₂ ⁻	NED COLOURIMETRIC METHOD (SM: 4500-NO ₂ ⁻ B)	ND	0.07
PHENOLS	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	0.009	0.005
PHOSPHORUS	mg/L P	ASCORBIC ACID METHOD (SM: 4500-P E)	0.02	0.01
METALS				
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: 3114 C)	0.0013	0.0003
CADMIUM	mg/L Cd	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
CHROMIUM	mg/L Cr	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.010
COPPER	mg/L Cu	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
MERCURY	mg/L Hg	COLD VAPOUR AAS METHOD (SM: 3112 B)	ND	0.0002
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			YELLOW/TURBID	
SEDIMENT			BROWN	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

ND : NON-DETECTABLE.

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Benjawan V.

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JANUARY 12, 2021



ANALYSIS REPORT

PROJECT NAME : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net
SAMPLING SOURCE : KYAUKTAN TOWNSHIP
SAMPLE TYPE : GROUNDWATER **RECEIVED DATE** : JANUARY 4, 2021
SAMPLING DATE : DECEMBER 23, 2020 **ANALYTICAL DATE** : JANUARY 4-11, 2021
SAMPLING TIME : - **REPORT NO.** : 2021-U01708
SAMPLING METHOD : - **WORK NO.** : 2020-009199
SAMPLING BY : CUSTOMER **ANALYSIS NO.** : T21AA023-0005
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			GW-2 T21AA023-0005	
AMMONIA	mg/L NH ₃	PHENATE METHOD (SM: 4500-NH ₃ F)	ND	0.05
CYANIDE	µg/L CN ⁻	DISTILLATION, PYRIDINE-BARBITURIC ACID METHOD (SM: 4500-CN ⁻ C AND 4500-CN ⁻ E)	ND	5
NITRATE	mg/L NO ₃ ⁻	CADMIUM REDUCTION METHOD (SM: 4500-NO ₃ ⁻ E)	ND	0.09
NITRITE	mg/L NO ₂ ⁻	NED COLOURIMETRIC METHOD (SM: 4500-NO ₂ ⁻ B)	ND	0.07
PHENOLS	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	ND	0.005
PHOSPHORUS	mg/L P	ASCORBIC ACID METHOD (SM: 4500-P E)	0.23	0.01
METALS				
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: 3114 C)	0.0010	0.0003
CADMIUM	mg/L Cd	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
CHROMIUM	mg/L Cr	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.010
COPPER	mg/L Cu	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
MERCURY	mg/L Hg	COLD VAPOUR AAS METHOD (SM: 3112 B)	ND	0.0002
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			YELLOW/CLEAR	
SEDIMENT			GREY	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

ND : NON-DETECTABLE.

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(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JANUARY 12, 2021



ANALYSIS REPORT

PROJECT NAME	: BRIGHTER ENERGY OIL TERMINAL PROJECT	RECEIVED DATE	: JANUARY 4, 2021
CUSTOMER NAME	: RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.	ANALYTICAL DATE	: JANUARY 4-11, 2021
ADDRESS	: B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR	REPORT NO.	: 2021-U01709
CONTACT INFORMATION	: TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net	WORK NO.	: 2020-009199
SAMPLING SOURCE	: KYAUKTAN TOWNSHIP	ANALYSIS NO.	: T21AA023-0006
SAMPLE TYPE	: GROUNDWATER		
SAMPLING DATE	: DECEMBER 23, 2020		
SAMPLING TIME	: -		
SAMPLING METHOD	: -		
SAMPLING BY	: CUSTOMER		
ANALYZED BY	: MISS CHOMTHANAN APHIPATPAPHA		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			GW-3 T21AA023-0006	
AMMONIA	mg/L NH ₃	PHENATE METHOD (SM: 4500-NH ₃ F)	ND	0.05
CYANIDE	µg/L CN ⁻	DISTILLATION, PYRIDINE-BARBITURIC ACID METHOD (SM: 4500-CN ⁻ C AND 4500-CN ⁻ E)	ND	5
NITRATE	mg/L NO ₃ ⁻	CADMIUM REDUCTION METHOD (SM: 4500-NO ₃ ⁻ E)	2.44	0.09
NITRITE	mg/L NO ₂ ⁻	NED COLOURIMETRIC METHOD (SM: 4500-NO ₂ ⁻ B)	ND	0.07
PHENOLS	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	ND	0.005
PHOSPHORUS	mg/L P	ASCORBIC ACID METHOD (SM: 4500-P E)	0.18	0.01
METALS				
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: 3114 C)	0.0012	0.0003
CADMIUM	mg/L Cd	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
CHROMIUM	mg/L Cr	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.010
COPPER	mg/L Cu	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
MERCURY	mg/L Hg	COLD VAPOUR AAS METHOD (SM: 3112 B)	ND	0.0002
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			BROWN	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

ND : NON-DETECTABLE.

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Benjawan V.

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JANUARY 12, 2021



ANALYSIS REPORT

PROJECT NAME : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
ADDRESS : B702 DELTA PLAZA, SHWEGONDAING ROAD, BAHAN, YANGON MYANMAR
CONTACT INFORMATION : TEL : +959 7301 3448 e-mail : thandartun@enviromyanmar.net
SAMPLING SOURCE : KYAUKTAN TOWNSHIP
SAMPLE TYPE : GROUNDWATER **RECEIVED DATE** : JANUARY 4, 2021
SAMPLING DATE : DECEMBER 23, 2020 **ANALYTICAL DATE** : JANUARY 4-11, 2021
SAMPLING TIME : - **REPORT NO.** : 2021-U01711
SAMPLING METHOD : - **WORK NO.** : 2020-009199
SAMPLING BY : CUSTOMER **ANALYSIS NO.** : T21AA023-0007
ANALYZED BY : MISS CHOMTHANAN APHIPATPAPHA

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT	DETECTION LIMIT
			GW-4 T21AA023-0007	
AMMONIA	mg/L NH ₃	PHENATE METHOD (SM: 4500-NH ₃ F)	ND	0.05
CYANIDE	µg/L CN ⁻	DISTILLATION, PYRIDINE-BARBITURIC ACID METHOD (SM: 4500-CN ⁻ C AND 4500-CN ⁻ E)	ND	5
NITRATE	mg/L NO ₃ ⁻	CADMIUM REDUCTION METHOD (SM: 4500-NO ₃ ⁻ E)	0.62	0.09
NITRITE	mg/L NO ₂ ⁻	NED COLOURIMETRIC METHOD (SM: 4500-NO ₂ ⁻ B)	ND	0.07
PHENOLS	mg/L	DISTILLATION, 4-AMINOANTIPYRINE METHOD (SM: 5530 B AND 5530 C)	ND	0.005
PHOSPHORUS	mg/L P	ASCORBIC ACID METHOD (SM: 4500-P E)	0.03	0.01
METALS				
ARSENIC	mg/L As	HYDRIDE GENERATION AAS METHOD (SM: 3114 C)	0.0006	0.0003
CADMIUM	mg/L Cd	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
CHROMIUM	mg/L Cr	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.010
COPPER	mg/L Cu	NITRIC ACID DIGESTION AND DIRECT AIR ACETYLENE FLAME METHOD (SM: 3030 E AND 3111 B)	ND	0.003
MERCURY	mg/L Hg	COLD VAPOUR AAS METHOD (SM: 3112 B)	ND	0.0002
SAMPLE CONDITION				
WATER'S COLOUR/TURBID			COLOURLESS/CLEAR	
SEDIMENT			BROWN	

SM : STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER, APHA, AWWA, WEF, 23rd EDITION, 2017.

ND : NON-DETECTABLE.

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Benjawan V.

(MISS BENJAWAN VIRIYOTHAI)
LABORATORY SUPERVISOR

JANUARY 12, 2021



ANALYSIS REPORT

PROJECT	: BRIGHTER ENERGY OIL TERMINAL PROJECT	SUBMITTAL/ RECEIPT NO.	: 3/12/2020
CUSTOMER NAME	: RESOURCE AND ENVIRONMENT MYANMAR CO.,LTD	RECEIVED DATE	: DECEMBER 24, 2020
ADDRESS	: B 402, DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON, MYANMAR. TEL.+95973013448	ANALYSIS DATE	: DECEMBER 24-JANUARY 12, 2020
SAMPLING SOURCE	: SW-1	ANALYSIS NO.	: LAA171/2020
SAMPLE TYPE	: SURFACE WATER	REPORT NO.	: L00191/2020
SAMPLING DATE	: DECEMBER 23, 2020		
SAMPLING TIME	: 11:45 HOUR		
SAMPLING METHOD	: GRAB		
SAMPLING BY	: REM		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT
			SW-1
			LAA171/2020
pH	-	ELECTROMETRIC METHOD (SM : 4500-H B)	6.9 (25 °C)
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM : 5210 B AND 4500-O G)	2.9
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, TITRIMETRIC METHOD (SM : 5220 C)	74
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM : 2540 D)	214
FECAL COLIFORM BACTERIA	MPN/100 mL	MULTIPLE TUBE FERMENTATION TECHNIQUE (SM : 9221 E)	920
OIL AND GREASE	mg/L	PARTITION-GRAVIMETRIC METHOD (SM : 5520 B)	ND (<3)
SAMPLE CONDITION			
WATER'S COLOUR/TURBID			BROWN / TURBID
SEDIMENT			BROWN

SM : APHA/AWWA/WEF STANDARD METHOD FOR THE EXAMINATION OF WATER AND WASTEWATER, 23rd EDITION, 2017
 ND : NON-DETECTABLE.

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GENERAL MANAGER

DATE JANUARY 21, 2020

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ANALYSIS REPORT

PROJECT : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO.,LTD
ADDRESS : B 402, DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON, MYANMAR. TEL.+95973013448
SAMPLING SOURCE : SW-2
SAMPLE TYPE : SURFACE WATER **SUBMITTAL/ RECEIPT NO.** : 3/12/2020
SAMPLING DATE : DECEMBER 23, 2020 **RECEIVED DATE** : DECEMBER 24, 2020
SAMPLING TIME : 11:22 HOUR **ANALYSIS DATE** : DECEMBER 24-JANUARY 12, 2020
SAMPLING METHOD : GRAB **ANALYSIS NO.** : LAA172/2020
SAMPLING BY : REM **REPORT NO.** : L00192/2020

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT
			SW-2
			LAA172/2020
pH	-	ELECTROMETRIC METHOD (SM : 4500-H B)	7.2 (25 °C)
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM : 5210 B AND 4500-O G)	ND (<1.0)
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, TITRIMETRIC METHOD (SM : 5220 C)	58
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM : 2540 D)	126
FECAL COLIFORM BACTERIA	MPN/100 mL	MULTIPLE TUBE FERMENTATION TECHNIQUE (SM : 9221 E)	79
OIL AND GREASE	mg/L	PARTITION-GRAVIMETRIC METHOD (SM : 5520 B)	ND (<3)
SAMPLE CONDITION			
WATER'S COLOUR/TURBID			LIGHT BROWN / TURBID
SEDIMENT			BROWN

SM : APHA/AWWA/WEF STANDARD METHOD FOR THE EXAMINATION OF WATER AND WASTEWATER, 23rd EDITION, 2017
 ND : NON-DETECTABLE.

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 (MS TOE TOE HLAING)
 GENERAL MANAGER
 DATE JANUARY 21, 2020

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ANALYSIS REPORT

PROJECT	: BRIGHTER ENERGY OIL TERMINAL PROJECT	SUBMITTAL/ RECEIPT NO.	: 3/12/2020
CUSTOMER NAME	: RESOURCE AND ENVIRONMENT MYANMAR CO.,LTD	RECEIVED DATE	: DECEMBER 24, 2020
ADDRESS	: B 402, DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON, MYANMAR. TEL.+95973013448		
SAMPLING SOURCE	: SW-3	ANALYSIS DATE	: DECEMBER 24-JANUARY 12, 2020
SAMPLE TYPE	: SURFACE WATER	ANALYSIS NO.	: LAA173/2020
SAMPLING DATE	: DECEMBER 23, 2020	REPORT NO.	: L00193/2020
SAMPLING TIME	: 11:03 HOUR		
SAMPLING METHOD	: GRAB		
SAMPLING BY	: REM		

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT
			SW-3
			LAA173/2020
pH	-	ELECTROMETRIC METHOD (SM : 4500-H ⁺ B)	7.3 (25 ^o C)
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM : 5210 B AND 4500-O G)	1.5
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, TITRIMETRIC METHOD (SM : 5220 C)	45
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 ^o C (SM : 2540 D)	78.7
FECAL COLIFORM BACTERIA	MPN/100 mL	MULTIPLE TUBE FERMENTATION TECHNIQUE (SM : 9221 E)	350
OIL AND GREASE	mg/L	PARTITION-GRAVIMETRIC METHOD (SM : 5520 B)	ND (<3)
SAMPLE CONDITION			
WATER'S COLOUR/TURBID			GREY / TURBID
SEDIMENT			GREY

SM : APHA/AWWA/WEF STANDARD METHOD FOR THE EXAMINATION OF WATER AND WASTEWATER, 23RD EDITION, 2017

ND : NON-DETECTABLE.


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 GENERAL MANAGER
 DATE JANUARY 21,2020

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ANALYSIS REPORT

PROJECT : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO.,LTD
ADDRESS : B 402, DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON, MYANMAR. TEL.+95973013448
SAMPLING SOURCE : GW-1
SAMPLE TYPE : GROUNDWATER **SUBMITTAL/ RECEIPT NO.** : 3/12/2020
SAMPLING DATE : DECEMBER 23, 2020 **RECEIVED DATE** : DECEMBER 24, 2020
SAMPLING TIME : 03:00 HOUR **ANALYSIS DATE** : DECEMBER 24-JANUARY 12, 2020
SAMPLING METHOD : GRAB **ANALYSIS NO.** : LAA174/2020
SAMPLING BY : REM **REPORT NO.** : L00194/2020

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT
			GW-1
			LAA174/2020
pH	-	ELECTROMETRIC METHOD (SM : 4500-H B)	6.9 (25 °C)
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM : 5210 B AND 4500-O G)	1.5
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, TITRIMETRIC METHOD (SM : 5220 C)	51
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM : 2540 D)	158
FECAL COLIFORM BACTERIA	MPN/100 mL	MULTIPLE TUBE FERMENTATION TECHNIQUE (SM : 9221 E)	<1.8
OIL AND GREASE	mg/L	PARTITION-GRAVIMETRIC METHOD (SM : 5520 B)	ND (<3)
SAMPLE CONDITION			
WATER'S COLOUR/TURBID			YELLOWISH BROWN /
SEDIMENT			TURBID BROWN

SM : APHA/AWWA/WEF STANDARD METHOD FOR THE EXAMINATION OF WATER AND WASTEWATER, 23rd EDITION, 2017
 ND : NON-DETECTABLE.

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GENERAL MANAGER

DATE JANUARY 21, 2020

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ANALYSIS REPORT

PROJECT : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO.,LTD
ADDRESS : B 402, DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON, MYANMAR. TEL.+95973013448
SAMPLING SOURCE : GW-2
SAMPLE TYPE : GROUNDWATER **SUBMITTAL/ RECEIPT NO.** : 3/12/2020
SAMPLING DATE : DECEMBER 23, 2020 **RECEIVED DATE** : DECEMBER 24, 2020
SAMPLING TIME : 03:45 HOUR **ANALYSIS DATE** : DECEMBER 24-JANUARY 12, 2020
SAMPLING METHOD : GRAB **ANALYSIS NO.** : LAA175/2020
SAMPLING BY : REM **REPORT NO.** : L00195/2020

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT
			GW-2
			LAA175/2020
pH	-	ELECTROMETRIC METHOD (SM : 4500-H B)	7.6 (25 ⁰ C)
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM : 5210 B AND 4500-O G)	1.2
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, TITRIMETRIC METHOD (SM : 5220 C)	53
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 ⁰ C (SM : 2540 D)	213
FECAL COLIFORM BACTERIA	MPN/100 mL	MULTIPLE TUBE FERMENTATION TECHNIQUE (SM : 9221 E)	4.5
OIL AND GREASE	mg/L	PARTITION-GRAVIMETRIC METHOD (SM : 5520 B)	ND (<3)
SAMPLE CONDITION			
WATER'S COLOUR/TURBID			GREY / TURBID
SEDIMENT			BLACK

SM : APHA/AWWA/WEF STANDARD METHOD FOR THE EXAMINATION OF WATER AND WASTEWATER, 23rd EDITION, 2017

ND : NON-DETECTABLE.

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GENERAL MANAGER

DATE JANUARY 21,2020

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ANALYSIS REPORT

PROJECT : BRIGHTER ENERGY OIL TERMINAL PROJECT
CUSTOMER NAME : RESOURCE AND ENVIRONMENT MYANMAR CO.,LTD
ADDRESS : B 402, DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON, MYANMAR. TEL.+95973013448
SAMPLING SOURCE : GW-3
SAMPLE TYPE : GROUNDWATER **SUBMITTAL/ RECEIPT NO.** : 3/12/2020
SAMPLING DATE : DECEMBER 23, 2020 **RECEIVED DATE** : DECEMBER 24, 2020
SAMPLING TIME : 04:15 HOUR **ANALYSIS DATE** : DECEMBER 24-JANUARY 12, 2020
SAMPLING METHOD : GRAB **ANALYSIS NO.** : LAA176/2020
SAMPLING BY : REM **REPORT NO.** : L00196/2020

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT
			GW-3
			LAA176/2020
pH	-	ELECTROMETRIC METHOD (SM : 4500-H B)	7.1 (25 °C)
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM : 5210 B AND 4500-O G)	ND (<1.0)
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, TITRIMETRIC METHOD (SM : 5220 C)	26
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 °C (SM : 2540 D)	6.5
FECAL COLIFORM BACTERIA	MPN/100 mL	MULTIPLE TUBE FERMENTATION TECHNIQUE (SM : 9221 E)	2.0
OIL AND GREASE	mg/L	PARTITION-GRAVIMETRIC METHOD (SM : 5520 B)	ND (<3)
SAMPLE CONDITION			
WATER'S COLOUR/TURBID			LIGHT GREY / LITTLE
SEDIMENT			TURBID
			GREY

SM : APHA/AWWA/WEF STANDARD METHOD FOR THE EXAMINATION OF WATER AND WASTEWATER, 23rd EDITION, 2017
 ND : NON-DETECTABLE.

Toe Toe Hlaing

(MS TOE TOE HLAING)
 GENERAL MANAGER
 DATE JANUARY 21, 2020

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ANALYSIS REPORT

PROJECT	: BRIGHTER ENERGY OIL TERMINAL PROJECT		
CUSTOMER NAME	: RESOURCE AND ENVIRONMENT MYANMAR CO.,LTD		
ADDRESS	: B 402, DELTA PLAZA, SHWEGONDAING ROAD, BAHAN TOWNSHIP, YANGON, MYANMAR. TEL.+95973013448		
SAMPLING SOURCE	: GW-4		
SAMPLE TYPE	: GROUNDWATER	SUBMITTAL/ RECEIPT NO.	: 3/12/2020
SAMPLING DATE	: DECEMBER 23, 2020	RECEIVED DATE	: DECEMBER 24, 2020
SAMPLING TIME	: 04:30 HOUR	ANALYSIS DATE	: DECEMBER 24-JANUARY 12, 2020
SAMPLING METHOD	: GRAB	ANALYSIS NO.	: LAA177/2020
SAMPLING BY	: REM	REPORT NO.	: L00197/2020

PARAMETER	UNIT	METHOD OF ANALYSIS	RESULT
			GW-4
			LAA177/2020
pH	-	ELECTROMETRIC METHOD (SM : 4500-H ⁺ B)	7.1 (25 ^o C)
BIOCHEMICAL OXYGEN DEMAND	mg/L	MEMBRANE ELECTRODE METHOD (SM : 5210 B AND 4500-O G)	1.2
CHEMICAL OXYGEN DEMAND	mg/L	CLOSED REFLUX, TITRIMETRIC METHOD (SM : 5220 C)	29
TOTAL SUSPENDED SOLIDS	mg/L	TOTAL SUSPENDED SOLIDS DRIED AT 103-105 ^o C (SM : 2540 D)	14.4
FECAL COLIFORM BACTERIA	MPN/100 mL	MULTIPLE TUBE FERMENTATION TECHNIQUE (SM : 9221 E)	4.5
OIL AND GREASE	mg/L	PARTITION-GRAVIMETRIC METHOD (SM : 5520 B)	ND (<3)
SAMPLE CONDITION			
WATER'S COLOUR/TURBID SEDIMENT			LIGHT GREY / TURBID GREY

SM : APHA/AWWA/WEF STANDARD METHOD FOR THE EXAMINATION OF WATER AND WASTEWATER, 23rd EDITION, 2017
 ND : NON-DETECTABLE.

Toe Toe Hlaing

(MS TOE TOE HLAING)
 GENERAL MANAGER

DATE JANUARY 21, 2020

- DO NOT COPY PARTIAL OF THIS ANALYSIS REPORT WITHOUT OFFICIAL APPROVAL.
- REPORTED ANALYSIS REFERS TO SUBMITTED SAMPLE ONLY.

APPENDIX D IBAT REPORT

Integrated Biodiversity Assessment Tool

WORLD BANK GROUP BIODIVERSITY RISK SCREEN

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Yangon New Town Myanmar

Overlaps with:

Protected Areas	1
Key Biodiversity Areas	4
IUCN Red List	39
Critical Habitat	Likely



Displaying project location and buffers: 50km



This report is based on IFC Performance Standard 6 (PS6) but applies to World Bank Environmental and Social Standard 6 (ESS6)

About this report

IBAT provides initial screening for critical habitat values. Performance Standard 6 (PS6) defines these values for critical habitat (PS6: para. 16) and legally protected and internationally recognized areas (PS6: para. 20). PS6 will be triggered when IFC client activities are located in modified habitats containing “significant biodiversity value,” natural habitats, critical habitats, legally protected areas, or areas that are internationally recognized for biodiversity. References to PS6 and Guidance Note 6 (GN6) are provided to guide further assessment and detailed definitions where necessary. Please see <https://www.ifc.org/ps6> for full details on PS6 and GN6.

The report screens for known risks within a standard 50km buffer of the coordinates used for analysis. This buffer is not intended to indicate the area of impact. The report can be used to:

- Scope risks to include within an assessment of risks and impacts
- Identify gaps within an existing assessment of risks and impacts
- Prioritize between sites in a portfolio for further assessment of risks and impacts
- Inform a preliminary determination of critical habitat
- Assess the need for engaging a biodiversity specialist
- Identify additional conservation experts or organizations to inform further assessment or planning

WARNING: IBAT aims to provide the most up-to-date and accurate information available at the time of analysis. There is however a possibility of incomplete, incorrect or out-of-date information. All findings in this report must be supported by further desktop review, consultation with experts and/or on-the-ground field assessment as described in PS6 and GN6. Please consult IBAT for any additional disclaimers or recommendations applicable to the information used to generate this report.

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Priority Species

Habitat of significant importance to priority species will trigger critical habitat status (See PS6: para 16). IBAT provides a preliminary list of priority species that could occur within the 50km buffer. This list is drawn from the IUCN Red List of Threatened Species (IUCN RL). This list should be used to guide any further assessment, with the aim of confirming known or likely occurrence of these species within the project area. It is also possible that further assessment may confirm occurrence of additional priority species not listed here. It is strongly encouraged that any new species information collected by the project be shared with species experts and/or IUCN wherever possible in order to improve IUCN datasets.

IUCN Red List of Threatened Species - CR & EN

The following species are potentially found within 50km of the area of interest. For the full IUCN Red List please refer to the associated csv in the report folder.

Species name	Common name	IUCN Category	Group
Batagur baska	Northern river terrapin	CR	Reptilia
Calidris pygmaea	Spoon-billed sandpiper	CR	Aves
Carcharhinus hemiodon	Pondicherry shark	CR	Chondrichthyes
Emberiza aureola	Yellow-breasted bunting	CR	Aves
Glyphis siamensis	Irrawaddy river shark	CR	Chondrichthyes
Gyps bengalensis	White-rumped vulture	CR	Aves
Gyps tenuirostris	Slender-billed vulture	CR	Aves
Pristis pristis	Large-tooth sawfish	CR	Chondrichthyes
Pristis zijsron	Green sawfish	CR	Chondrichthyes
Sarcogyps calvus	Red-headed vulture	CR	Aves
Sonneratia griffithii		CR	Magnoliopsida

Species name	Common name	IUCN Category	Group
<i>Acropora rudis</i>		EN	Anthozoa
<i>Aetomylaeus maculatus</i>	Mottled eagle ray	EN	Chondrichthyes
<i>Anoxypristis cuspidata</i>	Narrow sawfish	EN	Chondrichthyes
<i>Aquila nipalensis</i>	Steppe eagle	EN	Aves
<i>Asarcornis scutulata</i>	White-winged duck	EN	Aves
<i>Axis porcinus</i>	Hog deer	EN	Mammalia
<i>Balaenoptera musculus</i>	Blue whale	EN	Mammalia
<i>Cuon alpinus</i>	Dhole	EN	Mammalia
<i>Enhydryis vorisi</i>		EN	Reptilia
<i>Haliaeetus leucoryphus</i>	Pallas's fish-eagle	EN	Aves
<i>Heliopais personatus</i>	Masked finfoot	EN	Aves
<i>Heritiera fomes</i>		EN	Magnoliopsida
<i>Holothuria lessoni</i>		EN	Holothuroidea
<i>Holothuria scabra</i>		EN	Holothuroidea
<i>Isurus oxyrinchus</i>	Shortfin mako	EN	Chondrichthyes
<i>Isurus paucus</i>	Longfin mako	EN	Chondrichthyes
<i>Lamiopsis temminckii</i>	Broadfin shark	EN	Chondrichthyes

Species name	Common name	IUCN Category	Group
Leptoptilos dubius	Greater adjutant	EN	Aves
Lonchura oryzivora	Java sparrow	EN	Aves
Orcaella brevirostris	Irrawaddy dolphin	EN	Mammalia
Pavo muticus	Green peafowl	EN	Aves
Rhincodon typus	Whale shark	EN	Chondrichthyes
Sphyrna lewini	Scalloped hammerhead	EN	Chondrichthyes
Sphyrna mokarran	Great hammerhead	EN	Chondrichthyes
Sterna acuticauda	Black-bellied tern	EN	Aves
Thelenota ananas		EN	Holothuroidea
Trachypithecus phayrei	Phayre's leaf-monkey	EN	Mammalia
Urogymnus polylepis		EN	Chondrichthyes

Restricted Range Species

	Common name	IUCN Category	Group
Chrysomma altirostre	Jerdon's babbler	VU	Aves
Alophoixus griseiceps	Grey-crowned bulbul	LC OR LR/LC	Aves
Acrocephalus orinus	Large-billed reed-warbler	DD	Aves

Biodiversity featured which are likely to trigger Critical Habitat

Protected Areas

Proximal to the point (Buffer intersect) Reporting areas located up to [x] km from the AOI
For further details please refer to the associated csv file in the report folder.

Area name	Distance	Recommendation
Hlawga Park	50km	Assess for biodiversity risk

Key Biodiversity Areas

Proximal to the point (Buffer intersect) Reporting areas located up to [x] km from the AOI
For further details please refer to the associated csv file in the report folder.

Area name	Distance	Recommendation
Hlawga Park	50km	Assess for critical habitat
Hlawga Reservoir	50km	Assess for critical habitat
Maletto Inn	50km	Assess for critical habitat
Payagyi	50km	Assess for critical habitat

Species with potential to occur

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
Reptilia	73	6	1	1	4	0	61	6

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
Aves	417	23	5	8	10	28	365	1
Chondrichthyes	65	35	4	9	22	18	7	5
Magnoliopsida	77	2	1	1	0	2	67	6
Anthozoa	265	41	0	1	40	82	134	8
Mammalia	102	15	0	5	10	2	80	5
Holothuroidea	32	7	0	3	4	0	13	12
Liliopsida	65	1	0	0	1	0	62	2
Actinopterygii	413	6	0	0	6	12	365	30
Insecta	86	0	0	0	0	0	79	7
Polypodiopsida	4	0	0	0	0	0	4	0
Gastropoda	136	0	0	0	0	0	122	14
Malacostraca	36	0	0	0	0	0	25	11
Bivalvia	46	0	0	0	0	0	29	17
Amphibia	17	0	0	0	0	0	17	0
Arachnida	4	0	0	0	0	0	4	0
Hydrozoa	2	0	0	0	0	0	2	0

Country-level summary

Coming soon

Recommended Experts and Organizations

For projects located in critical habitat, clients must ensure that external experts with regional expertise are involved in further assessment (GN6: GN22). Clients are encouraged to develop partnerships with recognized and credible conservation organizations and/or academic institutes, especially with respect to potential developments in natural or critical habitat (GN6: GN23). Where critical habitats are triggered by priority species, species specialists must be involved. IBAT provides data originally collected by a large network of national partners, while species information is sourced via the IUCN Red List and affiliated Species Specialist Groups. These experts and organizations are listed below. **Please note that this is not intended as a comprehensive list of organizations and experts. These organizations and experts are under no obligation to support any further assessment and do so entirely at their discretion and under their terms. Any views expressed or recommendations made by these stakeholders should not be attributed to the IFC or IBAT for IFC partners.**

Relevant national or regional organizations

IBAT integrates information developed by a global network of conservation agencies, organizations and experts. These efforts are coordinated by the IBAT Alliance (BirdLife International, Conservation International, IUCN and UNEP-WCMC) who compile and maintain this information as globally standardized databases. The local partners most relevant to the area of analysis are:

Wild Bird Society of Japan Address: Maruwa Building, 3-9-23 Nishi-Gotanda, Shinagawa-ku, Tokyo 141-0031, Japan Web: <http://www.wbsj.org/>

BirdLife Asia Regional Office Address: 354 Tanglin Road, #01-16/17, Tanglin International Centre, Singapore 247672
Email: singapore.office@birdlife.org Web: <http://www.birdlife.org/asia>

Directory for Species Survival Commission (SSC) Specialist Groups and Red List Authorities

URL: http://www.iucn.org/about/work/programmes/species/who_we_are/ssc_specialist_groups_and_red_list_authorities_directory/

APPENDIX E CONSTRUCTION WASTE MANAGEMENT PLAN



CPP (Myanmar)

Construction Waste Management Plan

Project Title: Tank Farm and Distribution System Project Of MEC Land (Thilawa)

Owner : Brighter Energy Co.Ltd

Contractor: China Petroleum Pipeline (Myanmar) Co.Ltd

Table of Contents

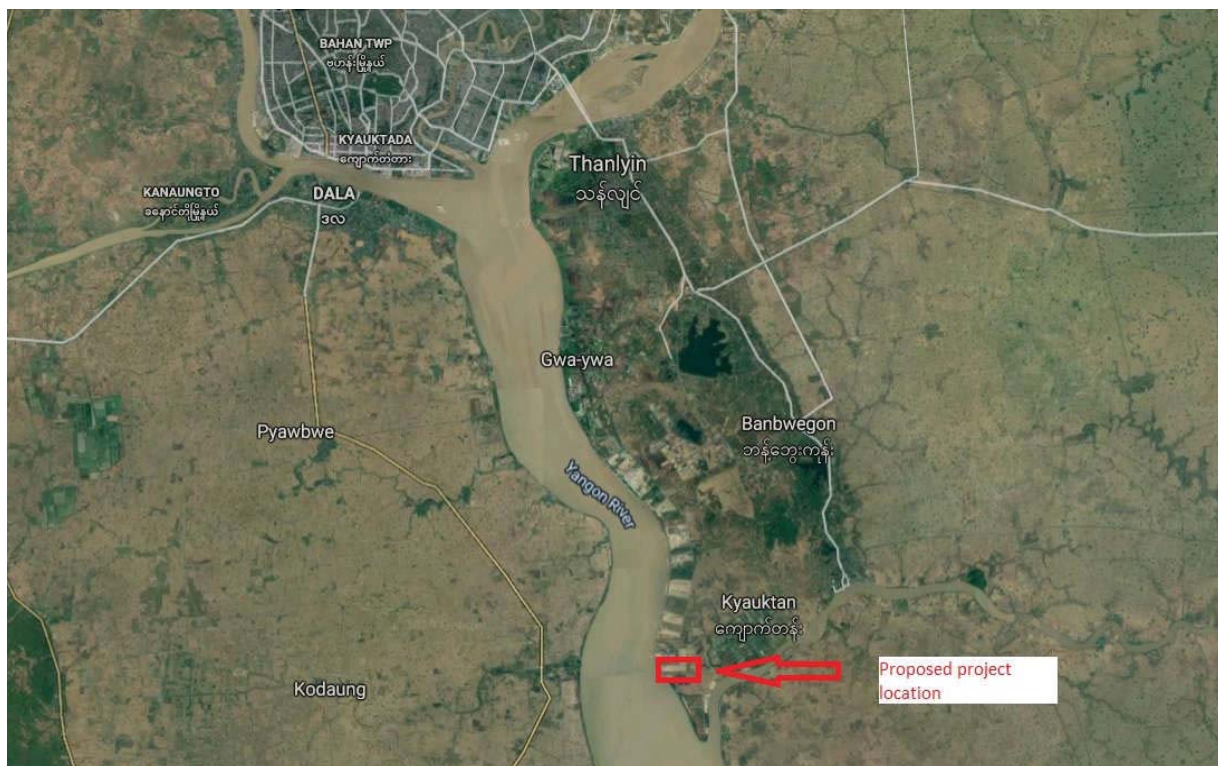
1. PROJECT OVERVIEW.....	3
1.1. Location, Size and Scale of the Development.....	3
1.2. Detail of Waste to be Produce.....	3
1.3. Waste Categories.....	3
1.4. Anticipated Hazardous Waste Arising.....	4
2. ESTIMATED WASTE ARISING.....	4
2.1. Construction Waste Generation.....	4
2.2. Proposed Waste Management Options.....	4
2.3. Tracking and documentation procedures for off-site waste.....	5
2.4. Disposal of Waste.....	5
3. ESTIMATED COST OF WASTE MANAGEMENT.....	6
3.1. Reuse.....	6
4. Training Provisions for Waste Manager and Site Team.....	6
4.1. Site Manager Training and Responsibility.....	6
4.2. Site Team Waste Management Training.....	6
5. RECORD KEEPING.....	6
6. LOCAL AUTHORITY AND RECYCLING COMPANIES.....	7

1. PROJECT OVERVIEW

1.1. Location, Size and Scale of the Development

Brighter Energy Company limited (BE) intends to develop an Oil & LPG Terminal at Thilawa area on the Yangon River. Thilawa, located at southern part of Yangon for 16 kilometers, is convenient in logistic of both sea access and country's distribution including supply of industries estate.

The proposed development is to be undertaken on 404099 square meter of land and facility comprises of Jetty, Tank Farms, Utilities and Interconnecting pipelines from Jetty to Tank Farm named as the Tank farm & distribution system project of MEC land will be operated for the receipt, storage and handling of Gasoline, Diesel and LPG finished products.



1.2. Source of Wastes

During the construction phase, there will be surplus of materials such as off-cuts from timber and broken concrete blocks, tiles and bricks. Waste from packaging and over supply of materials will also be generated. Subsoil will be required to create berms for planting on the site. Other wastes that will arise from the construction phase of the development will be from the site compound i.e. canteen waste and temporary W/C utilities.

1.3. Waste Categories

The main non-hazardous and hazardous waste streams that will be generated by the construction activities are as follow.

- Soil and stone
- Concrete etc

- *Wood*
- *Bituminous mixtures*
- *Gypsum*
- *Iron and steel*
- *Insulation materials*
- *Canteen waste*

1.4. Anticipated Hazardous Waste

Soil tests shall be carried out on excavated soil if deemed appropriate when excavations are undertaken. Fuels stored on site that will be used during the construction are hazardous. There will be fuel stored on site for machinery and construction vehicles. All fuel tanks and draw off points will be prevented from spillage by providing metal tray or embankment. If the fuel is correctly contained and bund, it is not expected that there will be any fuel wastage or spillage at site.

2. ESTIMATED WASTE

2.1. Construction Waste Generation

If any contaminated material is encountered during the construction works, this will increase the disposal rate. Any potentially contaminated material encountered will have to be classified and disposed of in accordance with local regulation.

2.2. Proposed Waste Management Options

Waste will be segregated on site. The appointed waste contractor will collect and transfer the recyclable wastes as receptacles or designated waste areas are full. The non-recyclable waste will be transferred by an authorized waste collector to an appropriated facility.

A successful waste management plan is largely dependent on how really it can be integrated in to normal site operations by the person responsible. It is recognized that the plan should not be obstructive to site operations and the construction programme by placing the responsibility of construction waste management with the manager. All reuse, recycling, wastage and necessary disposal can be monitored as close to the source as possible. An Environmental Representative from each works sub-contractor will also be nominated responsible for all waste management in their own operations. In this way, it is possible to identify where the greatest material wastage occurs, with a view to implementing better management both in this and future projects.

The site construction manager will be designated as the responsible person and have overall responsibility for the implementation of the on-site WMP. The responsible person will be assigned the authority to instruct all site personnel to comply with the specific provisions of the plan. At the operational level, a nominated environmental representative from each sub-contractor or company on the site shall be assigned the direct responsibility to ensure that the discrete operations stated in the WMP are performed on an on-going basis.

Bedrock, Blocks and Concrete

The majority of the waste will be clean, inert material and it is proposed to reuse it for construction purposes where possible. If bedrock is encountered during excavations, it will either be crushed on site and used for infill during construction or be removed from the site by appropriately permitted waste collectors. Rock recovered from the site will be recovered at an authorized site locally.

Soil/Subsoil

Excess inert soils and sub-soils excavated that is not required or use as fill on site will be recovered off-site. Soil will only be removed by authorized waste collectors to an authorized site. Any fill material excavated at the site, which is deemed to be contaminated (i.e, non-hazardous or hazardous) will be stored separately to the inert material, sampled and tested, in order to appropriately classify the material as non-hazardous or hazardous in accordance with local regulation which establishes the

criteria for the acceptance of waste at landfills before being transported to an appropriately authorized facility by permitted contractors.

Plastic

As plastic is now considered a highly recyclable material, much of the plastic generated during construction will be diverted from landfill and recycled. The plastic will be segregated at source and kept as clean as possible and stored in a dedicated skip/bin.

Timber

There will be timber waste generated from the construction work as off-cuts or damaged pieces of timber or from the demolished buildings. Timber that is uncontaminated i.e. free from paints, preservatives, glues etc, will be recycled. It will be collected on-site in a designated area, and collected by a timber recycling company, or a recycling company that will pass it on to a timber recycling company. Such companies shared the timber and use it in energy recovery or for manufacture of wood products or for landscaping woodchip etc.

Scrap Metal

Steel is a highly recyclable material and there are numerous companies that will accept waste steel and other scrap metals. A segregated skip metal will be available for steel/metal storage on-site pending recycling.

Cardboard Packaging

Cardboard packaging can also be recycled. Cardboard will be flattened and placed in a covered skip to prevent it getting wet.

Hazardous Wastes

On-site storage of any hazardous wastes produced will be minimized with off-site removal organized on a regular basis. Appropriate storage of all hazardous wastes on-site will be undertaken including burning of fuels, lubricants etc so as to minimize exposure to on-site personnel (and the public) and to also minimize potential for environmental impacts. Hazardous wastes will be recovered where possible and falling this, disposed of appropriately.

Canteen Wastes/WC utilities Waste

Regular housekeeping of the temporary canteen, WC areas will be carried out. Removal of domestic waste from the construction compound will be carried out by a permitted waste contractor. Any temporary WC utilities used on site during the construction phase will be maintained by an approved and permitted contractor.

2.3. Tracking and documentation procedures for off-site waste

The waste manager will maintain a copy of all waste collection permits. If waste (Soil & Stone) is being accepted on-site, a waste docket must be issued to the collector. If the waste is being transported to another site, a copy of the waste permit or EPA waste license for that site must be provided to the waste manager. If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TPS) document must be obtained from authority and kept on site along with details of the final destination (permits, licenses etc). As well as a waste collection docket, a receipt from the final destination of the material will be kept as part of the on-site waste management records. All information will be entered in a waste management system to be maintained on site.

2.4. Disposal of Waste

There will be a general skip or receptacle for construction waste not suitable for reuse or recovery. This skip will include general wet waste (Mixed food waste and food packaging), contaminated cardboard, contaminated plastic etc. Workers on the site will be encouraged to recycle as much municipal waste as possible i.e cardboard, plastic, metals and glass. Prior to removal, the municipal waste receptacle will be examined by whether the foreperson or a member of his/her team to determine if

recyclable materials have been placed in there. If this is the case, effort will be made to determine the cause of waste not being segregated correctly.

3. ESTIMATED COST OF WASTE MANAGEMENT

The cost of waste management is difficult to estimate at this stage of the development for a number of reasons. Waste costs have changed significantly over the past few years and are set to keep changing as regional waste management plans are implanted fully and the emphasis of reduce reuse recycle increases. In addition, the changing economic climate has significantly reduced waste management costs.

3.1. Reuse

By re-using materials on-site, there will be a reduction in transport and disposal costs for a waste contractor taking the material away.

4. Training Provisions for Waste Manager and Site Team

A waste manager will be assigned to ensure commitment, operational efficiency and accountability during the construction phase.

4.1. Site Manager Training and Responsibility

The waste manager will be given responsibility and authority to select a waste team if required i.e. site team that will aid him in the organization, operation and recording the waste management system implemented on-site. The waste manager will have overall responsibility to oversee record and provide feedback to the client on everyday waste management at the site. Authority will be given to the waste manager to delegate responsibility to sub-contractors where necessary and to coordinate with suppliers, service providers and sub-contractors to prioritize waste prevention and salvage. The waste manager will be trained in how to set up and maintain a record keeping system, how to perform and audit and how to establish targets for waste management on site. He will also be trained in the best method for segregation and storage of recyclable materials, have information on the materials that can be reused on-site and know how to implement the WMP.

4.2. Site Team Waste Management Training

Training of the site crew is the responsibility of the waste manager and as such, a waste training program should be organized. A basic awareness course will be held for all crew to outline the WMP and to detail the segregation of waste at source. This may be incorporated with other training needs (e.g, general site induction, safety training etc.) This basic course will describe the materials to be segregated, the storage methods and the location of the waste storage areas. A subsection on hazardous wastes will be incorporated and the particular dangers of each hazardous waste will be explained.

5. RECORD KEEPING

Records will be kept for each waste material which leaves the site, wither for reuse on another site, recovery, recycling or disposal. A system will be put in place to record the construction waste arising on-site.

The waste manager or delegate will record the following,

1. Waste taken off-site for reuse
2. Waste taken off-site for recovery
3. Waste taken off-site for recycling
4. Waste taken off-site for disposal
5. Waste (soil & stone) accepted on site or recovery

For each movement of waste off-site, a signed waste collection docket will be obtained by the waste manager (or delegate) from the contractor. This will be carried out for each material type. This system will also be linked with the delivery records.

A signed waste acceptance docket will be issued for each movement of waste on-site.

6. LOCAL AUTHORITY AND RECYCLING COMPANIES

YCDC will be consulted as required throughout the construction phase in order to ensure that all available waste reduction, re-use and recycling opportunities are identified and utilized. In addition, the local authority will be consulted when required under the relevant legislation.

A breakdown of the anticipated waste streams arising and waste management options to be used are described in the table below.

Waste Item	Waste Category	On-site Storage Treatment Method	Off-site Treatment/Disposal Method	Anticipated Waste Removal Contractors
General (Mixed)	A	Segregated Bin/Skip	Recovery/Disposal	TBA
Surplus Excavated Material	B	Stock piling Topsoil, fractions to be in separate	Majority to be-reused on-site possible beneficial re-use off-site	TBA
Timber	C	Segregate/Bin/Skip Reuse on-site where possible	Reuse or energy recovery	TBA
Plastic	D	Segregated Bin/Skip	Return to supplier, recycling or disposal	TBA
Metal	E	Segregated Bin/Skip	Deliver to metals merchant	TBA

APPENDIX F TRAFFIC MANAGEMENT PLAN



CPP (Myanmar)

Project Traffic Safety Management Plan

Project Title: Tank Farm and Distribution System Project Of MEC Land (Thilawa)

Owner : Brighter Energy Co.Ltd

Contractor: China Petroleum Pipeline (Myanmar) Co.Ltd

Table of Contents

S/No	Description	Pages
1.0	Purpose and Scope	4
2.0	Responsibilities of Site Security Team	4
2.1	Responsibilities of Project Management Team	4
2.2	Responsibilities of Workers	4
2.3	Responsibilities of Traffic Controllers / Banksman	5
2.4	Responsibilities of Sub-contractor Person In-charge	5
2.5	Responsibilities of Vehicle Driver and Mobile Machinery Operator	6
2.6	Responsibilities of Pedestrians	6
2.7	Responsibilities of Visitors	7
3.0	Project Traffic Safety Management Procedures / Requirements	7
3.1	Project Basic Traffic Rules & Regulations	7
3.2	Use of Project Internal Access Road	7
3.3	Traffic Safety Violation	8
3.4	Private Passenger Vehicles	8
3.5	Registration of Vehicle and Mobile Machinery for Construction Work	8
3.6	Pre-Operation Inspection and Scheduled Maintenance for Vehicles and Mobile Machinery	8
3.7	Required Safety Devices / Features of Vehicle and Mobile Machinery	9
3.8	Common Hazards While Driving in the Project	9
3.9	Driving / Operating of Vehicle / Mobile Machinery in Project	10
3.10	Provision of Designated Vehicle / Mobile Machinery Access Driveway Within Project	11

3.11	Reversing of Vehicles / Mobile Machinery on Site:	12
3.12	Provision of Designated Personnel Entry / Exit Access Points	12
3.13	Provision of Designated Personnel Access Walkways Within the Project	13
3.14	Usage of Vehicles to Transport Passengers	14
3.15	Transporting of Loads	14
3.16	Parking of Vehicle / Mobile Machinery on Site	15
3.17	Avoid Overturning of Vehicle / Mobile Machinery	15
4.0	Risk Assessment	15
5.0	Monitoring	16
6.0	Reporting and Auditing	16
7.0	References	16
8.0	Annexures	16
	Annex A: Project Traffic Management Layout Plan	17
	Annex B: Traffic Management Signages	19
	Annex C: Pictures of Good Traffic Management Practices	22
	Annex D: Hand Signals for Traffic Control	28
	Annex E: Standard Attire for Traffic Controller	29
	Annex F: Checklist for Transporters Delivery to Project Worksite	30
	Annex G: Traffic Safety Management Monitoring Checklist and Corrective Action Form	31

1.0 Purpose and Scope

The purpose of this Traffic Safety Management Plan (MP) is to set out **CPP (Myanmar) Co., Ltd.** To manage and mitigate the residual impacts from traffic safety as identified in the Project's Environmental and Social Impact Assessment (ESIA) and the Project Health, Safety, Security and Environment Plan (HSSE Plan).

It should be noted the information in this Traffic Safety MP is based on relevant regulations, guidelines and standards at the time of writing of the ESIA dated October 2019. Should **CPP** activities change or new regulations, guidelines or standards apply, **CPP** will review, amend and resubmit this Traffic Safety MP **Brighter Energy Company Limited** (the Project Company).

2.0 Responsibilities of Project Personnel

2.1 Project Management Team

- 1) Project Management team includes person-in-charge such as Project Managers, Construction Managers, Engineers, HSSE personnel, supervisors, foremen, etc.
- 2) Their responsibilities include):
 - Develop and implement the workplace traffic safety management plan;
 - Ensure that the workplace traffic safety management plan is implemented effectively and communicated to all levels of workers;
 - Ensure that workplace traffic safety rules, training programmes and safe work procedures (SWPs) are followed by workers;
 - Provide all workers with the necessary information, instruction, training and supervision to ensure their safety and health at the workplace;
 - Provide and ensure proper use of personal protective equipment (PPE);
 - Ensure that there are safe means of access to and egress from any part of the workplace;
 - Ensure that all equipment (including vehicles) used are properly maintained in accordance with the manual;
 - Ensure that all workers under their charge have attended the relevant safety training course and possess the relevant certification for the work that is to be carried out;
 - Provide all necessary emergency facilities required at a workplace such as first aid kits;
 - Ensure that workers are familiar with the contingency or emergency plan;
 - Keep records of reported accidents, incidents and diseases and take necessary action to prevent a recurrence;
 - HSSE Personnel shall undertake monthly monitoring to ensure proper implementation of the proposed mitigation and management measures in accordance with the requirements of the Traffic Safety Management Monitoring Checklist and Corrective Action Form. (Refer to Annex A);
 - CPP site HSSE Manager shall review the monitoring checklist and corrective action form to ensure appropriate corrective actions are proposed and implementation is undertaken by the timescale specified.

2.2 Responsibilities of Workers

- 1) Workers include construction workers, operators, drivers, etc.
- 2) Their responsibilities include:
 - Follow workplace traffic instructions and safety warnings or signages at the workplace
 - Attend workplace traffic safety and health training or briefing sessions
 - Only operate plant or equipment if they hold valid licenses, possess the relevant safety certification and have been given the authorization to do so.
 - Observe emergency procedures, instructions and arrangements as established and instructed
 - Operate equipment with care and do not use equipment (including vehicles) beyond their capacity or designated purpose;
 - Use all safety devices and PPE as provided.
 - Never misuse, interfere with or modify any of the devices or equipment.
 - Report any damage, malfunction or suspected defect of plant, equipment, safety device or PPE to their respective supervisor
 - Report accidents, incidents, diseases and any workplace hazards to the supervisor or person-in-charge
 - Suggest ways to improve traffic safety at the workplace if they identify any lapses during the course of work.

2.3 Responsibilities of Traffic Controllers / Banksman

- 1) Trained traffic controllers / banksmen shall be appointed to assist in directing transport vehicles at the workplace during difficult maneuvers such as unavoidable blind spots and tight bends.
- 2) Where the driver has difficulty seeing a single traffic controller / banksman, two or more traffic controllers / banksmen, or other alternatives should be appointed.
- 3) Traffic controllers / banksmen must be properly trained to direct traffic and are aware of the risks they are exposed to.
- 4) Traffic Controller / banksman shall wear the following standardized PPE:
 - Safety helmet, safety boots and green reflective vest with “Traffic Controller” / “Banksman” labelled behind the vest.
 - Reflective Hand glove and
 - Whistle
- 5) The following are some responsibilities of traffic controllers / banksmen:
 - To control and direct traffic flow to ensure vehicles and personnel access in and around the project boundary safely
 - Observe SWPs or safe traffic measures
 - Remain highly visible to the driver at all times,
 - Use a clear or standard signaling system understood by the driver,
 - Stand at a safe position while guiding the transport vehicle,

2.4 Responsibilities of Sub-Contractors Person In-Charge

- 1) To provide direction and coordination related to the use of work access.
- 2) To ensure traffic controller is deployed at their area of work to control and direct traffic.
- 3) To feedback any of the project's traffic related issues to Project Management Team.
- 4) To nominate trained and qualified personnel for authorization by Project Management Team to operate vehicles / mobile machinery on the project site.
- 5) To ensure all faulty vehicles and mobile machinery are Locked Out and Tagged Out (LOTO) (e.g. keys removed and "**DANGER – UNSAFE FOR USE**" tag attached to steering wheel / hung outside the cabin door, etc.) to prevent use by other personnel, inform all personnel to stop using the faulty vehicle / mobile machinery and ensure the faulty vehicles / mobile machinery are repaired immediately.
- 6) To valid and verify that the repaired vehicles / mobile machinery is repaired satisfactorily and in safe for use condition before removing the LOTO and informing authorized operators the repaired vehicles / mobile machinery is safe for use.

2.5 Responsibilities of Vehicle Driver / Mobile Machinery Operator

- 1) To adhere to all project rules and regulations, risk assessments and safe work procedures whilst operating the vehicles and mobile machinery as per instructions.
- 2) All vehicle drivers / mobile machinery operators shall conduct daily pre-operation inspection on their vehicle / mobile machinery prior to use. They shall feedback to their immediate supervisor / project management team if they discover the vehicle / mobile machinery is faulty.
- 3) Drivers and operators shall turn on the lights of their vehicles and mobile machinery when the visibility is low.
- 4) To ensure all loads are tied and secure before commencing transportation.
- 5) To ensure all unattended vehicles and mobile machineries are effectively immobilized to prevent rolling / sliding, etc. by ensuring the vehicle / mobile machinery is set in "**Parking**" gear with hand-brake applied. Wheel chocks shall be provided to chock the wheels from movement.
- 6) To ensure wheels of vehicles and mobile machinery under repair are chock using wheel chocks.
- 7) All drivers and operators must observe the safety of other personnel and ensure pedestrians always have the right of way.
- 8) Sound the horn prior to reversing and whenever driving off from stationary position.
- 9) To report all incidents and near-miss to their immediate supervisor / project management team.

To assist in investigation of traffic related incidents.

2.6 Responsibilities of Pedestrians

- 1) To adhere to all rules and regulations, whilst walking at the designated safe personnel walkway.
- 2) To understand and follow all safety signs displayed in all working areas.

To be alert of the all vehicles and mobile machinery around their walking area.

2.7 Responsibilities of Visitors

- 1) All visitors must only enter through the designate personnel entry / exit access points and report to the project security guard house to register their details.
- 2) Visitors who have to drive into the project area must register their vehicle with the project security.
- 3) Visitors shall be briefed on the project's HSE requirements before they are allowed to enter the project area.

All visitors, except suppliers and persons performing self-collection, shall be follow by the project personnel that they are visiting.

3.0 Project Traffic Safety Management Procedures / Requirements

3.1 Project Basic Traffic Rules and Regulations

- 1) The Project Basic Traffic Rules and Regulations are for compliance by all levels of staff, vendors, contractors and visitors. The rules and regulations serve as a constant reminder of their obligations and responsibilities.
- 2) The following are the project basic traffic rules and regulations:
 - All drivers must obey to Myanmar Motor Vehicle Rules at all times
 - Only allow authorized transport vehicles or personnel to enter workplaces.
 - Observe all traffic safety measures at workplaces
 - Observe the notices, and safety or traffic signage displayed at workplaces
 - Ensure that the designated pedestrian walkways are used
 - Observe the safe speed limit signs displayed at workplaces
 - Turn on the flashing warning light on the transport vehicles whenever they are in operation
 - Do not load a vehicle beyond its safe working load
 - Avoid reversing vehicles within the compound

Reverse vehicles only under the direction of a traffic controller / banksman

3.2 Use of Project's Internal Access Roads

The project's internal access roads are meant for vehicles, mobile machinery, as well as personnel work access. Any other type of use for the road shall be considered as deviation unless approved by CPP / JPC Project Managers.

3.3 Traffic Safety Violations

- 1) All parties must strictly adhere to the project's traffic management requirements and the traffic signages displayed on site at all times.
- 2) The Project Management will be taken action against the offenders who fail to follow the speed limit for vehicles / mobile machinery moving within the project internal access roads is set at 15 km/hr and speed limit for external access road followed by local traffic rules and regulations.

The Consequence Management policy (Refer-CPP-HSE-PD-001) shall be applied for all project traffic safety violations.

3.4 Private Passenger Vehicles

- 1) All personnel who intend to drive their private passenger vehicle into the project premises must inform the project management team and register their vehicle with the project security personnel.
- 2) The project management team reserves the right to refuse any vehicles from entering the project site at their discretion.
- 3) Private passenger vehicles must only be parked in designated parking lots.

Private passenger vehicles are not allowed to drive into or park in the work areas within the construction site at all times.

3.5 Registration of Vehicle and Mobile Machinery for Construction Work

- 1) All vehicles / mobile machineries required to bring into the project premises for performing their scope of work must inform beforehand and only get approval from the project management team and project HSSE personnel with their relevant documents are then allowed to bring into the site
- 2) Details of the vehicle / mobile machinery and their drivers / operators must be submitted to the project management team and HSSE personnel.

The license plate / unique identification numbers shall be prominently displayed at the front and rear of the vehicle

3.6 Pre-Operation Inspection and Scheduled Maintenance for Vehicles and Mobile Machinery

- 1) Pre-operation inspection for all vehicles and mobile machinery must be conducted prior to their use and such inspection recorded using the operator inspection checklist.
- 2) Project Plant & Vehicle Management and Maintenance Plan for procedure on maintenance regime and keeping of maintenance / servicing records.

- 3) Maintenance / servicing records for all vehicles and mobile machinery shall be maintained periodically.

3.7 Required Safety Devices / Features of Vehicle and Mobile Machinery

- 1) All safety devices / features of the vehicle / mobile machinery must be present and in good working conditions.
- 2) Modification and/or removal of the original manufacturer's safety devices / features from the vehicle / mobile machinery is not allowed.
- 3) All vehicle / mobile machinery shall be operated strictly in accordance to their manufacturer's specifications and requirements stated in the operator's manual.
- 4) All vehicles shall be equipped with safety belt (if applicable).
- 5) All vehicles shall be equipped with working head lights, rear and side view mirrors.
- 6) All vehicles shall be equipped with working brakes.
- 7) Vehicle tires shall be replaced when the depth of the tread is less than 1.6mm.
- 8) Vehicle tires shall be inflated with the right air pressure.

All vehicles/ mobile machinery shall be equipped with reversed alarms to warn people surrounding.

3.8 Common Hazards While Driving in the Project

All vehicles drivers and mobile machinery operators are to take precaution of the following hazards when driving and operating on the project's internal roads.

- Blind Spots
- Poor road condition
- Movement of heavy vehicles

3.9 Driving / Operating of Vehicle / Mobile Machinery in Project

- 1) All drivers and operators must undergo the project HSE induction briefing / training (in-house defensive driving training) prior being allowed to work on site. (To include in Project Training Matrix)
- 2) Adhere to speed limit of **15km/hr.** while driving on site.
- 3) No talking on mobile phones is allowed while driving and operating.
- 4) Secure seat belts (if applicable) before driving and operating.
- 5) Always turn on the head lights and hazards lights when driving on site.
- 6) Pedestrians have the right of way at all times.

- 7) Apply handbrakes, set gear in "Park" mode and chocks the wheels of the vehicle while it is stationary, whether it is only temporary or for an extended period of time (e.g. loading and unloading of material).
- 8) All vehicle and mobile machinery shall only be parked at their designated parking lot.
- 9) No parking of vehicle and mobile machinery in front of fire hydrant, fire engine access at all times.
- 10) Engine must be switched off when not in use or left unattended.
- 11) All vehicle and mobile machinery must only be parked on solid, level and stable ground.
- 12) Supervisors shall conduct daily tool box briefing to their drivers / operators.
- 13) All drivers / operators must comply with the respective project's specific requirements for traffic management.
- 14) Consumption of intoxicating substance prior to driving / operating is strictly not allowed.

3.10 Provision of Designated Vehicle / Mobile Machinery Access Driveway Within Project

The project is required to provide safe designated access driveway for vehicles / mobile machineries to move on. The provisions shall include but not limited to the following:

- Provide designated vehicle access driveway within the worksite that are physically separated using rigid barrier system. The rigid barrier system must be placed effectively to allow the types of vehicles moving area.
- Provide directional signs to guide the drivers of vehicles on the correct direction of movement within the worksite.
- Provide warning signs such as speed limits, **STOP signs, SLOW DOWN signs, LOOK OUT FOR PEDESTRIANS signs**, etc. to warn drivers.
- Provide convex mirrors and blinking warning lights at blind / turning spots to assist and warn drivers to drive carefully.
- All physical obstructions / protrusions along the driveway must be brightly and clearly demarcated (e.g. painted / marked with yellow and black stripes, etc.).
- The ground condition of vehicle access driveway must be maintained in good condition (i.e. level, stable and clean without slipping / skidding hazards).
- Exposed soil areas shall be provided with measures to ensure adequate ground bearing capacity (e.g. laying of steel plates, etc.) and non-slip surfaces for vehicles to move safely.
- Conduct in-house briefing for project's personnel and drivers on the safety requirements on driving on the worksite.
- Supervisors to brief workers during their daily Toolbox Meetings to remind them to only use the designated safe personnel access walkways to move within the worksite and maintain a safety distance of at least 3 meters away from all vehicles.

- Daily inspection and maintenance of vehicle access driveways by designated person in-charge.
- Vehicle access driveway with unsafe ground conditions shall be ceased from use immediately and physically cordoned off and posted with warning signs, until it is made safe for use again.
- Vehicles entering the worksite must switch on their headlights and hazard lights and limit their speed to only **15km/hr**. Personnel ALWAYS have the Right of Way and vehicles MUST stop to allow personnel to move off safety first before proceeding where necessary.

3.11 Reversing of Vehicles / Mobile Machinery on Site:

- Implement restriction on the areas whereby vehicles may reverse. Areas whereby vehicles may reverse shall be demarcated with signs.
- Implement project requirement that vehicles may only reverse under the direction of a traffic controller / or banksman.
- Traffic Controller / Banksman must be worn safety reflective vests.
- Traffic Controller / banksman must observe the safe distance of at least 5 meters from the vehicle and must always stand at the driver's side of the vehicle to ensure the driver maintain visual contact with him.

Conduct in-house briefing of project's personnel and drivers on the safety requirements for driving on the work site.

3.12 Provision of Designated Personnel Entry / Exit Access Points

The project is required to provide safe designated personnel entry / exit access points for personnel to enter into / exit from the project site. The provisions shall include but not limited to the following:

- Provide physically separated personnel access gate from the vehicle access gate at the project's work access points (from the main gate).
- Post information signs at the personnel access gate to indicate it is a designated personnel entry and exit point into the worksite.
- Full time traffic controllers provided at each gate to guide & ensure workers use the designated personnel access gates to enter / exit the work site.
- Provide blinking / rotating warning lights, speed limit sign and convex mirror at each vehicle access gate to alert driver.
- Provision of lighting at the personnel and vehicle entry / exit gates to illuminate the area for safe access.
- Conduct in-house briefing of project's personnel access walkway entry / exit points to inform all workers.
- Supervisors to brief workers during their daily Toolbox Meetings to remind them to only use designated safe personnel access entry / exit points to enter or exit the worksite.
- All personnel must wear their safety reflective vests before entering the work site and at all times while they are in the worksite.

- Daily inspection and maintenance of personnel access entry / exit gates by designated person in-charge.
- Vehicles entering the worksite must switch on their headlights and hazard lights and limit their speed to only 15km/hr. Personnel ALWAYS have the Right of Way and vehicles MUST stop to allow personnel to move site regulation

3.13 Provision of Designated Personnel Access Walkways Within the Project

The project is required to provide safe designated personnel access walkways for personnel to move safely from point to point within the project site. The provisions shall include but not limited to the following:

- Provide personnel access walkway (of at least 900mm in width) that are physically separated from vehicle access way, using rigid barrier system such as water barriers, rigid barricade, etc.
- Install symbol directional signs and text-form informational signs to guide workers along the routes of the personnel access walkway.
- Personnel and vehicle access walkway / driveway must be provided with adequate illumination.
- At areas where it is designated for personnel to cross over a vehicle access driveway.
- Implement project traffic control requirement that all personnel must observe a safety distance away of at least 5 meters from all moving vehicles.
- Conduct in-house briefing of project's personnel access walkways within the worksite to inform all workers.
- Supervisors to brief workers during their daily Toolbox Meetings to remind them to only use the designated safe personnel access walkways to move within the worksite.
- All personnel must wear their safety reflective vests at all times while they are in the worksite.
- Daily inspection and maintenance of personnel access walkways by designated person in-charge.
- Vehicles moving the worksite must switch on their headlights and hazard lights and limit their speed to only 15km/hr.

3.14 Usage of Vehicles to Transport Passengers

- 1) All mobile machinery that are not originally designated to ferry passengers (e.g. forklift) must not be used to transport personnel other than the operator.
- 2) Personnel transported by vehicles; e.g. lorry & pick-up trucks must remain inside the vehicle at all times.
- 3) The front passenger seat of the vehicle shall be filled occupied first before other personnel occupy the rear cargo carriage.
- 4) All vehicles are only allowed to carry the predesignated number of workers it is allowed to carry.
- 5) Pick-up vehicle used to transport passenger shall be fitted with sufficient height rear guard and side guards.

- 6) No part of the workers, when in a sitting position, should be higher than 3.2 meter from the ground.
- 7) All passengers must remain seated at all times. No passenger is allowed to stand while the vehicle is moving.
- 8) All passengers must be seated in a manner that would not cause them to fall off from the vehicle.
- 9) All vehicles transporting passenger within the premises must strictly abide to speed limit.
- 10) Vehicles must remain in stationary position during picking-up and dropping-off of passengers.

The rear carriage door of the vehicle shall remain shut when it is on the move within the project premises.

3.15 Transporting of Loads

- 1) Loading and unloading operation should be carried out at a designated area such as a loading or unloading bay. The driver should follow the safe operating instructions laid out in the operation manuals of the respective transport vehicles.
- 2) Do not overload the vehicle.
- 3) Loads must be suitably packaged.
- 4) All loads must be secured at all times. (To be briefed all personnel during their first day induction).
- 5) The total weight of loads transported shall not exceed the maximum weight of the vehicle can carry.

The truck's box doors and container's doors shall remain shut when they are on the move within the premises

3.16 Parking of Vehicle / Mobile Machinery on Site

- 1) Drivers shall only park their vehicles at designated parking areas.
- 2) Parking areas should be level, firm, well-lit, well-drained and clearly marked.
- 3) Drivers should ensure that their vehicles are properly parked with the brakes engaged, engines turned off, starter keys removed and load or equipment lowered and secured.

When parking or stopping vehicles on slopes, drivers must apply handbrakes, set gear in "Park" mode and chocks the wheels of the vehicle.

3.17 Avoid Overturning of Vehicle / Mobile Machinery

The following are safety measures (not exhaustive) to be observed to prevent overturning of vehicles / mobile machinery:

- Do not drive on steep slopes
- Do not drive on slippery surfaces such as oil patches
- Do not drive on soft ground, potholes or uneven terrain, curbs, steps or other edges
- Do not overload or load unevenly

- Do not drive too fast, especially around corners
- Do not use a transport vehicle for unsuitable tasks
- Do not carry loads above the height limit
- Survey the ground conditions in advance

4.0 Risk Assessment

- 1) The project shall conduct risk assessment for the project's traffic related hazards and risks with effective mitigating control measures.
- 2) The risk assessments conducted for the project's traffic management shall be attached as part of this plan.

Refer to CPP-HSE-PD-004 - Risk Assessment / Environmental Aspect Analysis (RA/EAA) for CPP's Risk Assessment procedures.

5.0 Monitoring

- 1) Monthly on-site inspection by HSSE personnel to ensure proper implementation of the proposed mitigation and management measures.

HSSE personnel to use monitoring checklist and corrective action form to ensure robust management control measures are in place. (Refer to Annex A).

6.0 Auditing and Reporting

- 1) CPP HSSE Manager to review the monitoring checklist and correction form to ensure appropriate corrective actions are proposed and implementation is undertaken by the timescale specified.
- 2) Monitoring checklists to be archived in an orderly manner for external auditing.

All monitoring checklists to be maintained at the Project site.

7.0 References

- IFC EHS Guidelines, General EHS Guidelines: Community Health and Safety Traffic Safety (2007).
- IFC EHS Guidelines, General EHS Guidelines: Construction and Decommissioning (2007) Community Health and Safety.

Project Emergency Preparedness and Response Management Plan

8.0 Annexures

Annex A : Project Traffic Management Layout Plan (Internal & External)

Annex B : Traffic Control Signages

Annex C : Pictures of Good Traffic Management Practices

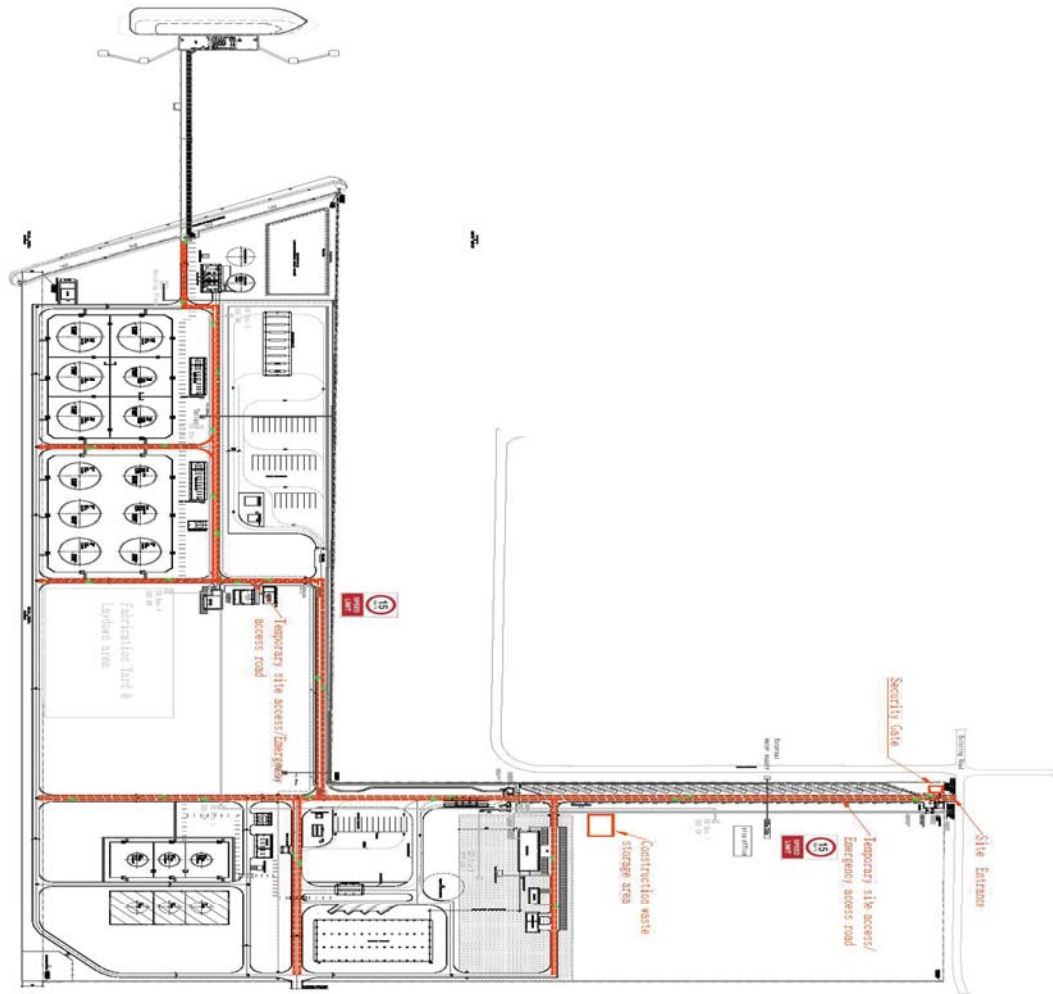
Annex D : Hand Signals for Traffic Control

Annex E : Standard Attire for Traffic Controller

Annex F: Checklist for Transporters Delivering to Project Worksite

Annex G: Traffic Safety Management Monitoring Checklist and Corrective Action Form

Annex A: Project Traffic Safety Management Layout Plan



Internal Traffic Management Plan/Emergency Accessway Plan










External Traffic Management Plan




Annex B: Traffic Control Signages





Prohibition Signs	
	No Entry
	No Parking
	No Right Turn
	No Left Turn

Prohibition Signs	
	No U -turn allowed
	No use of hand phone

Mandatory Signs	
	One-way sign
	No through (Dead end)
	Bicycles Track

	<p>Split way</p>
	<p>Stop and give other users to proceed first</p>
	<p>Speed limit</p>
	<p>Give way</p>

<p style="text-align: center;">Warning Signs</p>	
	<p>Bump ahead</p>
	<p>Pedestrian crossing</p>
	<p>No working on the ramp</p>

	Height limit
	Narrow road ahead
	Left turn ahead
	Heavy Equipment in use

Annex C: Pictures of Good Traffic Management Practices



Example of a Wheel Chock



Display of cautionary signage to remind driver to provide wheel chock for their vehicle / mobile machinery

Always secure seat belts before driving / operating



No using of hand phones when driving vehicles / operating mobile machinery.

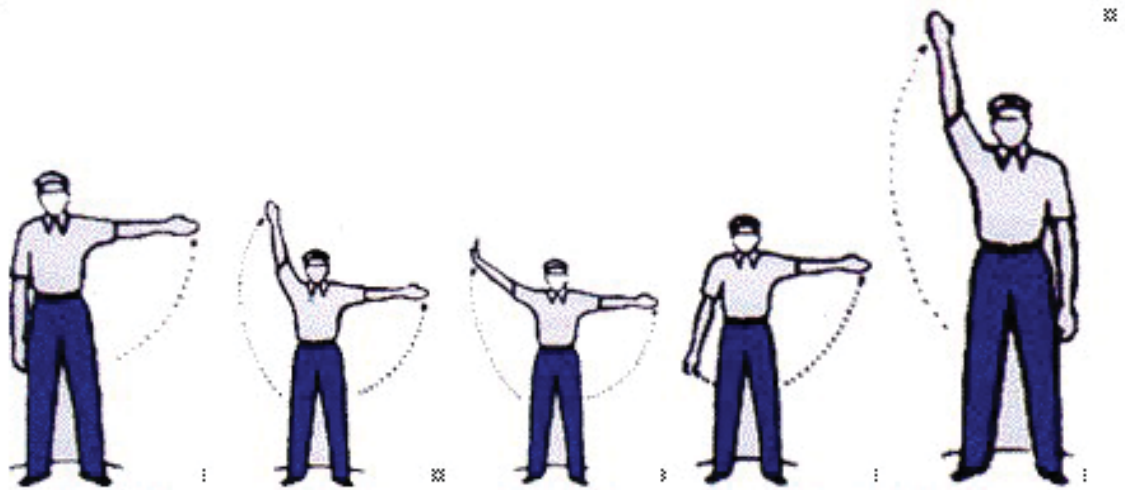


Conduct daily pre-operation checks on vehicle / mobile machinery



Display of safety signages to reinforce good traffic safety practices on site

Annex D: Hand Signals for Traffic Controller / Banksman



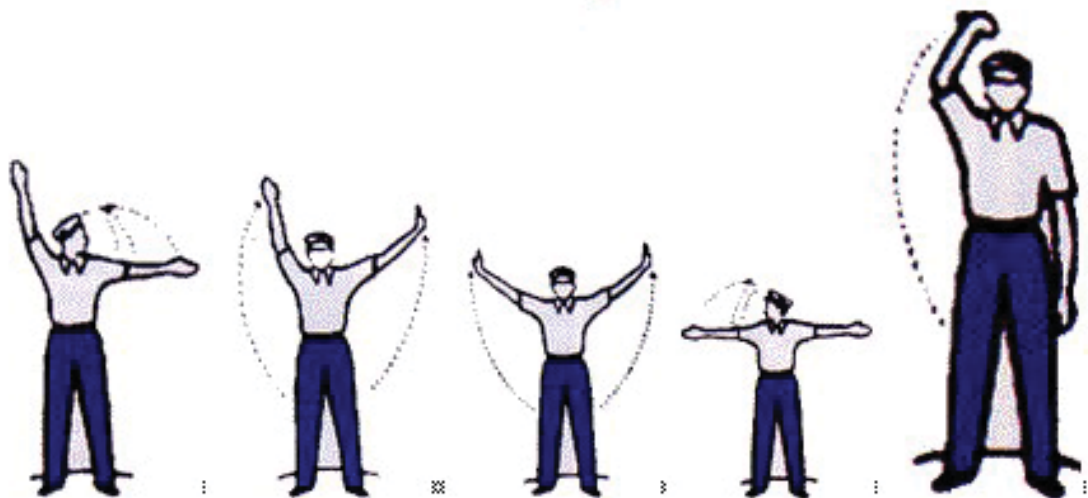
To stop vehicles approaching from behind. *

To stop vehicles approaching simultaneously from front and behind. *

To stop vehicles approaching from the right to allow vehicles from the left to turn right. *

To stop vehicles approaching from the left and wanting to turn right. *

To stop vehicles coming from front. *



Beckoning vehicles approaching from left. *

To allow vehicles coming from the right and turning right by stopping traffic approaching from the left. *

Warning signal closing all vehicles. *

Beckoning vehicles approaching from right. *

Beckoning vehicles from front. *

Annex E: Standard Attire for Traffic Controller / Banksman(For Example)



Annex F: Checklist for Transporters Delivering to Project Worksite

Project			
Name of Transporter Company			
Name of Contractor			
Date of Loading		Time of Loading	

Weight of Vehicle		What is the load capacity of Vehicle?	
Total Weight of Loads			
Total Weight (Load + Vehicle)			

S/N	Description	Yes	No
1	Are the load placed and arranged safely?		
2	Has the center of gravity been considered when placing the load?		
3	The load been checked for loose or unsecured items, which might fall off during the transporting?		
4	Are the loads being properly tighten.		
5	Have the capacity of lashing gear been checked?		
6	Are the lashing gears visibly free of defects or damaged?		
7	Any softeners placed to protect the sharp edges?		

Remarks:

Prepared by Transport Driver:
 Name: _____ Hand Phone No-----
 Signature-----

Annex G: Traffic Safety Management Monitoring Checklist and Corrective Action Form

No	Description	Yes	No	Contact Details / Role of Individual Undertaking Monitoring	Details of Observation / Location	Corrective Action to be Taken	Date Corrective Action to be Implemented	Date Corrective Action was Implemented & Verified by
1	Traffic sign in place?							
2	Speed Limited requirement establish?							
3	Are Operators/ Drivers authorized to operate on site?							
4	Driver / Operator are attended defensive driving training?							
5	Banksman provided for Heavy Equipment / machinery							
6	Regular maintenance program in place?							
7	Are Operator/ drivers aware Key person contact numbers to use in case of emergency ?							
8	Transport for workers from dormitory to							

	work site provided?							
9	Load securing checklist of transport vehicle for materials is provided?							

APPENDIX G STAKEHOLDER ENGAGEMENT MATERIALS



ရေနံအဆောက်အအုံနှင့်သိုလှောင် ဖြန့်ဖြူးခြင်းစီမံကိန်း(သီလဝါ)အတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ တွေ့ဆုံဆွေးနွေးခြင်း
၂၀၂၁ခုနှစ်

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The business of sustainability



အစီအစဉ်

အကြောင်းအရာ

၁. မိတ်ဆက်ခြင်း
၂. စီမံကိန်းအကြောင်းရှင်းလင်းတင်ပြခြင်း
၃. ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလေ့လာမှု
၄. အခြေခံအချက်အလက်များကောက်ယူခြင်းနှင့်ရလဒ်များ
၅. စီမံကိန်းနှင့်ပတ်သက်ဆက်နွှယ်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
၆. ဖြစ်နိုင်ခြေရှိသောသက်ရောက်နိုင်မှုများနှင့် လျှော့ချရေးအစီအစဉ်များအားတင်ပြခြင်း
၇. EIA အဆင့် ဆက်လက်ဆောင်ရွက်မည့်လုပ်ငန်းစဉ်များ
၈. ဆက်သွယ်ရန်လိပ်စာ



ရေနံအဆောက်အအုံနှင့်သိုလှောင်
 ဖြန့်ဖြူးခြင်းစီမံကိန်း
 အကြောင်းအရာဖော်ပြချက်

စီမံကိန်းဖော်ဆောင်သူ

- Brighter Energy Company, Ltd သည် ကမ္ဘောဇကုမ္ပဏီအုပ်စု နှင့် PTTOR ကုမ္ပဏီတို့ အကျိုးတူပူးပေါင်းဆောင်ရွက်မှု လက်အောက်ရှိ ကုမ္ပဏီတစ်ခုဖြစ်ပါသည်။
- ကုမ္ပဏီ၏ရည်ရွယ်ချက်သည် အရည်အသွေးကောင်းမွန်ပြီး ရေရှည်တည်တံ့သော ရေနံထွက်ထုတ်ကုန်များကို အကောင်းဆုံးဖြည့်ဆည်းပေးသည့် မြန်မာနိုင်ငံ၏ ထိပ်တန်းကုမ္ပဏီအဖြစ် ရပ်တည်သွားရန်ဖြစ်ပါသည်။
- ကုမ္ပဏီ၏မျှော်မှန်းချက်သည် စီးပွားတိုးတက်မှုနှင့်အတူ ရပ်ရွာအကျိုးပြုမှုကိုပါ ရည်ရွယ်ပါသည်။ ကုမ္ပဏီအနေဖြင့် စီးပွားရေးလုပ်ငန်းများနှင့်ပတ်သက်၍ လူမှုရေးအရ တာဝန်ယူမှုကို အဓိကလုပ်ငန်းစဉ်တစ်ခုအဖြစ် ခံယူထားပါသည်။
- BE ကုမ္ပဏီသည် သီလဝါစက်မှုဇုန်တွင် ရေနံအဆောက်အအုံနှင့် သိုလှောင်ဖြန့်ဖြူးခြင်းစီမံကိန်းကို အကောင်အထည်ဖော် ဆောင်ရွက်လျက်ရှိပါသည်။

Brighter Energy

VISION
 To be the "Top Myanmar provider of quality and sustainable petroleum product through best-in-class operation"

MISSION
 To construct an oil terminal and LPG filling plant in a timely and cost-efficient manner with zero accident along with social and environment responsibility

စီမံကိန်းတည်နေရာ

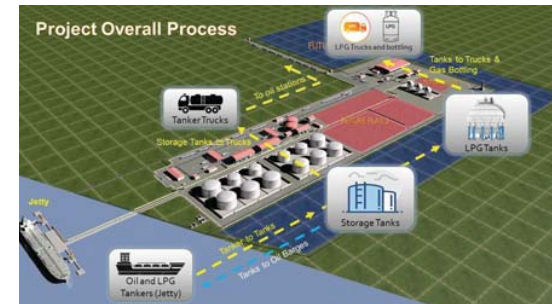
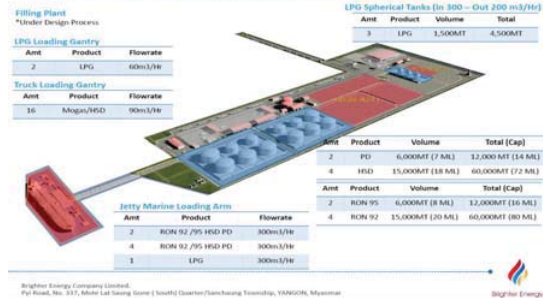
- ရေနံအဆောက်အအုံနှင့်သိုလှောင်ဖြန့်ဖြူးခြင်းစီမံကိန်းသည် ရန်ကုန်မြို့၏ တောင်ဘက် ကျောက်တန်းမြို့နယ်ရှိ မြို့ပြတစ်စိတ်တစ်ဒေသ (semi-urban) တွင်တည်ရှိပြီး စီမံကိန်းဧရိယာသည် ပျမ်းမျှ ၁၁၂.၅ ဧက ကျယ်ဝန်းပါသည်။
- ကျောက်တန်းမြို့နယ်သည် မြောက်ဘက်တွင် သန်လျင်မြို့နယ်၊ အရှေ့ဘက်တွင် သုံးခွမြို့နယ်၊ တောင်ဘက်တွင် မုတ္တမကွေ့နှင့် အနောက်ဘက်တွင် ရန်ကုန်မြစ် တို့တည်ရှိကြပါသည်။



စီမံကိန်းအကြောင်းရှင်းလင်းတင်ပြခြင်း

- စီမံကိန်းကိုအောက်ဖော်ပြပါ အဓိကအစိတ်အပိုင်းသုံးပိုင်းဖြင့် ဖွဲ့စည်းထားပါသည်။
 - ဆိပ်ခံတံတား
 - သိုလှောင်ကန် (ဒီဇယ်ဆီ၊ ဓာတ်ဆီ၊ ရေနံဓာတ်ငွေ့ရည်) နှင့်
 - ချိတ်ဆက်ပိုက်လိုင်းများ နှင့် အခြားအစိတ်အပိုင်းများ။
- ဒီဇယ်၊ ဓာတ်ဆီ နှင့် ရေနံဓာတ်ငွေ့ရည်ကို လောင်စာတင်ရေယာဉ်များ မှတဆင့် ဆိပ်ခံတံတားတွင် လက်ခံရယူပါမည်။
- ဒီဇယ်၊ ဓာတ်ဆီ နှင့် ရေနံဓာတ်ငွေ့ရည်ကို ချိတ်ဆက်ပိုက်လိုင်းများ မှတဆင့် သိုလှောင်ကန်များထံသို့ပေးပို့ပါမည်။
- ဒီဇယ်နှင့်ဓာတ်ဆီများကို သိုလှောင်ကန်များမှတဆင့် ဖြန့်ဖြူးရေးအတွက် လောင်စာတင်ယာဉ်များထံသို့ပေးပို့ပါမည်။
- ရေနံဓာတ်ငွေ့ရည်ကို သိုလှောင်ကန်များမှတဆင့် LPG ယာဉ်များထံသို့ (သို့မဟုတ်) ရေနံဓာတ်ငွေ့ရည်သိုလှောင်အိုးများမှတဆင့် ဖြန့်ဖြူးရန် ပေးပို့ပါမည်။

Project Details





ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ
လေ့လာမှု

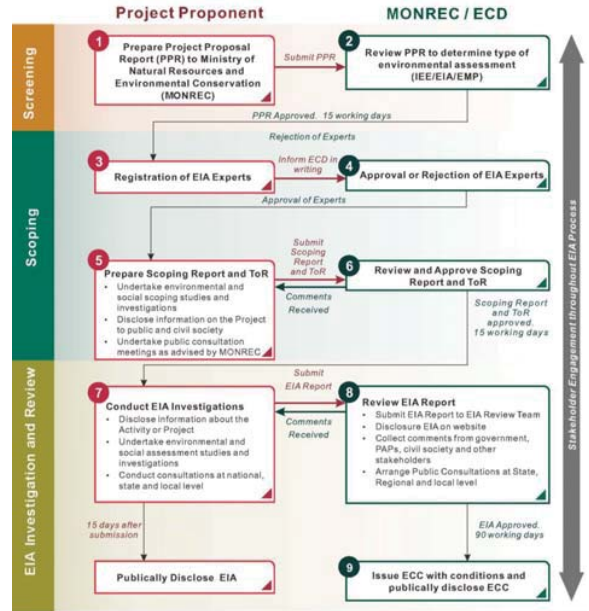
EIA ဆောင်ရွက်မည့်အဖွဲ့အစည်း

- ERM သည် နိုင်ငံတကာကုမ္ပဏီတစ်ခုဖြစ်ပြီး ကမ္ဘာတဝှမ်းတွင် ဝန်ထမ်းပေါင်း ၅,၅၀၀ ကျော်နှင့် နိုင်ငံပေါင်း ၄၀ကျော်တွင် ရုံးခန်းပေါင်း ၁၆၀ကျော်ခန့် ရှိသော အဖွဲ့အစည်းတစ်ခု ဖြစ်ပါသည်။
- ERM သည် ရန်ကုန်မြို့တွင်ရုံးခန်းဖွင့်လှစ်ထားပြီး နိုင်ငံသားဝန်ထမ်းနှင့် နိုင်ငံခြားသားဝန်ထမ်းတို့ဖြင့် လုပ်ငန်းများကိုဆောင်ရွက်လျက်ရှိပါသည်။
- ERM သည် သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန (MONREC) တွင် EIA အကြံပေးအဖြစ် မှတ်ပုံတင်ထားသည့် အဖွဲ့အစည်း ဖြစ်ပါသည်။
- မြန်မာနိုင်ငံတွင် ၁၉၉၆ ခုနှစ်မှစတင်၍ လုပ်ငန်းများကိုဆောင်ရွက်လျက်ရှိပြီး စီမံကိန်းပေါင်း (၁၀၀)ကျော်အတွက် IEE, EIA, EMP များအား ရေးဆွဲဆောင်ရွက်ခဲ့ပြီး ဖြစ်ပါသည်။
- ပြည်တွင်းအဖွဲ့အစည်း REM နှင့်အတူ အခြေခံအချက်အလက်စစ်တမ်း ကောက်ယူများ၊ စီမံကိန်းဆိုင်ရာသက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးမှုများကို ပြုလုပ်ဆောင်ရွက်လျက်ရှိပါသည်။



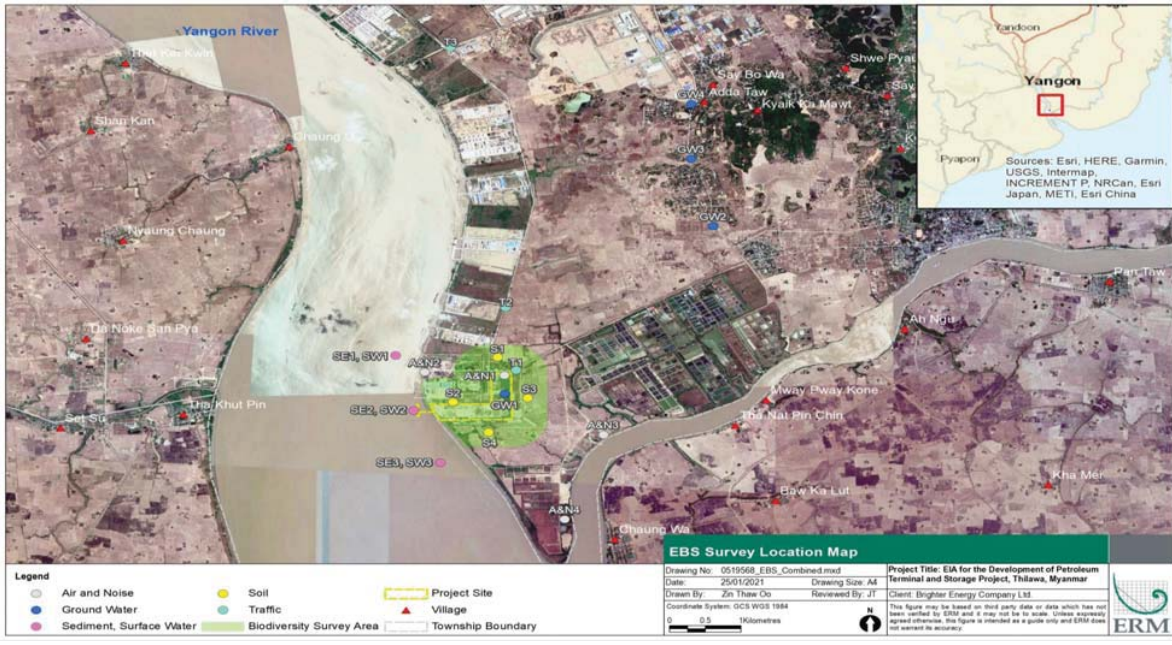
ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ဆောင်ရွက်မှုလုပ်ငန်းစဉ်များ

- စီမံကိန်းအဆိုပြုအစီရင်ခံစာ - ၂၀၁၉ခုနှစ် အောက်တိုဘာလ
- တတိယအဖွဲ့အစည်း အမည်စာရင်းတင်သွင်းခြင်း - ၂၀၂၀ခုနှစ် ဇန်နဝါရီလ
- နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်းအဆင့် တွေ့ဆုံဆွေးနွေးခြင်း
 - ရန်ကုန်တိုင်းဒေသကြီးအစိုးရအဖွဲ့နှင့် လွှတ်တော်ကိုယ်စားလှယ်များ - ၂၀၂၀ခုနှစ် ဖေဖော်ဝါရီလ
 - မြို့နယ်အဆင့်တွေ့ဆုံဆွေးနွေးခြင်း - ၂၀၂၀ခုနှစ် အောက်တိုဘာလ
- နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်းအစီရင်ခံစာပြင်ဆင်ခြင်း
- အခြေခံအချက်အလက်များကောက်ယူခြင်း
 - ပတ်ဝန်းကျင်ဆိုင်ရာ - ၂၀၂၀ခုနှစ် ဒီဇင်ဘာလ မှ ၂၀၂၁ခုနှစ် ဇန်နဝါရီလအထိ
 - လူမှုဝန်းကျင်ဆိုင်ရာ - ၂၀၂၁ခုနှစ်
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့် တွေ့ဆုံဆွေးနွေးခြင်း
 - မြို့နယ်နှင့် ရပ်ကွက်/ကျေးရွာအုပ်စုများအဆင့် တွေ့ဆုံဆွေးနွေးခြင်း - ၂၀၂၁ခုနှစ်
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာပြင်ဆင်ခြင်း



အခြေခံအချက်အလက်များ
ကောက်ယူခြင်းနှင့်ရလဒ်များ

အခြေခံအချက်အလက်များကောက်ယူခြင်းနှင့်ရလဒ်များ

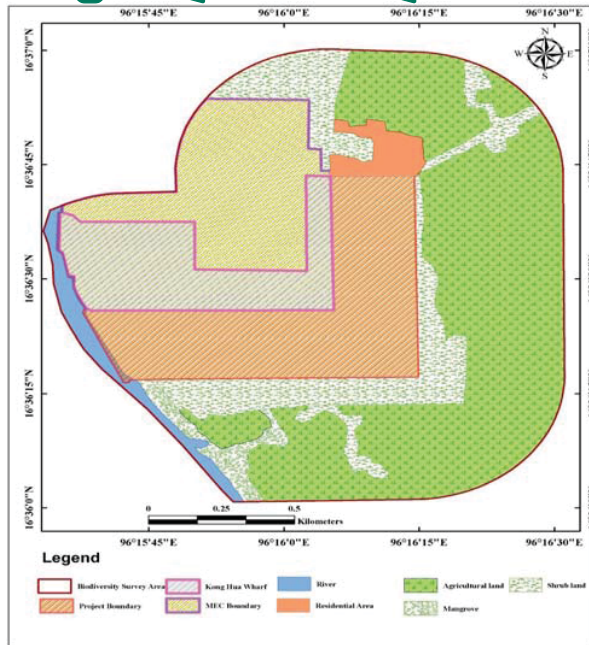


အခြေခံအချက်အလက်များကောက်ယူခြင်းနှင့်ရလဒ်များ

ခေါင်းစဉ်	တည်နေရာများ	သတ်မှတ်ကောက်ယူချက်နှင့်မှတ်ချက်များ
လေအရည်အသွေး	၄	NO ₂ , SO ₂ , CO, PM _{2.5} နှင့် PM ₁₀ (၂၄နာရီကာလပတ်လုံး လေအရည်အသွေး သက်ရောက်ခံရနိုင်သည့်နေရာများတွင် တိုင်းတာခြင်း)
ဆူညံသံအရည်အသွေး	၄	(နေ့တစ်ခါ ညတစ်ခါ ဆူညံသံအရည်အသွေးသက်ရောက်ခံရနိုင်သည့်နေရာများတွင် တိုင်းတာခြင်း)
ယာဉ်ကြောပိတ်ဆို့မှုပမာဏ	၃	(၂၄နာရီကာလပတ်လုံး ၂ရက်စီအပိုင်းအခြားဖြင့် ရက်သီတင်းပတ်အလယ်ရက်များနှင့် အကုန်များတွင် တိုင်းတာခြင်း)
မြေပေါ်ရေအရည်အသွေး	၃	pH, Total Suspended Solid, Total Cyanide, Ammonia, Nitrite, Nitrate, Reactive Phosphorus, Oil & Grease, Chemical Oxygen Demand, Biochemical Oxygen Demand, Phenols, Arsenic, Cadmium, Chromium, Copper, Mercury နှင့် Faecal Coliforms များကို လေ့လာဆန်းစစ်မှုပြုလုပ်ခြင်း
မြေအောက်ရေအရည်အသွေး	၄	Analyzed for pH level, Moisture Content, Cadmium, Copper, Lead, Zinc နှင့် Iron များကို လေ့လာဆန်းစစ်မှုပြုလုပ်ခြင်း
နုန်းအနည်အနှစ်အရည်အသွေး	၃	အမုန့်အရွယ်အစားခွဲခြမ်းလေ့လာခြင်းနှင့်အတူ Total Petroleum Hydrocarbon (C10 - C36), Total Organic Carbon (TOC), Oil & Grease, Arsenic, Barium, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Nickel, Selenium, Zinc နှင့် Mercury စသည်များကို လေ့လာဆန်းစစ်မှုပြုလုပ်ခြင်းအပြင် ရေအောက်စီဝင်ကောင်သေးငယ်များကို လေ့လာခြင်း
ဖိစပ်တံခန်းကျင့်	စီမံကိန်းလုပ်ငန်းခွင်နှင့် အနီးအနားတဝိုက်	စီမံကိန်းလုပ်ငန်းခွင်အနီးတဝိုက်ရှိ အပင်၊ တိရစ္ဆာန်နှင့်အဓိကသက်ရှိတည်နေရာများကို စောင့်ကြည့်လေ့လာမှုပြုလုပ်ခြင်း



အခြေခံအချက်အလက်များကောက်ယူခြင်းနှင့်ရလဒ်များ



Environmental Impact Assessment for the Development of Petroleum Terminal and Storage Project, Thilawa, Myanmar

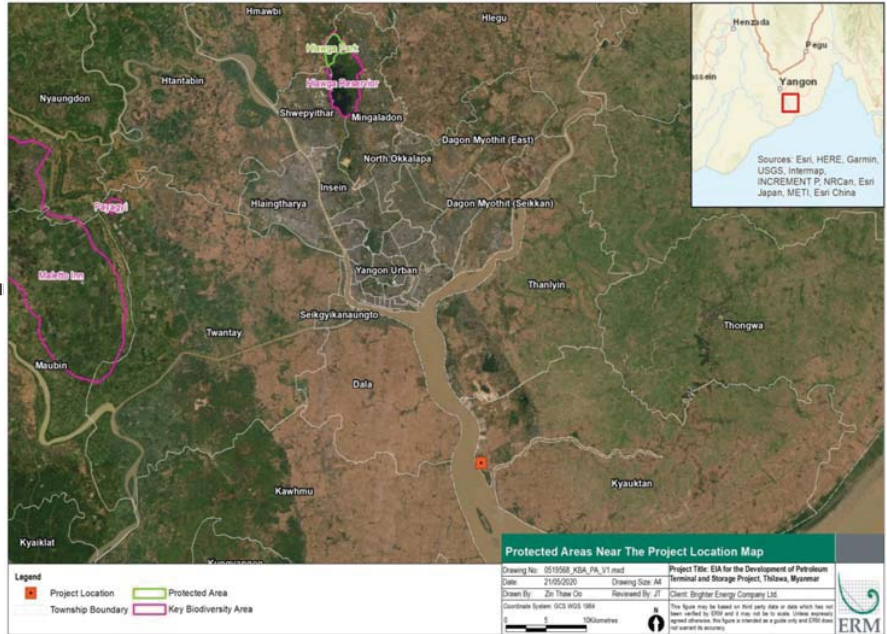
04/05/2021 13

အခြေခံအချက်အလက်များကောက်ယူခြင်းနှင့်ရလဒ်များ

- **လေအရည်အသွေး** - NO₂ နှင့် CO တို့၏ရလဒ်တန်ဖိုးများသည် ကမ္ဘာ့ကျန်းမာရေးအဖွဲ့အစည်း WHO နှင့် EU တို့မှ ထုတ်ပြန်ထားသော လမ်းညွှန်ချက်များနှင့် ထုတ်လွှတ်မှုစံချိန်စံညွှန်းများကို ကျော်လွန်နေခြင်းမရှိပါ။ ကောက်ယူသည့်နေရာများမှ PM_{2.5} ရလဒ်များသည် WHO မှ ထုတ်ပြန်ထားချက်များကို ကျော်လွန်နေခြင်းမရှိဘဲ တည်နေရာ (၄) နေရာမှ (၃) နေရာ၏ PM₁₀ ရလဒ်များမှာ အနည်းငယ်ကျော်လွန်နေပါသည်။
- **ဆူညံသံအရည်အသွေး** - တိုင်းတာခဲ့သည့်တည်နေရာ (၄) နေရာမှ (၂) နေရာသည် ညအချိန်တွင် အသံစွန်းထက် 4 dB ကျော်လွန်လျက် ရှိပါသည်။
- **မြေပေါ်ရေအရည်အသွေး** - ကောက်ယူခဲ့သော နေရာများအားလုံးမှ မြေပေါ်ရေအရည်အသွေးသည် WHO နှင့် မြန်မာနိုင်ငံအမျိုးသားသောက်သုံးရေအရည်အသွေး စံချိန်စံညွှန်းတို့ကို ကျော်လွန်နေခြင်းမရှိပါ။
- **မြေအောက်ရေအရည်အသွေး** - ကောက်ယူခဲ့သော နမူနာ (၄) ခုမှ (၃) ခုသည် WHO ၏သောက်သုံးရေအရည်အသွေးစံချိန်စံညွှန်းတို့နှင့် ကိုက်ညီလျက်ရှိပြီး ၎င်းတို့မှအိမ်သုံးတွင်းရေများမှဖြစ်ပါသည်။ နမူနာ (၁) ခုသည် အမိုးနီးယားနှင့် ဆိုင်ယံနိုက်ဒ်နွန်းများ မြင့်တက်နေပြီး WHO နှင့် မြန်မာနိုင်ငံအမျိုးသားသောက်သုံးရေအရည်အသွေး စံချိန်စံညွှန်းတို့ကို ကျော်လွန်လျက်ရှိပါသည် (GW1)။
- **မြေအရည်အသွေး** - ကောက်ယူခဲ့သော နေရာများအားလုံးမှ မြေအရည်အသွေးသည် ကုလသမဂ္ဂစားနပ်ရိက္ခာနှင့်စိုက်ပျိုးရေးအဖွဲ့ (FAO) ၏ မြေအရည်အသွေးပြန်တမ်းအမှတ် ၆၅ နှင့် Dutch စံချိန်စံညွှန်းများကို ကျော်လွန်နေခြင်းမရှိပါ။
- **သက်ရှိများ** - လေ့လာမှုနယ်မြေဧရိယာတွင် အဓိကအားဖြင့် အမျိုးအစား ၃မျိုးကို တွေ့ရှိခဲ့ပြီး (၁) ဒီရေတောဧရိယာအချို့ (၂) စိုက်ပျိုးမြေ နှင့် (၃) ခြံတောဧရိယာများဖြစ်ကြပါသည်။

ဇီဝမျိုးစုံမျိုးကွဲများ

- စီမံကိန်းတည်နေရာသည် စက်မှုဇုန်အနီးနှင့် စိုက်ပျိုးမြေများအနီးတွင် တည်ရှိပါသည်။
- စီမံကိန်းတည်နေရာနှင့်အနီးတဝိုက်သည် ဂေဟစနစ်မြင့်မားသည့်အနေအထား မရှိပါ။
- အနီးဆုံး ဇီဝမျိုးစုံမျိုးကွဲများနှင့်သာဘာဝထိန်းသိမ်းရေးနယ်မြေသည် စီမံကိန်းတည်နေရာမှ ၃၆ ကီလိုမီတာ အကွာအဝေးတွင်တည်ရှိသောကြောင့် သက်ရောက်မှုများမရှိနိုင်ပါ။



သတင်းအရင်းအမြစ် - World Database of Key Biodiversity Areas

လူမှုပတ်ဝန်းကျင်ဆိုင်ရာ အခြေအနေ

မြို့နယ်	လူဦးရေ	အိမ်ထောင်စု	မြို့ပြနေလူဦးရေရာခိုင်နှုန်း
ကျောက်တန်း	၁၆၉,၆၅၉	၄၂,၈၁၆	၃၅.၈%
ကော့မှူး	၁၃၅,၃၃၆	၃၃,၁၀၄	၇.၇၃%
ဒလ	၁၆၅,၆၂၅	၃၉,၆၁၀	၇၀.၃၉%

သတင်းအရင်းအမြစ်: မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန ရန်ကုန်တောင်ပိုင်းခရိုင် (ကျောက်တန်းမြို့နယ်၊ ကော့မှူးမြို့နယ်၊ ဒလမြို့နယ်) ဒေသဆိုင်ရာအချက်အလက်များ - ၂၀၁၉

- **ကျောက်တန်းမြို့နယ်**သည် ရန်ကုန်တိုင်းဒေသကြီးအတွင်းရှိစီးပွားရေးအရ ဖွံ့ဖြိုးတိုးတက်သည့် မြို့နယ်များထဲတွင်ပါဝင်ပါသည်။ ဒေသခံပြည်သူလူထုသည် စိုက်ပျိုးရေး၊ ရေလုပ်ငန်းနှင့် အစားအသောက်များတွင် အဓိကလုပ်ကိုင်ကြပါသည်။
- **ကော့မှူးမြို့နယ်**သည် ရန်ကုန်တိုင်းဒေသကြီးအတွင်းရှိ စီးပွားရေးမြို့နယ်များမှတစ်ခုဖြစ်ပြီး အဓိကဝင်ငွေလုပ်ငန်းများမှာ စိုက်ပျိုးရေး၊ မွေးမြူရေးလုပ်ငန်းများကို လုပ်ကိုင်ကြပြီး အဓိကမိန်းမလမ်းမကြီးပေါ်တွင်လည်း တည်ရှိသောကြောင့် သွားလာရေးမှာကောင်းမွန်လျက် ရှိပါသည်။
- **ဒလမြို့နယ်**သည် ရန်ကုန်တိုင်းဒေသကြီးအတွင်းရှိ စီးပွားရေးမြို့နယ်များမှတစ်ခုဖြစ်ပြီး အဓိကဝင်ငွေလုပ်ငန်းများမှာ စိုက်ပျိုးရေး၊ ရေလုပ်ငန်းနှင့် ဝန်ဆောင်မှုလုပ်ငန်းများကို လုပ်ကိုင်ကြပါသည်။ ဒေသခံများသည် သယ်ယူပို့ဆောင်ရေးအတွက် ကုန်းလမ်းနှင့်ရေလမ်းများကို အသုံးပြုကြပါသည်။





စီမံကိန်းနှင့်ပတ်သက်ဆက်နွယ်သူများနှင့်
တွေ့ဆုံဆွေးနွေးခြင်း

တွေ့ဆုံဆွေးနွေးမှုနည်းစနစ်

ရှင်းလင်းတင်ပြခြင်း



ဆွေးနွေးခြင်း/အကြံပြုခြင်း



ဆက်သွယ်စုံစမ်းခြင်း



Note: Figure sources are taken from website.

စီမံကိန်းပတ်သက်ဆက်နွယ်သူများနှင့်တွေ့ဆုံဆွေးနွေးခြင်း

စီမံကိန်းပတ်သက်ဆက်နွယ်သူများနှင့်တွေ့ဆုံဆွေးနွေးဆောင်ရွက်ရခြင်းရည်ရွယ်ချက်မှာ-

- စီမံကိန်းပတ်သက်ဆက်နွယ်သူများသို့ စီမံကိန်းဆိုင်ရာ အချက်အလက်များကိုအသိပေးအကြောင်းကြားခြင်း၊
- စီမံကိန်းပတ်သက်ဆက်နွယ်သူများ၏အတွေ့အကြုံများနှင့်ဗဟုသုတများကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလေ့လာမှုတွင်ထည့်သွင်းစဉ်းစားခြင်း နှင့် သက်ရောက်မှုလျှော့ချရေး အစီအမံများ၊ စီမံခန့်ခွဲမှုများရေးဆွဲဆောင်ရွက်ရာတွင် စီမံကိန်းပတ်သက်ဆက်နွယ်သူများထံမှ အကြံဉာဏ်များရယူခြင်း၊
- မြန်မာနိုင်ငံ၏ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လိုအပ်ချက်များနှင့်အညီဆောင်ရွက်နိုင်ရန်၊

ဆွေးနွေးမှုလုပ်ငန်းစဉ်

ပြည်ထောင်စုအဆင့်
သက်ဆိုင်ရာဝန်ကြီးဌာနများ၊ အစိုးရဌာနများ၊ အရပ်ဖက်လူမှုအဖွဲ့အစည်းများ၊ သုတေသနအဖွဲ့အစည်းများ

တိုင်းဒေသကြီးအဆင့်
ဝန်ကြီးချုပ်အပါဝင်သက်ဆိုင်ရာဌာနများပါဝင်သော တိုင်းဒေသကြီးအစိုးရအဖွဲ့၊ အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊ မြန်မာ့ရေနံနှင့်သဘာဝဓာတ်ငွေ့လုပ်ငန်း၊ မြန်မာ့ရေနံဓာတ်လုပ်ငန်း၊ မြန်မာ့ရေနံထွက်ကုန်လုပ်ငန်း

မြို့နယ်/ကျေးရွာအုပ်စုအဆင့်
အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊ ဒေသခံလူထုအဖွဲ့အစည်းများ၊ သက်ဆိုင်ရာအစိုးရဌာနများ၊ ကျေးရွာအုပ်ချုပ်ရေးမှူးများ၊ အရပ်ဖက်အဖွဲ့အစည်း (NGO၊ CSO)များ (ကျောက်တန်း၊ ကော့မူး၊ ဒလမြို့နယ်များမှ)

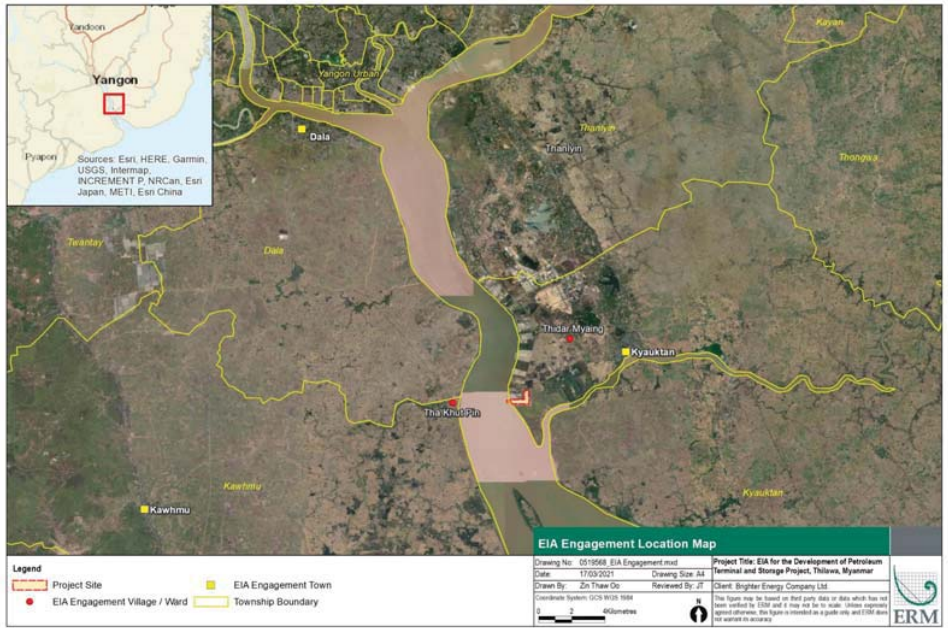


အဆိုပြုထားသည့် စီမံကိန်းနှင့် ပတ်သက်ဆက်နွယ်သူများနှင့်တွေ့ဆုံဆွေးနွေးခြင်း (EIA အဆင့်)

နေ့စွဲ	တွေ့ဆုံဆွေးနွေးမှုအစီအစဉ်
၂၀၂၁ ခုနှစ်	ကျောက်တန်းမြို့နယ် အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနတွင် အစည်းအဝေးပြုလုပ်ခြင်း အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနအပါအဝင် မြို့နယ်အဖွဲ့အစည်းများနှင့်သက်ဆိုင်သူများ၊ အခြားသက်ဆိုင်ရာအစိုးရဌာနများ၊ လွှတ်တော်ကိုယ်စားလှယ်များ၊ ဒေသခံလူထုအဖွဲ့အစည်းများ၊ ရပ်ကွက်/ကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးများနှင့် အရပ်ဖက်အဖွဲ့အစည်းများ
၂၀၂၁ ခုနှစ်	ကျောက်တန်းမြို့နယ် သီတာမြိုင်ရပ်ကွက်တွင် အစည်းအဝေးပြုလုပ်ခြင်း အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနအပါအဝင် မြို့နယ်အဖွဲ့အစည်းများနှင့်သက်ဆိုင်သူများ၊ အခြားသက်ဆိုင်ရာအစိုးရဌာနများ၊ လွှတ်တော်ကိုယ်စားလှယ်များ၊ ဒေသခံလူထုအဖွဲ့အစည်းများ၊ ရပ်ကွက်/ကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးများနှင့် အရပ်ဖက်အဖွဲ့အစည်းများ
၂၀၂၁ ခုနှစ်	သီတာမြိုင်ရပ်ကွက်တွင် လူမှုစီးပွားစစ်တမ်းကောက်ယူမှုများပြုလုပ်ခြင်း
၂၀၂၁ ခုနှစ်	ကျေးရွာမြို့နယ် အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနတွင် အစည်းအဝေးပြုလုပ်ခြင်း အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနအပါအဝင် မြို့နယ်အဖွဲ့အစည်းများနှင့်သက်ဆိုင်သူများ၊ အခြားသက်ဆိုင်ရာအစိုးရဌာနများ၊ လွှတ်တော်ကိုယ်စားလှယ်များ၊ ဒေသခံလူထုအဖွဲ့အစည်းများ၊ ရပ်ကွက်/ကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးများနှင့် အရပ်ဖက်အဖွဲ့အစည်းများ
၂၀၂၁ ခုနှစ်	ကျေးရွာမြို့နယ် သရုပ်ပင်ကျေးရွာတွင် အစည်းအဝေးပြုလုပ်ခြင်း အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနအပါအဝင် မြို့နယ်အဖွဲ့အစည်းများနှင့်သက်ဆိုင်သူများ၊ အခြားသက်ဆိုင်ရာအစိုးရဌာနများ၊ လွှတ်တော်ကိုယ်စားလှယ်များ၊ ဒေသခံလူထုအဖွဲ့အစည်းများ၊ ရပ်ကွက်/ကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးများနှင့် အရပ်ဖက်အဖွဲ့အစည်းများ
၂၀၂၁ ခုနှစ်	ဒလမြို့နယ် အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနတွင် အစည်းအဝေးပြုလုပ်ခြင်း အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနအပါအဝင် မြို့နယ်အဖွဲ့အစည်းများနှင့်သက်ဆိုင်သူများ၊ အခြားသက်ဆိုင်ရာအစိုးရဌာနများ၊ လွှတ်တော်ကိုယ်စားလှယ်များ၊ ဒေသခံလူထုအဖွဲ့အစည်းများ၊ ရပ်ကွက်/ကျေးရွာအုပ်စု အုပ်ချုပ်ရေးမှူးများနှင့် အရပ်ဖက်အဖွဲ့အစည်းများ



စီမံကိန်းနှင့် ပတ်သက်ဆက်နွယ်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း (EIA အဆင့်)



ဖြစ်နိုင်ခြေရှိသောသက်ရောက်နိုင်မှုများနှင့် လျော့ချရေးအစီအစဉ်များအားတင်ပြခြင်း

ဖြစ်နိုင်ခြေရှိသော သက်ရောက်နိုင်မှုများ

- လေအရည်အသွေး
- ဆူညံသံနှင့်တုန်ခါမှု
- စွန့်ပစ်ပစ္စည်း
- အလုပ်သမားများ စုပြုံရောက်ရှိလာနိုင်မှု
- ယာဉ်ကြောပိတ်ဆို့မှု



ဖြစ်နိုင်ခြေရှိသည့် သက်ရောက်မှုများနှင့် အဆိုပြုလျှော့ချနိုင်မည့်နည်းလမ်းများ

သက်ရောက်နိုင်မှုများ	ဆောက်လုပ်ရေးလုပ်ငန်းအဆင့်	လုပ်ငန်းလည်ပတ်သည့်အဆင့်	လျှော့ချနိုင်မည့် အစီအစဉ်များ
လေအရည်အသွေး	<ul style="list-style-type: none"> • အမှုန်နှင့်ဖုန်မှုန်ထုတ်လွှတ်မှု 	<ul style="list-style-type: none"> • အကြီးစား စက်ယန္တရားများနှင့် လျှပ်စစ်ဓာတ်အားပေးစက်များ • ယာဉ်နှင့်ရေယာဉ်များမှ ထုတ်လွှတ်ခြင်းများ 	<ul style="list-style-type: none"> • မြန်မာနိုင်ငံနှင့် နိုင်ငံတကာ ပတ်ဝန်းကျင်ဆိုင်ရာထုတ်လွှတ်မှု စံချိန်စံညွှန်းများနှင့်အညီ ထုတ်လွှတ်ခြင်း • အမှုန်ဖုန်မှုန်နည်းစေသည့် နည်းလမ်းများ ဆောင်ရွက်ခြင်း • ပြုပြင်ထိန်းသိမ်းရေးနည်းလမ်းကောင်းများ ပြုလုပ်ခြင်း (ယာဉ်၊ ရေယာဉ်များနှင့် စက်ပစ္စည်းများ)
ဆူညံသံသက်ရောက်မှု	<ul style="list-style-type: none"> • စက်ပစ္စည်းကိရိယာများ (မြေတူးစက်များ၊မြေထိုးစက်များ၊ မီးစက်များ၊ ကုန်တင်ကားများ၊ အစရှိသဖြင့်...) 	<ul style="list-style-type: none"> • စက်ရုံဆူညံသံ (ဥပမာ - ယာဉ်/ယန္တရားများ၊ မီးစက်များ) 	<ul style="list-style-type: none"> • မြန်မာနိုင်ငံ နှင့် နိုင်ငံတကာပတ်ဝန်းကျင်ဆိုင်ရာထုတ်လွှတ်မှု စံချိန်စံညွှန်းများနှင့်အညီ ထုတ်လွှတ်ခြင်း • ပြုပြင်ထိန်းသိမ်းရေးနည်းလမ်းကောင်းများ ပြုလုပ်ခြင်း (ယာဉ်များနှင့် စက်ပစ္စည်းများ) • ယာယီဆူညံသံထိန်းချုပ်သည့် အကာအကွယ်များကို သင့်တော်သည့်နေရာများတွင် တပ်ဆင်ခြင်း
ရေအရည်အသွေး	<ul style="list-style-type: none"> • စီမံကိန်းမှ စီးဆင်းခြင်းနှင့် စွန့်ပစ်ခြင်းများ • မတော်တဆယိုဖိတ်မှု • ဆိပ်ခံဘေးတားဆောက်လုပ်ခြင်း 	<ul style="list-style-type: none"> • စီမံကိန်းမှ စီးဆင်းခြင်းနှင့် စွန့်ပစ်ခြင်းများ • မတော်တဆယိုဖိတ်မှု • မြစ်ရေစီးကြောင်းပြောင်းလဲခြင်း 	<ul style="list-style-type: none"> • မြန်မာနိုင်ငံနှင့် နိုင်ငံတကာ ပတ်ဝန်းကျင်ဆိုင်ရာထုတ်လွှတ်မှု စံချိန်စံညွှန်းများနှင့်အညီ စွန့်ထုတ်ခြင်း • မြေနှင့် ရေညစ်ညမ်းမှုအား လျှော့ချနိုင်ရန် ကောင်းမွန်စွာ သိုလှောင်ခြင်း (လောင်စာ၊ ပစ္စည်းကိရိယာများ နှင့် ဆောက်လုပ်ရေးသုံး ကိရိယာများ) • မြေထုညစ်ညမ်းခြင်းကို လျှော့ချနိုင်မည့်နည်းလမ်းများဆောင်ရွက်ခြင်း
စွန့်ပစ်ပစ္စည်းများမှ သက်ရောက်မှု	<ul style="list-style-type: none"> • အန္တရာယ်ဖြစ်စေသော စွန့်ပစ်ပစ္စည်းများနှင့် အန္တရာယ်မရှိသောစွန့်ပစ်ပစ္စည်း 	<ul style="list-style-type: none"> • အန္တရာယ်ဖြစ်စေသော စွန့်ပစ်ပစ္စည်းများနှင့် အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်း 	<ul style="list-style-type: none"> • မြန်မာနိုင်ငံနှင့် နိုင်ငံတကာပတ်ဝန်းကျင်ဆိုင်ရာထုတ်လွှတ်မှု စံချိန်စံညွှန်းများနှင့်အညီ စွန့်ထုတ်ခြင်း • စွန့်ပစ်ပစ္စည်းများကို တတိယအဖွဲ့အစည်းမှတစ်ဆင့် စွန့်ပစ်ခြင်း
မြေအရည်အသွေး	<ul style="list-style-type: none"> • ရေနှင့်စွန့်ပစ်ပစ္စည်းများစီမံခန့်ခွဲခြင်းမှ 		<ul style="list-style-type: none"> • အထက်ဖော်ပြပါရေအရည်အသွေးနှင့်စွန့်ပစ်ပစ္စည်းလျှော့ချနိုင်မည့် အစီအစဉ်များကိုကူးကားရန်

ဖြစ်နိုင်ခြေရှိသည့်သက်ရောက်မှုများနှင့် အဆိုပြုလျှော့ချနိုင်မည့်နည်းလမ်းများ

သက်ရောက်နိုင်မှုများ	ဆောက်လုပ်ရေးလုပ်ငန်းအဆင့်	လုပ်ငန်းလည်ပတ်သည့်အဆင့်	လျှော့ချနိုင်မည့် အစီအစဉ်များ
လူမှုစီးပွားရေးအပေါ် သက်ရောက်မှု	<ul style="list-style-type: none"> မြေယာသိမ်းဆည်းမှုကြောင့် ပြန်လည်နေရာချထားခံရခြင်း ငါးဖမ်းလုပ်ငန်းများနှင့်စီမံကိန်းရေးယာဉ်များ ထိတွေ့မှုရှိခြင်း 	<ul style="list-style-type: none"> ငါးဖမ်းလုပ်ငန်းများနှင့်စီမံကိန်းရေးယာဉ်များ ထိတွေ့မှုရှိခြင်း ပိုမိုကောင်းမွန်သောအလုပ်အကိုင် အခွင့်အလမ်းများ 	<ul style="list-style-type: none"> အသက်မွေးဝမ်းကျောင်းလုပ်ငန်းများကို ပြန်လည်လုပ်ကိုင်စေသည့် အစီအစဉ်နှင့် ပြန်လည်နေရာချထားသည့် လုပ်ဆောင်ချက် အစီအစဉ်များ ချမှတ်ခြင်း ထိခိုက်နစ်နာမှုများအား အရေးယူဆောင်ရွက်ရန် ဆွေးနွေးတိုင်ပင်နိုင်သည့်စနစ်အားထိရောက်စွာ အသုံးပြုခြင်း
ဆောက်လုပ်ရေး အလုပ်သမားအင်အား	<ul style="list-style-type: none"> အလုပ်သမားများ အများအပြား ရောက်ရှိလာခြင်း ဒေသတွင်း ရှိ အခြေခံအဆောက်အအုံများ (ရေ၊ အညစ်အကြေးစွန့်ပစ်သည့် နေရာ၊ ကျန်းမာရေးစောင့်ရှောက်မှုများ၊ အစားအစာများရရှိမှု အစရှိသဖြင့်) မျှဝေသုံးစွဲရသည့်အတွက် လူမှုရေးတင်းမာမှု အဆင်မပြေဖြစ်မှုများ 		<ul style="list-style-type: none"> ဝန်ထမ်းများနှင့်ကန်ထရိုက်တာများအတွက်လိုက်နာရမည့် စည်းကမ်းများထားရှိခြင်း ဒေသခံများကို ဦးစားပေးအလုပ်ခန့်ခြင်း
ကျန်းမာရေးနှင့်ဘေးကင်းမှု	<ul style="list-style-type: none"> ယာဉ်အသွားအလာ မတော်တဆ ထိခိုက်မှုများ စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော လုပ်ငန်းခွင်ဆိုင်ရာနှင့် တစ်ကိုယ်ရေ ကျန်းမာရေးနှင့် လုံခြုံမှု ငါးဖမ်းလုပ်ငန်းများနှင့်စီမံကိန်းရေးယာဉ်များထိတွေ့မှုရှိခြင်း 		<ul style="list-style-type: none"> ကျန်းမာရေးနှင့် လုံခြုံရေးဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ ထိခိုက်နစ်နာမှုများအား အရေးယူဆောင်ရွက်ရန် ဆွေးနွေးတိုင်ပင်နိုင်သည့်စနစ်အားထိရောက်စွာ အသုံးပြုခြင်း
ယာဉ်အသွားအလာ သက်ရောက်မှု	<ul style="list-style-type: none"> ယာဉ်အသွားအလာပိုမိုများပြားလာခြင်း 		<ul style="list-style-type: none"> ယာဉ်အသွားအလာလျှော့ချနိုင်မည့်နည်းလမ်းများအား အဆိုပြုသွားပါမည်



EIA အဆင့် ဆက်လက်ဆောင်ရွက်မည့် လုပ်ငန်းစဉ်များ

ရှေ့ဆက်ဆောင်ရွက်မည့် လုပ်ငန်းစဉ်များ



- စီမံကိန်းဆောင်ရွက်နေသည့် သက်တမ်းကာလတလျှောက် လိုအပ်သည့် လူထုတွေ့ဆုံဆွေးနွေးမှုများကို ပြုလုပ်ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။
- အစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနသို့ တင်ပြသွားမည်ဖြစ်ပြီး ထုတ်ပြန်မှုများလည်း ပြုလုပ်သွားပါမည်။

ထုတ်ပြန်ကြေငြာခြင်း

- Brighter Energy ၏ ဝတ်ဆိုင်ကိတ်ဒ် - <https://brighterenergy.com/news-press-releases/>
- ပြည်တွင်းသတင်းစာများမှ အသိပေးခြင်း
- စီမံကိန်းအစီရင်ခံစာအကျဉ်းချုပ် (မြန်မာဘာသာဖြင့်) ကို မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနရုံး (ကျောက်တန်း၊ ကော့မှူး၊ ဒလ မြို့နယ်များသို့) ပေးပို့သွားပါမည်။

Scoping of EIA for the development of Petroleum Terminal and Storage Project in Kyauk Tan Township (Near Thilawa SEZ) by Brighter Energy Company Ltd. (BE)

Brighter Energy Company Ltd. (BE) is developing the Petroleum Terminal and Storage Project located at the semi-urban in the Kyauktan Township to the south of Yangon and covers a total of approximately 112.5 acres. The project includes Jetty Terminal, Tank Farm (Diesel, Gasoline, LPG), and interconnecting pipelines and advanced utilities.

Under the Environmental Conservation Law and Environmental Conservation Rules of the Republic of the Union of Myanmar, BE is required to undertake an Environmental Impact Assessment (EIA) study to obtain an Environmental Compliance Certificate (ECC) for the proposed activities. On behalf of BE, Environmental Resources Management (ERM) and Resource & Environment Myanmar (REM), are currently undertaking an EIA Study in accordance with the Myanmar EIA Procedure (2015), which includes Scoping Study that has been completed in July and August.

Information on the project is available at BE's webpage <https://brighterenergy.com/news-press-releases/>. Any queries, comments, or suggestions on the Project and the EIA Study can be provided in writing to rahason.p@brighterenergymm.com / saiyechan@brighterenergymm.com.

Brighter Energy Company Limited (BE) ကျောက်တန်းမြို့နယ်အတွင်းရှိ (ယင်းလမ်းထွက်) မြေပေါ်တွင် Petroleum Terminal and Storage စီမံကိန်းအတွက် ယာယီကျွတ်ယူမှုပြင်ဆင်ခြင်း (ယူနိုက်တက်ညောင်တန်းစီမံကိန်းဥပဒေအရ)

Brighter Energy Company Ltd. (BE) သည် Petroleum Terminal and Storage စီမံကိန်းအတွက် ယာယီကျွတ်ယူမှုပြင်ဆင်ခြင်း (ယူနိုက်တက်ညောင်တန်းစီမံကိန်းဥပဒေအရ) ကို ဆောင်ရွက်နေပါသည်။ ဤစီမံကိန်းသည် ကျောက်တန်းမြို့နယ်၊ ကျောက်တန်းမြို့နယ်အတွင်းရှိ (ယင်းလမ်းထွက်) မြေပေါ်တွင် ဆောင်ရွက်မည်ဖြစ်ပြီး ယင်းစီမံကိန်းသည် Jetty Terminal, Tank Farm (Diesel, Gasoline, LPG) နှင့် အပြန်အလှယ် ပိုက်လိုင်းများနှင့် ချိတ်ဆက်ထားသည့် ပြင်ဆင်မှုများပါဝင်ပါသည်။

Myanmar ၏ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေနှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစည်းကမ်းများ (2015) အရ BE သည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး (ERM) နှင့် Resource & Environment Myanmar (REM) ကို ခန့်အပ်ကာ EIA Study ကို ဆောင်ရွက်ရန်အတွက် မြေပေါ်တွင် ယာယီကျွတ်ယူမှုပြင်ဆင်ခြင်း (ယူနိုက်တက်ညောင်တန်းစီမံကိန်းဥပဒေအရ) ကို ဆောင်ရွက်ရမည်။ ဤစီမံကိန်းသည် မြောက်ဗဟိုဒေသတွင် ယာယီကျွတ်ယူမှုပြင်ဆင်ခြင်း (ယူနိုက်တက်ညောင်တန်းစီမံကိန်းဥပဒေအရ) ကို ဆောင်ရွက်ရမည်ဖြစ်ပြီး ယင်းစီမံကိန်းသည် Jetty Terminal, Tank Farm (Diesel, Gasoline, LPG) နှင့် အပြန်အလှယ် ပိုက်လိုင်းများနှင့် ချိတ်ဆက်ထားသည့် ပြင်ဆင်မှုများပါဝင်ပါသည်။

Information on the project is available at BE's webpage <https://brighterenergy.com/news-press-releases/>. Any queries, comments, or suggestions on the Project and the EIA Study can be provided in writing to rahason.p@brighterenergymm.com / saiyechan@brighterenergymm.com.



ဆက်သွယ်ရန်လိပ်စာ



ကျေးဇူးတင်ပါသည်။

The business of sustainability

BE

လိပ်စာ: အမှတ် - ၃၃၇၊ ပြည်လမ်း၊ မုန့်လက်ဆောင်းကုန်း (တောင်) ရပ်ကွက်၊ စမ်းချောင်းမြို့နယ်၊ ရန်ကုန်မြို့၊

တယ်လီဖုန်းနံပါတ်: +၉၅ (၀) ၉၅၀၀၃၁၈၃၊ +၉၅ (၀) ၉၅၉၉၅၂၀၉၅၉

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ERM

လိပ်စာ: အမှတ် - ၀၁၊ အထပ် ၂၀၊ Crystal Tower, Junction Square, ကျွန်းတောင်လမ်း၊ ကမာရွတ်မြို့နယ်၊ ရန်ကုန်မြို့၊

တယ်လီဖုန်းနံပါတ်: +၉၅၁ ၉၃၃၉၂၅၉

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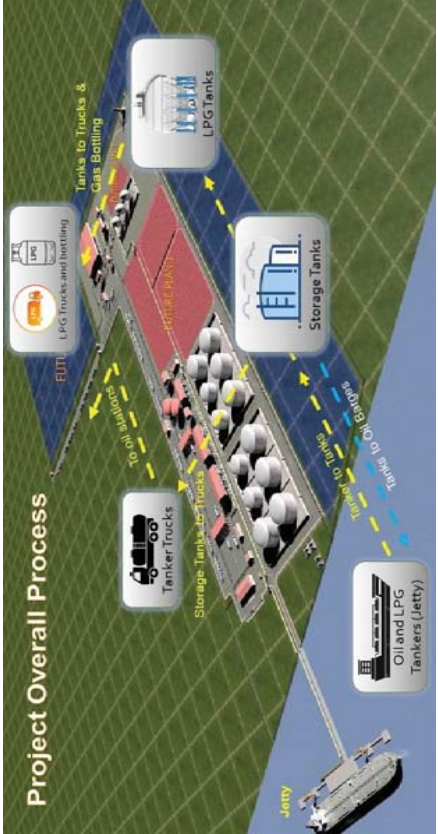


ရေနံအဆောက်အအုံနှင့်သို့လှောင်ဖြန့်ဖြူးခြင်းစီမံကိန်း (သီလဝါ) အတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း



အကြောင်းအရာ စီမံကိန်းဆိုင်ရာ အသေးစိတ်အချက်အလက်များ

စီမံကိန်းအမည်	Petroleum Terminal and Storage စီမံကိန်း (သီလဝါ)
စီမံကိန်းဗဟိုကောင်စီ	Brighter Energy Company Ltd.
စီမံကိန်းအရွယ်အစား	၁၁၂.၅ ဧက
စီမံကိန်းတွင်ပါဝင်သည့် အစိတ်အပိုင်းများ	<ul style="list-style-type: none"> ဆိပ်ခံတံတား သိုလှောင်ကန်များ (ဒီဇယ်၊ ဓာတ်ဆီ၊ ရေနံဓာတ်ငွေ့ရှည်) နှင့် ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများ
စီမံကိန်းဆောင်ရွက်ချက်	<ul style="list-style-type: none"> ဒီဇယ်၊ ဓာတ်ဆီနှင့်ရေနံဓာတ်ငွေ့ရှည်ကို လောင်စာတင်ရေယာဉ်များမှတစ်ဆင့် ဆိပ်ခံတံတားတွင် လက်ခံရယူပါမည်။ ဒီဇယ်၊ ဓာတ်ဆီ နှင့် ရေနံဓာတ်ငွေ့ရှည်ကို ချိတ်ဆက်ပိုက်လိုင်းများမှတစ်ဆင့် သိုလှောင်ကန်များထဲသို့ပေးပို့ပါမည်။ ဒီဇယ်နှင့်ဓာတ်ဆီများကို သိုလှောင်ကန်များမှတစ်ဆင့် ဖြန့်ဖြူးရေးအတွက် လောင်စာတင်ယာဉ်များထံသို့ပေးပို့ပါမည်။ ရေနံဓာတ်ငွေ့ရှည်ကို သိုလှောင်ကန်များမှတစ်ဆင့် LPG ယာဉ်များထံသို့ (သို့မဟုတ်) ရေနံဓာတ်ငွေ့ရှည်သိုလှောင်အိုးများမှတစ်ဆင့် ဖြန့်ဖြူးရန် ပေးပို့ပါမည်။



ဖြစ်နိုင်ခြေရှိသည့်အဓိကသက်ရောက်မှုများနှင့် အဆိုပြုလျှော့ချနိုင်မည့်နည်းလမ်းများ

သက်ရောက်နိုင်မှုများ	ဆောက်လုပ်ရေးလုပ်ငန်းအဆင့်	လုပ်ငန်းလည်ပတ်သည့်အဆင့်	လျှော့ချနိုင်မည့် အစီအစဉ်များ
လေထုအရည်အသွေး	<ul style="list-style-type: none"> အနံ့နှင့် ပုန်းကန်ထုတ်လွှတ်မှု 	<ul style="list-style-type: none"> အကြီးစား စက်ယန္တရားများနှင့် လျှပ်စစ်စက်အားပေးစက်များ ယာဉ်နှင့် ရေယာဉ်များမှ ထုတ်လွှတ်ခြင်းများ 	<ul style="list-style-type: none"> မြန်မာနိုင်ငံနှင့် နိုင်ငံတကာ ပတ်ဝန်းကျင်ဆိုင်ရာထုတ်လွှတ်မှု စံချိန်စံညွှန်းများနှင့်အညီ ထုတ်လွှတ်ခြင်း၊ အနံ့ဖျက်မှုနှင့်နည်းစေသည့် နည်းလမ်းများ ဆောင်ရွက်ခြင်း၊ ပြင်ဆင်ထိန်းသိမ်းရေးအစီအစဉ်များ ပြုလုပ်ခြင်း၊ (ယာဉ် ရေယာဉ်များနှင့် စက်ပစ္စည်းများ)
ဆူညံသက်ရောက်မှု	<ul style="list-style-type: none"> စက်ပစ္စည်းကိရိယာများ (မြေတူးစက်များ၊ မြေထိုးစက်များ၊ လျှပ်စစ်စက်အားပေးစက်များ၊ ကုန်တင်ကားများ၊ အစရှိသဖြင့်...) 	<ul style="list-style-type: none"> စက်ရုံဆူညံသံ (ဥပမာ - လျှပ်စစ်စက်အားပေးစက်များ) 	<ul style="list-style-type: none"> မြန်မာနိုင်ငံနှင့် နိုင်ငံတကာ ပတ်ဝန်းကျင်ဆိုင်ရာထုတ်လွှတ်မှု စံချိန်စံညွှန်းများနှင့်အညီ ထုတ်လွှတ်ခြင်း၊ ပြင်ဆင်ထိန်းသိမ်းရေးနည်းလမ်းကောင်းများ ပြုလုပ်ခြင်း၊ (ယာဉ်များနှင့် စက်ပစ္စည်းများ) ယာယီအညံ့သံထိန်းချုပ်သည့် အကာအကွယ်များကို သင့်တော်သည့်နေရာများတွင် တပ်ဆင်ခြင်း
ရေအရည်အသွေး	<ul style="list-style-type: none"> စီမံကိန်းမှ စီးဆင်းခြင်းနှင့် စွန့်ပစ်ခြင်းများ မတော်တဆယိုမိတ်မှု ဆိပ်ဘောက်ဘက်ဆောက်လုပ်ခြင်း 	<ul style="list-style-type: none"> စီမံကိန်းမှ စီးဆင်းခြင်းနှင့် စွန့်ပစ်ခြင်းများ မတော်တဆယိုမိတ်မှု မြစ်ရေရေကြောင့်ပြောင်းလဲခြင်း 	<ul style="list-style-type: none"> မြန်မာနိုင်ငံနှင့် နိုင်ငံတကာ ပတ်ဝန်းကျင်ဆိုင်ရာထုတ်လွှတ်မှု စံချိန်စံညွှန်းများနှင့်အညီ စွန့်ထုတ်ခြင်း၊ မြေနှင့် ရေညစ်ညမ်းမှုအား လျှော့ချနိုင်ရန် ကောင်းမွန်စွာ သိလျှောက်ခြင်း၊ (လောင်စာ၊ ပစ္စည်းကိရိယာများနှင့် ဆောက်လုပ်ရေးသုံး ကိရိယာများ) မြေထုညစ်ညမ်းခြင်းကို လျှော့ချနိုင်မည့်နည်းလမ်းများဆောင်ရွက်ခြင်း
စွန့်ပစ်ပစ္စည်းများမှ သက်ရောက်မှု	<ul style="list-style-type: none"> အန္တရာယ်ဖြစ်စေသော စွန့်ပစ်ပစ္စည်းများနှင့် အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်း 	<ul style="list-style-type: none"> အန္တရာယ်ဖြစ်စေသော စွန့်ပစ်ပစ္စည်းများနှင့် အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်း 	<ul style="list-style-type: none"> မြန်မာနိုင်ငံနှင့် နိုင်ငံတကာ ပတ်ဝန်းကျင်ဆိုင်ရာထုတ်လွှတ်မှု စံချိန်စံညွှန်းများနှင့်အညီ စွန့်ထုတ်ခြင်း၊ စွန့်ပစ်ပစ္စည်းများကို တတိယအဖွဲ့အစည်းမှတစ်ဆင့် စွန့်ပစ်ခြင်း
မြေအရည်အသွေး	<ul style="list-style-type: none"> ရေနှင့်စွန့်ပစ်ပစ္စည်းများစိမ့်စေခြင်းမှ 	<ul style="list-style-type: none"> ရေနှင့်စွန့်ပစ်ပစ္စည်းများစိမ့်စေခြင်းမှ 	<ul style="list-style-type: none"> အထက်ဖော်ပြပါရေအရည်အသွေးနှင့်စွန့်ပစ်ပစ္စည်းလျှော့ချနိုင်မည့် အစီအစဉ်များကိုကိုးကားရန်
လူမှုစီးပွားရေးအပေါ် သက်ရောက်မှု	<ul style="list-style-type: none"> မြေယာသိမ်းဆည်းမှုကြောင့် မြန်လည်နေရာထားခံရခြင်း ငါးဖမ်းလုပ်ငန်းများနှင့်စီမံကိန်းရေး ယာဉ်များထိတွေ့မှုရှိခြင်း 	<ul style="list-style-type: none"> ငါးဖမ်းလုပ်ငန်းများနှင့်စီမံကိန်းရေး ယာဉ်များ ထိတွေ့မှုရှိခြင်း ပိုမိုကောင်းမွန်သော အလုပ်အကိုင် အခွင့်အလမ်းများ 	<ul style="list-style-type: none"> အသက်မွေးဝမ်းကျောင်းလုပ်ငန်းများကို ပြန်လည်လုပ်ကိုင်စေသည့် အစီအစဉ်နှင့် ပြန်လည်နေရာချထားသည့် လုပ်ဆောင်ချက် အစီအစဉ်များ ဖျတ်ခြင်း၊ ထိခိုက်မှုနှုန်းများအား အရေးယူဆောင်ရွက်ရန် ဆွေးနွေးတိုင်ပင်နိုင်သည့်စနစ်အားထိရောက်စွာ အသုံးပြုခြင်း
ဆောက်လုပ်ရေး အလုပ်သမားအင်အား	<ul style="list-style-type: none"> အလုပ်သမားများ အများအပြား ရောက်ရှိလာခြင်း ဒေသတွင်း ရှိ အခြေအဆောက်အအုံများ (ရေ၊ အညစ်အကြေးစွန့်ပစ်သည့် နေရာ၊ ကျန်မာရေးစောင့်ရှောက်မှုများ၊ အစားအစာများရရှိမှု အစရှိသဖြင့်) ဖွဲ့စည်းထူထောင်သည့်အတွက် လူမှုရေးတင်းမာမှု အဆင်မပြေဖြစ်မှုများ 	<ul style="list-style-type: none"> အလုပ်သမားများ အများအပြား ရောက်ရှိလာခြင်း ဒေသတွင်း ရှိ အခြေအဆောက်အအုံများ (ရေ၊ အညစ်အကြေးစွန့်ပစ်သည့် နေရာ၊ ကျန်မာရေးစောင့်ရှောက်မှုများ၊ အစားအစာများရရှိမှု အစရှိသဖြင့်) ဖွဲ့စည်းထူထောင်သည့်အတွက် လူမှုရေးတင်းမာမှု အဆင်မပြေဖြစ်မှုများ 	<ul style="list-style-type: none"> ဝန်ထမ်းများနှင့်ကန်ထရိုက်တာများအတွက်လိုက်နာရမည့် စည်းကမ်းများထားရှိခြင်း ဒေသခံများကို ဦးစားပေးလုပ်ခေါ်ခြင်း
ကျန်မာရေးနှင့်သောကင်မှု	<ul style="list-style-type: none"> ယာဉ်အသွားအလာ မတော်တဆ ထိခိုက်မှုများ စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော လုပ်ငန်းခွင်ဆိုင်ရာနှင့် တစ်ကိုယ်ရေ ကျန်းမာရေးနှင့် လုံခြုံမှု ငါးဖမ်းလုပ်ငန်းများနှင့်စီမံကိန်းရေးယာဉ်များထိတွေ့မှုရှိခြင်း 	<ul style="list-style-type: none"> ယာဉ်အသွားအလာ မတော်တဆ ထိခိုက်မှုများ စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော လုပ်ငန်းခွင်ဆိုင်ရာနှင့် တစ်ကိုယ်ရေ ကျန်းမာရေးနှင့် လုံခြုံမှု ငါးဖမ်းလုပ်ငန်းများနှင့်စီမံကိန်းရေးယာဉ်များထိတွေ့မှုရှိခြင်း 	<ul style="list-style-type: none"> ကျန်းမာရေးနှင့် လုံခြုံရေးဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ ထိခိုက်မှုနှုန်းများအား အရေးယူဆောင်ရွက်ရန် ဆွေးနွေးတိုင်ပင်နိုင်သည့်စနစ်အားထိရောက်စွာ အသုံးပြုခြင်း
ယာဉ်အသွားအလာ သက်ရောက်မှု	<ul style="list-style-type: none"> ယာဉ်အသွားအလာပိုမိုများပြားလာခြင်း 	<ul style="list-style-type: none"> ယာဉ်အသွားအလာပိုမိုများပြားလာခြင်း 	<ul style="list-style-type: none"> ယာဉ်အသွားအလာပိုမိုများပြားလာခြင်း



စီမံကိန်းလုပ်ငန်းစဉ်အနှစ်ချုပ်

- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းကိုဆောင်ရွက်မည့် ERM နှင့် REM သည် သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးစံနှုန်းကြိုငွေမှထွက်ပတ်ပတ်တော်ဖြင့် အသိအမှတ်ပြုခံထားရသောကုမ္ပဏီများဖြစ်ပါသည်။ စီမံကိန်းပတ်ဝန်းကျင်ဆန်းစစ်မှုများနှင့်တွေထုံးဆွေးနွေးမှုများကို ဆောက်ရွက်ရာတွင်သေချာစီစဉ်မှုများအကြောင်းထိရောက်စွာ ဆောင်ရွက်ပေးမည်။
- ဒေသအခြေအနေကိုပိုမိုနားလည်နိုင်ရန်ပတ်ဝန်းကျင်နှင့်လူမှုစီးပွား အချက်အလက်များကောက်ယူမည်။
- စီမံကိန်းကြောင့်သက်ရောက်မှုများရရှိစေရန်ကောက်ယူရရှိ လာမည့် အချက်အလက်များကိုအခြေခံသည့်စီမံကိန်းမှ ဆောင်ရွက်မည့်ပတ်ဝန်းကျင်ဆန်းစစ်မှုများအကြောင်းထိရောက်စွာ ဆောင်ရွက်ပေးမည်။
- စီမံကိန်းအကျဉ်းချုပ်အစီရင်ခံစာကိုဖြန့်ဖြူးပေးသောစာကား ပြင်ဆင်ပေးမည်။
- စီမံကိန်းမှလေ့လာထားသောပတ်ဝန်းကျင်ထိန်းသိမ်းရေးစံနှုန်းနှင့် သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း
- ထိခိုက်မှုနှုန်းများအား အရေးယူဆောင်ရွက်ရန် ဆွေးနွေးတိုင်ပင်နိုင်သည့်စနစ်အား စီမံကိန်းတွင် ထည့်သွင်းဆောင်ရွက်မည်။

ဆက်သွယ်ရန်လိပ်စာ

Brighter Energy
 အမည် - ဦးစိုင်းအေးမျှော်သိန်း၊ Mr. Rathapon Phakdeewong
 လိပ်စာ - အမှတ် - ၃၃၇၊ ပြည်လမ်း၊ မန္တလေးတိုင်းဒေသကြီး (တောင်) ရပ်ကွက်၊ စမ်းချောင်းမြို့နယ်၊ ရန်ကင်းမြို့၊
 တယ်လီဖုန်းနံပါတ် - +၉၅ (၀) ၉၅၀၃၀၃၀၂ +၉၅ (၀) ၉၅၀၃၀၃၀၃
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APPENDIX H

**QUESTIONNAIRES TO BE USED TO COLLECT THE
SOCIO-ECONOMIC STATUS OF THE PROJECT AREA**

**Socio-Economic Survey Questionnaire for the
Brighter Energy - Petroleum Terminal And Storage Project, Thilawa, Myanmar**

Please fill in the blanks /circle the option

Interviewer				
Date of Survey				
Name of the respondent				
Age				
Sex (M/F)				
Township				
Village Tract				
Village				
State / Region				
Number of Household Members	Male		Female	
Religion (Please circle)	a) Buddhist	b) Christian	c) Muslim	d) Others
Ethnicity				
How many HH (families) in the house				
How many rooms are used by family members of the HH?				
Do you live permanently or temporarily within the house? (Please circle)	1. Permanently		2. Temporarily	

Section A Household Income Source

Source of Income	Household Annual Income in MMK
a) Agriculture	
b) Trading	
c) Service / small-medium enterprises	
d) Company workers	
e) Casual labourers	
f) Government workers	
g) Fishing	
h) Money from other family members (not in HH)	
i) Government pension	

j) Rent of property / land	
k) Other (specify)	
Total – Annual Income	

Section B Information about the Members of House hold

	(a) Name of HH Member	(b) Sex Male = 1 Female = 2	(c) Age	(d) Place of birth	(e) Relation to HH Head 1. Wife 2. Husband 3. Son / Daughter 4. Father 5. Mother 6. HH Head 7. Other...specify (Please put the number)	(f) Education 1. Graduate (University) 2. High school 3. Middle School 4. Primary school 5. Monastery 6. No education (Please put the number)	(g) Occupation 1. Student 2. Employed / HH earner 3. Dependent (on HH – no income) 4. Other...specify (Please put the number)	(h) Type of Work 1. Permanent Work 2. Temporary Work (Please put the number)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								

Section C Access to Services

	C.1. Water			
	a. Source: (Can choose more than one)			
A) From where do you get our drinking water?	1. Tap water/ piped	2. Tube well / borehole		
	3. Protected well/ spring	4. Bottled / purifier water		
	5. Unprotected well / spring	6. Pool / pond / lake		
	7. River / stream / canal	8. Rainwater		
	9. Other (specify) ...			
		b. Availability	1. Seasonal	2. Year round
	c. Distance	1. HH Level	2. Inside village	3. Outside village
	d. Quality	1. Good		2. Bad (smell, dirty, etc.)
	Source	Availability	Distance	Quality
	i)			
	ii)			
B) From where do you get water for domestic usage?	Source	Availability	Distance	Quality
	i)			
	ii)			
	iii)			
	C.2 Latrine			
C) Type of latrine	1. Flush	2. Pit (Traditional pit latrine)		
	3. Water Seal	4. Bucket (Surface latrine)		
	5. Other (specify)...			
	C.3 Source of Energy			
D) Energy source of lighting (please circle, can circle more than one)	1. Electricity	2. Kerosene		
	3. Candle	4. Battery		
	5. Generator (private)	6. Water mill (private)		
	7. Solar system / energy	8. Other (specify)...		
E) Source of cooking fuel (please circle, can circle more than one)	1. Electricity	2. LPG / natural gas		
	3. Kerosene	4. Biogas		
	5. Firewood	6. Charcoal		

	7. Coal	8. Other (specify)...	
F) Firewood collection	1. Within village	2. Outside village	
	3. Market seller	4. Other (specify)	
What is the preferred health facility amongst the HH – private and public (please circle)	C.4 Access to Health Service		
	1. Private	2. Public	3. Traditional
Is the preferred facility available within the village or outside	1. Within		2. Outside
Common illness in the village	1. Diarrhea	2. Malaria / Dengue	3. Skin rash / itches
	4. Cold / Cough	5. Worms	6. Hypertension / High blood pressure
	7. Tuberculosis	8. Diabetes	9. Other (specify) ...
How would you rate your local services / environmental conditions?	C.5 Ratings on local services / environmental conditions		
	1 = Good 2 = Fair 3 = Bad 4 = Unavailable in the area (please put the number next to each service / environmental condition)		
1) Services			
a) Schools			
b) Transportation			
c) Health care services			
d) Law and order / crime			
e) Public areas			
f) Electricity			
g) Water resources			
h) Waste collection / disposal			
i) Employment opportunities			
2) Conditions			
a) Noise			
b) Air quality			
c) Groundwater (wells)			
d) Surface water (rivers, lakes, ponds, creeks, etc.)			
e) Smell			

f) Drainage	
g) Other...specify	

Section D Adequacy of services in the community

<p>How good are the services in the community?</p> <p>1 = Good 2 = Satisfactory 3 = Unsatisfactory 4 = Unavailable in the village</p> <p>(please put the number next to each service)</p>	a) Education services / facilities
	b) Drinking water
	c) Medical services / facilities
	d) Sanitation (toilets)
	e) Roads / transport
	f) Solid waste disposal
	g) Electricity
	h) Law and order / security
	i) Telecommunications
	j) Employment

Section E Floods

Has the village experienced flood events before	1) Yes	2) No	
If yes, provide details	Year	Month	Was HH affected?
	i)		
	ii)		
	iii)		

Section F Land / Assets

Size of land owned	a) Agricultural land (ac):
	b) Garden Land (ac):
	c) Residential area (sq.ft):
	d) Other (specify) (ac):
Land affected by Project (yes/no), provide area if known	a) Agricultural land (ac):
	b) Garden Land (ac):
	c) Residential area (sq.ft):
	d) Other (specify) (ac):
Livestock owned (please provide number)	a) Cow
	b) Buffalo
	c) Goat
	d) Poultry
	e) Pig
	f) Horse

	g) Other (specify)		
What assets will be affected by the Project (please provide number)	a) House		
	b) Hut		
	c) Well		
	d) Other (specify)		
Did you get compensation for affected land / assets? (please circle)	1) Yes	2) No	
Compensation Type (in percentage)	a) Cash		
	b) Land relocation		
	c) Crop compensation		
If cash, does it equal to the market price at that time?	1) Yes	2) No	3) Not complete / confirmed
Are you satisfied with the compensation for the affected land / assets?	1) Yes		2) No

Section G Knowledge about the project

How do you know about the project?	1) Nothing		
	2) Informed by Project Proponent		
	3) Informed by local government / village leader		
	4) Informed by media		
	5) Informed by relatives / friends		
	6) Informed by interviewer		
	7) Other ...specify		
Do you think this project is important for this community?	1) Yes	2) No	
What do you think will be the project impacts? (Please circle; can circle more than one)	A. Positive Impacts		
	1) Job opportunity		
	2) Increase annual income		
	3) Improve transportation / infrastructure		
	4) Compensation for land use		
	5) Other (specify)		
	B. Negative Impacts		
	1) Air pollution		
	2) Noise		
	3) Loss of land / assets		
	4) Waste generation / disposal		
	5) Employment / income disruption		
	6) Safety / crime		
	7) Worker influx		
	8) Traffic / infrastructure		

	9) Water / land pollution	
	10) Others (specify)	
	C. No Effect	
Are you concerned about construction, operation and maintenance workers from outside the area coming to your village / community to work on the project? (please circle)	1) Yes	2) No
What are the priority development initiative(s) for your community? 1 = highest, 5 = lowest	a) Transportation	
	b) Electricity	
	c) Telecommunication	
	d) Water	
	e) Access to credit	
	f) Education	
	g) Health	
	h) Other	

REFERENCES

- Accimatise News, 2021 Keeping it local: Engaging communities in climate resilience projects in Yangon. Available at: <http://www.acclimatise.uk.com/2021/01/20/keeping-it-local-engaging-communities-in-climate-resilience-projects-in-yangon/> (Accessed on 31st May, 2021)
- ADB, 2016 Myanmar Transport Sector Policy Note: River Transport. Available at: <https://www.adb.org/sites/default/files/publication/189082/mya-river-transport.pdf> (Accessed on 27th May 2021)
- AEA Energy and Environment on behalf of the Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2008) Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users [Online] Available at: https://laqm.defra.gov.uk/documents/0802141004_NO2_WG_PracticalGuidance_Issue1a.pdf [Accessed 08 August 2017]
- Ahlong Township Data, 2017. General Administration Department
- Alliance for Zero Extinction (2019) <http://zeroextinction.org/>
- Aman, A., et al., 2018. The Palmyrah Palm (*Borassus flabellifer* L.): Overview of biology, uses and cultivation. Biomolecule Reports.
- Another Development & The East Asia Institute, 2018. Access to Clean and Safe Water in Yangon – A Case of Municipal Water Provision in Insein Township.
- Aung Lwin, 2012. Yangon River geomorphology identification and its environmental impacts analysis by optical and radar sensing techniques, Conference Paper in ISPRS – International Archives of the Photogrammetry Remote Sensing and Spatial Information Science, July, 2012. Available at: <https://www.researchgate.net/publication/276021811> (Accessed on 21st January, 2021)
- Bartram, J., & Balance, R. (1996). Water Quality Monitoring - A Practical Guide to the Design and Implementation of Freshwater Quality Studies and Monitoring Programmes: CH 5 - Field Work and Sampling. United Nations Environment Programme & the World Health Organization ISBN 0 419 22320 7 (Hbk) 0 419 21730 4 (Pbk). Retrieved from http://www.who.int/water_sanitation_health/resourcesquality/waterqualmonitor.pdf
- Basudha, 2007. Induced spawning of *Osteobrama belangeri* (Val.), a critically endangered fish in India using carp pituitary and ovaprim. *Aquaculture*. 8. 231-236.
- Birdlife international, 2005. <http://www.ibiblio.org/obl/docs2/biodiv.pdf>
- Birdlife International, 2019. <https://www.birdlife.org/>
- Carter M.R., & Gregorich E.G. (2006). Soil Sampling and Methods of analysis (2nded.). Taylor & Francis Group, LLC. Retrieved from http://www.niordc.ir/uploads%5C86_106_Binder1.pdf
- CCAC, Undated. Solid Waste Management: City Profile (Yangon), Available at: https://www.waste.ccacoalition.org/sites/default/files/files/yangon_city_profile_final_draft.pdf (Accessed on 31st May 2021)
- Chaudhury. S & Koli. V. K, 2018. Population status, habitat preference, and nesting characteristic of black-headed ibis *Threskiornis melanocephalus* Latham, 1790 in southern Rajasthan, India. *Journal of Asia-Pacific Biodiversity*. 11 (2) 223-228.
- China Communications Construction Company Limited, 2019. New Yangon City Phase 1 Development – Pre-Project Document.
- Chondar, 1999. Biology of Finfish and Shellfish. SCSC Publishers, India. pp.514
- Climate Data Website, 2018. *Climate: Myanmar*. Accessed: 7 December 2018. Retrieved from: <http://en.climate-data.org/location/317/>

Environmental Impact Assessment Report

- De Koning, R.J. and M.P.J. Janssen, 2015. Delft 3D-Flow Model of the Yangon Port Area. Accessed: 27 November 2018. Retrieved from: <https://repository.tudelft.nl/islandora/object/uuid:96917480-dc97-421e-b55e-6c560ce44264/datastream/OBJ/download>.
- Department of Population, 2018. Township Census Report – Yangon. Accessed: 10 January 2019. Retrieved from: <http://www.dop.gov.mm/en/state-region/yangon>
- Desert Research Institute, 2010. Measurement System Evaluation for Fugitive Dust Emissions Detection and Quantification
- EO Earth Website, 2016. Water Profile of Myanmar. Accessed: 7 December 2018. Retrieved from: <http://www.eoearth.org/view/article/156974/>
- Francesca D. W. (2004). U.S. Geological Survey Techniques of Water-Resources Investigations: Book 9 Handbooks for Water-Resources Investigations: CH A3. Cleaning of equipment for water Sampling (Ed). US Geological Survey. Retrieved from <http://pubs.water.usgs.gov/twri9A/>
- Gupta, 2015. A threatened catfish of Indian waters. International journal of research in fisheries and aquaculture. 5 (4) 140-142.
- Hiroshi Sakai, Yatsuka Kataoka and Kensuke Fukushi, 2013 Quality of Source Water and Drinking Water in Urban Areas of Myanmar. Hindawi Publishing Corporation, The Scientific World Journal, Volume 2013, Article ID 854261. (Accessed on 21st January, 2021)
- Hla Hla Aung, 2011. Potential Seismicity of Yangon Region (Geological Approach). https://www.academia.edu/26734898/GEOLOGY_OF_YANGON_RANGOON_COMPILATION_FILE_BY_MYO_AUNG_MYANMAR?auto=download
- Hong Kong Environmental Protection Department, 2005. Technical Paper Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning. Available at: http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/water/guide_ref/files/gesf.pdf
- Horton, et al. 2016. Assessing Climate Risk in Myanmar. New York, NY, USA: Center for Climate Systems Research at Columbia University, WWF-US and WWF-Myanmar.
- Institute of Air Quality Management, 2014. Guidance on the Assessment of Dust from Demolition and Construction
- Istituto Oikos and BANCA, 2011. Myanmar Protected Areas. Context, Current Status and Challenges. Milano, Italy. Ancora Libri.
- IUCN, 2019. Red List. <https://www.iucnredlist.org>
- JICA, 2020 Press Releases: Signing of Grant Agreement with Myanmar – Contributing to securing the safety of navigation through rehabilitation of vessel traffic navigation aids in Yangon River. Available at: https://www.jica.go.jp/english/news/press/2020/20200702_10_en.html (Accessed on 26th May 2021)
- Khaing, Khin Kay. 2012 Climate of Yangon City in context with Global Warming. Available at: https://www.researchgate.net/publication/332523995_Climate_of_Yangon_City_in_context_with_Global_Warming (Accessed on 31st May 2021)
- Kinyon, S. 2004. An illustrated checklist for the butterflies of Myanmar. Zoology Department of Yangon University
- Michałowicz, J., & Duda, W. (2007). Phenols--Sources and Toxicity. Polish Journal of Environmental Studies, 16(3).

Environmental Impact Assessment Report

Midwest Laboratories, Inc. Soil Sampling. Omaha: 13611 B Street. Retrieved from
<http://agrienergy.net/docs/lab-information/soil-sampling.pdf>

Ministry of Environmental Conservation and Forestry, 2012. Myanmar's National Adaptation Programme of Action (NAPA) to Climate Change.

Ministry of Forestry, 2005. National Action Programme of Myanmar to Combat Desertification in the Context of United Nations Convention to Combat Desertification (UNCCD). Retrieved from:
<https://knowledge.unccd.int/sites/default/files/naps/myanmar-eng2005.pdf>

Ministry of Health and Sports 2020 Myanmar Health Statistics

Moore, 2005. Alien invasive species: impacts on forests and forestry. FAO.

Myanmar Insider 2017. How to handle Yangon's appealing traffic jams, (15-8-2017). Available at:
<https://www.myanmarinsider.com/how-to-handle-yangons-appalling-traffic-jams/> (Accessed on 26th May 2021)

Noise measurement methodologies. <https://www.ehp.qld.gov.au/licences-permits/.../noise-measurement-manual-em1107.p>.

Ohnmar May Tin Hlaing et al., 2009. Air Quality Monitoring in Yangon and Mandalay City during 2007-2008: The State of Ambient Air Quality in Selected Urban Areas in Myanmar Health Research Congress, 2009 Abst. Pp.55

Patra, M. K., Acharjee, S. K. and Chakraborty, S. K., 2005. Conservation categories of siluroid fishes in North-East

Pethiyagoda, 1991. Freshwater fishes of Sri Lanka. The Wildlife Heritage Trust of Sri Lanka, Colombo. 362 pp.

Raizada, S., et al., 2013. Captive breeding and embryonic development of Butter Catfish (*Ompok bimaculatus*, Bloch 1794), A threatened fish of Indian sub-continent in Northern India. Proceedings of the national academy of sciences, India. Springer. 83 (3) 333-339.

RAMSAR (2019) <https://www.ramsar.org>

Republic of the Union of Myanmar, 2015. National Biodiversity Strategy and Action Plan 2015-2020 (Oct, 2015) Retrieved from <https://www.cbd.int/doc/world/mm/mm-nbsap-v2-en.pdf>

Royal Haskoning DHV, 2019. Strategic Flood Risk Assessment New Yangon City – Final Report.

Sakai, Hiroshi, Yatsuka Kataoka, and Kensuke Fukushi, 2013. Quality of Source Water and Drinking Water in Urban Areas of Myanmar. Accessed: 7 December 2018. Retrieved from:
<https://www.hindawi.com/journals/tswj/2013/854261/>

Singh, 2016. Population structure of *Osteobrama belangeri* (Cypriniformes) based on MtDNA Cytochrome b gene in India waters. International Journal of research in zoology. 6 (1) 6-9.

Skamarock, W. C., J. B. Klemp, J. Dudhia, D. O. Gill, D. M. Barker, M. G Duda, X.-Y. Huang, W. Wang, and J. G. Powers, 2008: A Description of the Advanced Research WRF Version 3. NCAR Tech. Note NCAR/TN-475+STR, 113 pp.

Sridhar, S., Vijaykumar, C. and Haniffa, M. A., 1998. Induced spawning and establishment of a captive population for an endangered fish *Ompok bimaculatus* in India. Current Science 75 (10)1066–1067.

Sundarbans, India. Biodiversity Conservation. 14(8) 1863-1876.

Thant Myanmar, 2019. Plastics Survey on the Ayeyarwaddy River. Available at:
https://www.thantmyanmar.com/sites/thantmyanmar.com/files/documents-file/ayeyarwaddy_plastic_survey.pdf (Accessed on 26th May 2021)

Environmental Impact Assessment Report

- Theilen-Willige, Barbara and George Pararas-Carayannis, 2009. "Natural Hazard Assessment of SW Myanmar – A Contribution of Remote Sensing and GIS Methods to the Detection of Areas Vulnerable to Earthquakes and Tsunami/ Cyclone Flooding." *Science of Tsunami Hazards*, 2(2), 108-128
- Toe Aung, 2009. Air Quality Assessment in Yangon City, Yangon City Development Committee. Available at https://www.researchgate.net/publication/233943963_Air_Quality_Assessment_in_Yangon_City
- U.S. EPA Base Study Standard Operating Procedure, Environmental Health & Engineering, Inc. 60 Wells Avenue Newton, MA 02159-3210 and U.S. Geological Survey Techniques of Water-Resources Investigations: Book Handbooks for Water-Resources Investigations: CH A4.Collection of Water Samples (2006).US Geological Survey. Retrieved from <http://pubs.water.usgs.gov/twri9A/>
- U.S. EPA, 2019. <https://www.epa.gov/acidrain/what-acid-rain>
- U.S. Geological Survey Techniques of Water-Resources Investigations: Book 9Handbooks for Water-Resources Investigations: CH A4.Collection of Water Samples (2006).US Geological Survey. Retrieved from <http://pubs.water.usgs.gov/twri9A/>
- UNESCO World Heritage Centre, Information kits (2008) <https://whc.unesco.org/en/activities/567/>
- UNICEF 2014. A Snapshot of Child Wellbeing, Yangon Region. Available at https://www.unicef.org/myanmar/Yangon_Region_Profile_30-07-15.pdf (Accessed on 26th May, 2021)
- Union of Myanmar, 2009. Hazard Profile – Myanmar.
- United Nations Development Programme, 2015. Local Governance Mapping – The State of Local Governance: Trends in Yangon
- United Nations Office for the Coordination of Humanitarian Affairs (OCHA), 2011. https://www.preventionweb.net/files/4164_ochamyahazardv3110606.pdf. Accessed 2 July 2018.
- United States Department of Agriculture: Natural Resources Conservation Service. Sampling Soils for Nutrient Management. Retrieved from https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_051273.pdf
- United States Environmental Protection Agency (USEPA) Ambient Monitoring Technology Information Centre [Online] Available at: <https://www3.epa.gov/ttn/amtic/> [Accessed 08 August 2017]
- United States Environmental Protection Agency (USEPA), 1976. EPA 440-9-76-023. Quality Criteria for Water. 553 pp.
- United States Environmental Protection Agency (USEPA), 2006, "Basic Information on Nitrate in Drinking Water," <http://water.epa.gov/drink/contaminants/basicinformation/nitrate.cfm>
- United States Environmental Protection Agency (USEPA), 2006. Volunteer Estuary Monitoring Manual, A Methods Manual, Second Edition, EPA-842-B-06-003.
- United States Environmental Protection Agency, 1995. AP-42 Section 13.2 Fugitive dust sources, www.epa.gov
- United States Geological Survey (USGS), 2009, "Water Quality of Potential Concern in US Private Wells" http://water.usgs.gov/nawqa/studies/domestic_wells/
- United States Geological Survey (USGS), 2010, "Quality of Water from Public Supply Wells in the United States" http://water.usgs.gov/nawqa/studies/public_wells/
- US EPA, <https://www.epa.gov/sites/production/files/2014-08/documents/indoor.pdf>

Environmental Impact Assessment Report

W. John Kress, Robert A. Defilippes, Ellen Farr and Daw Yin Kyi, 2003. A Check List of the Trees, Shrubs, Herbs and Climbers of Myanmar

World Bank, 2019. Solid Waste Management in Myanmar, Infographic (June 11, 2019). Available at: <https://www.worldbank.org/en/news/infographic/2019/06/11/solid-waste-management-in-myanmar> (Accessed on 31st May 2021)

World Health Organisation, 2017. Guidelines for drinking-water quality.

www.xinhuanet.com, 2018 Myanmar bans illegal fishing in Yangon River. Available at: http://www.xinhuanet.com/english/2018-06/20/c_137267722.htm#:~:text=Fishing%20is%20banned%20at%20the,overfishing%20in%20the%20countrys%20sea.&text=The%20illegal%20fishing%20cases%20occurred,Yangon%20C%20Ayeyarwaddy%20and%20Taninthayi%20regions. (Accessed on 31st May 2021).

Yangon Region, Northern District, Township General Administration Department, 2017. "Hlaing Tharyar Township Information"

Yangon Region, Southern District, Township General Administration Department, 2017. "Dala Township Information"

Yangon Region, Southern District, Township General Administration Department, 2017. "Seikgyi Kanaungto Township Information"

Yangon Region, Southern District, Township General Administration Department, 2017. "Twantay Township Information"

Yangon Region, Southern District, Township General Administration Department, 2017. "Kye Myin Daing Township Information"

Yangon Region, Western District, Township General Administration Department, 2017. "Ahlone Township Information"

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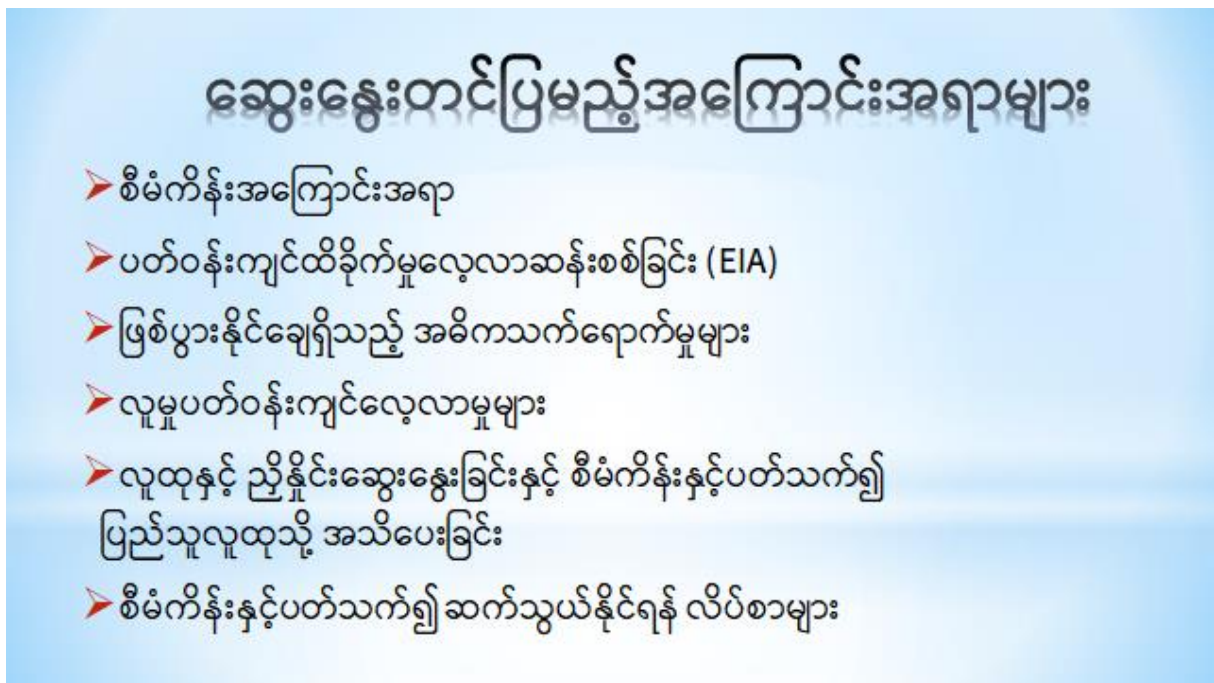
Appendix I

Stakeholder Engagement Materials and Meeting Minutes

Resource and Environment Myanmar Company Limited

1. Presentation and brochures in Myanmar language are as follows;

1) Presentation in Myanmar language



စီမံကိန်းဆိုင်ရာ အချက်အလက်များ

ရေနံအဆောက်အအုံနှင့်သိုလှောင်ရုံ စီမံကိန်းသည် ရန်ကုန်မြို့တောင်ဘက် ကျောက်တန်းမြို့နယ်ရှိ မြို့ပြ တစ်စိတ်တစ်ဒေသ (semi-urban) တွင်တည်ရှိပြီး မြောက်ဘက်တွင် သန်လျင်မြို့နယ်၊ အရှေ့ဘက်တွင် သုံးခွမြို့နယ်၊ တောင်ဘက်တွင် မုတ္တမကျွန်း နှင့် အနောက်ဘက်တွင် ရန်ကုန်မြစ်တို့ တည်ရှိပါသည်။ (ပုံ ၁.၁)။ စီမံကိန်းဧရိယာသည် ပျမ်းမျှ ၁၁၂၅ ဧက ကျယ်ဝန်းပြီး ဆိပ်ခံတံတား (၁၃.၅ ဧက) နှင့် စီမံကိန်းမြေနေရာ (၉၉ ဧက) တို့ ပါဝင်ပါသည်။



ပုံ ၁.၁ ရေနံအဆောက်အအုံနှင့်သိုလှောင်ရုံစီမံကိန်းတည်ရာ

စီမံကိန်းကို အောက်ဖော်ပြပါ အဓိကအစိတ်အပိုင်းများဖြင့်ဖွဲ့စည်းထားပါသည်။

- ဆိပ်ခံတံတား
- သိုလှောင်ကန် (ဒီဇယ်၊ ဓာတ်ဆီ၊ ရေနံခဲတံငွေရည်) နှင့်
- ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများ။

၁.၃.၁.၁ ဆိပ်ခံတံတား

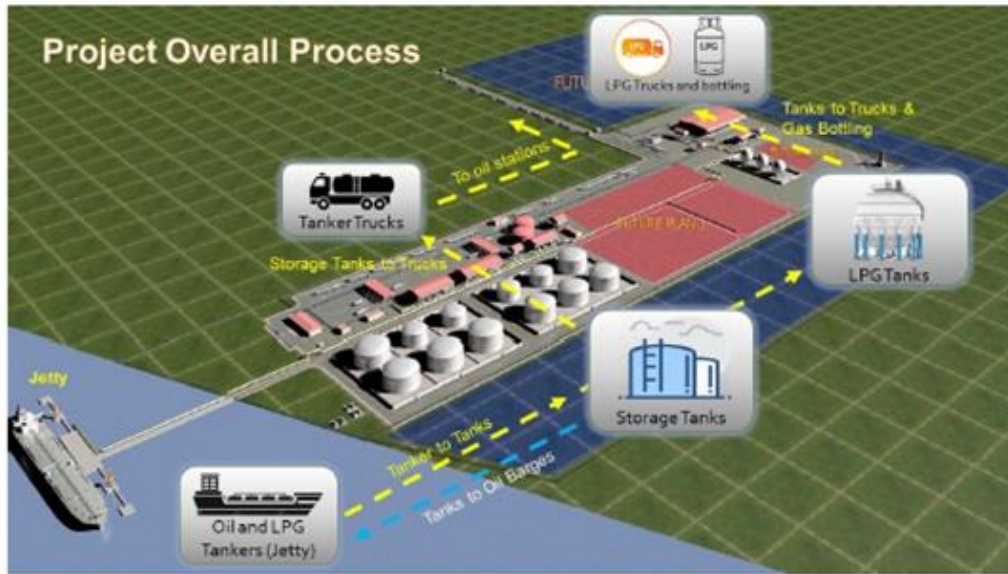
ဆိပ်ခံတံတားကို သင်္ဘောကုန်တင်တန်းချိန် ၂၅,၀၀၀ အထိရှိသော ရေနံတင်သင်္ဘောများနှင့် ၂,၀၀၀ တန်းချိန်ထိရှိသော သမ္ဗန်များအတွက် ချည်ရွယ်၍တည်ဆောက်ပါသည်။ ဆိပ်ခံပုံလှဲတိုင် (mooring dolphin) ၄ခုပါရှိမည့် လှုပ်ငန်းသုံး ဧကရပ် တစ်ခုပါဝင်ပြီး ၎င်းသည် ကမ်းဖက်သို့ ၉ မီတာ x ၂၄၉.၅ မီတာ အရှည်ကျယ်ရှိသော ဆိပ်ကမ်းထောက်တန်းများဖြင့် ချိတ်ဆက်ထားမည်ဖြစ်ပါသည်။ ကမ်းရိုးတန်းတလျှောက်ကို ကာကွယ်နိုင်ရန်အတွက် မြေထိန်းနံရံများကိုတည်ဆောက်သွားပါမည်။ ဆိပ်ခံတံတားနှင့် သင်္ဘောလှည့်ကွင်းနေရာတို့ရှိ ရေအနက်မှာ သတ်မှတ်ရေအနက် ၁၀.၇ မီတာ ခန့်အထိရှိပါသည်။

၁.၃.၁.၂ သိုလှောင်ကန် (ဒီဇယ်၊ ဓာတ်ဆီ၊ ရေနံခဲတံငွေရည်)

သိုလှောင်ကန်ကို စီမံကိန်းဆိုင်ရာတောင်ဘက်အခြမ်းတွင်ထားရှိပါသည်။ ၎င်းတွင် စုစုပေါင်း ဂါလံ ၂၅.၆၈ သန်းဆုံသော ဓာတ်ဆီသိုလှောင်ကန် ၆ခု၊ ဂါလံ ၂၂.၅၉ သန်းဆုံသော ဒီဇယ်သိုလှောင်ကန် ၆ခုနှင့် ၄၅၀၀ မက်ထရစ်တန် (metric ton) ဆုံသော ရေနံခဲတံငွေရည်သိုလှောင်ကန် ၃ခုတို့ ပါဝင်ကြပါသည်။ ထို့အပြင် ဂါလံ ၁,၅၈၅ သန်းဆုံသော မီးသတ်ရေကန်ကိုလည်း ထားရှိထားမည်ဖြစ်ပါသည်။

၁.၃.၁.၃ ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများ

စီမံကိန်းဆိုင်ရာအတွက် ပစ္စည်းများရွှေ့ပြောင်းနိုင်ရန်အတွက်ချိတ်ဆက်ပိုက်လိုင်းများနှင့် အခြားအစိတ်အပိုင်းများ ပါဝင်ပါသည်။ ဥပမာ - စီမံကိန်းလည်ပတ်ရာတွင် အထောက်အပံ့ဖြစ်ရန် ရေဆင်းစနစ်နှင့်မီးဘေးကာကွယ်ရေးစနစ်များ ဖြစ်ပါသည်။ ပိုက်လိုင်းများကို မြေပေါ်ရှိ စင်များတွင် အဓိက ထားရှိမည်ဖြစ်ပါသည်။



စီမံကိန်းအစီအစဉ်

PROJECT: TANK FARM AND DISTRIBUTION SYSTEM PROJECT OF MEC LAND (Thilawa)
TITLE: MASTER SCHEDULE

Serial No	Description	Start	Finish
PROJECT		10-Nov-17	15-Apr-23
1 KEY PROJECT EVENT		10-Nov-17	26-Mar-18
1.1	Access to Site	10-Nov-17	10-Nov-17
1.2	Notice to Proceed (NTP)	24-Nov-17	24-Nov-17
1.3	Construction Start	26-Mar-18	26-Mar-17
2 SYSTEM MILESTONE		30-Oct-21	1-Apr-23
2.1	Jetty & Trestle Handover	30-Oct-21	30-Oct-21
2.2	Plant Electrical System in Service	30-Jul-22	30-Jul-22
2.3	Gasoline Tank and Loading System in service	1-Jan-23	20-Jan-23
2.4	Diesel Oil Tank and Loading System in service	1-Jan-23	20-Jan-23
2.5	LPG Tank and Loading System in service	13-Mar-23	1-Apr-23
2.6	Air Compressor System in service	30-Jul-22	31-Dec-22
2.7	Central Control System in service	30-Jul-22	31-Dec-22
2.8	Frueflighting System in service	30-May-22	31-Dec-22
2.9	Building services system in service	30-Jun-22	31-Dec-22
3 ENGINEERING		17-Sep-18	30-Dec-22
4 PROCUREMENT		10-Jun-18	30-Nov-22
5 CONSTRUCTION		16-Mar-18	28-Feb-23
5.1	Gasoline Tank Farm	1-Dec-20	31-Dec-22
5.2	Diesel Tank Farm	30-Oct-20	31-Dec-22
5.3	LPG Tank Farm	7-Dec-20	28-Feb-23
5.4	Associated Facilities	20-May-21	31-Dec-22
6 TESTING AND COMMISSIONING		1-Jan-23	15-Apr-23
6.1	Diesel System	1-Jan-23	20-Jan-23
6.2	Gasoline System	1-Jan-23	20-Jan-23
6.3	LPG System	13-Mar-23	1-Apr-23
7 Handover to Brighter Energy for Commercial Operation		20-Jan-23	15-Apr-23
7.1	Diesel System	20-Jan-23	19-Feb-23
7.2	Gasoline System	20-Jan-23	19-Feb-23
7.3	LPG System	1-Apr-23	15-Apr-23

စီမံကိန်းအကြောင်းအရာမိတ်ဆက်ခြင်း

EIA အကြံပေးအဖွဲ့အစည်း

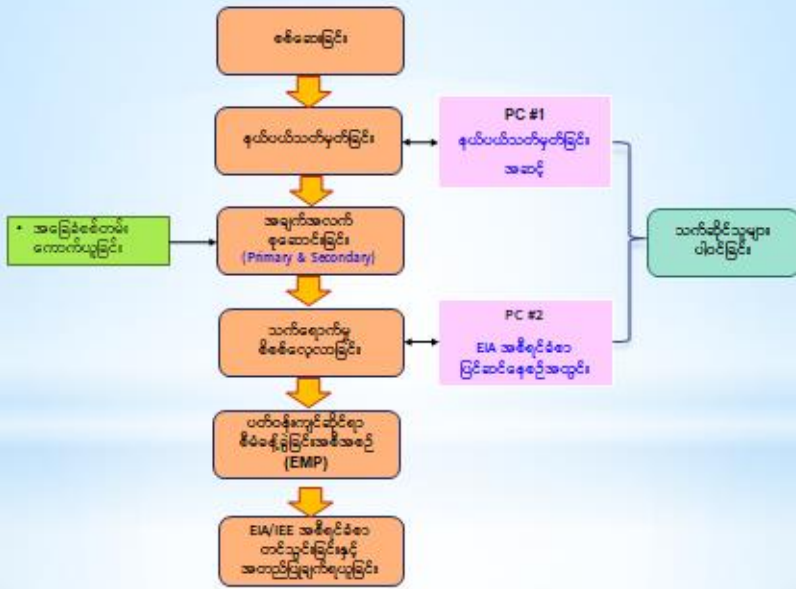


Resource and Environment Myanmar Co., Ltd. (REM)

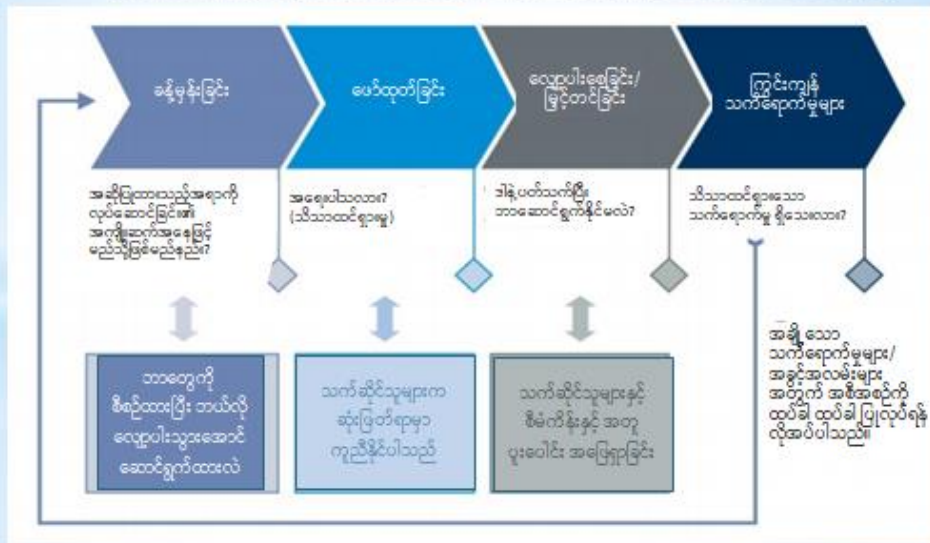
- REM ဆိုသည်မှာ နယ်ပယ်အသီးသီးမှ တက္ကသိုလ်ဆရာဟောင်းများနှင့် တာဝန်ထမ်းဆောင်ဆဲပါမောက္ခများ ပါဝင်သော သဘာဝပတ်ဝန်းကျင်၊ လူမှုစီးပွား နှင့် မြေပြင်ပထဝီဝင်အရင်းအမြစ်များ စီမံခန့်ခွဲမှု ဆိုင်ရာလုပ်ငန်း စသည်တို့ကို ဝန်ဆောင်မှုပေးသည့် ထိပ်တန်း သယ်ဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ အတိုင်ပင်ခံကုမ္ပဏီ တစ်ခု ဖြစ်သည်။
- REM သည် မြန်မာနိုင်ငံတွင် ၂၀၀၇ ခုနှစ်တွင် စတင်တည်ထောင်ခဲ့ပြီး IEB EIA နှင့် EMP အစီရင်ခံစာပေါင်း ၁၀၀ ကျော်ပြုစီမံဆောင်ရွက်ခဲ့သည်။
- REM သည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနတွင် EIA အတိုင်ပင်ခံကုမ္ပဏီအဖြစ် မှတ်ပုံတင်ရရှိထားသောကုမ္ပဏီဖြစ်သည်။
- REM ရုံးသည် ရန်ကင်းမြို့၊ ရွှေဂုံတိုင်မြို့နယ်တွင် တည်ရှိပြီး ဝန်ထမ်း ၄၀ ကျော်ဖြင့် လည်ပတ်လျက်ရှိပါသည်။



EIA လေ့လာခြင်းလုပ်ငန်းစဉ်



ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ အခြေခံသဘောတရား



ပတ်ဝန်းကျင်ဆိုင်ရာ နောက်ခံအချက်အလက်များ

သဘာဝပတ်ဝန်းကျင် (Physical Environment)

ဥတုရာသီ၊ လေထု၊ ရေ၊ နှုတ်၊ ဘူမိဗေဒ၊ အလင်း၊ အပူ စသည်ဖြင့်

ဂေဟပတ်ဝန်းကျင် (Ecological Environment)

ရေအောက် အပင်နှင့် တိရစ္ဆာန်များ၊ ရွှေ့ပြောင်းငှက်များ၊ အထူးထိန်းသိမ်းထားသည့် နယ်မြေများနှင့် မျိုးစိတ်များ၊ ကာကွယ်ခြင်း စသည်ဖြင့်

လူများအသုံးပြုခြင်း (Human Use)

ငါးဖမ်းခြင်း၊ ရေယာဉ်အသွားအလာ၊ ကမ်းလွန်အဆောက်အဦများ၊ ရေရရှိမှု၊ စွမ်းအင်ရရှိမှု၊ စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှု

လူနေမှုဘဝ (Quality of Life)

အလုပ်အကိုင်နှင့် ဝင်ငွေ၊ အလုပ်သမားများနှင့် ဒေသခံလူထု၏ ကျန်းမာရေး၊ သိသာထင်ရှားသည့် ကျန်းမာရေးပြဿနာများနှင့် စိုးရိမ်ပူပန်မှုများ၊ ကျန်းမာရေးအဆောက်အဦများနှင့် ဝန်ဆောင်မှုများ



ပတ်ဝန်းကျင်နေရာ	ထိခိုက်လွယ်မှု
ကုန်းနေ ဇီဝမျိုးစုံမျိုးကွဲများ	<ul style="list-style-type: none"> - စီမံကိန်းနယ်မြေဧရိယာနှင့် အနီးဝန်းကျင်သည် စက်မှုဇုန်ဧရိယာဖြစ်ပြီး ဒေသမျိုးရင်းမဟုတ်သော မျိုးစိတ်များသာရှိသည့်အတွက် ဂေဟဗေဒရှုထောင့်အရ နိမ့်ကျသည် ဟုယူဆပါသည်။ - ကုန်းနေ ဇီဝမျိုးစုံမျိုးကွဲများ၏ဂေဟဗေဒဆိုင်ရာအရည်အသွေးများကို အတည်ပြုနိုင်ရန်အတွက် အခြေခံအချက်အလက်များ စစ်တမ်းများကောက်ယူခြင်းကို ဆက်လက်ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။ - စီမံကိန်းမှ ကုန်းနေ ဇီဝမျိုးစုံမျိုးကွဲများ အပေါ်သက်ရောက်မှုများကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားမည်။
ရေနေ ဇီဝမျိုးစုံမျိုးကွဲများ	<ul style="list-style-type: none"> - စီမံကိန်းနယ်မြေဧရိယာ ရန်ကုန်မြစ်ကမ်းပေါ်တွင်တည်ရှိပါသည်။ - အရင်ကောက်ယူထားသည့် ဒေတာအချက်အလက်များအရ ရန်ကုန်မြစ်ရေသည် အနည်များ/ နောက်ကျိမှု မြင့်မားပါသည်။ - စီမံကိန်းနယ်မြေဧရိယာ နှင့် အနီးဝန်းကျင်ရှိ ရေနေဇီဝမျိုးစုံကွဲများ၏ ဂေဟဗေဒအရည်အသွေးကို နည်းပါသည်ဟုယူဆပါသည်။ - စီမံကိန်းမှ ကုန်းနေ ဇီဝမျိုးစုံမျိုးကွဲများ အပေါ်သက်ရောက်မှုများကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားမည်ဖြစ်ပါသည်။

ပတ်ဝန်းကျင်နေရာ	ထိခိုက်လွယ်မှု
ပတ်ဝန်းကျင်လေထု အရည်အသွေး	<ul style="list-style-type: none"> - လက်ရှိအနေအထားတွင် ပတ်ဝန်းကျင်လေထု အရည်အသွေးအတွက် လိုအပ်သော အချက်အလက်များ မရှိပါ။ - စီမံကိန်း၏ တည်ဆောက်ရေးနှင့် လည်ပတ်ရေးတို့မှ လေထုအရည်အသွေး သက်ရောက်မှုများကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားမည် ဖြစ်ပါသည်။
ဝန်းကျင်ဆူညံသံ	<ul style="list-style-type: none"> - လက်ရှိအနေအထားတွင် အနီးဝန်းကျင်ဆူညံသံနှင့် ပတ်သက်သည့် အချက်အလက်များမရှိပါ။ - စီမံကိန်း၏ တည်ဆောက်ရေးနှင့် လည်ပတ်ရေးတို့မှ ဆူညံသံသက်ရောက်မှုများကို ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားရန် လိုအပ်သွားမည် ဖြစ်ပါသည်။
ရေအရင်းမြစ်နှင့် ရေနုတ်မြောင်းစနစ်	<ul style="list-style-type: none"> - စီမံကိန်းနယ်မြေဧရိယာ ရန်ကုန်မြစ်ကမ်းပေါ်တွင်တည်ရှိပါသည်။ - စီမံကိန်းအတွက် ရေအရင်းအမြစ်များကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားသွားရန်လိုအပ်ပါသည်။

ပတ်ဝန်းကျင်နေရာ	ထိခိုက်လွယ်မှု
ရပ်ရွာလူထုနှင့် အသက်မွေးဝမ်းကျောင်းများ	<ul style="list-style-type: none"> - စီမံကိန်းသည် ကျောက်တန်းမြို့နယ်အတွင်း တည်ရှိပါသည်။ - စီမံကိန်းမှ အနီးအနားရှိရပ်ရွာများ၏ အသက်မွေးဝမ်းကျောင်းအပေါ် သက်ရောက်မှုများအပေါ်ထည့်သွင်းစဉ်းစားရန်လိုအပ်ပါသည်။
သယ်ယူပို့ဆောင်ရေး	<ul style="list-style-type: none"> - စီမံကိန်းကြောင့် ကျောက်တန်းမြို့နယ်တို့တွင် လက်ရှိယာဉ်အသွားအလာ ပမာဏထက် ပိုမိုတိုးပွားလာနိုင်ပါသည်။ - ယာဉ်အသွားအလာအပေါ် သက်ရောက်မှုများကို ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားရန် လိုအပ်ပါသည်။
ယဉ်ကျေးမှုအမွေအနှစ်	<ul style="list-style-type: none"> - ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ထည့်သွင်းစဉ်းစားရန် လိုအပ်ပါသည့် လေ့လာမှုနယ်မြေဧရိယာအတွင်း၌ ထင်ရှားသော ဘုရားများနှင့် ဘုန်းကြီးကျောင်းများရှိပါသည်။

ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့ချရေးအစီအမံများ

မြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
တည်ဆောက်ရေးကာလ			
ပတ်ဝန်းကျင် လေထုအရည်အသွေးပေါ် သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> လေထုထဲသို့ ထုတ်လွှတ်မှုအားလုံးအား အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (EQEG) အတိုင်းဆောင်ရွက်သွားရန် (အထွေထွေ - EQEG စီ အခန်း ၁.၂)၊ နစ်နာမှုတိုင်ကြားချက် ယန္တရားလမ်းစဉ်အား စတင် အကောင်အထည်ဖော်ရန်၊ ပစ္စည်းအစုအုံများအား သက်ရောက်မှုခံရနိုင်သည့်သူများနှင့် တက်နိုင်သမျှ အဝေးဆုံးတွင် ထားရှိရန် မုန့်မှုများပြန်ပြောင်းအား ရှောင်ကျဉ်ရန် ပြေတူးလုပ်ငန်းများမှ ထွက်ရှိလာသော မုန့်ထွက်နိုင်သည့် တူးဖော်ထားသောမြေစာများ၊ သောင်တူးထားသည့် ပစ္စည်းများ ပြန်ပြည့်သည့်မြေ အစုအုံများအား ရေမြန်းရန် (သို့/ နှင့်) မိုးအုပ်ရန်၊ မည်သည့် သယ်ယူပို့ဆောင်ခြင်းအတွက်မဆို အချိန်နှင့် သယ်ယူ ပို့ဆောင်ခြင်းမပြုလုပ်ပဲ မိုးအုပ်သယ်ဆောင်ရန်နှင့်

မြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
ပတ်ဝန်းကျင်ဆူညံမှုပေါ် သက်ရောက်မှု	အနည်းငယ်	အနည်းငယ်	<ul style="list-style-type: none"> ဆူညံသံအဆင့် (Level) များအား EQEG ဆူညံမှုတိုင်းတာသည့်စံနှုန်းများဖြင့် တိုင်းတာဆောင်ရွက်ရန် (အထွေထွေ - EQEG စီ အခန်း ၁.၄)၊ အသံတိုင်းတာမှုတွက်သော (SPL) စက်ကိရိယာများ (လိုအပ်သော နေရာများတွင်)အား EQEG ဆူညံမှုတိုင်းတာသည့် စံနှုန်းများနှင့်ကိုက်ညီရန် (အထွေထွေ-အခန်း ၁.၄)အတွက် ရွေးချယ် အသုံးပြုရန်၊ လိုအပ်သောနေရာများတွင် အလုပ်ပိတ်အခန်းများပြုလုပ်ခြင်း၊ ဆူညံသံထွက်သည့် ကိရိယာများအား အသံလုံစေသည့် အမှိုးအအုပ်များဖြင့် မိုးအုပ်တပ်ဆင်ရန်၊ ပစ္စည်းကိရိယာများအား သုံးစွဲသူလမ်းညွှန် စံနှုန်းများအတိုင်း သေချာစွာ ပြုပြင်ထိန်းသိမ်းရန်၊ ဆူညံနိုင်သည့်စက်ပစ္စည်းများ (ဥပမာ ဟိုက်ဒရိုလစ် ရိုက်တုကြီးများ၊ ကွန်ကရစ်ပန့်မောင်းတင်သည့် စက်ကြီးများ) ကို သက်ရောက်မှုခံရနိုင်သည့်နေရာများတွင် ဝေးသထက်ဝေးသောနေရာများတွင် ထားရှိ၍ဆောင်ရွက်ရန်၊ ဆူညံသံထွက်ရှိနိုင်သော စက်ပစ္စည်းများအတွက် အသံနှုန်းလျော့ချနိုင်ရန်အသံတိတ်ကိရိယာများ သို့မဟုတ် အသံထိန်းကိရိယာများကို တပ်ဆင်ထားရှိသွားရန်၊

မြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
မြေပေါ်ရေနှင့် မြေအောက်ရေ အရည်အသွေးအပေါ်သက်ရောက်မှု	မြင့်မား	အနည်းငယ်	<ul style="list-style-type: none"> ■ စွန့်ထုတ်ရေ၊ မိုးရေ စီးဆင်းရေ နှင့် မိလ္လာရေအညစ်အကြေးစွန့်ထုတ်မှုအားလုံးအား (EQEG ၏ အတွေ့ထွေးအခန်း ၁၂) ပါအတိုင်း စွန့်ထုတ်ရန် နှင့် လုပ်ငန်းခွင် စီးဆင်းရေနှင့် စွန့်ပစ်ရေများအား (EQEG ၏ လမ်းအတွက် သတ်မှတ်ထားသည့် အခန်း ၂၇.၈) အတိုင်း လိုက်နာဆောင်ရွက်ရန် ■ နောက်ဆုံးအခြေသတ်လုပ်ကိုင်ထားသည့် မြေမျက်နှာပြင်များအား မိုးရေကြောင့် မြေဖိလွှာ တိုက်စားခြင်းများမဖြစ်စေရန် ရေနှုတ်မြောင်းထားရှိပေးခြင်း၊ မြေမျက်နှာပြင်အား အကာအကွယ်ဖြင့် ဖုံးအုပ်ပေးခြင်းများဖြင့် ဆောင်ရွက်ရန် ■ မိုးရေကြီးမှုနှင့် လုပ်ငန်းလည်ပတ်မှုအချိန်တိုင်းတွင် ပုံမှန်အနေအထားနှင့်ထိန်းသိမ်းထားရှိမှုများ ပြုလုပ်နိုင်စေရန်အတွက် ရေနှုတ်မြောင်းစနစ်နှင့် နှမ်းတင်အနည်ကျထိန်းသိမ်းစနစ်များကို ထားရှိသွားရန်၊ သဲအတိုင်ကျခြင်းနှင့်ချော်ခြင်းများမဖြစ်စေရန် ပုံမှန်ရှင်းလင်းရေးများပြုလုပ်ရန်၊ အခြားသော ကောင်းမွန်သည့် လျော့ချရေးအစီအမံများအား အသုံးပြုပြီး မြေပေါ်မြေအောက်ရေ စီမံခန့်ခွဲမှုအစီအစဉ်များ ပြုစု ဆောင်ရွက်ရန်နှင့် ■ တည်ဆောက်ရေးကာလတွင်း စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ်များ ပြုစုပြီးဖြစ်ပါ၍ စီမံကိန်းသည် အစီအစဉ်တွင်ပါဝင်သော နည်းလမ်းအတိုင်း အကောင်အထည်ဖော် ဆောင်ရွက်ရန်။

မြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
သေသစ်လူထု ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအပေါ် သက်ရောက်မှု	အတန်အသင့်	အနည်းငယ်	<ul style="list-style-type: none"> ■ စီမံကိန်းရေပူအတွင်း နေထိုင်သော လုပ်သားများအပ အခြားလုပ်သားအားလုံးအား လုပ်သားစခန်းတွင်ထားရှိ၍ လုပ်ငန်းခွင်နှင့် ကြိုတင်အစီအစဉ်များ ပံ့ပိုးပေးသွားရန် ■ လုပ်သားအားလုံးအား အဓိကအဖြစ်အများဆုံး ကူးစက်တက်သော ရောဂါများ၏ လက္ခဏာများ၊ ကြိုတင်ကာကွယ်ရေးအစီအမံများ၊ ဖွံ့ဖြိုးနိုင်သည့် လမ်းကြောင်းများ နှင့် ကုသရေးဆိုင်ရာ ဓာတ်ပုံများ တိုးမြှင့်စေအတွက် သင်တန်းပံ့ပိုးပေးသွားရန် ■ လုပ်သားများတွင် ရှိနှင့်ပြီးသော ကူးစက်ရောဂါများအား ကြိုတင်သိရှိရန်အတွက် ခန့်အပ်မည့်လုပ်သားအားလုံးအား ကျန်းမာရေး ဆေးစစ်ချက်များ သေချာပြုလုပ်ရန် ■ လူထုနစ်နာမှုတိုင်ကြားမှုအစီအစဉ်များအဖြစ် ပုဂ္ဂိုလ်ရေးလိုမြို့မှုနှင့် ဘေးကင်းလိုမြို့ရေး ကိစ္စများအတွက် (သို့) ဆောင်ရွက်ချက်များကို စီမံကိန်းထဲမှ လူထုနစ်နာမှု တိုင်ကြားမှု လုပ်ထုံးလုပ်နည်းများအရ စီစဉ်ဆောင်ရွက်ရန် ■ မြေပေါ်မြေအောက်ရေ စီမံခန့်ခွဲမှုအစီအစဉ်အား ပြုစု အကောင်အထည်ဖော် ဆောင်ရွက်ရန် ■ တည်ဆောက်ရေးကာလတွင်း စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ်ကို အကောင်အထည်ဖော် ဆောင်ရွက်သွားရန် နှင့် ■ ယာဉ်ကြောပိတ်ဆို့မှုဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်အား ပြင်ဆင်ပြီးဖြစ်ပါ၍ စီမံကိန်းမှစီမံခန့်ခွဲမှု အစီအစဉ်တွင် ဖော်ပြထားသော လျော့ချနည်းများအတိုင်း အကောင်အထည်ဖော် ဆောင်ရွက်ရန်။

လုပ်ငန်းလည်ပတ်မှုအဆင့်

မြစ်ပေါ်လာနိုင်သော သက်ရောက်မှု	သက်ရောက်မှုများ၏ အရေးပါမှု	ကြွင်းကျန် သက်ရောက်မှုများ၏ အရေးပါမှု	လျော့ချရေးအစီအမံများ အနှစ်ချုပ်ဖော်ပြချက်
လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအပေါ် သက်ရောက်မှု	အတန်အသင့်	အနည်းငယ်	<ul style="list-style-type: none"> ■ စီမံကိန်းသည် ပြန်မာအလုပ်သမားဥပဒေ၊ EQEG စံချိန်စံညွှန်းများ၊ နိုင်ငံတကာအလုပ်သမား အဖွဲ့အစည်း စံချိန်စံညွှန်းများနှင့် ကောင်းမွန်သည့်နိုင်ငံတကာစက်မှုအလုပ်ရုံ စံချိန်စံညွှန်းများအတိုင်း လိုက်နာဆောင်ရွက်ရန်။ ■ လုပ်ငန်းစတင်မှု နှင့် လိုအပ်သည့်အခါတိုင်း ဝန်ထမ်းများအားလုံး ကျန်းမာရေး ဆေးစစ်ချက် ပြုလုပ်ရန် နှင့် ■ လုပ်သားများအား လုပ်ငန်းများဆောင်ရွက်ရာတွင် မျက်လုံးအကာအကွယ်၊ လက်အိတ် နှင့် ဖိနပ်များ စသည့် သင့်တော်သော လုပ်ငန်းခွင်သုံးကာကွယ်ရည်ကာကွယ်ရေးပစ္စည်း (PPE) ပံ့ပိုးပေးရန်။
မိတ်စင်မှုများနှင့် ယိုစိပ်မှုများ	အတန်အသင့်	အနည်းငယ်	<ul style="list-style-type: none"> ■ မြေပြင်ပေါ်သို့ ဆီယိုစိန်မှု၊ ဆီယိုမိတ်မှုများအား ကာကွယ်ရန် လုပ်ငန်းသုံးပစ္စည်းများ၊ ယန္တရားများ၏ ဆီဖြည့်ခြင်း၊ ပြုပြင်ထိန်းသိမ်းခြင်းအလုပ်များအား သတ်မှတ်ထားသော နေရာများတွင်သာ ■ ယိုစိတ်မှုအတွက် အရေးပေါ်အခြေအနေတုံ့ပြန်မှုအစီအစဉ် ပြုလုပ်ရန်။ ၎င်း အရေးပေါ်အခြေအနေ တုံ့ပြန်မှုအစီအစဉ်တွင် စာတုပစ္စည်းများယိုစိတ်မှုအတွက် တုံ့ပြန်မည့်လုပ်ထုံးလုပ်နည်းများ ပါဝင်ရန်။ ၎င်းအစီအစဉ်ထဲတွင် ယိုစိတ်မှုအားထိန်းချုပ်ရန်နှင့် သန့်ရှင်းရေးပြန်လည်ပြုလုပ်မည့် ပစ္စည်းများ၏ တည်နေရာများ ဖော်ပြ ပါဝင်ရန် နှင့် ■ စွန့်ပစ်ပစ္စည်းများ၏ အမျိုးအစား၊ ပမာဏ နှင့် စွန့်ပစ်မှုများအား အသေးစိတ် ဖော်ပြထားသည့် လုပ်ငန်းလည်ပတ်ရေးကာလစွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုအစီအစဉ် တစ်ခု အကောင်အထည်ဖော် ဆောင်ရွက်သွားရန်။

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

စီမံကိန်းသည် တည်ဆောက်ရေးနှင့် လုပ်ငန်းလည်ပတ်ရေးအဆင့်များအတွင်း အောက်ဖော်ပြပါ စီမံခန့်ခွဲမှုအစီအစဉ် များအား ပြင်ဆင်ထားပါမည်။

- စွန့်ပစ်ပစ္စည်းများ စီမံခန့်ခွဲမှုအစီအစဉ် (လုပ်ငန်းလည်ပတ်ရေးကာလ)၊
- ကျန်းမာရေး၊ ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၊
- အရေးပေါ်အခြေအနေတုံ့ပြန်မှုအစီအစဉ်၊
- ယိုစိတ်မှုကာကွယ်ခြင်းနှင့် တုံ့ပြန်မှုအစီအစဉ်၊
- စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်းအစီအစဉ် နှင့်
- ပတ်ဝန်းကျင်စောင့်ကြည့်လေ့လာရေးအစီအစဉ်။

စီမံကိန်းအတွက် စောင့်ကြည့်လေ့လာရေး စီမံကိန်း (အနှစ်ချုပ်)

သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံချက်	စောင့်ကြည့်လေ့လာရေး ခံနိုင်ရည်များနှင့် အခြေခံပြုမှု	စောင့်ကြည့်လေ့လာရေး အမျိုးအမည် (စီမံကိန်း လည်ပတ်သည့်ကာလပတ်ပတ်)	တာဝန်ရှိသူ
တည်ဆောက်ရေးအဆင့်ကာလ စောင့်ကြည့်လေ့လာရေးတွင် - <ul style="list-style-type: none"> • ဓလေ့ အရည်အသွေး • ဆူညံသံ • မြေပေါ်ခေ • မြေအောက်ခေ • မြေသားတု 	အမျိုးသမားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (EQREG) ခံနိုင်ရည်များဖြင့် တည်ဆောက်ရေးလုပ်ငန်းများ၏ ထုတ်လွှတ်မှုများနှင့် ခွန်ထုတ်မှု ကန့်သတ်ချက်များအား နှိုင်းယှဉ်သွားမည်။	လစဉ် စောင့်ကြည့်လေ့လာခြင်း နှင့် လအကြာတွင် အကြိမ်အခရအတွက်အား ပြန်လည်သုံးသပ်သွားရန်။	တတိယအဖွဲ့အစည်း
တည်ဆောက်ရေးအဆင့်ကာလ စောင့်ကြည့်လေ့လာရေးတွင် - <ul style="list-style-type: none"> • အန္တရာယ်ရှိ နှင့် အန္တရာယ်မဲ့ ခွန်ပစ်ပစ္စည်းများ • လျော့စွမ်းဆိုင်ရုံ စီမံခန့်ခွဲမှု အစီအမံများအား စစ်ဆေးခြင်း • လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဓာတုအန္တရာယ်ကင်းရှင်းရေး • လူမှုရေးဆိုင်ရာ • သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ မလိုက်နာမှုများ 	ဤအချက်အလက်များအား ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာအတိုင်း စီမံကိန်း၏ လိုက်နာဆောင်ရွက်မှုများ ဆန်းစစ်ရာတွင် ထည့်သွင်း အသုံးပြုသွားမည် ဖြစ်ပါသည်။ မည်သည့် နှစ်နာမူများ မဆို သို့မဟုတ် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ မလိုက်နာမှုများ မဆို အစီရင်ခံစာအရ ထည့်သွင်း ဖြစ်ပါသည်။	လစဉ် စစ်ဆေးခြင်းများ	EPC ကန်ထရိုက် / စီမံကိန်း ထုတ်လုပ်သူ (BE)
လုပ်ငန်းလည်ပတ်ရေးအဆင့်ကာလ စောင့်ကြည့်လေ့လာရေးတွင် - <ul style="list-style-type: none"> • အန္တရာယ်ရှိ နှင့် အန္တရာယ်မဲ့ ခွန်ပစ်ပစ္စည်းများ • လျော့စွမ်းဆိုင်ရုံ စီမံခန့်ခွဲမှု အစီအမံများအား စစ်ဆေးခြင်း • လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဓာတုအန္တရာယ်ကင်းရှင်းရေး • လူမှုရေးဆိုင်ရာ • သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ မလိုက်နာမှုများ 	ဤအချက်အလက်များအား ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းအစီရင်ခံစာအတိုင်း စီမံကိန်း၏ လိုက်နာဆောင်ရွက်မှုများ ဆန်းစစ်ရာတွင် ထည့်သွင်း အသုံးပြုသွားမည် ဖြစ်ပါသည်။ မည်သည့် နှစ်နာမူများ မဆို သို့မဟုတ် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ မလိုက်နာမှုများ မဆို အစီရင်ခံစာအရ ထည့်သွင်း ဖြစ်ပါသည်။	လစဉ် စစ်ဆေးခြင်းများ	စီမံကိန်း ထုတ်လုပ်သူ (BE)

အခြေခံစစ်တမ်းကောက်ယူခြင်း

- လူမှုစီးပွားစစ်တမ်းများကို အဆိုပြုစီမံကိန်း၏ တည်နေရာ အနီးတဝိုက်တွင် ကောက်ယူပါသည်။
- အခြေခံစစ်တမ်းကောက်ယူခြင်း အစီအစဉ် ကို ၂၀၂၂ ခုနှစ်၊ စက်တင်ဘာလ (၂၂)ရက် မှ (၂၅)ရက်နေ့အထိ ဆောင်ရွက်ခဲ့သည်။
 - သခွတ်ပင်ကျေးရွာအုပ်စု (ကျေးမူမြို့နယ်)
 - သီတာမြိုင်ရပ်ကွက်(ကျောက်တန်းမြို့နယ်)
 - ချောင်းဝကျေးရွာ(ကျောက်တန်းမြို့နယ်)



လူမှုစီးပွားရေးစစ်တမ်း ကောက်ခံယူမှု

ကွင်းဆင်းနည်းလမ်းများ

- အဖွဲ့လိုက်တွေ့ဆုံခြင်း (Focus Group Meeting)
- ကျေးရွာတာဝန်ရှိသူများအားမေးမြန်းခြင်း (Key Informant Survey)
- လူမှုစီးပွားမေးခွန်းလွှာမေးမြန်းခြင်း (Socio-economic Survey)

သက်ရောက်မှုရှိနိုင်မည့် ကျေးရွာများ - ကော့မှူးမြို့နယ် - သခွတ်ပင်ကျေးရွာအုပ်စု၊
ကျောက်တန်းမြို့နယ် - သီတာမြိုင်ရပ်ကွက်နှင့် ချောင်းဝကျေးရွာ (မေးခွန်းလွှာပေါင်း - 145)

မေးခွန်းများနှင့် အကြံပြုချက်များမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

- ဒေသဖွံ့ဖြိုးရေးအတွက် အထောက်အပံ့ဖြစ်စေခြင်း။
- အလုပ်အကိုင် အခွင့်အလမ်း ဖန်တီးပေးခြင်း။
- စီမံကိန်းမှအကျိုးရလဒ်များကို အများပြည်သူမှ ခံစားရရှိနိုင်ခြင်း။

အဖွဲ့လိုက်တွေ့ဆုံခြင်း (Focus Group Meeting)၊ ကျေးရွာတာဝန်ရှိသူများအားမေးမြန်းခြင်း (Key Informant Survey)၊ လူမှုစီးပွားမေးခွန်းလွှာမေးမြန်းခြင်း (Socio-economic Survey) မှ ရရှိသော အဖြေများ

သခွတ်ပင်ကျေးရွာအုပ်စု	သီတာမြိုင်ရပ်ကွက်	ချောင်းဝကျေးရွာ
-စီမံကိန်းကရွာနှင့်ဝေး၍သက်ရောက်မှုနည်းမည်။ -အလုပ်အကိုင်အခွင့်အလမ်းပေးစေလိုခြင်း -ရွာသားများမှာငါးလုပ်ငန်းကိုအဓိကအားထားရသဖြင့် သင်္ဘောများအသွားအလာ များ၍ငါးလုပ်ငန်းထိခိုက်မည် စိုးရိမ်မိဖြစ်ခြင်း -ပညာသင်ထောက်ပံ့ကြေးပေးစေလိုခြင်း -စိုက်ပျိုးရေး၊ မွေးမြူရေးကူညီစေလိုခြင်း -သခွတ်ပင်ဆိပ်ကမ်းနေရာဆောင်ရွက်ပေးရန်နှင့်လမ်းများပျက်ဆီးနေ၍ပြုပြင်ပေးစေလိုခြင်း	-စီမံကိန်းကရွာနှင့်ဝေးသော်လည်း ဒေသကိုအကျိုးပြုဆောင်ရွက်ပေးခဲ့သည် -ဒေသခံရွာသားများအလုပ်အကိုင် ရရှိမှုနည်းနေခြင်းနှင့် အလုပ်အကိုင် အခွင့်အလမ်းများပေးစေလိုခြင်း -စာသင်ကျောင်းတိုးချဲ့ခြင်း -သောက်ရေအကူအညီလိုအပ်ခြင်း	-ဤစီမံကိန်းသည် ဒေသခံများအတွက် အလုပ်အကိုင်များရရှိနိုင်ခြင်းနှင့်ဒေသဖွံ့ဖြိုးနိုင်စေခြင်း -သောက်ရေကန်များပိုမိုလိုအပ်ခြင်း -ဒီရေတောများထိန်းသိမ်းခြင်းကို ကူညီဆောင်ရွက်စေလိုခြင်း



သခွတ်ပင်
ကျေးရွာအုပ်စု
ကျေးမှူးညွှန်ကြားရေး
ဦးစီးဌာန

သီပေါမြို့
စုပိတ်ကျက်
ကျေးကွက်တန်း
ညွှန်ကြားရေး
ဦးစီးဌာန

ချောင်းစတုဂံ
ကျေးကွက်တန်း
ညွှန်ကြားရေး
ဦးစီးဌာန

လူထုနှင့် ညှိနှိုင်းဆွေးနွေးခြင်းနှင့် စီမံကိန်းနှင့် ပတ်သက်၍ အများပြည်သူသို့ အသိပေးခြင်း



အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးခြင်းအား ၂ကြိမ် ပြုလုပ်ရမည်ဖြစ်ပါသည်။

- ပထမအကြိမ် အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးခြင်း အဆိုပြုထားသော စီမံကိန်း၏ နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ခြင်း၊ လုပ်ငန်းစဉ်ကို အသိပေးရန်
- ဒုတိယအကြိမ် အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးခြင်း စီမံကိန်း အကြောင်းအရာများ၊ လက်ရှိသဘာဝ ပတ်ဝန်းကျင်အခြေအနေ၊ ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုများနှင့် လျော့ပါးစေရေးနည်းလမ်းများ၊ စောင့်ကြည့်ရေးအစီအမံများကို အသိပေးရန်

ရည်မှန်းချက်

၂၀၁၅ ခုနှစ် EIA လုပ်ထုံးလုပ်နည်း (အပိုဒ် ၅၀၊ ၆၁ နှင့် ၆၅) တွင် ပြဌာန်းဖော်ပြထားသည့် EIA/IEE လေ့လာဆန်းစစ်ခြင်း အဆင့် ပြီးပြည့်စုံသော အများပြည်သူနှင့် တွေ့ဆုံဆွေးနွေးခြင်းဆိုင်ရာ လိုအပ်ချက် စံနှုန်းများနှင့်အညီ ဖြည့်ဆည်း ဆောင်ရွက်သွားရန်။

ရည်ရွယ်ချက်များ

- ▶ အဆိုပြု စီမံကိန်းနှင့် ပတ်သက်သည့် သက်ဆိုင်ရာ အချက်အလက်အားလုံးကို အချိန်နှင့်တပြေးညီ ထုတ်ပြန်နိုင်စေရန်
- ▶ အများပြည်သူနှင့် အရပ်ဘက်အဖွဲ့အစည်းများအား ဖြစ်ပေါ်လာနိုင်သည့် ဆိုးကျိုး သက်ရောက်မှုများကို ပွင့်လင်းမြင်သာစွာ ဖော်ပြရန်
- ▶ စီမံကိန်းနှင့် အဆိုပြု လျော့ပါးစေရေးအစီအမံများကြောင့် ဖြစ်ပေါ်လာမည့် သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ သက်ရောက်မှုများကို ဆွေးနွေးရန်

လူထုနှင့် တွေ့ဆုံဆွေးနွေးခြင်းနှင့် စီမံကိန်းနှင့် ပတ်သက်၍ အများပြည်သူသို့ အသိပေးခြင်း

- EIA လုပ်ထုံးလုပ်နည်း၏ အပိုဒ် ၅၀ နှင့် ၆၁ တို့အရ ပြည်သူလူထုနှင့် ညှိနှိုင်းဆွေးနွေးခြင်းကို သင့်လျော်သည့် သက်ဆိုင်သူများနှင့် ဆောင်ရွက်ရေး စီစဉ်ရမည် ဖြစ်ပါသည်။
- ပြည်သူလူထုနှင့် ညှိနှိုင်းဆွေးနွေးခြင်းကို (၂) ကြိမ် ပြုလုပ်ရမည်ဖြစ်ပါသည်။
 - အဆိုပြုစီမံကိန်း၏ နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ခြင်းကို အသိပေးရန် ပထမအကြိမ်တွေ့ဆုံဆွေးနွေးခြင်း (1st Public Consultation) (၂၀၂၀ ခုနှစ် online ဖြင့်ဆောင်ရွက်ပြီးစီး)
 - စီမံကိန်းအကြောင်းအရာ၊ ဖြစ်ပွားနိုင်သည့် သက်ရောက်မှုများ၊ ကုစားခြင်းနှင့် စောင့်ကြည့်လေ့လာခြင်း နည်းလမ်းများနှင့်ပတ်သက်၍ အသိပေးရန် ဒုတိယအကြိမ် တွေ့ဆုံဆွေးနွေးခြင်း (2nd Public Consultation) (ယနေ့)
- သင့်လျော်သည့်ကုစားသည့်နည်းလမ်းများ ဖော်ထုတ်ရေးအတွက် အကြံပြုချက်များ/ စိုးရိမ်ပူပန်မှုများကို သိရှိနိုင်ရန် ရည်ရွယ်ပါသည်။

ပထမအကြိမ် ညှိနှိုင်းဆွေးနွေးခြင်း (1st Public Consultation)

စဉ်	မီမက်နီနှင့်သက်ဆိုင်သူ/ နေရာ	တွေ့ဆုံဆွေးနွေးခြင်း၏ရည်ရွယ်ချက်
၂၅ ရက် မေမော်ဒါရီလ ၂၀၂၀ ခုနှစ် (အင်္ဂါနေ့)	ရန်ကင်းတိုင်းဒေသကြီးဝန်ကြီးဌာန	<ul style="list-style-type: none"> မီမက်နီနှင့်သက်ဆိုင်ရာ သတင်းအချက်အလက်များ တင်ပြခြင်း ပြင်ဆင်ရေးအဖွဲ့အစည်းအဖွဲ့ဝင်များအတွက် နှစ်ပြုချက်ပေးခြင်း မီမက်နီနှင့်သက်ဆိုင်သူများထံမှ ဝိုင်းရံမှုများနှင့်အကြံပေးချက်များ စုဆောင်းခြင်း
၂၈ ရက် အောက်တိုဘာလ ၂၀၂၀ ခုနှစ် (ဗုဒ္ဓဟူးနေ့)	(အွန်လိုင်းအင်တာနက်နေ့စဉ်ဖြင့် တွေ့ဆုံဆွေးနွေးမှု) ကော့ဗစ်ဗီဒီယို အသံသွင်းအုပ်စုအဖွဲ့ဝင်များ၊ တိုင်းဒေသကြီးလူ့စားဝတ်ဝတ်လဲလဲလဲ၊ ပြင်ဆင်ရေးဗဟုစာရင်းအင်စတီကျုနှင့် သစ်ပင်ရေးရာအဖွဲ့အစည်းများ	<ul style="list-style-type: none"> ဒေသခံအဖွဲ့အစည်းများ၊ ရပ်ကွက်အုပ်စုများမှ များစွာ၊ ဒေသခံလူထုများနှင့် အခြားမီမက်နီနှင့်သက်ဆိုင်သူများထံ မီမက်နီနှင့်သက်ဆိုင်ရာ သတင်းအချက်အလက်များ တင်ပြခြင်း မီမက်နီနှင့်သက်ဆိုင်သူများထံမှ ဝိုင်းရံမှုများနှင့်အကြံပေးချက်များ စုဆောင်းခြင်း
၄ ရက် နိုဝင်ဘာလ ၂၀၂၀ ခုနှစ် (ဗုဒ္ဓဟူးနေ့)	(အွန်လိုင်းအင်တာနက်နေ့စဉ်ဖြင့် တွေ့ဆုံဆွေးနွေးမှု) သီတာပြိုင်ရပ်ကွက်အုပ်စုအဖွဲ့နှင့် ရာဘီမီများ၊ ရပ်ကွက်ဒေသခံ လူထုအဖွဲ့အစည်းများ	<ul style="list-style-type: none"> ဒေသခံအဖွဲ့အစည်းများ၊ ရပ်ကွက်အုပ်စုများမှ များစွာ၊ ဒေသခံလူထုများနှင့် အခြားမီမက်နီနှင့်သက်ဆိုင်သူများထံ မီမက်နီနှင့်သက်ဆိုင်ရာ သတင်းအချက်အလက်များ တင်ပြခြင်း မီမက်နီနှင့်သက်ဆိုင်သူများထံမှ ဝိုင်းရံမှုများနှင့်အကြံပေးချက်များ စုဆောင်းခြင်း

ယနေ့ စီမံကိန်းအကြောင်းအရာ၊ ဖြစ်နိုင်ချေရှိသည့် သက်ရောက်မှုများ၊ ကုစားခြင်းနှင့် စောင့်ကြည့်လေ့လာခြင်း နည်းလမ်းများနှင့်ပတ်သက်၍ အသိပေးခြင်းနှင့် သက်ဆိုင်သူများနှင့် ဒုတိယအကြိမ် တွေ့ဆုံဆွေးနွေးခြင်း (2nd Public Consultation) အကြံဉာဏ်ရယူခြင်းများကို EIA အစီရင်ခံစာတွင် လူမှုပတ်ဝန်းကျင်နှင့် Public Consultation အခန်းကို ဖြည့်စွက် သွားပါမည်။

အစည်းအဝေးတက်ရောက်လာသူများ
မေးခွန်းများမေးမြန်းခြင်းနှင့် အကြံဉာဏ်ပေးရန်ဖိတ်ခေါ်အပ်ပါသည်။

CONTACT US

Brighter Energy Company လီမိတက် Mr. Rathapon Phakdeewong (COO)/ U Sai Aye Chan

အမှတ် (၃၃၇)၊ ပြည်လမ်း၊ စမ်းချောင်းမြို့နယ်၊ ရန်ကုန်မြို့။

ဖုန်း- ၉၅ (၉) ၈၉၉၅၂၀၉၅၉၊ ၀၉ ၅၀၀၃၀၈၃

REM Consultant ကုမ္ပဏီလီမိတက်

U Win Naing Tun

အမှတ် B702၊ Delta Plaza၊ ရွှေတိုင်းလမ်း၊ ဗဟန်းမြို့နယ်၊ ရန်ကုန်မြို့။

ဖုန်း- ၀၉၇၇၇၀၆၃၇၂

ကျေးဇူးတင်ရှိပါသည်။

3) Meeting of Minutes at Kyauktan Township, Yangon Region

The Project Proponent developed a preliminary Stakeholder Engagement Plan (SEP) which contained an overview of the relevant stakeholder groups to be consulted and the estimate schedule for engagement activities. During the EIA stage, information will be disclosed to various stakeholders.

Meeting Agenda is

- Agenda 1 Opening of the Public Consultation Meeting
- Agenda 2 Opening remark of U Kyaw Soe Paing, Deputy Administrator, General Administrative Department
- Agenda 3 Presentation of U Sai Aye Chan on Petroleum Terminal and Storage Project, Thilawa, Myanmar Project of Brighter Energy Company
- Agenda 6 Presentation of Daw Khin Ohnmar Htwe from REM Co., on EIA/ SIA Findings
- Agenda 7 Question and answer
- Agenda 8 Closing of the Public Consultation Meeting

The presentation and brochures were prepared and explained in Myanmar language. The suggestions and opinions from the participants were received in the question and answer session.

Date:6/10 / 2022 (Thursday)		Time: 10:00 am to 11:30 am	Venue: Meeting Room, Brighter Energy Compamy, Thilawa, Kyauktan Township	
	Organization	Name/ Position	Total	
1. Participants	Township Administrative Committee (Kyauktan Township)	-U Kyaw Soe Paing	-Deputy Administrator	1
	Kyauktan Township Officer	-U Min Zaw -U Myo Thant -U Khin Win	-Township Police Office -Officer, Agriculture Department -Township Officer, Fishery Dept	3
	Thilawa SEZ, OSSC, Environment Section	-Daw Win Win Mar -Daw Linn Linn Myat	- -	2
	Environmental Conservation Department (Yangon Eastern District)	-Daw Thinn Thinn Nu -Daw Ohnmar Linn -Daw Aye Aye Aung -U Thiha Zaw -U Arkar Myint Myat	- Assistant Director - Staff Officer -Deputy Staff Officer -Deputy Staff Officer - Deputy Staff Officer	5
	Factory	-U Khaing Win -U Myo Min Thein	-Factory Assistant Manager -Clerk,	2
	Brighter Energy Co.,	-U Sai Aye Chan -U Win Bo -U Myint Oo	-Director - Senior Officer -Project Coordinator	3
	REM-UAE Co.,	-Daw Khin Ohnmar Htwe -U Win Naing Tun -U Saw Pyone Naing -Daw May Thazin -Daw Haymar Htet Naing	-Director -Director -Principal Consultant -Consultant -Consultant	5
	Head of Village Tract	-U Aung Than Kyaw -U Han Linn Tun -U Aye Kyaw -U Po Htay -U Shwin Kyi -U Tin Mg Zaw -U Aye Kyi -U San Myint Oo -U Myint Lwin -U Lay Lwin -U Win Zaw -U Mya Tun -U Aye Than - U chit Linn Oo -U San Win -U San Yin -U Khin Mg Myint -U Thein Aye	-Head of Chaung Oo Village, Kyauktan Township -Chaung Oo Village - - - - - - - - - - - - - - - - -Head of Thidar Myaing Ward, Kyauktan Township -Thidar Myaint Ward - - - - - - -Head of Tha Kyut Pin Village, Kawhmu Township -	19

		-U Kyaw Zin Than	-		
	Total				40

4) List of Attendees

အစည်းအဝေးတက်ရောက်သူများ

Name of Project ကျွန်းဒါအစောင့်အရှောက်နှင့် ဆိုင်ဖျက်ခြင်းမံခိမ်ရေး ဝါဒီလမ်း

Place || သီပေါ

Date || ၆.၁၀.၂၀၂၂

စဉ်	အမည်	ရာထူး/ နေရာ	ဆက်သွယ်ရန်နံပါတ်	လက်မှတ်
၁	ဖိုးကျွန်း မင်းဝေ	မြို့နယ်အဖွဲ့ချုပ်	၀၉၂၅၀၉၁၈၅၀၄	
၂	ဦးစိုးဝင်း	ဦးစီးအရာရှိ	၀၉၇၉၅၄၆၂၂၀၅	
၃	ဦးစိုးဝင်း	အဖွဲ့အစည်း	၀၉၆၈၄၀၀၀၆၆၄	
၄	ဦးကျော်စွာ	ဥက္ကဋ္ဌ	၀၉၆၅၀၂၅၂	
၅	ဒေါ်ခင်ခင်စာ	တာဝန် : TSEZ, OSSC Env. Sec	၀၉၉၆၄၃၀၈၈၇၄	
၆	ဒေါ်ခင်ခင်စာ	Staff Officer, OSSC Env. Sec	၀၉၇၉၄၆၆၄၇၇၆	
၇	ဦးစိုးဝင်း	မဟူးကလေး IBE Co.Ltd	၀၉-၉၇၄၇၃၃၁၇၇	
၈	Dr. စောမြင့်စိုး	Principal Consultant	၀၉-၉၇၇၇၈၈၈၂၅	
၉	ဦးစိုးဝင်း	REM. Co - Ltd	၀၉-၅၁၉၆၇၅၈	
၁၀	ဒေါ်ခင်ခင်စာ	REM. Co. Ltd	၀၉-၉၇၂၅၀၇၅၃၅	
၁၁	ဒေါ်ခင်ခင်စာ			
၁၂	ဟေဟေဟေ		၀၉-၇၇၇၀၀၀၄၃၅	
၁၃	ဟေဟေ			
၁၄	ဦးစိုးဝင်း	BE Co Ltd	၀၉၅၀၇၂၆၅၅	
၁၅				
၁၆				
၁၇				
၁၈				

5) Focus Group Meetings

Focus Group Meeting at Kawhmu and Kyauktan Townships

Sr.	Township/ Village/ Ward	
1	Kawhmu Township	<ul style="list-style-type: none"> - The project will not be no impact of the project on this village. - Villagers are worried about the impacts on fishing activities, bank erosion due to shipping. - To support the village development. - To give the job opportunities for local people. - To conserve the Mangrove forest along Yangon River.
2	Sat Su Village	
3	Tha Kyuk Pin Village	
4	Thidar Myaing Ward	
5	Chaung Wa Village	

6. Record of FGDs



Stakeholder Engagement with Kawhmu Township Administrator





Tha Kyut Pin and Sat Su Villages, Kawhmu Township



Thidar Myaing Ward, Kyauktan Township





Chaung Wa Village, Kyauktan Township

7. Key Informant Surveys' results

Brighter Energy Company
 ကျွန်ုပ်တို့၏အဖွဲ့နှင့် ပူးပေါင်းဆောင်ရွက်ရန် ရည်ရွယ်ချက်ဖြင့် ဝင်ရောက်ပါ။

10:28 am

KEY INFORMANT SURVEY QUESTIONNAIRE

Project: Brighter Energy Co. Date: 20/9/22

1. Survey Location အရှင်မင်းတင်ရွာ၊ အရှင်မင်းတင်မြို့နယ်၊ (1)

Village	Name	GPS Location
Village Tract	အရှင်မင်းတင်	
Township	အရှင်မင်းတင်မြို့နယ်	
District		
State/Region		

2. Respondent's Information

Name	ဒေါ်ခင်
Sex	မ
Age	၆၀
Marital Status	မ
Is the respondent a village head/chief?	(အရှင်မင်းတင်ရွာ၊ အရှင်မင်းတင်မြို့နယ်၊ အရှင်မင်းတင်)
Key informant's role or title	အရှင်မင်းတင်ရွာ၊ အရှင်မင်းတင်မြို့နယ်၊ အရှင်မင်းတင်
If the respondent is not the head, what is his/her role?	" "

3. Village Description and history

No.	Description	Old	New	Migrated	Planned	Other
1	Type of Village					
2	When was the village established?	အရှင်မင်းတင် ၅၀ နှစ် အထိ ရှိခဲ့သည်။				
3	According to the village history, when did the village settlement begin?	အရှင်မင်းတင်ရွာ၊ အရှင်မင်းတင်မြို့နယ်၊ အရှင်မင်းတင်				

4. Village Boundary

1	Village Area	----- Acres	----- Sq Miles	----- Sq.Km
2	How the clear is the boundary with the neighboring village?	Clear -----	Not very clear-- အရှင်မင်းတင်ရွာ၊ အရှင်မင်းတင်မြို့နယ်၊ အရှင်မင်းတင်	
3	What kinds of (1) Administrative boundary and (2) natural boundary are in place for the village?	2000 3. 1000' နှစ်	အရှင်မင်းတင်ရွာ၊ အရှင်မင်းတင်မြို့နယ်၊ အရှင်မင်းတင်	

5. Demography

5.1 Population

How many people are there in your village?	Male	Female	Total
			700 နှစ်
How many households are there in your village?	အရှင်မင်းတင်		
How many houses are there in your village?	အရှင်မင်းတင်		

5.2 Ethnic group

What ethnic groups make up this village?	No. or %	No. or %	No. or %
Kachin		Chin	Rakhine
Kayah		Mgn	Shan
Kayin		Bamar	Other
		100	

Page 1

5.7 Healthcare

1. Did you or any household members face a health problem within the last 6 months?	Yes	No
		✓
2. In general, which facilities do you and your household members usually go for medical care?	ပရိုဂျက်	
3. How many percentage do the villagers dose the Covid-19 medicine?	ပရိုဂျက်	

5.7.1 Medical treatment

Where do you go for treatment?	
ဝက်စ် ဟိုပီ: ၁၆၂	
ဝက်စ်: ၂၀၀၆၂၀: ၃၃	

5.7.2 Are there any health facilities in the village?

Yes	No	Type
✓ ၂၃၆၂၀၃ ဝက်စ်: ၂၀၀၆၂၀: ၃၃		ဝက်စ်: ၂၀၀၆၂၀: ၃၃

5.8 Are there any protected or significant cultural and religious area/location near the village?

Yes	No
	ပရိုဂျက်

5.9 If yes, what are these?

ပရိုဂျက်

6. Identification of vulnerable groups

6.1 Are there any woman-headed and above 70 years households in the village?

	Yes	households (or) %	No
woman-headed	✓	(25)%	
above 70 years	✓	၃၀ (30)%	

6.2 Does your village have social organization? Which activities?

- ကာကွယ်ရေး နှင့် အထောက်အကူ ပေးရန် အဖွဲ့များ ရှိပါသည်။

Yes No

7. Opinions, attitudes and suggestions on the project

7.1 Do you feel any worries about potential Environment, Ecology, socio-economic and Health impacts of the project?

No.	Construction Phase	Operating Phase	Closing Phase
1		ပရိုဂျက်	
2		ပရိုဂျက်	
3		ပရိုဂျက်	
4			
5	Not yet(because no implementation)		
6	No idea at all		

7.2 Do you have any opinions about potential issues and suggestions on the project?

No.	Construction Phase	Operating Phase	Closing Phase
1			
2			
3		မရှိပါ	
4			
5	Not yet(because no implementation)		
6	No idea at all		

7.3 Do you have any suggestions to support the development programs for your place/village in prioritized sectors?

No.	Sectors	Requirement	Suggestions
1	Transport		
2	Education		
3	Health		
4	Infrastructure		
5	Economic activities	① လက်မှုပညာရေးပညာရေးပေးရန်	
6	Livelihood		
7	Others	② အလုပ်အကိုင်ပေးရန်	
8	Not yet (because no implementation)		
9	No idea at all		

8. Comments and Suggestions

အခြားအချက်အလက်များကို ချိတ်ဆက်ဖော်ပြရန်အတွက် အောက်ဖော်ပြပါအတိုင်း ဖြေဆိုပေးပါ။

Important note for the surveyor

1. Check again and if all the questions have been answered
2. Thanks the respondents, ask him/her if they have any further questions
3. Write the ending time of the interview/asking questions at the top of the questionnaire.

မေးခွန်းများကို ဖြေဆိုခြင်း မဟုတ်ဘဲ အခြားအချက်အလက်များကို ဖြေဆိုပါ။

မေးခွန်းများကို ဖြေဆိုခြင်း မဟုတ်ဘဲ အခြားအချက်အလက်များကို ဖြေဆိုပါ။

- လက်မှုပညာရေးပညာရေးပေးရန်
- (အခြား) လက်မှုပညာရေးပညာရေးပေးရန်
- လက်မှုပညာရေးပညာရေးပေးရန်

Thida Myaing Ward
Kyauktan Tsp..

KEY INFORMANT SURVEY QUESTIONNAIRE

Project: Brighter Energy Co.

Date: 25/9/2022
(9:00 AM)

1. Survey Location ဒီစာမြိုင်ရပ်ကွက်

Village	Name	GPS Location
Village Tract	ဒီစာမြိုင်ရပ်ကွက်	
Township	ကျောက်တန်း	
District		
State/Region		

2. Respondent's Information

Name	ဦးဇော်ဝေ
Sex	ကျား
Age	၆၂
Marital Status	ဒ်
Is the respondent a village head/chief?	လုပ်ကိုင်လုပ်ချုပ်ပေးပါသည်
Key informant's role or title	✓
If the respondent is not the head, what is his/her role?	✓

3. Village Description and history

No.	Description	Old	New	Migrated	Planned	Other
1	Type of Village					
2	When was the village established?	၁၉၀၆-၀၇ ခုနှစ်တွင် စတင် တည်ထောင်ခဲ့သည်။				
3	According to the village history, when did the village settlement begin?	၁၆၅၀ ခုနှစ်တွင် (ကျောက်တန်း)။				

4. Village Boundary

1	Village Area	၂၀၀၀၀	Acres	-----Sq.Miles	-----Sq.Km
2	How clear is the boundary with the neighboring village?	Clear	✓	Not very clear	---
3	What kinds of (1) Administrative boundary and (2) natural boundary are in place for the village?	ကျောက်တန်း မြို့နယ်နယ်နိမိတ် ဖြစ်သည်။			

5. Demography

5.1 Population

How many people are there in your village?	Male	Female	Total
	၃၀၀၀	၇၀၀-၈၀၀	၂၀၀၀
How many households are there in your village?	၈၀၀		
How many houses are there in your village?	၅၀၀		

5.2 Ethnic group

What ethnic groups make up this village?	No. or %	No. or %	No. or %
Kachin		Chin	Rakhine
Kayah		Mon	Shan
Kayin		Bamar	Other
		၉၉%	၅၅၂ (၁၂%)

5.3 Religion

Religion	Households of %
Buddhism	✓ (100)%
Hindu	
Christian (Protestant)	
Christian (Catholic)	
Muslim	
Other	

5.4 Education

5.4.1 How many schools are in this village?

၂ကျောင်း ရှိသည်။

5.4.2 How many students are enrolled in the school this year?

5.4.4 School Statistics

Type of school	Teachers	Pupils	Buildings
ကျောင်း	၄	၂၆၀	✓
ကျောင်း	၃	၂၆၀	✓

5.5 Main Occupation or livelihood

Main Occupation	Income (Kyats/month)	Income (Kyats/year)
1. ကပ်စ်	၂၀၀၀၀	၂၄၀၀၀၀
2. ကပ်စ်	၂၀၀၀၀	၂၄၀၀၀၀
3. ကပ်စ်	၂၀၀၀၀	၂၄၀၀၀၀
Secondary Occupation	Income (Kyats/month)	Income (Kyats/year)
1.		
2.		
3.		

5.6 Energy use and sanitation

Is there electricity in the village? All houses? or some?	Yes	No	Yes	No	Remarks
	✓				
What kind of fuel do you use for cooking/boiling?	Wood	Charcoal	Electricity	Gas	Others
	✓	✓	✓		
What is the drinking water source?	Pond	Surface well	Tube well	Rain water	Stream
	ကျောင်း	ကျောင်း	ကျောင်း	ကျောင်း	ကျောင်း
What is the domestic water source?	Pond	Surface/tube well	Purified water	Rain water	Stream
	ကျောင်း				
What is the latrine system?	Water closet	Fly-proof	Open pits	Common	No
		✓			
What is the waste system?	Dump in the yard	Burn	Throw into the stream	Land fill	Municipal
					ကျောင်း

၂၅၀၀၀
၂၅၀၀၀
ကျောင်း
ကျောင်း
ကျောင်း
ကျောင်း
ကျောင်း

5.7 Healthcare

1. Did you or any household members face a health problem within the last 6 months?	Yes	No
	✓	
2. In general, which facilities do you and your household members usually go for medical care?	ကျေးကုမဂ္ဂဇာတ်, မန္တလေးတိုင်းဆေးရုံ (၁) နှင့် နယ်ဆေးရုံ	
3. How many percentage do the villagers dose the Covid-19 medicine?	၇၀%	

5.7.1 Medical treatment

Where do you go for treatment?	ကျေးကုမဂ္ဂဇာတ်

5.7.2 Are there any health facilities in the village?

Yes	No	Type
✓		ကျေးကုမဂ္ဂဇာတ် (၁) နှင့် နယ်ဆေးရုံ

5.8 Are there any protected or significant cultural and religious area/location near the village?

Yes	No
	✓

5.9 If yes, what are these?

မရှိပါ။

6. Identification of vulnerable groups -----

6.1 Are there any woman-headed and above 70 years households in the village?

	Yes	households (or) %	No
woman-headed	✓	40%	
above 70 years	✓	၇၀ - ၄ (၂)	

6.2 Does your village have social organization? Which activities?

Yes	No
○	

ဒုက္ခသည်အဖွဲ့များ အား ပံ့ပိုးပေးခြင်း

7. Opinions, attitudes and suggestions on the project

7.1 Do you feel any worries about potential Environment, Ecology, socio-economic and Health impacts of the project?

No.	Construction Phase	Operating Phase	Closing Phase
1	ကျေးကုမဂ္ဂဇာတ်	-	-
2			
3			
4			
5	Not yet(because no implementation		
6	No idea at all		

Appendix J

Answers to ECD's comments

4.L The situation if there is “No Project”, include the other project locations and comparison and the reasons for the selection.

In the beginning of the conceptual stage, different locations were considered to develop the project. Three different locations along the Yangon River, were scrutinized as the project location to implement. The first location, A is located at the offshore and shore area along the Yangon River approximately 31 km from the mouth of the Andaman Sea. The second location B, is located at the same shoreline along the Yangon River approximately 5 km before to the previous location. The latter location C, is located also at the same shoreline along the Yangon River approximately 19 km from the mouth of the Andaman sea. The final location, C is located in the Thidar Myaing Ward, Kyauktan Township, Yangon which covers an area of approximately 112.5 acres where 13.5 acres for the jetty construction and 99 acres for the terminal construction.



Photo 1: Other considered project locations for selection during the feasibility study

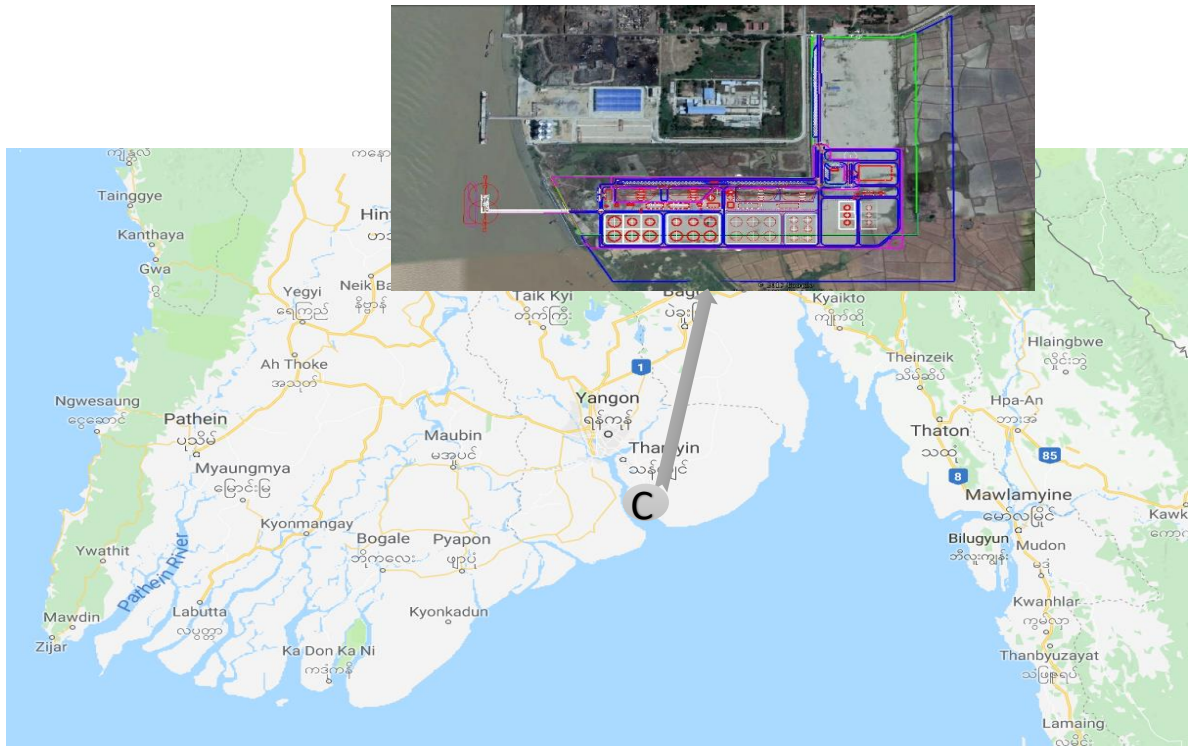


Photo 2: The final project location for the jetty and terminal construction

Location	Comparison	Main Reason for the Selection
A	A is located 31 km from Mouth of the adman sea. Households and industrial zones are located approximately, within 8 km radius.	Rejected due the following reasons: - <ol style="list-style-type: none"> 1. Location is adjacent to households and villages. 2. Far from the mouth of the Adman Sea and already inside the middle of Yangon River.
B	B is located 26 km from Mouth of the adman sea. Households and industrial zones are located approximately, within 13 km radius.	Rejected due the following reasons: - <ol style="list-style-type: none"> 3. Location is adjacent to households and villages. 4. Far from the mouth of the Adman Sea and already inside the middle of Yangon River.
C	C is located 19 km from Mouth of the adman sea. Households and industrial zones are located approximately, within 20 km radius.	Selected due the following reasons: - <ol style="list-style-type: none"> 1. Location is far from the households and villages. 2. Located approximately 19 km from the mouth of the Adman Sea. 3. Less Dredging Volume, activities and reduce sequential activities which can harm to the small invertebrates, shellfish, bottom-dwelling fish and also dismantling intricate biological habitats.

Other jetty design, comparison and the reasons for the selection

Several operation conditions such as length of the trestle, product unloading capacity, mooring dolphins' design and designs' parameters such as allowable draft for low and high tide, sizes of the tankers and barges were considered during the feasibility study. Two different jetty designs were developed during the conceptual stage. The Primary design was considered for two parallel berthing system where both Tanker vessel and barge can berth at the same time as per the picture 3 below. The primary design also includes two different isolated working platforms and their associated facilities for the unloading of products. However, due to the Health Safety and Environmental reason, the primary design was not considered. Thus, the single berthing system is developed with the single working platform and their associated facilities. The final jetty design includes single working platform with mooring dolphins (210 meters), total 249.5m x 9m trestle, 7 marine loading Arms, 6 quick release hook and 2 fire monitor towers. The final jetty design also allows the vessels up to 25,000 DWT and barges up to 1,000 ~ 2,000 DWT with the draft of 9.5 m at low tide and high tide at 18.5m.

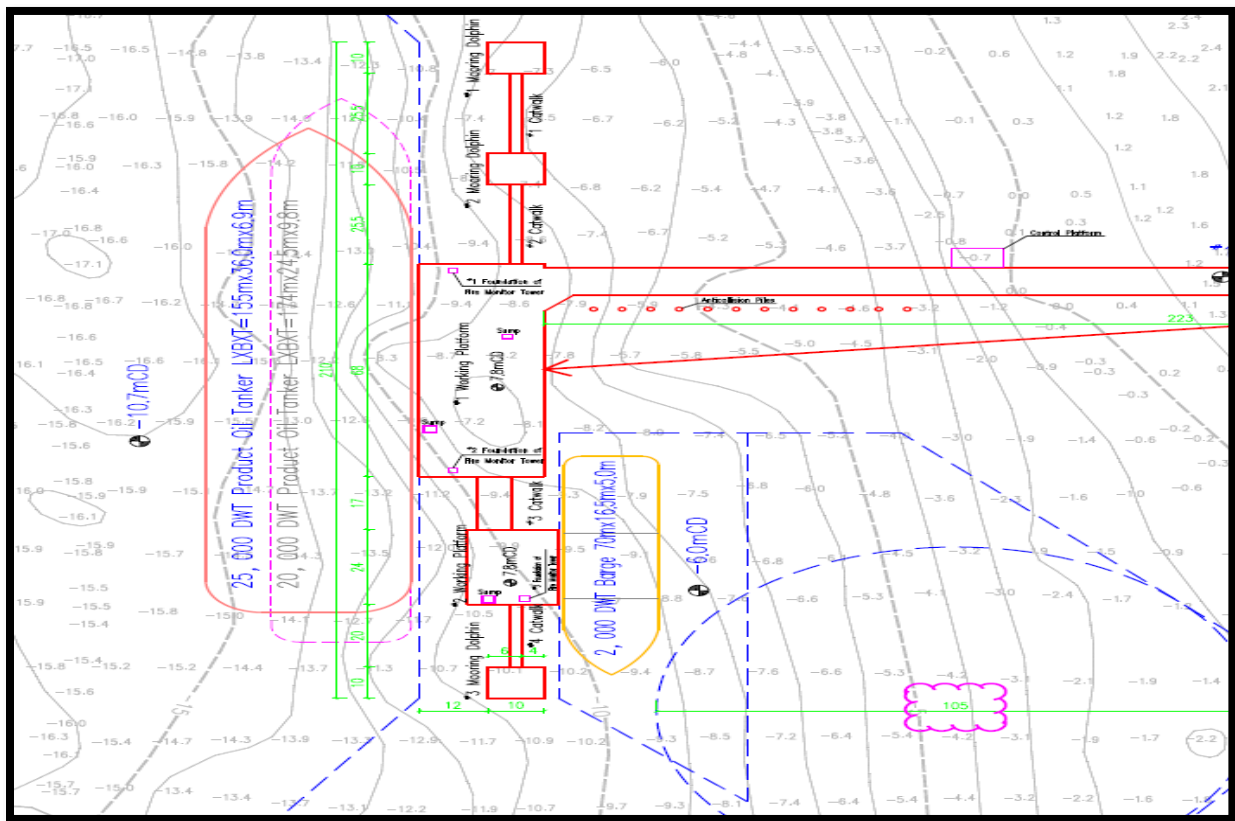


Photo 3: The primary design for parallel berthing of a tanker and a barge.



Photo 4: Aerial Photo of the Jetty

No	Jetty Design	Main Reason for the Selection
1	Primary Design – Dual Berthing System (Tanker and Barge) with two Working Platforms.	<p>Rejected due the following reasons: -</p> <ol style="list-style-type: none"> 1. Two isolated working platforms which require the interconnected bridge where the operators shall use during the operation and become more unsafe conditions for personnel safety. 2. Two different sump oil tanks are required in each working platform for the oily water accumulation. 3. Dual unloading at the same time will have adverse impact on the oil spill handling and controls.
2	Final Design – Single Berthing System (Tanker or Barge) with one working platform.	<p>Selected due the following reasons: -</p> <ol style="list-style-type: none"> 1. Only a single working platform (210m) will allow functioning of all unloading associated facilities on single platform. Easy for operation and reduce more unsafe conditions and working on the platform for personnel. 2. Only one sump oil tank and interconnected pipeline is required. 3. The functioning of emergency stop can be activated at any time during the unloading incase of oil spill and the oil spill handling and control can be followed up with quick action.

Other Petroleum Storage Tank design, comparison and the reasons for the selection

For the Petroleum Storage Tank Design and Facilities, few different designs were considered during the feasibility study. The primary design included, for the Gasoline Tank farms, all the six tanks' designs based on API 650, API 2000 with dome roof with Aluminum Internal Floating Roof (IFR) and for the Diesel Tank Farms, all the six tanks' designs were considered as per API 650, API 2000 with Dome Roof. Design Basis for all the (12) tanks to be erected with base material of class A36 with allowable corrosion resistant of (2/1.5/1 mm – Bottom/Shell/Roof). But in the primary design, the bottom coating (HDPE Membrane) inside the tank farm paving for both Diesel and Gasoline Tank Farms were not considered.

After the environmental inspection during the feasibility study, it is found out that the HDPE membrane coating is essential to consider in the design to prevent the soil contamination. Therefore, not only the HDPE membrane coating inside both Diesel and Gasoline tanks farm pavement but also the Oily Water Separator and Oily water network were considered in the revised design basis.



Photo 5: Installation of HDPE membrane inside the Diesel Tank Farms



Photo 6: Oily water separator, networks and pit installation

Comparison, reasons for the selection

Particular	Primary Design	Final Design	Main Reasons for the Selection
Soil Contamination	Not consider.	HDPE membrane installation inside the Diesel & Gasoline Tank Farms.	HDPE membrane layer will be the main filtration agent during the oil spill inside the tank farm eventually it will prevent the soil contamination.
River Contamination	Only Oily Water Pit is considered.	Install Oily Water Networks, Separator and Oily Water Pit.	During the oil spill if any, the oil will flow via the oily water networks and accumulate inside the oily water pit. After the gravity separation in the pit, co-mingled liquid is pumped into the separator to collect the oil. Finally, only oil filtered water is allowed to discharge to prevent the soil and river contamination.

3.a BE's Environmental and Social Policies

Brighter Energy Believes that a healthy environment is necessary for the well-being of society, our people and our business, and is the foundation for a sustainable and strong economy. Moreover, diverse, healthy natural resources are a critical component of social and sustainable economic development.

As a part of our continuing drive for quality in things we do have therefore developed a comprehensive policy statement because we recognize that in our day-to-day operations we inevitable impact on the environment in a number of ways and we wish to minimize the potentially harmful effects of such activity wherever and whenever possible.

In Particular Brighter Energy will:

- Identify environmental aspects and reduce environmental impacts of our operations, wherever practical and bring focused attention to the management of activities in sensitive environmental areas,
- Assess the effects on the environment of any new activity and ensure that environmental protection criteria are considered in the design, selections and construction of new sites,
- Recognize and comply with relevant environmental legislation as a minimum level of performance,
- Raise awareness, educate, train and motivate all personnel, including subcontractors' personnel, to conduct all activities in an environmentally friendly and acceptable manner,
- Promote the efficient use of energy and natural resources in all Company's activities,
- Minimize emissions and contamination of soil, air and water, especially caused by spills and leakages,
- Reduce waste created during Construction Activities, especially hazardous promoting re-cycling and re-use and manage the disposal of waste through safe and responsible manners,
- Ensure that all abandoned sites are returned to their original environmental conditions,
- Seek to realize the dual benefits of reduced fuel consumption and lower exhaust emissions through coordinating route and journey planning and delivery schedules,
- Respect conservation of global biodiversity and contribute by working with others to maintain ecosystems,
- Monitor the progress and review the environmental performance on a regular basis,
- Expect similar environmental standards from all suppliers and contractors,
- Implement this policy through a coordinated environmental management system,
- Continuously seek to improve BE's environmental performance.

Line Managers and supervisors are responsible for ensuring that this policy is fully implemented and for effectively monitoring its implementation by their staff.

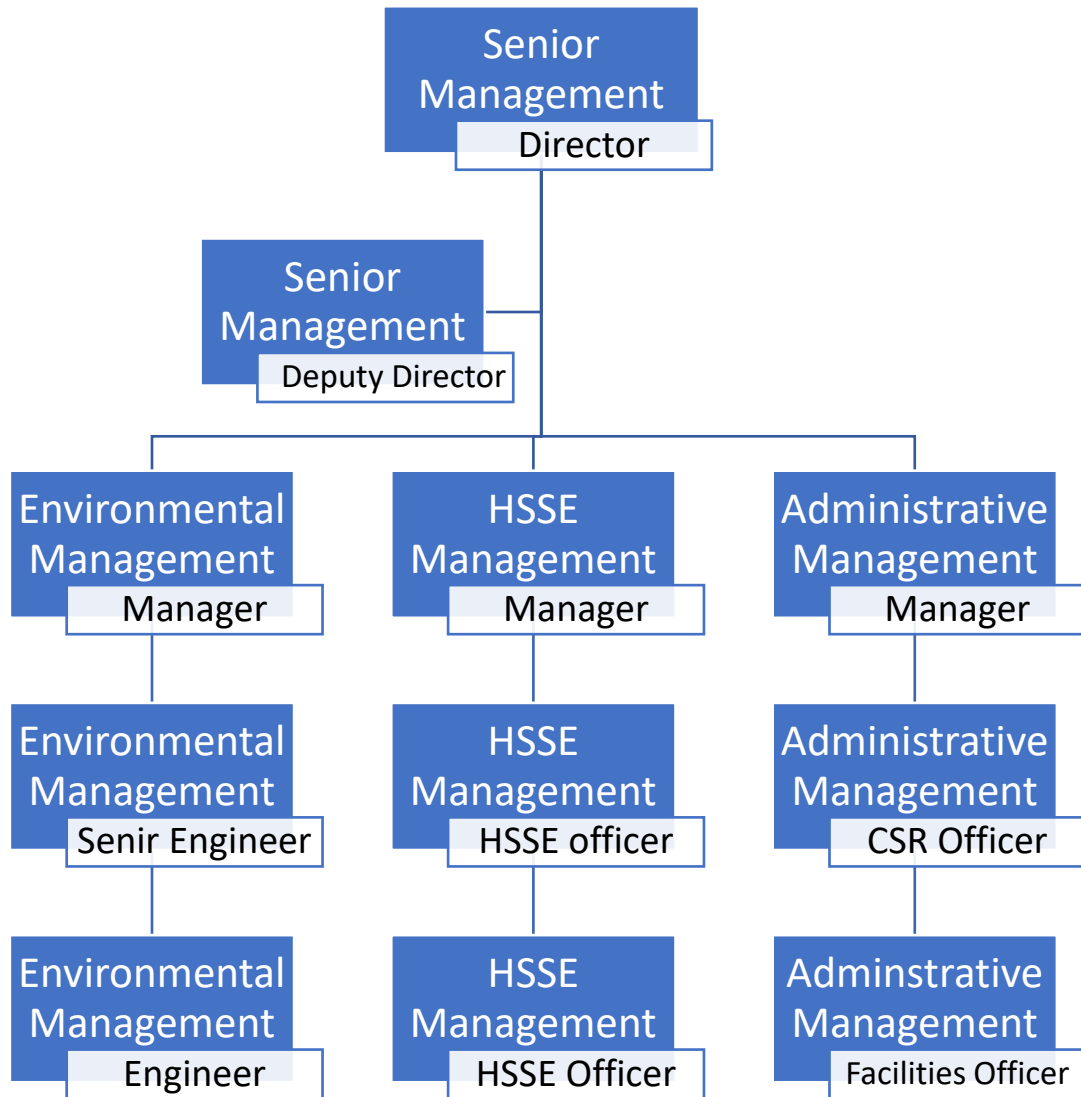
7.c Breakdown Estimated Budget

Estimated Budget

Sr	Particular	Budget Allocation (%)	Particular	Budget Allocation (%)	Budget (USD)
1	Environmental Monitoring and Measurement Control	35%	Air Pollution Control	20%	26,526
			Soil Contamination Control	20%	26,526
			Sea Water Contamination Control	20%	26,526
			Waste Management	20%	26,526
			Publi Complain Control (Noise, Vibration, Dust, etc. Control)	20%	26,526
2	Environmental Inspection	25%	Frequent Inspection of construction activities	100%	94,736
3	Welfare Facilities for workers (Internal Workers)	20%	Personal Protective Equipment (PPE)	50%	37,894
			Accomodation	30%	22,737
			Training	10%	7,579
			Social cultural activities	10%	7,579
4	Cooperate Social Responsible (CSR) Activities	20%	Benefitial for the environment, Community and Volunteering, Charitable global giving.	100%	75,789

7.L The responsibilities person, organization chart, who will be implementing EMP and Monitoring Programs

Environmental Management Committee



4.h Identify and list of construction waste and volume (Tank farm and Jetty)

No	Construction	Waste Streams			
		Air Emissions	Noise	Wastewater	Solid Waste
1.	Excavation	Dust and emission from excavation and truck movements.	Excavators	-	-
2.	Pilling	Dust and emission from pile machine.	-	-	Extra Pile Head and Damaged piles.
3.	Cement Concrete Work	Dust and emission from truck movements.	Operation of ready mixed truck.	-	Extra ready mixed concrete.
4.	Generators for power	Emissions from generator	Generator operation	Accidental spills and leaks	
5.	Temporary Sanitation facilities	-	-	Domestic wastewater	General Waste

Monitoring Plan for Construction Stage

Monitoring Item	Description	Remark
Dust	To lessen fugitive dust, provided sprinkle water general site area during dry ambient conditions. Covered to aggregate stockpiles. Traffic speed controlled inside	Daily
Noise and Vibration	Using hand drive noise meter check, regular maintain and avoid noise exposure at night work by using sound proof generator.	Daily
Solid Waster	For extra pile head and damaged piles are used for rebar and steel plate sleeper. Some are crushed and used as hard core for road access. For extra ready mixed concrete are used for concrete cover block and temporary building. General waste are collected by Municipal waste collector. For marine piling, regular disposed to construction waste.	Estimated waste of pile material is 0.01%.
Air Emission	Regular maintain for generator.	Monthly
Waste Water	Generator are provided oil pan at job site. For domestic waste water is collected by septic tank.	Monthly

