ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR

HOTEL AND RESORT DEVELOPMENT PROJECT

Project Proponent;

K-FUTURE

K Future Company Limited

Prepared by;

Guardians of Green
Enviromental Services Company Limited

Guardians of Green
Environmental Services Company Limited

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DISCLAIMER

This Environmental Impact Assessment report has been prepared by a third party, Guardians of Green Environmental Services Company Limited for K Future Company Limited for the Hotel and Resort Project located at Bo Nat Kyaw island, Kawthaung Township, Tanintharyi Region, Lower Myanmar. This report is prepared in accordance with the framework of Myanmar Environmental Impact Assessment Procedure 2015.

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

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

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

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

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List of Abbreviation

EIA	Environmental Impact Assessment
ECD	Environmental Conservation Department
ECC	Environmental Compliance Certificate
IFC	International Finance Corporation
EMP	Environmental Management Plan
MIC	Myanmar Investment Commission
GIIP	Good International Industry Practice
WHO	World Health Organization
PM10	Particulate Matters Equal to or Less than 10µm
PM2.5	Particulate Matters Equal to or Less than 2.5µm
RH	Relative Humidity
CO	Carbon monoxide
NO	Nitrogen oxide
CO_2	Carbon dioxide
NO_2	Nitrogen dioxide
TEMP	Temperature
O_3	Ozone
SO_2	Sulphur dioxide
NEQ	National Environment Quality (Emission) Guideline
DO	Dissolved oxygen
COD	Chemical oxygen demand
BOD	Biological oxygen demand
GPS	Global Positioning System
IUCN	International Union for Conservation of Nature
LMPN	Lampi Marine National Park
GHG	Green House Gas

Executive Summary

This Environmental Impact Assessment (EIA) report is prepared by Guardians of Green (GOG) Environmental Services for Hotel and Resort development which is implemented by K Future Company Limited to initiate the required EIA process under Myanmar Environmental Conservation Law (2012), Myanmar Environmental Conservation Rules (2014) and Environmental Impact Assessment Procedure (2015). This EIA report is to be submitted to Environmental Conservation Department, in line with the Environmental Conservation Law, Environmental Conservation Rules and related guidelines, enacted by Ministry of Natural Resources and Environmental Conservation (MONREC).According to the Myanmar Environmental Conservation Law, 2012, it requires that the proponents of every development project in the country submit either an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) to MONREC. As per the comments of MONREC, the said project requires an EIA to meet the environmental assessment requirements of Myanmar Environmental Conservation Law. Therefore, K Future Company Limited has commissioned Guardians of Green Environmental Services to conduct the EIA study.

Project Description

This proposed project is undertaken by K Future Company Limited which is 100% Local investment. The proposed project is located at Bo Nat Kyaw island, North Latitude 10°33'37.15"N and East Latitude 98°14'2.26"E, Su Nge Baline Village Tract, Kawthaung Township, Tanintharyi Region. Bo Nat Kyaw island is part of the Myeik archipelago which located in southern Myanmar. It is approximately 73km by waterway from Kawthaung Township. The nearest island to the project is Nyaung Wee island and Lampi Island MNP (Marine National Park) area is located about twenty kilometers north of the project area. The project will be established in (50) acres of the island.

K Future Company Limited has already received permission from Myanmar Investment Commission (MIC) to establish the Hotel and Resort development at Bo Nat Kyaw island with the lease of (700) acres although K Future will use only (50) acres for the project. The

construction period will be from 2017-2022. K Future was sturdily set up the restriction on the activities that disturbed the environment before the construction period. During the pre-construction K Future presented the awareness training and Dos' and Don'ts procedures to the construction workers with the cooperation of Forestry Department. The construction process will maintain a safe working environment during construction and afterward. It will have limited use of machinery and heavy machinery on the island. All the building establishment will be environmentally friendly and all the construction activities will be done least disturbance to the environment. During the construction process in order to reduce the cement usage, H.Beam (Steel) were used in the structure member. The hardwoods were restricted in building instead of local bamboo were used in decoration. In order to avoid the disruption of sand dunes and beach all the buildings were about 40 feets far from the beach. All the trekking route are determined and waste-bins were provided along side of the route. K Future installed activated sludge treatment system for wastewater treatment and domestic water usage.

Bo Nat Kyaw island is off the grid with no power from the mainland, therefore, as an alternative energy source, K Future three (150) KVA diesel generators for electricity and two generators will be on standby. An estimated total of (3,780) gallons of diesel will be consumed per year. The water resource can be obtained from two resources, groundwater and spring water. The current water usage will be sustained by groundwater extraction. The water will be stored in 50 cu.m and 25 cu.m water tanks. During the opening season, the estimated water usage was 3,000 gallons per day and during the closing season, the estimated water usage was 200 gallons per day. A total of 144,000 gallons per year. For domestic wastes, the standard municipal solid waste generation is 0.53 kg/capita/day. And for K Future Project, the total number of workers in a day are total staff 45 people and the estimated guest number 40 people for peak season. Hence, the total number of persons is 95 persons and the municipal solid waste generation is 45.05 kg/day.

Environmental Quality Measurement Results and Biodiversity Survey

According to the data interpretation for ambient air quality, noise level, and water quality results were compared with National and Environmental Quality (Emission) guidelines and international guidelines and standards. Moreover, most of the tube well water lab results parameters are within WHO Drinking Water Guideline. Surface runoff water lab results are within the limit of NEQG guidelines. Therefore, a significant impact on the environment and socio-economic are expected to be low.

During the study of Bo Nat Kyaw Island, a comprehensive assessment recorded a total of 151 flora species and 154 fauna species, including 70 species of corals belonging to Cnidaria, Anthozoa, and Scleractinia. Among them, the species composition was higher in Arcropora (17 species), follow by Dipsastrea and Favites (7 species) and Porites (6 species) respectively. Two zones such as High sensitive and low-sensitive zone were divided according to their vulnerability, morphology and sensitivity. At the edges of Station 1 and 2 because this area has massive type (not easy to damage) coral reefs such as Porites species as well as in the northeastern part of island (north of Station 3).

Notably, two endangered (EN) species, Dipterocarpus alatus Roxb. and Dipterocarpus dyeri Pierre, known locally as Kanyin phyu and Kanyin, were observed. The island does not fall within the vicinity of any Important Bird Area (IBA), and no globally threatened birds were detected during the bird survey. However, the nearby Lampi Marine National Park hosts over 200 native and migratory shorebirds. Consequently, it can be concluded that the proposed project would have minimal impact on the avian fauna in this area. To safeguard the birds and other terrestrial species, the project proponent should implement a buffer zone.

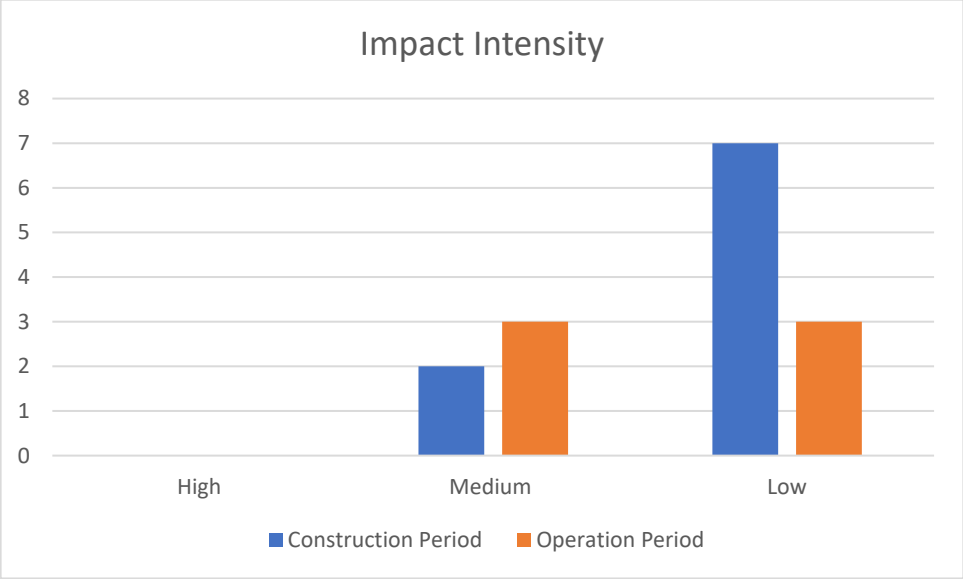
Impact Assessment

In the EIA study, it is necessary to establish baseline information on the environmental and socio-economic setting of an area, which could receive direct and indirect impacts during the project construction and operation phases. The baseline information was collected during the EIA process and serves two purposes;

- Firstly, it is used in conjunction with the information on the project, for identification of potential impacts of the project and assessment of their significance, and
- Secondly, it serves as the benchmark for evaluating environmental and social management performance of the project construction and operation phases.

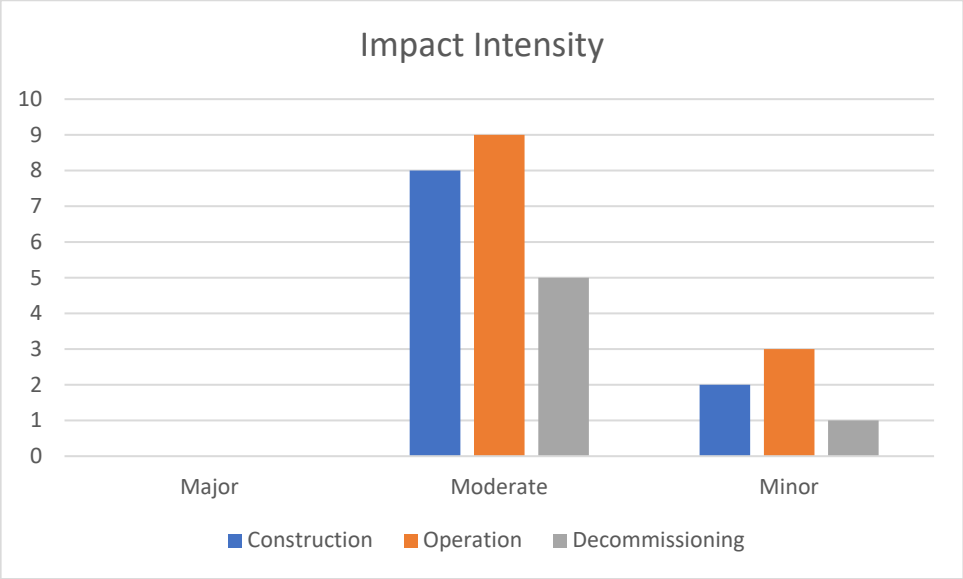
Potential impact on the environment and mitigation measures are identified by their relevant significance in line with the requirements set out by international guidelines for Environmental Impact Assessment (IEMA, 2004) and Guidelines for Ecological Impact Assessment (IEEM, 2006).

Based on the construction activities and services procedure a total of 9 impacts are identified during the construction period and 6 impacts are identified during the operation period for the physical environment. Among them, 7 impacts are identified as low and 2 impacts are identified as medium in the construction period and 3 impacts are identified as low and 3 impacts are identified as medium impact for the operation period. Employment opportunities, less illegal trading and economic improvement are identified as positive impacts.



Summary of impacts for physical environment

For the biological environment, 8 moderate impacts and 2 minor impacts are identified during the construction period such as change access rights and usage, noise, light and air pollution, site clearance etc. There are a total of 12 impacts are identified during the operation period for the biological environment. Among them, 9 are identified as moderate and 3 are identified as minor. Such as resource consumption, change access rights and usage, solid waste disposal, wastewater disposal, misuse of marine resources etc.



Summary of impact for biological environment

This project can create job opportunities for local people in all three phases. The positive impacts during operational period are employment opportunity for 47 locals which is long term in nature. There will be positive impacts such as Employment & staff training, Procurement opportunities for local communities, Landscape & grounds maintenance, Diversity of entertainment, Introduction of new skills and professions (associated with the marine activities), Increase in the provision of public services with the introduction of municipal and medical services, Less illegal trading due to the activities on the island and procurement opportunities for local communities.

Cumulative Impact Assessment

Development activities such as K Future may impact environmental values as a result of overlap locations, scheduling overlap or utilization of the same infrastructure, services and resources. The majority of the cumulative impacts are associated with the proposed project and other/proposed projects in or other commercial activities near the vicinity of the project. Impacts related to water quality, waste accumulation, tourism activities, and fishery are assessed in the vicinity of the project site. According to the interview with local people from Nyaung wee Village, there were no commercial fishing activities and other business activities were done at the island. Therefore, the distress on local businesses can be omitted.

Waste accumulation of marine litter is one of the more significant impacts in cumulative impacts for this proposed development than the other impacts such as water quality deterioration, tourism activities and fishery. Managing the waste accumulation of this marine litter is one of the biggest challenges for island resorts. There is no concrete plan to avoid this impact other than that the project proponent should have considered the cleanup activities for marine litter once a year.

Environmental Management Plan

To mitigate and reduce all potential negative impacts, it is imperative to adhere to the Mitigation Measures, Environmental Management Plan, and Environmental Monitoring Plan. Similarly, to enhance and maintain all potential positive impacts, the Environmental Management Plan and Environmental Monitoring Plan should be followed.

The environmental management plan of K Future is organized with the following sections:

1. Environmental Management Plan
2. Environmental Monitoring Plan
3. Occupational Health and Safety Plan
4. Community Health and Safety Plan
5. Emergency Preparedness and Response Plan
6. Waste Management Plan
7. Water Management Plan
8. Corporate Social Responsible Plan

9. Community Grievance Redress Mechanism
10. Biodiversity Management Plan
11. Coral Conservation Plan

Environmental Management Plan and Environmental Monitoring Plan have to be implemented by the proponent by appointing HSE Coordinator, assistant and biodiversity management officer. They are responsible to prepare the periodic (semi-annual) Environmental Monitoring Reports and submitted to ECD and disclosing such reports to Project Affected Persons (PAPs) upon request.

Biodiversity Management Plan has also to be implemented by the proponent by appointing Biodiversity Management Officer. Biodiversity Management Officer needs to cooperate with HSE Coordinator and they are responsible to implement the biodiversity management plan and need to revise per yearly if it is necessary.

K Future's Environmental and Social Engagement Committee has to fully implement Corporate Social Responsibility (CSR) Plan as an ethical obligation, so as to be regarded as a good neighbor/investor in the neighborhood. Project proponent need to keep full records of environmental management activities and present to annual independent third-party environment audit and follow up the audit report and comments. If unanticipated environmental and or social risks and impacts arise during construction and implementation or operation of, the proponent has to propose the corrective action plan.

In conclusion, Bo Nat Kyaw Island boasts a rich biodiversity, particularly renowned for its abundant forests and coral communities. The diverse ecosystem of the island presents an opportunity for tourism and ecotourism. The coral stations, especially Station 1 and 3, provide excellent snorkeling experiences, while Station 2 is suitable for SCUBA diving. However, it is crucial to implement a comprehensive management system to prevent pollution resulting from irresponsible tourist activities. Therefore, the Environmental and Social Management Committee of K Future must adhere to all existing rules and regulations and diligently follow the environmental management plan and its associated sub-plans.

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အစီရင်ခံစာအကျဉ်းချုပ်

ဤပတ်ဝန်းကျင်ထိခိုက်မှု လေ့လာဆန်းစစ်ခြင်း ဆိုင်ရာ အစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၂)၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး စည်းမျဉ်းဥပဒေ (၂၀၁၄) နှင့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅) အရ K Future Co., Ltd. က အကောင်အထည်ဖော်ဆောင်ရွက်မည့် အပန်းဖြေစခန်း တည်ဆောက်ရာတွင် လိုအပ်သော ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းစဉ်များကို ဖော်ပြရန် အတွက် Guardians of Green (GOG) Environmental Services မှ ပြုစုရေးသားခဲ့ပါသည်။ ဤအစီရင်ခံစာအား ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန သို့ တင်သွင်းရာတွင် သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဦးစီးဌာန (MONREC) မှ ပြဋ္ဌာန်းထားသော ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၂)၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး စည်းမျဉ်းဥပဒေ (၂၀၁၄) နှင့် အခြားဆက်စပ်သော လမ်းညွှန်ချက်များ နှင့် အညီ တင်ပြရမည်ဖြစ်သည်။

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅) အရ ပတ်ဝန်းကျင် အရည်အသွေး အပေါ် သက်ရောက်နိုင်မည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အမျိုးအစား လုပ်ဆောင်ရမည်ဟု သတ်မှတ်သော လုပ်ငန်း လုပ်ကိုင်မည့် မည်သည့် ဝန်ကြီးဌာန၊ အစိုးရဌာန၊ အဖွဲ့အစည်း၊ စီးပွားရေးလုပ်ငန်းရှင်များ၊ တရားဝင်အုပ်ချုပ်မှုအဖွဲ့များ၊ ဖွံ့ဖြိုးတိုးတက်မှု ကော်မတီ၊ ဒေသအစိုးရ (သို့) လုပ်ပိုင်ခွင့်ရှိသောသူများ၊ ကုမ္ပဏီများ၊ ပူးပေါင်းဆောင်ရွက်နိုင်သော အဖွဲ့အစည်း၊ စီးပွားရေးကုမ္ပဏီလုပ်ငန်း၊ လုပ်ငန်းအစုဝင်များ၊ ပူးတွဲလုပ်ငန်း (သို့) ကိုယ်ပိုင်လုပ်ငန်း ရှင်များ၏ လုပ်ငန်းသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး စည်းမျဉ်းဥပဒေ (၂၀၁၄)၊ အပိုင်း (၂၁) နှင့် ပုဒ်မ (၆၂) နှင့်အညီ ပထမဦးစွာ ခွင့်ပြုချက်ကို ရယူရန် လိုအပ်ပါသည်။ ပတ်ဝန်းကျင်ကို ထိခိုက်နိုင်ခြေရှိသော စီမံကိန်းများသည် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅) အရ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ လိုက်နာဆောင်ရွက်မှု သက်သေခံလက်မှတ် (ECC) ရရှိရန် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန မှ ဆုံးဖြတ်သတ်မှတ်သော ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE) သို့မဟုတ် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) သို့မဟုတ် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် (EMP) ကို ဆောင်ရွက်ရန် လိုအပ်ပါသည်။

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ငန်းစဉ် ၏ ရည်ရွယ်ချက်မှာ အဆိုပြုစီမံကိန်းကြောင့် သဘာဝပတ်ဝန်းကျင်အပေါ်တွင် သက်ရောက်နိုင်မည့် သိသာထင်ရှားသော ထိခိုက်မှုများကို သတ်မှတ်နိုင်ရန်ဖြစ်သည်။ ဖြစ်နိုင်ခြေ ရှိသော သိသာထင်ရှားသည့် သက်ရောက်မှုများကို

လေ့လာဆန်းစစ်ရာတွင် လက်တွေ့ကွင်းဆင်း လေ့လာချက်များနှင့် သုတေသနပြုထားသော အစီရင်ခံစာများ နှင့် စာတမ်း များ အပေါ်မူတည်၍ သတ်မှတ်ဆုံးဖြတ်ပါသည်။

ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး တိုင်းတာခြင်း ကို မြန်မာနိုင်ငံတွင် ပတ်ဝန်းကျင် လေ့လာ ဆန်းစစ်ခြင်း အစီရင်ခံစာနှင့် ပတ်သက်၍ အတွေ့အကြုံ အများ အပြားရှိသော Guardians of Green (GOG) Environmental Services မှ တာဝန်ယူဆောင်ရွက်ခဲ့ပါသည်။ ထို အဖွဲ့ သည် ဆောက်လုပ်ရေးကာလ ၊ လုပ်ငန်းလည်ပတ်စဉ် ကာလနှင့် ပြန်လည် ဖျက်သိမ်းစဉ် ကာလအတွင်း ဖြစ်ပေါ်နိုင်သော ဆိုးကျိုးများကို ထည့်သွင်း စဉ်းစားခဲ့သည်။

ဤပတ်ဝန်းကျင်ထိခိုက်မှုလေ့လာ ဆန်းစစ်ခြင်း လုပ်ငန်းစဉ်၏ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားဝန်းကျင် ရှုထောင့်များတွင် မြန်မာနိုင်ငံ မှ ထုတ်ပြန်ထားသော မူဝါဒများ၊ ဥပဒေများနှင့် နည်းဥပဒေများ နှင့် နိုင်ငံတကာမှ လမ်းညွှန်ချက်များကိုလည်း ထည့်သွင်းရေးသားခဲ့ပါသည်။

အဆိုပြုစီမံကိန်းကို ၁၀၀ ရာခိုင်နှုန်း နိုင်ငံသားပိုင်ဖြစ်သော K Future Company Limited က ဆောင်ရွက်မည်ဖြစ်သည်။ အဆိုပြုစီမံကိန်းသည် ဘိုနက်ကျော်ကျွန်း၊ ဆူငယ်ဘလိုင်း ကျေးရွာအုပ်စု၊ ကော့သောင်းမြို့နယ်၊ တနင်္သာရီတိုင်းဒေသကြီးတွင် တည်ရှိပါသည်။ ဘိုနက်ကျော်ကျွန်းမှာ မြိတ်ကျွန်းစုဝင်ဖြစ်ပြီး ကော့သောင်းမြို့နှင့် ၇၃ ကီလိုမီတာ အကွာတွင်တည်ရှိသည်။ အဆိုပြုစီမံကိန်းအား ကျွန်း၏ (၅၀) ဧက တွင်ဆောင်ရွက်မည်ဖြစ်သည်။

<u>စီမံကိန်းဆိုင်ရာ အချက်အလက်များ</u>

K Future Company Limitedသည် Myanmar Investment Commission (MIC) မှ ဘိုနက်ကျော်ကျွန်းတွင် ဟိုတယ်နှင့်အပန်းဖြေစခန်း တည်ဆောက်မှု စီမံကိန်းအတွက် ဧက (၇၀၀) အားငှားရမ်းအသုံးပြုခွင့်ကို ရရှိခဲ့ပြီး ဧက (၅၀) တွင်သာ တည်ဆောက်ရေး လုပ်ငန်းတွင် အကောင်အထည်ဖော်ဆောင်မည်ဖြစ်သည်။ တည်ဆောက်မှု လုပ်ငန်းစဉ်အား ၂၀၁၇-၂၀၂၂ အထိဆောင်ရွက်မည်ဖြစ်သည်။ ဆောက်လုပ်ရေး လုပ်ငန်းစဉ်များ မစတင်မီ K Future အနေဖြင့် သဘာဝဝန်းကျင်သို့ အနှောက်အယှက် အနည်းဆုံးဖြစ်စေရန် လုပ်ငန်းစဉ်များတွင် တင်းကြပ်သော ကန့်သတ်မှုများ ချမှတ်သွားမည်ဖြစ်သည်။ ဆောက်လုပ်ရေးအကြိုလုပ်ငန်းစဉ်များ လုပ်ဆောင်စဉ် ကာလအတွင်းတွင် သစ်တောဦးစီးဌာနနှင့် ပူးပေါင်း၍ ဆောက်လုပ်ရေး လုပ်သားများကို Dos' and Don'ts လုပ်ထုံးလုပ်နည်းများကို ပို့ချပေးမည်ဖြစ်သည်။

ဆောက်လုပ်ရေးလုပ်ငန်းခွင်သည် စိတ်ချလုံခြုံသော လုပ်ငန်းခွင်အဖြစ်ရှိစေရန် ဆောင်ရွက်၍ စက်ပစ္စည်းများနှင့် အကြီးစားစက်ပစ္စည်းများ အသုံးချခြင်းကို ကန့်သတ်ဆောင်ရွက်မည်ဖြစ်သည်။

သဘာဝပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေသော အဆောက်အဦများကိုသာ တည်ဆောက်၍ ဆောက်လုပ်ရေးလုပ်ငန်းစဉ်များကို သဘာဝဝန်းကျင်သို့ အနှောက်အယှက် အနည်းဆုံးဖြစ်စေရန် လုပ်ဆောင်သွားမည်ဖြစ်သည်။ ဆောက်လုပ်ရေး လုပ်ငန်းစဉ်တွင် ဘိလပ်မြေသုံးစွဲမှုကို လျှော့ချရန် H.Beam (Steel) structure များကို အသုံးပြုမည်ဖြစ်သည်။ အခန်းတွင်းအလှဆင်ရာတွင် သစ်မာများကိုအသုံးမပြုဘဲ ဝါးများကို အသုံးပြုမည်ဖြစ်သည်။ ကမ်းခြေနှင့် သောင်ခုံများကို ထိခိုက်မှုမရှိစေရန် အဆောက်အဦများကို ကမ်းခြေမှ (၄၀) ပေ အကွာတွင်သာ ဆောက်လုပ်မည်ဖြစ်သည်။ တောင်တက်လမ်းများကို သေချာစွာသတ်မှတ်၍ အမှိုက်ပုံးများကို တောင်တက်လမ်းတလျှောက်တွင် ထားရှိမည်ဖြစ်သည်။ ရေဆိုးသန့်စင်ခြင်းအတွက် activated sludge treatment system စနစ်အား တပ်ဆင်အသုံးပြုမည်ဖြစ်သည်။

ဘိုနက်ကျေးကျွန်းသည် လျှပ်စစ်မရရှိသော နေရာတွင်တည်ရှိ၍ အစားထိုးနည်းလမ်း အနေဖြင့် (150) KVA diesel generators (၃) လုံးအား အသုံးပြုမည်။ တစ်နှစ်အတွက် စက်သုံးဆီ ပမာဏမှာ (၃,၇၈၀) ဂါလံဖြစ်သည်။ ရေအရင်းအမြစ်မှာ မြေအောက်ရေ နှင့် စမ်းချောင်းတို့မှ ရရှိနိုင်ပြီး 50 cu.m and 25 cu.m ရှိသော ကန်များဖြင့် သိုလှောင်သုံးစွဲမည်။ ခရီးသွားကာလတွင် ရေသုံးစွဲမှုမှာ တစ်ရက်လျှင် (၃,၀၀၀)ဂါလံရှိပြီး၊ ခရီးသွာရာသီအကုန်တွင် ရေသုံးစွဲမှုမှာ တစ်ရက်လျှင် (၂၀၀) ဂါလံ ဖြစ်ပြီး တစ်နှစ်လျှင် စုစုပေါင်း (၁၄၄,၀၀၀) ဂါလံ အသုံးပြုမည်ဖြစ်သည်။ အညစ်အကြေးနှင့် စွန့်ပစ်ပစ္စည်း ထုတ်လွှင့်မှုမှာ အလုပ်သမား (၄၅)ဦးနှင့် ခရီးသွားရာသီအများဆုံးတွင် ဧည့်သည် (၄၀)ဦး၊ စုစုပေါင်း လူဦးရေ (၉၅)ဦး၏ တစ်ရက်လျှင် (၄၅.၀၅) ကီလိုဂရမ်/ရက် ဖြစ်သည်။

<u>ရုပ်ပိုင်းဆိုင်ရာ အရည်အသွေး တိုင်းတာမှုရလဒ်များနှင့် ဇီဝမျိုးစုံမျိုးကွဲဆိုင်ရာ လေ့လာတွေ့ရှိချက်များ</u>

တိုင်းတာရရှိသော လေထုအရည်အသွေး၊ ဆူညံသံနှင့် ရေအရည်အသွေး ရလဒ်များကို အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် နှင့် နိုင်းယှဉ်ချက်များအရ ရုပ်ပိုင်းဆိုင်ရာ ပတ်ဝန်းကျင် အရည်အသွး ရလဒ်များသည် လမ်းညွှန်ချက်အတွင်းရှိသည်ကို တွေ့ရှိရသည်။ ထိုကြောင့် သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်သို့ သိသာထင်ရှားသော ထိခိုက်မှုများ မရှိနိုင်ဟု သုံးသပ်ရသည်။

ဘိုနက်ကျေးကျွန်းနှင့် အနီးရှိပင်လယ်ပြင်အတွင်း ဇီဝဗေဒဆိုင်ရာ လေ့လာမှုများအရ အပင်မျိုးစိတ် (၁၅၁) မျိုး၊ အကောင်မျိုးစိတ် (၁၅၄) မျိုး၊ Cnidaria, Anthozoa, and Scleractinia မျိုးစိတ်ဝင် သန္ဓာမျိုးစိတ် (၇၀)မျိုး ကို လေ့လာတွေ့ရှိသည်။ ၎င်းတို့တွင် မျိုးစိတ်ပါဝင်မှု အမြင့်ဆုံးမှာ Arcropora (17 species), ဖြစ်ပြီး၊ ဒုတိယအားဖြင့် Dipsastrea and Favites (7 species) နှင့် Porites (6 species) တို့ဖြစ်သည်။ လေ့လတွေ့ရှိချက်အရ တွေ့ရှိရသော မျိုးစိတ်များ၏ အားနည်းချက်၊ ထိခိုက်ခံနိုင်မှုစွမ်းရည်

နှင့် ရုပ်သွင်လက္ခဏာများအပေါ်ဆန်းစစ်၍ High sensitive and low-sensitive zone ဟူ၍ ခွဲခြားရရှိသည်။

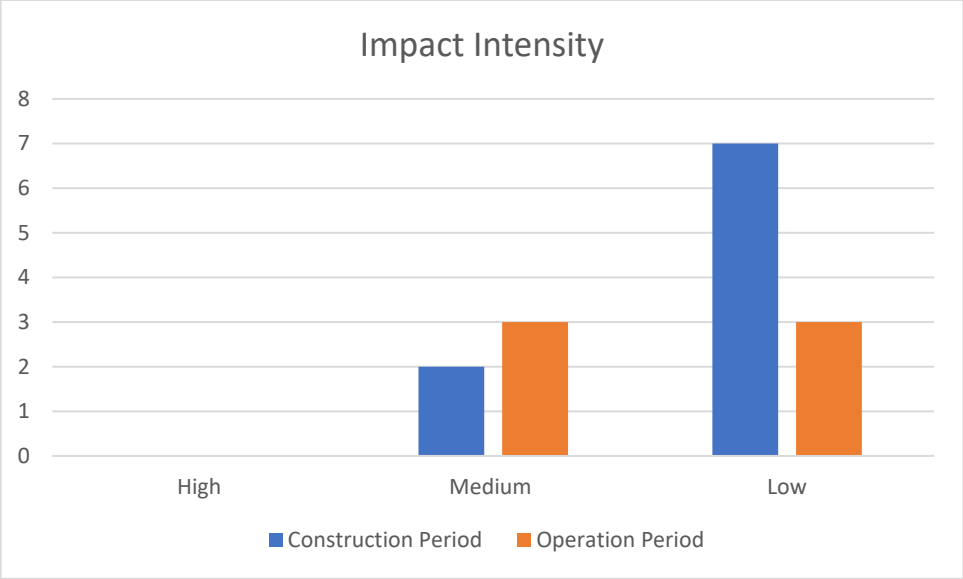
ထို့အပြင် endangered (EN) မျိုးစိတ်ဖြစ်သော *Dipterocarpus alatus* Roxb. and *Dipterocarpus dyeri* Pierre, အမည် ကရင်ဖြူနှင့် ကရင် အပင်မျိုးစိတ် နှစ်မျိုးကို တွေ့ရှိသည်။ ဘိုနက်ကျော်ကျွန်းသည် မည်သည့် Important Bird Area (IBA) အတွင်းတွင် ကျရောက်ခြင်းမရှိပဲ avian fauna များကိုလေ့လာရာတွင်လည်း လေ့လာစဉ်အတွင်းတွင် မည်သည့် globally threatened birds မျိုးစိတ်များကို တွေ့ရှိခြင်းမရှိပါ။ သို့ရာတွင် ဘိုနက်ကျော်ကျွန်းနှင့် (၂၀) ကီလိုမီတာအကွာတွင် တည်ရှိသော Lampi Marine National Park မှာ ဒေသရင်းငှက်မျိုးစိတ်များနှင့် ရွှေ့ပြောင်းငှက်မျိုးစိတ်များ (၂၀၀) ကျော် တည်ရှိသော ကျွန်းဖြစ်သောကြောင့် K Future အနေဖြင့် buffer zone များ သတ်မှတ်၍ ငှက်မျိုးစိတ်များနှင့် အခြားသော ကုန်းတွင်းမျိုးစိတ်များ အပေါ်သော ထိခိုက်မှု အနည်းဆုံးဖြစ်စေရန် ဆောင်ရွက်ရမည်။

<u>ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း</u>

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း တွင် စီမံကိန်းဆောက်လုပ်ချိန် နှင့် လည်ပတ်ချိန်၌ ဆိုးကျိုးများ တိုက်ရိုက် သို့မဟုတ် သွယ်ဝိုက်၍ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားဝန်းကျင်တွင် ဖြစ်ပေါ်လာနိုင်သောကြောင့် လက်ရှိ သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုစီးပွားရေး အခြေအနေ အချက်အလက်များကို လေ့လာရန် လိုအပ်ပါသည်။ ထိုအခြေခံ အချက်လက်များကို ရည်ရွယ်ချက် (၂) ခုဖြင့်စုဆောင်းပါသည်။

- ပထမဦးစွာ စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများနှင့် ထိုသက်ရောက်မှုများမှ သိသာထင်ရှားသော သက်ရောက်မှုများကို အကဲဖြတ်နိုင်ရန်၊
- ဒုတိယ အနေဖြင့် စီမံကိန်း ဆောက်လုပ်ချိန် နှင့် လည်ပတ်ချိန် တွင် သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုစီးပွားဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှု လုပ်ဆောင်ချက်များကို လေ့လာအကဲဖြတ်နိုင်ရန် တို့ဖြစ်သည်။

ပတ်ဝန်းကျင် အပေါ် ထိခိုက်နိုင်ခြေရှိသော သက်ရောက်မှုများ နှင့် သိသာထင်ရှားသော ဆိုးကျိုးများကို လျော့ချရန် နည်းလမ်း များကို International Guidelines for Environmental Impact Assessment (IEMA, 2004) and Guidelines for Ecological Impact Assessment (IEEM, 2006) တို့မှ နည်းလမ်းများအတိုင်း သတ်မှတ်ပါသည်။



Summary of impacts for physical environment

တည်ဆောက်ခြင်း လုပ်ငန်းစဉ်နှင့် လုပ်ငန်းလည်ပတ်ဆောင်ရွက်မည့် လုပ်ငန်းစဉ်များအပေါ်မူတည်၍ ရုပ်ပိုင်းဆိုင်ရာ ဝန်းကျင်အတွက် ဆောက်လုပ်ရေးကာလတွင် သက်ရောက်မှု (၉)ခု၊ လုပ်ငန်းလည်ပတ်သည့်ကာလတွင် သက်ရောက်မှု (၆) ခု ဆန်းစစ်ရရှိသည်။ ထိုသက်ရောက်မှုများတွင် ဆောက်လုပ်ရေးကာလ သက်ရောက်မှုများ အနက်မှ သက်ရောက်မှု (၂) ခုမှာ အလည်အလတ် သက်ရောက်မှုအဖြစ် သတ်မှတ်ရရှိပြီး (၇)ခုမှာ အနည်းငယ် သက်ရောက်မှုအဖြစ် တွေ့ရှိရသည်။ လုပ်ငန်းလည်ပတ်သည့်ကာလ သက်ရောက်မှုများ အနက်မှ သက်ရောက်မှု (၃) ခုမှာ အလည်အလတ် သက်ရောက်မှုအဖြစ် သတ်မှတ်ရရှိပြီး (၃)ခုမှာ အနည်းငယ် သက်ရောက်မှုအဖြစ် တွေ့ရှိရသည်။ အလုပ်အကိုင်အခွင့်အလမ်းများ၊ တရားမဝင် ရောင်းဝယ်မှုများ လျော့ကျခြင်းနှင့် စီးပွားရေးအခွင့်အလမ်းများရရှိမှုကို ကောင်းကျိုးသက်ရောက်မှုများ အဖြစ်သတ်မှတ်ရသည်။

တည်ဆောက်ခြင်း လုပ်ငန်းစဉ်နှင့် လုပ်ငန်းလည်ပတ်ဆောင်ရွက်မည့် လုပ်ငန်းစဉ်များအပေါ်မူတည်၍ ဇီဝဆိုင်ရာဝန်းကျင်အတွက် ဆောက်လုပ်ရေးကာလတွင် သက်ရောက်မှု (၁၀)ခု (နေရာနှင့် အသုံးပြုနိုင်ခွင့်များ ပြောင်းလဲခြင်း၊ မြေနေရာ ရှင်းလင်းခြင်း၊ ဆူညံသံများ၊ အစရှိသည်) လုပ်ငန်းလည်ပတ်သည့်ကာလတွင် သက်ရောက်မှု (၁၂) ခု ဆန်းစစ်ရရှိသည် (အရင်းအမြစ်များ သုံးစွဲခြင်း၊ နေရာနှင့် အသုံးပြုနိုင်ခွင့်များ ပြောင်းလဲခြင်း၊ မိလ္လာအညစ်အကြေးများ နှင့် စွန့်ပစ်ခြင်း၊ အမှိုက်စွန့်ပစ်ပစ္စည်းများထွက်ရှိခြင်း၊ အစရှိသည်)။ ထိုသက်ရောက်မှုများတွင် ဆောက်လုပ်ရေးကာလ သက်ရောက်မှုများ အနက်မှ သက်ရောက်မှု (၈) ခုမှာ အလည်အလတ် သက်ရောက်မှုအဖြစ် သတ်မှတ်ရရှိပြီး (၂)ခုမှာ အနည်းငယ် သက်ရောက်မှုအဖြစ် တွေ့ရှိရသည်။ လုပ်ငန်းလည်ပတ်သည့်ကာလ

သက်ရောက်မှုများ အနက်မှ သက်ရောက်မှု (၉) ခုမှာ အလည်အလတ် သက်ရောက်မှုအဖြစ် သတ်မှတ်ရရှိပြီး (၃)ခုမှာ အနည်းငယ် သက်ရောက်မှုအဖြစ် တွေ့ရှိရသည်။

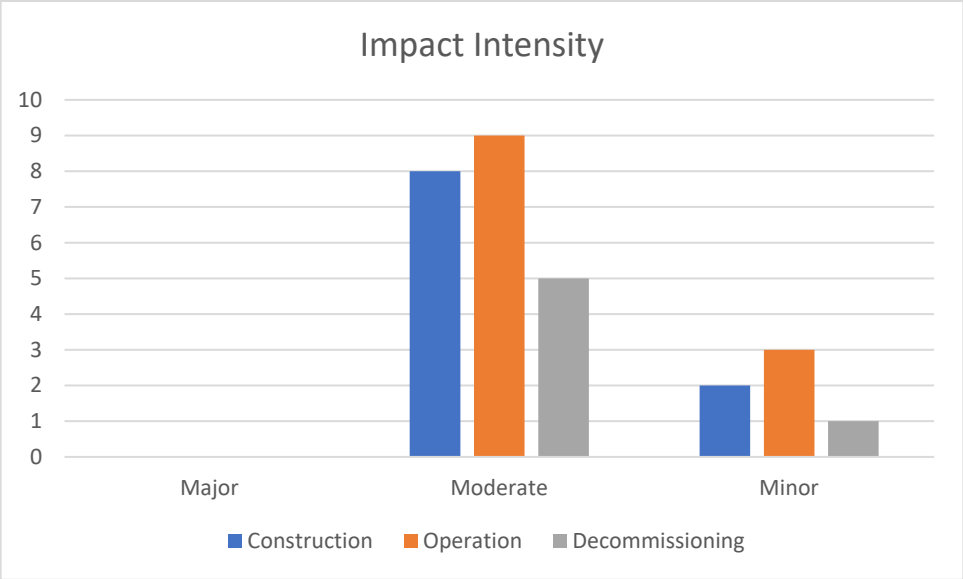


Figure: Summary of impact for biological environment

အဆိုပြုစီမံကိန်းမှ ဒေသခံများအတွက် အလုပ်အကိုင်အခွင့်အလမ်းများကို စီမံကိန်း၏ အဆင့် (၃) ဆင့်တွင် ရရှိနိုင်သည်။ စီမံကိန်းလည်ပတ်စဉ်ကာလတွင် အလုပ်အကိုင် အခွင့်အလမ်း (၄၇) နေရာ ရရှိမည်ဖြစ်သည်။ အလုပ်အကိုင် ရရှိခြင်းနှင့် ဝန်ထမ်းများ အတွေ့အကြုံများရရှိခြင်း ဒေသခံ အဖွဲ့စည်းများအတွက် အခွင့်လမ်းများ ရရှိနိုင်ခြင်း၊ မြေယာအလှဆင်ခြင်း နှင့် မြေသားထိန်းသိမ်းခြင်း၊ အတွေ့အကြုံသစ်များ ရရှိနိုင်ခြင်း (ပင်လယ်ပြင် အသုံးချမှုနှင့် သက်ဆိုင်သော)၊ ပြည်သူ့ဝန်ဆောင်မှုများတိုးများလာခြင်းနှင့် ကျန်းမာရေးဝန်ဆောင်မှုများတိုးလာခြင်း၊ တရားမဝင် ရောင်းဝယ်မှု နည်းပါးလာခြင်း အစရှိသော ကောင်းကျိုးသက်ရောက်မှုများကို တွေ့ရှိရသည်။

<u>ဆက်စပ်သက်ရောက်မှုများ</u>

အဆိုပြုစီမံကိန်း သို့မဟုတ် အခြားသော ဖွံ့ဖြိုးတိုးတက်မှုများ၊ နေရာတစ်ခုတည်း၊ တစ်ချိန်တည်းတွင် ဖွံ့ဖြိုးလာခြင်းနှင့် တူညီသော အရင်းအမြစ် များလိုအပ်မှုသည် သဘာဝပတ်ဝန်းကျင် အပေါ်တွင်သက်ရောက်မှုများ ရှိလာနိုင်ပါသည်။ စီမံကိန်းနှင့် ၎င်းနှင့် အနီးဝန်းကျင်ရှိ အခြားသော စီးပွားဖြစ်လုပ်ငန်းများကြောင့် ဖြစ်ပေါ်လာနိုင်သော အဓိက ဆက်စပ်သက်ရောက်မှုများမှာ ရေအရည်အသွေး ၊ အမှိုက်နှင့်အညစ်ကြေးများ စုပုံခြင်း၊ ခရီးသွားလုပ်ငန်းများ နှင့် ငါးဖမ်းလုပ်ငန်းများ တို့ဖြစ်သည်။

အဆိုပြုစီမံကိန်းအတွက် ပင်လယ်မှအမှိုက်များ စုပုံခြင်းသည် အခြားသော ဆက်စပ်သက်ရောက်မှုများဖြစ်သည့် ရေအရည်သွေးကျဆင်းလာမှု၊ ခရီးသွားလုပ်ငန်းများ နှင့် ငါးဖမ်းလုပ်ငန်းများထက် သိသာထင်ရှားသည်။ ညောင်ဝီးကျေးရွာရှိ ဒေသခံများကို မေးမြန်းချက်နှင့် လေ့လာတွေ့ရှိချက်များ အရ စီမံကိန်း၏ အနီးအနား (၂) မိုင် ပတ်လည်တွင် စီးပွားဖြစ် ဖွံ့ဖြိုးတိုးတက်သည့် ခရီးသွားလုပ်ငန်းများ နှင့် ငါးဖမ်းလုပ်ငန်းများ မရှိပါ။ ထို့ကြောင့် စီမံကိန်းကြောင့် ဒေသခံများ၏ စီးပွားရေးအား အနှောက်အယှက် မရှိပါ။

ကျွန်းပေါ်ရှိအပန်းဖြေ စခန်းများ အတွက် ပင်လယ်မှ အမှိုက်များ စုပုံခြင်းကို ထိန်းချုပ်ရန် မှာ ကြီးမားသော စိန်ခေါ်မှု ဖြစ်သည်။ ထို့ကဲ့ သို့သော ဆိုးကျိုး များ ကို ရှောင်ရှားရန် တိကျသော အစီအစဉ် မရှိပါ။ သို့သော်လည်း စီမံကိန်းတာဝန်ရှိသူ အနေဖြင့် တစ်နှစ် တစ်ကြိမ် သန့်ရှင်းပေး ရန် ထည့်သွင်းစဉ်းစားသင့်သည်။

<u>ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်များ</u>

ဆိုးကျိုးသက်ရောက်မှုများကို လျော့ချရန်နှင့် ကောင်းကျိုးသက်ရောက်မှုများကို တိုးမြှင့်နိုင်ရန် ဤအစီရင်ခံစာတွင် ဖော်ပြထားရှိသော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်များကို အကောင်အထည်ဖော်ဆောင်ရမည် ဖြစ်သည်။

K Future၏ အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်။

(၁) ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်

(၂) စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်

(၃) လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် လုံခြုံရေး အစီအစဉ်

(၄) လူမှုဝန်းကျင် ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် လုံခြုံရေး အစီအစဉ်

(၅) အရေးပေါ်တုန့်ပြန်မှု အစီအစဉ်

(၆) စွန့်ပစ်အမှိုက်နှင့် အညစ်အကြေးများစီမံခန့်ခွဲမှု အစီအစဉ်

(၇) ရေအရင်းအမြစ် စီမံခန့်ခွဲမှု အစီအစဉ်

(၈) လူမှုရေးဆိုင်ရာ တာဝန်ခံဆောင်ရွက်မှု အစီအစဉ်

(၉) မကျေလည်မှုများ ဖြေရှင်းဆောင်ရွက်မှု အစီအစဉ်

(၁၀) ဇီဝမျိုးစုံမျိုးကွဲများ စီမံခန့်ခွဲမှု အစီအစဉ်

(၁၁) သန္ဓာကျောက်တန်းများ ထိန်းသိမ်းခြင်း အစီအစဉ် တို့ဖြစ်သည်။

ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် နှင့် စောင့်ကြည့်စစ်ဆေးခြင်း အစီအစဉ် များကို ကျန်းမာရေးနှင့် ဘေးအန္တရယ်ကင်းရှင်းရေး စောင့်ရှောက်မှု တာဝန်ခံ၊ ကျန်းမာရေးနှင့် ဘေးအန္တရယ်ကင်းရှင်းရေး စောင့်ရှောက်မှု လက်ထောက်တာဝန်ခံ၊ ဇီဝမျိုးစုံမျိုးကွဲများ စီမံခန့်ခွဲမှု တာဝန်ရှိသူ တို့မှ အကောင်ထည်ဖော် ဆောင်ရွက်ရမည်။ ထိုသူများသည် စောင့်ကြည့်စစ်ဆေးခြင်း အစီရင်ခံစာကို ပြင်ဆင်ပြီး ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဦးစီးဌာန သို့တင်ပြရမည်။ ထို့အပြင် ထိုအစီရင်ခံစာကို စီမံကိန်းကြောင့် ထိခိုက်နိုင်သည့် လူများထံသို့ ထုတ်ဖော်ရမည်။

ဇီဝမျိုးစုံ မျိုးကွဲများ စီမံခန့်ခွဲမှု အစီအစဉ်ကို ဇီဝမျိုးစုံမျိုးကွဲများ စီမံခန့်ခွဲမှု တာဝန်ရှိသူမှ အကောင်ထည်ဖော် ဆောင်ရွက်ရမည်။ ဇီဝမျိုးစုံမျိုးကွဲများ စီမံခန့်ခွဲမှု တာဝန်ရှိသူသည်၊ ကျန်းမာရေးနှင့် ဘေးအန္တရယ်ကင်းရှင်းရေး စောင့်ရှောက်မှု တာဝန်ခံ နှင့်အတူ ဇီဝမျိုးစုံ မျိုးကွဲများ စီမံခန့်ခွဲမှု အစီအစဉ်ကို အကောင်ထည်ဖော် ဆောင်ရွက်ပြီး၊ လိုအပ်ပါက ဇီဝမျိုးစုံ မျိုးကွဲများ စီမံခန့်ခွဲမှု အစီအစဉ်ကို တစ်နှစ်လျှင် တစ်ကြိမ် ပြန်လည်စီစစ် သုံးသပ်ရမည်။

K Future အပန်းဖြေစခန်း စီမံခန့်ခွဲမှု တာဝန်ရှိသူ အနေဖြင့် လူမှုရေးဆိုင်ရာ တာဝန်ခံဆောင်ရွက်မှု အစီအစဉ်ကို အကောင်ထည်ဖော် ဆောင်ရွက်ရမည်။ စီမံကိန်း အဆိုပြုသူ သည် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် လုပ်ဆောင်ချက်များကို မှတ်တမ်းတင်ထားရှိရမည်။ ထိုမှတ်တမ်းများကို နှစ်စဉ် တတိယ အဖွဲ့အစည်းတစ်ခုထံသို့ တင်ပြပြီး စစ်ဆေးခံယူရမည်။ ထိုတတိယ အဖွဲ့အစည်း၏ စစ်ဆေးတွေ့ရှိချက်များနှင့် မှတ်ချက်များအတိုင်း လိုက်နာဆောင်ရွက်ရမည်။ ဆောက်လုပ်ရေးကာလနှင့် လည်ပတ်ချိန် အတွင်း မျှော်လင့်မထားသော သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုဆိုင်ရာဆိုးကျိုးများ ဖြစ်ပေါ်ခဲ့ပါက စီမံကိန်းအဆိုပြုသူသည် ပြန်လည်ပြင်ဆင်နိုင်သော အစီအစဉ် တစ်ခုကို တင်ပြရမည်။

ဘိုနက်ကျော်ကျွန်းသည် ဇီဝမျိုးစုံမျိုးကွဲများစွာဖြင့် တည်ရှိသော ကျွန်းဖြစ်သည်။ အထူးသဖြင့် ၎င်း၏ တောတောင်များ သန္ဓာကျောက်တန်းများဖြင့် တည်ရှိသောကြောင့် ခရီးသွားလုပ်ငန်းများ၊ သဘာဝအခြေခံ ခရီးသွားလုပ်ငန်းများ အစရှိသော အခွင့်အလမ်းများစွာ ရှိသောကျွန်းဖြစ်သည်။ ယoral stations, Station 1 နှင့် 3 သည် snorkeling လုပ်ရန် သင့်တော်သော နေရာဖြစ်ပြီး၊ Station 2 သည် SCUBA diving လုပ်ရန်အတွက် အထူးသင့်လျော်သည်။ သို့သော်၊ တာဝန်သိမှုမရှိသော ခရီးသွားလုပ်ငန်းဆောင်ရွက်မှုကြောင့် ပတ်ဝန်းကျင် ညစ်ညမ်းပျက်စီးမှု မရှိစေရန် တိကျခိုင်မာသော

စီမံခန့်ခွဲမှုစနစ်ကို မသွေမတိမ်း အကောင်အထည်ဖော်ဆောင်ရန် လိုအပ်သည်။ သို့ဖြစ်သောကြောင့် K Future၏ သဘာဝန်းကျင်နှင့် လူမှုဝန်းကျင် စီမံခန့်ခွဲမှု ကော်မတီအနေဖြင့် တည်ရှိသော ဥပဒေ၊ နည်းဥပဒေများကို အတိအကျ လိုက်နာဆောင်ရွက်၍ ဖော်ပြထားရှိသော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်နှင့် ၎င်းနှင့်ဆက်စပ် အစီအစဉ်များကို လိုက်နာဆောင်ရွက်မည် ဖြစ်သည်။

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CHAPTER 1: INTRODUCTION

1.1. BACKGROUND OF THE STUDY

This Environmental Impact Assessment (EIA) report is prepared by Guardians of Green (GOG) Environmental Services for Hotel and Resort development which is implemented by K Future Company Limited to initiate the required EIA process under Myanmar Environmental Conservation Law (2012), Myanmar Environmental Conservation Rules (2014) and Environmental Impact Assessment Procedure (2015). This EIA report is to be submitted to Environmental Conservation Department, in line with the Environmental Conservation Law, Environmental Conservation Rules and related guidelines, enacted by Ministry of Natural Resources and Environmental Conservation (MONREC).According to the Myanmar Environmental Conservation Law, 2012, it requires that the proponents of every development project in the country submit either an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) to MONREC. As per the comments of MONREC, the said project requires an EIA to meet the environmental assessment requirements of Myanmar Environmental Conservation Law. Therefore, K Future Company Limited has commissioned Guardians of Green Environmental Services to conduct the EIA study.

The Environmental Impact Assessment (EIA)) is conducted for the proposed Hotel and Resort development project, in order to identify the immediate and potential impacts of the project activities on physical, biological, socioeconomic and cultural environment of the proposed project site. The specific objectives of this study include:

- To conduct preliminary examination of the environmental consequences of the project
- To describe the existing environmental condition of the proposed project site
- To collect detailed information about used of process, technology, equipment and machinery for proposed project
- To assess the potential environmental impacts of the proposed project
- To develop environmental management plan (EMP) with site specific environmental mitigation measures and monitoring standards guidelines for the proposed project
- To carry our public consultants to address any issues in concern with implementation of this project

1.2. SCOPE OF THE STUDY

The EIA study firstly established baseline environmental setting within 1000 meters of the project area, including existing conditions of air quality, water quality, noise, weather and local climate, ecology and social assessment. The field studies were carried out by Guardians of Green

Environmental Services (GOG) having experiences in conducting environmental assessments for various types of projects in Myanmar. The GOG team conducted field survey, assessment activities, and prepared the report.

A reconnaissance study was performed on the proposed project site and baseline environmental data were also collected from possible sources using the appropriate measuring devices. Data interpretation and analysis were made based on those collected data for the present and potential future conditions. Suitable measures were proposed for the impacts to be mitigated to reduce to acceptable ones.

The study on existing environmental resources in the project area focused on two main resources: the primary data and the secondary data. Moreover, the EIA report comprises baseline data on existing conditions, together with the anticipated environmental impacts and proposed mitigation measures. The study is done by considering the potential impacts of the activities in all these phases of the project: construction, operation and decommissioning phases.

1.3. TECHNICAL EXPERT TEAM

Daw Moh Moh Khaing (Team Leader)

Daw Moh Moh Khaing is a Consultant holding Transitional Consultant Certificate No. 0072. Her areas of expertise include Ecology and Biodiversity, Marine Biology, and Microbiology. She obtained a Master of Research Degree in Microbiology in 2013 and a Master of Science Degree in Marine Science in 2012. With over ten years of experience, she has conducted environmental site inspections, stakeholder mapping, socio-economic surveys, and data interpretation. Additionally, she has expertise in Environmental Quality measurement, data analysis, ecology, and facilitation among project developers, government authorities, and local communities for stakeholder engagement and public consultation meetings. She has also been involved in reporting for Environmental Management Plans (EMP), Initial Environmental Examinations (IEE), and Environmental and Social Impact Assessments (ESIA) for various projects. Furthermore, she possesses experience in project management and risk assessment and management.

In the context of this EIA study, Daw Moh Moh Khaing serves as the team leader and has several responsibilities. These include project management, facilitating communication among team members, preparing socio-economic questionnaires, conducting stakeholder mapping, scoping the study area, identifying samplings, analyzing Environmental Quality data, assessing environmental and social impacts, conducting biodiversity surveys and ecological mapping, and preparing reports in accordance with guidelines and procedures. Her expertise for this project specifically focuses on Project Management, Life cycle Assessment, Risk Assessment, Natural Resources Management, Ecosystem and Biodiversity, Stakeholder Engagement, Environmental and Social Assessment, identifying project impact zones (both direct and indirect), and determining survey areas, Developed Management Plans and Monitoring Plans as well as Legal Analysis and lead in Report writing.

Daw Yu Wai Yan Thein Tan (Consultant)

Daw Yu Wai Yan Thein Tan, a senior consultant, holds Transitional Consultant Certificate No. 0071. She possesses expertise in Environmental Engineering and Management, with a Master of Engineering degree specializing in this field from the Asian Institute of Technology in Thailand. Additionally, she holds a Master of Engineering degree specializing in Chemical Engineering from Mandalay Technology University. With nine years of consulting experience in the environmental field, including her master's degree research, she has a strong background. Previously, she worked as an engineer at Mandalay City Development Committee for three years. Her professional experience encompasses various areas such as air and water quality analysis, environmental consulting, environmental management and EIA, as well as industry and environmental protection. She assumes responsibility for this project such as Air Pollution Control, Noise and Vibration Assessment, and Mitigation Measures, Solid Waste Management, Wastewater Treatment, Environmental Quality Management, Hazardous Waste Technology and Management, Data Analysis, and the development of EMP and EMoPs.

Daw Khin May Lwin (Senior Consultant)

Daw Khin May Lwin, with Transitional Consultant Certificate No 102, is an expert consultant specializing in Groundwater and Hydrology, Water Pollution Control, and Waste Management. She holds a Postgraduate Diploma in Pulp and Paper Technology from Deemed University in Dehradun, India, and a Bachelor of Science degree in Industrial Chemistry from Yangon Arts and Science University. With an impressive 32-year tenure at the Forest Research Institute, Forest Department, she has been entrusted with numerous responsibilities for this project. These include conducting impact assessments, implementing measures for identifying and mitigating impacts, managing water pollution control, groundwater and hydrology activities, waste management, and the development of Environmental Management Plans (EMP) and Environmental Monitoring Programs (EMoP). She is responsible for developing mitigation measures for water and waste management, pollution control and identifying and mitigation measures.

U Thura Min (Biodiversity Consultant)

U Thura Min, holder of Transitional Consultant Certificate No. 0040, is an experienced consultant specializing in Ecology and Biodiversity, Groundwater and Hydrology, and Modelling for Water Quality. He completed his Bachelor of Botany (B.Sc) in 2010 and obtained a Diploma in GIS & RS Technology from Yangon University in 2016. Since 2013, he has actively participated in a diverse range of projects. His responsibilities encompass flora and fauna surveys, land use and mapping, implementing mitigation measures, and identifying project impacts.

U Si Thu Min Naing

U Si Thu Min Naing, holding Transitional Consultant Certificate No. 0223, is a highly skilled consultant with expertise in soil. In 2014, he successfully completed his BE-Mining Engineering

degree and later obtained a GIS & RS Diploma from Dagon University in 2020. From 2015 to 2017, he gained valuable experience as an assistant mining engineer. Since 2017, he has been actively working as an EIA consultant, contributing to numerous projects. His responsibilities encompass instrumentation and soil analysis, identifying and implementing effective measures to mitigate impacts, as well as land use planning and mapping for the assigned project.

U Tun Lin Maung (Legal Consultant)

U Tun Lin Maung, a legal consultant, obtained his Bachelor's Degree in Law from the University of Kyaukse in 2014. In 2018, he pursued a full-time Postgraduate Diploma in Business Law, followed by a Postgraduate Diploma in International Law in 2019 from Yangon University. With over eight years of experience, he specializes in representing civil and criminal cases, providing legal consultation for Fertilizer Company and Medical Company, and holds the Higher-Grade Pleader (H.G.P) license number 47999/2016.

Additionally, he has worked as a legal consultant on environmental impact assessment projects, where his responsibilities included drafting the legal section of the EIA report, analyzing project-specific laws, regulations, policies, and other national and international guidelines. As a legal expert, he played a pivotal role in analyzing, reviewing, and composing relevant national laws, regulations, rules, and policies for the project, such as the Environmental Conservation Law 2012, Environmental Procedure, and internationally recognized guidelines such as those from the International Finance Corporation and the World Health Organization (WHO). He is responsible for overviewing laws and regulation, legal analysis and technical report writing.

Daw May Thu Htet (Socioeconomic Consultant)

Daw May Thu Htet, a Socioeconomic Consultant currently collaborating with Guardians of Green Environmental Services, holds a Master's degree in Economics from Chiang Mai University (International Program) achieved in 2017, as well as a Bachelor's degree in Economics from Yangon University of Economics obtained in 2014. Her expertise lies in various areas, including coordinating the development of resettlement action plans, overseeing and managing the social team, formulating assessment methodologies and questionnaires, analyzing and interpreting data, devising social impact strategies, identifying project impact zones (both direct and indirect), and determining survey areas. She assumes the responsibility of developing assessment methodologies and questionnaires, analyzing and interpreting data, devising social impact strategies, socioeconomic evaluation and assessment, identifying project impact zones (both direct and indirect), and determining survey areas specifically for this project.

U Min Thu Hlaing (Technical Expert)

U Min Thu Hlaing is a Technical Expert who working with Guardians of Green Environmental Services since 2020. He has accomplished in Bachelor of Science (Geology) at Pathein University. He has experiences in Project Management, Risk Assessment, Occupational Health and Safety,

Wastewater Plan and Process water system. He is responsible for consulting in Risk Assessment, Occupational Health and Safety, Environmental Quality Monitoring, Environmental Quality Analysis, Project Design and Wastewater Treatment System, Hazard Management and Technical Report Writing.

1.4. MATERIALS AND METHODS

The method adopted for this project site consists of field work in which water and soil samples were collected, air quality was measured, field observations to determine the physical, environmental impact of Hotel and Resort development and the laboratory work in which representative samples collected from the field were analyzed for their physical and chemical properties contents.

1.4.1. Field Work

The fieldwork was carried out within the designated place of the study area. The fieldwork has framed and conducted by respective consultants, experts and technicians of GOG team. In this EIA study the following field of study were carried out in order to structure the EIA framework.

1.4.1.1. TERRESTRIAL ECOLOGY

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

1.4.1.2. MARINE ECOLOGY

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

1.4.1.3. WATER QUALITY

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

The samples were analyzed for the following parameters:

- pH
- Temperature
- Salinity
- Dissolved Oxygen
- Biochemical Oxygen Demand
- Turbidity
- Nitrate
- Phosphate

1.4.1.4. AMBIENT AIR QUALITY

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

The following parameters will be identified;

- PM10, PM 2.5
- Nitrogen Dioxide (NO2)
- Carbon monoxide (CO)
- Carbon Dioxide (CO2)
- Sulphur Dioxide (SO2)
- Relative Humidity
- Temperature

1.4.1.5. NOISE

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

Table: 1. 1- Requirement of Environmental Equipment for the exciting project

No.	Name and Model of Instrument	Purpose	Measuring Instrument
1.	Haz-Scanner (EPAS)	PM10, PM2.5, CO2, CO, NO2 and SO2	
2.	Digital Sound Level Meter	Noise	

1.4.1.6. Field Observations

Field observation was done by site visit of whole project area and visual inspection and technical approach in order to evaluate the physical and biological impact of the Hotel and Resort development area. The current land use of the proposed project area is inhibited.

1.4.1.7. Laboratory Work

The water samples were collected appropriate manner and analyzed at the relevant laboratory such as ISO Tech Laboratory and SGS. The results are as shown in (….)

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CHAPTER 2: PROJECT DESCRIPTION AND ALTERNATIVE SELECTION

2.1. OVERVIEW

This proposed project is undertaken by K Future Company Limited which is 100% Local investment. The proposed project is located at Bo Nat Kyaw island, North Latitude 10°33'37.15"N and East Latitude 98°14'2.26"E, Su Nge Baline Village Tract, Kawthaung Township, Tanintharyi Region. Bo Nat Kyaw island is part of the Myeik archipelago which located in southern Myanmar. It is approximately 73km by waterway from Kawthaung Township. The nearest island to the project is Nyaung Wee island and Lampi Island MNP (Marine National Park) area is located about twenty kilometers north of the project area. The project will be established in (50) acres of the island.

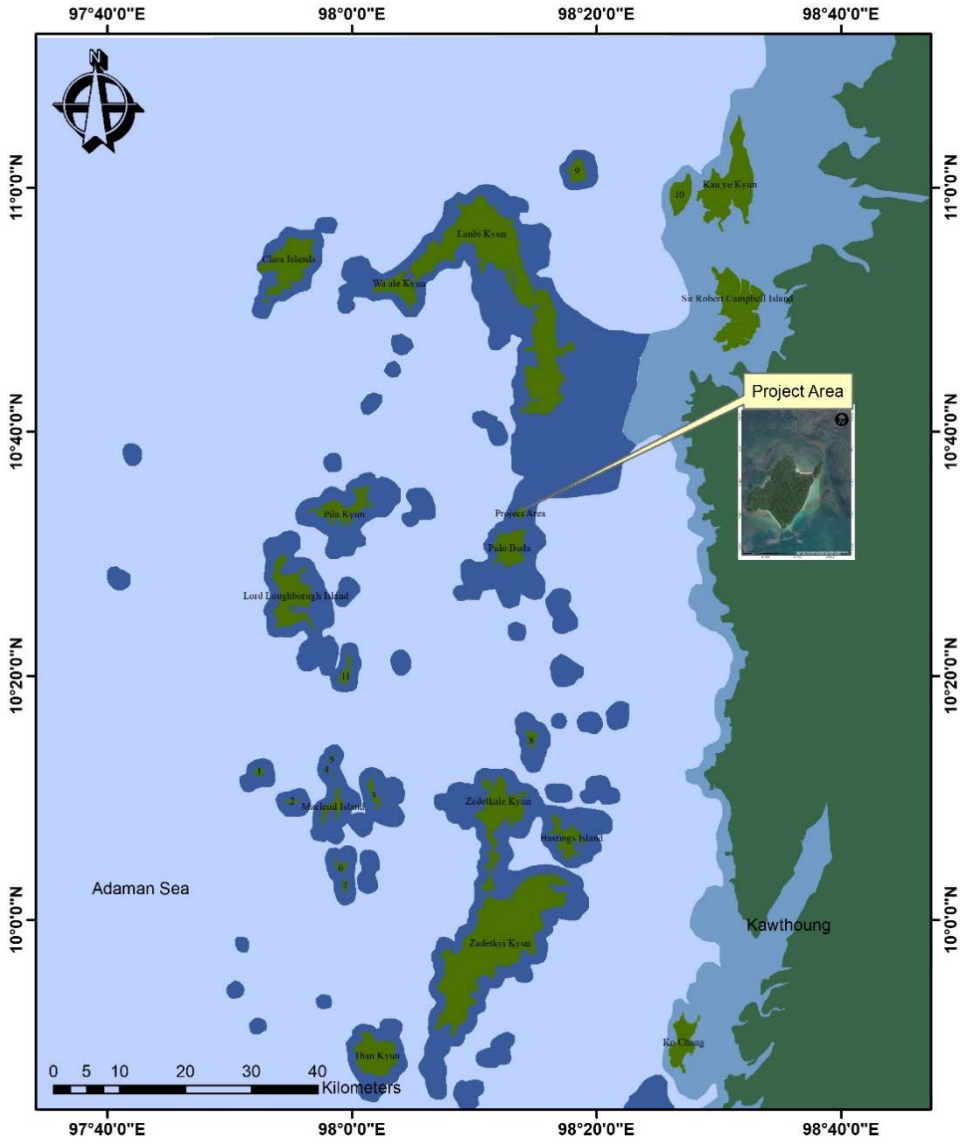


Figure: 2. 1- Proposed Project Location

2.2. PROJECT PROPONENT DESCRIPTION

K Future Company Limited is 100% local owned limited which has already received the permission from Myanmar Investment Commission to establish the resort development at Bo Nat Kyaw Island. The proposed project duration will be 42 months. The detailed information of project proponent description is shown below.

Board of Director List	
Name	**Position**
U Aung Thu Lwin	Managing Director
U Kaung Kyaw Swe	Director
U Ko Ko Latt	Director
Daw Su Su Lwin	Director
U Than Tun Win	Director
U Thet Phyo Lwin	Director
U Zaw Myint Htoo	Director

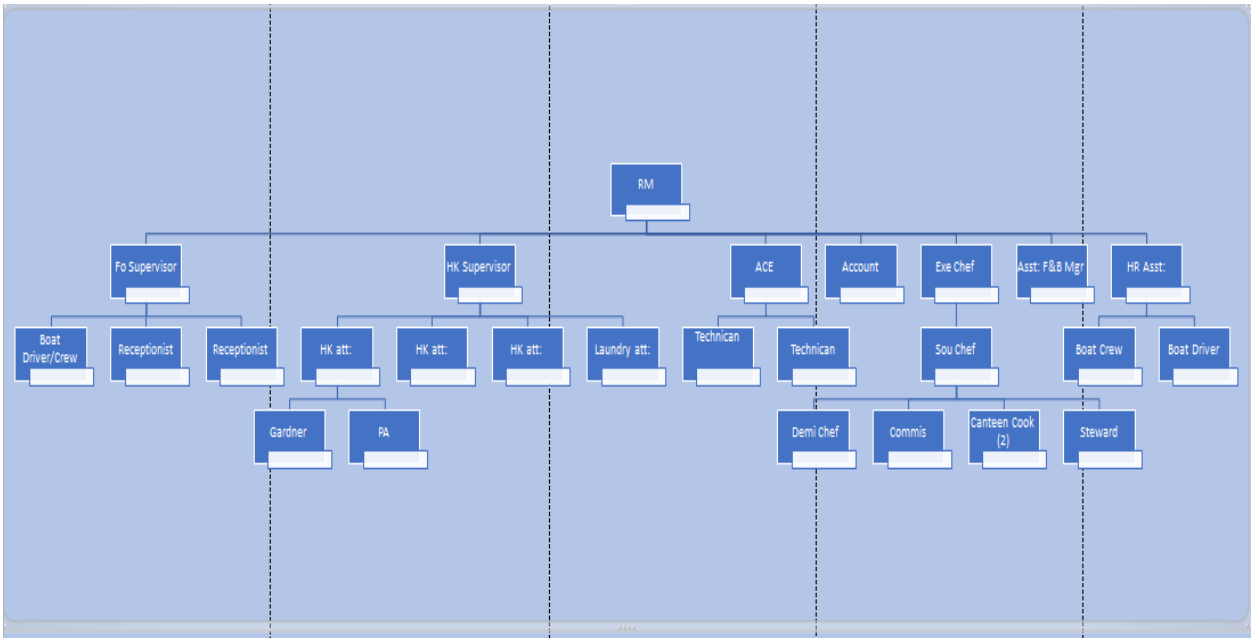


Figure: 2. 2-Organization Chart

2.3. PROJECT ALTERNATIVE AND SELECTION

2.3.1. Comparison and Selection of Alternatives

According to the requirement of EIA procedure clause 63, alternatives of the project have to be examined together with "No Action Alternatives". The comparisons between proposed alternatives are described below.

ALTERNATIVE 1: WITHOUT PROJECT OR NO ACTION ALTERNATIVES

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

- If there is no project, to promote the green economy will discourage
- No job opportunities would have created for local people if the project had not existed.
- If there are no more project implementations, there will be low human footprint

ALTERNATIVE 2: WITH PROJECT OR ACTION ALTERNATIVE

It means that the proposed project will be implemented as a plan. The major benefits of the proposed project play a significant role in the improvement of the economic and potential of employment opportunities. Moreover, the environmental and social impacts are predicted to be localized and reversible with the implementation of appropriate mitigation measures and by undertaking a regular compliance environmental monitoring plan. No adverse irreversible environmental or social impacts are anticipated.

The project site was selected as a most appropriate to establish a development other than surrounding island. K Future Company Limited is committed to abide the present rules and regulations concerning with social and environment. K Future was sturdily set up the restriction on the activities that disturbed the environment before the construction period. During the pre-construction K Future presented the awareness training and Dos' and Don'ts procedures to the construction workers with the cooperation of Forestry Department. The construction activities and services will be environmentally friendly to be restricted to lower the footprint on the island. In addition, within the lease of (700) acres, K Future will be established the operation area as (50) acres and the remaining area will be remained as natural buffer area. The operation activities will abide the environmental management plans.

2.4. PROPOSED PROJECT DEVELOPMENT

K Future Company Limited has already received permission from Myanmar Investment Commission (MIC) to establish the Hotel and Resort development at Bo Nat Kyaw island with the lease of (700) acres although K Future will use only (50) acres for the project. The construction period will be from 2017-2022.

2.4.1. Pre-Construction Activity

K Future was sturdily set up the restriction on the activities that disturbed the environment before the construction period. During the pre-construction K Future presented the awareness training and Dos' and Don'ts procedures to the construction workers with the cooperation of Forestry Department. A detail type of room and number of rooms are described in following table.

Table: 1. 2- Type of building

Type of Building	Number
Multipurpose Building	1
Main Reception	1
Bungalows	20
SPA	1
Swimming Pool	1
Back of House	3
Laundry	1
Canteen	1
Total	29

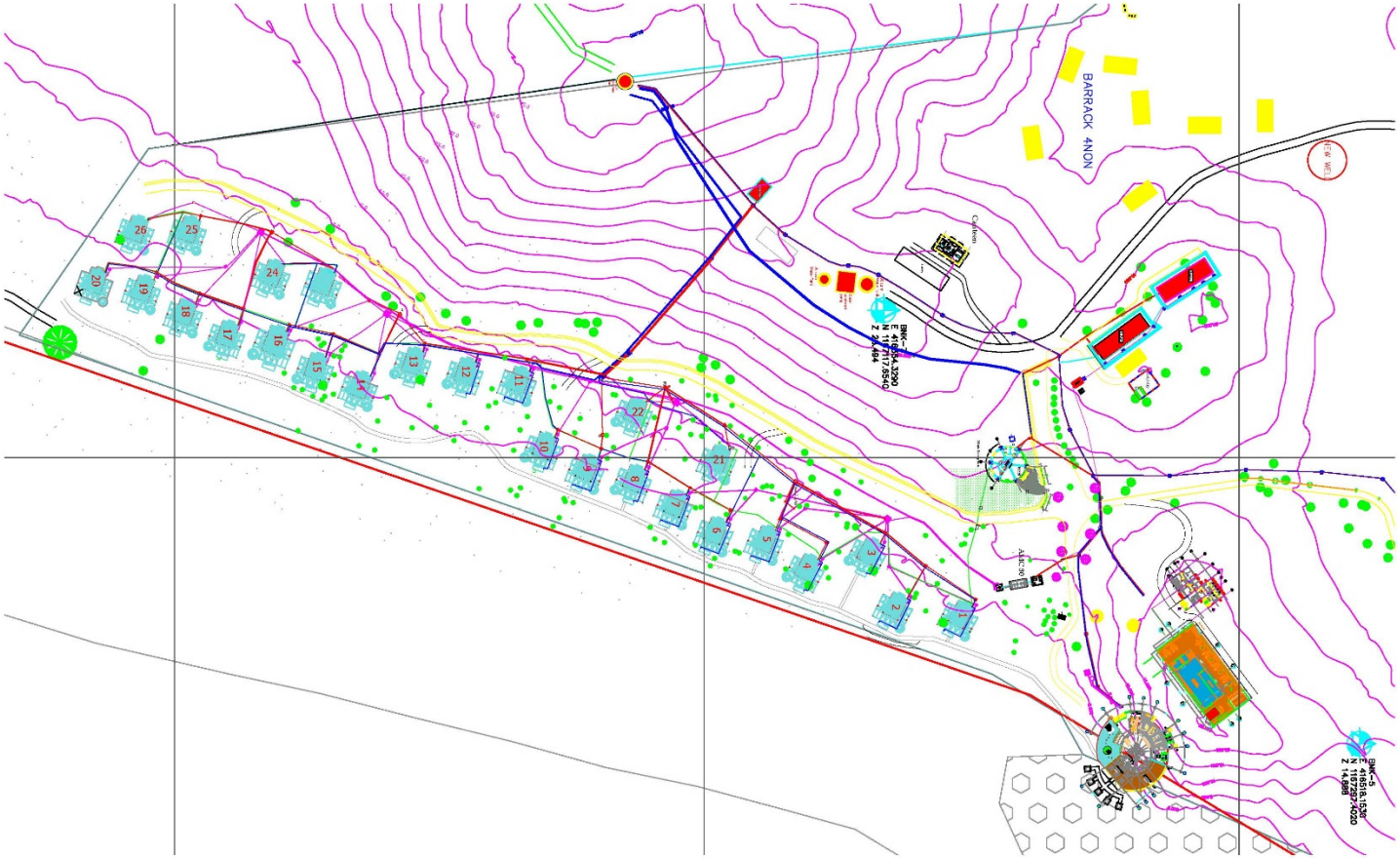


Figure: 2. 3- Project layout map

2.4.2. INVESTMENT PLAN

Kyat in Million		
Sr. no	Particular	Investment
1	In Cash	572.60
2	In Building	1,756.00
3	Jetty	149.27
4	EIA/SIA	26.32
5	In Machineries & Equipment	345.51
6	Furniture & Office supplies	130.63
7	Kitchen supplies	159.89
7	Kitchen supplies	159.89
8	Linen supplies	82.05
9	Glass ware	2.61
10	Boat	21.30
11	Dive supplies	23.00
12	Tube well	70.00
13	Land soaping	150.00
14	Cost of operation	627.46
15	Cost of (pre) operation	611.96
16	Other	672.46
	Total	5,401.06

2.4.3. BUILDING CONSTRUCTION:

The construction process will maintain a safe working environment during construction and afterward. It will have limited use of machinery and heavy machinery on the island. All the building establishment will be environmentally friendly and all the construction activities will be done least disturbance to the environment. During the construction process in order to reduce the cement usage, H.Beam (Steel) were used in the structure member. The hardwoods were restricted in building instead of local bamboo were used in decoration. In order to avoid the disruption of sand dunes and beach all the buildings were about 40 feets far from the beach. All the trekking route are determined and waste-bins were provided along side of the route. K

Future installed activated sludge treatment system for wastewater treatment and domestic water usage.

2.4.4. UTILITIES

2.4.4.1. ENERGY AND FUEL CONSUMPTION

Bo Nat Kyaw island is off grid with no power from the mainland, therefore, as an alternative energy source, K Future three (150) KVA diesel generators for electricity and two generators will be in standby. An estimated a total of (3,780) gallons of diesel will be consumed per year.

2.4.4.2. WATER STORAGE AND USAGE

The water resource can be obtained from two resources, groundwater and spring water. The current water usage will be sustained from groundwater extraction. The water will be stored in 50 cu.m and 25 cu.m water tanks. The water usage from island resources will be very limited due to the policies that will be implemented in the future. Drilling deep into the island will harm its long-term water sources but capturing rainwater through cisterns and large capture areas is the most environmentally friendly path and recommended. During the opening season the estimated water usage was 3,000 gallons per day and during the closing season the estimated water usage was 200 gallons per day. A total of 144,000 gallons per year.

Figure: 2. 4- Fresh water source (spring water)

2.4.5. HUMAN RESOURCES

	Position	Department	Level
1	Operation Manager		HOD

Front Office			
2	Room Division Manager	FO/ HK	HOD
3	FO Supervisor	Front Office	Supervisor
4	Receptionist	Front Office	Basic staff
5	Receptionist	Front Office	Basic staff
Housekeeping			
	Room		
6	HK Manager	Housekeeping	HOD
7	HK Attendant	Housekeeping	Basic staff
8	HK Attendant	Housekeeping	Basic staff
9	HK Attendant	Housekeeping	Basic staff
10	HK Attendant	Housekeeping	Basic staff
11	PA / Pool Attendant	Housekeeping	Basic staff
12	Laundry Attendant	Housekeeping	Basic staff
	Garden		
13	Gardener	Housekeeping	Basic staff
14	Gardener	Housekeeping	Basic staff
15	Gardener	Housekeeping	Basic staff
16	Gardener	Housekeeping	Basic staff
SPA			
17	SPA Supervisor	Housekeeping	Supervisor
18	SPA Attendant	Housekeeping	Basic staff
19	SPA Attendant	Housekeeping	Basic staff
F&B Service			
20	F&B Manager	Food & Beverage	HOD
21	Bar Attendant	Food & Beverage	Supervisor
22	Bar Attendant	Food & Beverage	Senior Staff

23	F&B Attendant	Food & Beverage	Basic Staff
24	F&B Attendant	Food & Beverage	Basic Staff
25	F&B Attendant	Food & Beverage	Basic Staff
26	F&B Attendant	Food & Beverage	Basic Staff
F&B Production			
27	Head Chef	F&B Production	HOD
28	Pastry Chef	F&B Production	HOD
29	Demi Chef	F&B Production	Supervisor
30	Commis 1	F&B Production	Basic staff
31	Commis 2	F&B Production	Basic staff
32	Steward	F&B Production	Basic staff
33	Steward	F&B Production	Basic staff
Engineering			
34	Asst; Chief Enginner	Eng;	HOD
35	Engineer	Eng;	Supervior
36	Engineer Helper	Eng;	Basic Staff
37	Engineer Helper	Eng;	Basic Staff
Admin & Finance			
38	Admin (Kawthaung)	Admin	Supervisor
39	Accountant(Kawthaung)	Finance	Asst; Supervisor
40	Cashier	Finance	Basic Staff
41	Inventory	Finance	Basic Staff
HR			
42	Asst; HR Assistant	Human Resource	HOD
43	Canteen Cook	Human Resource	Basic Staff
44	Canteen Cook	Human Resource	Basic Staff
Guest Boat			

45	Boat Driver	RDM	Superviosr
46	Boat Helper	RDM	Basic Staff
47	Boat Helper	RDM	Basic Staff

2.4.6. MACHINERY AND EQUIPMENT LIST

Excavator JCB	2
Excavator Case	2
Dump Truck	2
200 KVA Generator	3
100 KVA Generator	2
Construction Equipment	4 sets

2.4.7. WASTEWATER TREATMENT PLAN

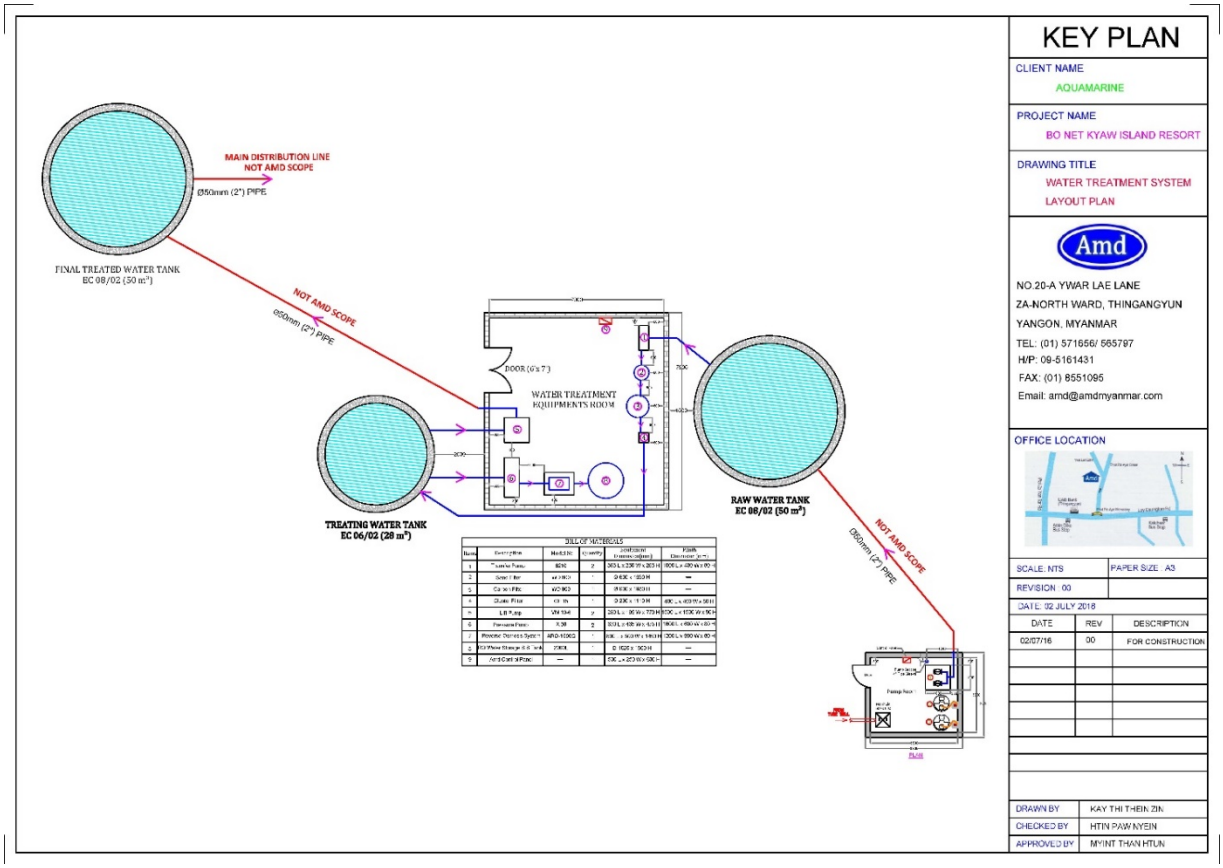


Figure: 2. 5- wastewater treatment system

PROCESS DESCRIPTION

This AMD water treatment system comprises the following process steps:

- pH adjustment
- Chlorination
- Filtration
- Dechlorination
- Fine Filtration
- UV Sterilization
- Reverse Osmosis
- pH adjustment after RO system
- Distribution

(a) pH adjustment

Tube well is filling into the Reservoir tank is not Amd scope of work. Tube well water from the Reservoir tank is pumped up via Davey transfer pump set (Model: VM 10-4 with 200 L cell) and transfer to the SBS raw water storage tank (Model: EC 08/02). During transferring period, tube well water is treated with pH adjustment chemical via Prominent dosing pump. 10% Liquid Caustic which is stored in the plastic container (200 L) is injected into raw water pipe line. Function of dosing pump is controlled via transfer pump for connection to electrical control panel. pH level is achieved to the normal pH level by pH adjustment system.

(b) Chlorination

After pH adjustment system, tube well water is again treated with 3% Liquid chlorine which is stored in the plastic container (200L). 3% liquid chlorine is dosed via prominent dosing pump and it is injected into the raw water pipe line. Function of dosing pump is also controlled via transfer pump for connection to electrical control panel. Chlorine destroys any harmful microorganism contained in the water and it is very effective chemical which is widely used as a disinfectant for water treatment system. Chlorinated water is then filled into the raw water tank (Model: EC 08/02) (50 m3).

(c) Filtration

Water from the SBS raw water storage tank (Model: EC08/02) (50 m3) is pumped up via Dual Davey Sand Filter Transfer Pump (Model: Dynaflo 6210) and passing through the Single Waterco Sand filter (Model: WD 600). Sand media which is imported from Australia is filled inside the filter housing and it removes the dirt particle contained in the water. Waterco filter housing is a high-performance corrosion-proof filter and ease operation features. Multiport valve handle is very easy for backwashing and positioning.

(d) Dichlorination

Sand Filter outlet water is again entered into the Single Waterco Carbon Filter (Model: WD 900). Activated Carbon which is imported from Sri Lanka is filled inside the filter housing. It removes odor & colour of the chlorine and also provides additional filtration.

(e) Fine Filtration

Dechlorinated water is then entered into the single Aquapro Stainless Steel Cluster Filter Housing (Model: CF-15). Five units of 30", 5µ PP String Cartridge filter are filled inside the housing and those filters can remove the dirt particles contained in the water to be finer. Fine filter water is then filled into the treated water tank (Model: EC 06/02) (28 m3). Treated water from the tank (EC 06/02) (28 m3) is pumped up via Davey Lift pump set (Model: VM 10-6 with 200L) and transfer to the overhead treated water tank (Model: EC 08/02) (50 m3).

(f) UV Sterilization

Treated water from the overhead treated tank (Model: EC 08/02) (50 m3) is entered into the three units of UV sterilization system (Model: UV 12 GPM-HTM) via gravity flow. UV filters are attached with the 20", 2.5 dia cartridge filter including 5-micron filter cartridge which is used as pre-filter. UV unit is used as secondary sterilization system in this water treatment system and Ultra Violet ray destroys any harmful microorganism contained in the treated water. UV light disinfection systems require a continuous power supply to power the light bulb. If the power fails or falls below the correct operating level the UV light intensity will fail or fall and as a result the system will not be able to safely disinfect water. UV outlet water is then distributed to the Kitchen.

(g) Reverse Osmosis

Water from the treated water tank (Model: EC06/02) (28 m3) is pumped up via Dual Davey Pressure pump (Model: X 50) then passing through the Reverse osmosis unit (Model: ARO 1500 GPD). Reverse Osmosis is a water treatment process that removes contaminants from water by using pressure to force water molecules through a semipermeable membrane. It can remove many types of dissolved and suspended chemical species as well as biological one (principally bacteria) from water and it used in both industrial processes and the production of potable water. RO outlet water is then stored in the stainless-steel tank (2000 L).

(h) pH adjustment after RO system

Before storing the RO outlet water into the stainless-steel tank (2000L), RO water is treated with the pH adjustment chemical via Prominent dosing pump. 10% Liquid Caustic which is stored in the plastic container (200 L) is injected into RO water pipe line. Function of dosing pump is controlled via Dual Davey pressure pump (Model: X 50) for connection to electrical control panel.

(i) Distribution

- Reverse Osmosis Outlet Water is distributed for the drinking water purpose.
- UV system outlet water is distributed to the kitchen
- Treated water without passing through the UV system is distributed to the Resort.

OPERATING PROCEDURE

The operation of the water treatment system installed at “Bo Net Kyaw Island” is carried out by automatic operation as below.

Filling up the tube well water into the reservoir tank is not Amd scope of work.

Set the Sand filter to be in FILTER mode. (Depress Vari-flo control valve handle and rotate to FILTER position.)

Set the Carbon filter to be in FILTER mode. (Depress Vari-flo control valve handle and rotate to FILTER position.)

Switch on the power for pH adjustment dosing pump. Check the 10% Liquid Caustic level inside the chemical tank and if necessary fill adequate solution. (Solution level must be at least half of the PE tank) For the pH adjustment, suction line of the Liquid Caustic dosing pump is in the special plastic container which stores the chemical, and Liquid Caustic is injected into the water flow line. Check injection valve which put on tube well water pipe, if necessary, clean with fresh water. Check foot valve which place inside of chemical storage container, if necessary, clean with fresh water.

Switch on the power for Chlorine dosing pump. Check the 3% liquid chlorine level inside the chemical tank and if necessary fill adequate solution. (Solution level must be at least half of the PE tank)

For the chlorination, suction line of the Cl2 dosing pump is in the special plastic container which stores the chemical, and chlorine is injected into the water flow line. Check injection valve which put on treated water pipe, if necessary, clean with fresh water. Check foot valve which place inside of chemical storage container, if necessary, clean with fresh water. Check inlet /outlet ball valve position of the filters, transfer pump, lift pump and pressure pump should be connected with the Amd control panel.

Set the one unit Amd control panel to be in Auto mode.

The function of transfer pump, lift pump and pressure pump are controlled by seven float switches as follows:

Float Switch F/S- 1 is installed inside the Reservoir tank.

Float Switch F/S – 2 is installed inside the Raw water tank (EC08/02) (50 m3).

Float Switch F/S-3 is installed inside the Raw water tank (EC08/02) (50 m3)

Float Switch F/S- 4 is installed inside the Treated water tank (EC06/02) (28 m3)

Float Switch F/S-5 is installed inside the Treated water tank (EC06/02) (28 m3)

Float Switch F/S-6 is installed inside the Over Treated water tank (EC08/02) (50 m3)

Float Switch F/S- 7 is installed inside the RO stainless steel tank (2000L)

For F/S (1)

F/S (1) is activated if water level inside the Reservoir tank is low, signal light will be on and buzzer will be alarmed at the control panel. Then Davey Transfer pump set (Model: 2 x VM10-4 with 200L cell) operation will be stopped.

For F/S (2)

F/S (2) is activated if water level inside the Raw water tank (EC08/02) (50 m3) is high, it will stop the operation of Davey Transfer pump set (Model: 2 x VM 10-4 with 200L cell).

Overload

If those Davey Transfer pump set (Model: 2 x VM 10-4 with 200L cell) are in abnormal situation, overload light will be ON and buzzer will be alarm at the control panel.

For F/S (3)

F/S (3) is activated if water level inside the Raw water tank (EC08/02) (50 m3) is low, it will stop the operation of Dual Davey Sand Filter Transfer pump (Model: Dynaflo 6210)

For F/S (4)

F/S (4) is activated if water level inside the treated water tank (EC06/02) (28 m3) is high, it will stop the operation of Dual Davey Sand Filter Transfer pump (Model: Dynaflo 6210).

Overload

If Dual Davey Sand filter transfer pump (Model: Dynaflo 6210) are in abnormal situation, overload light will be ON and buzzer will be alarm at the control panel.

For F/S (5)

F/S (5) is activated if water level inside the treated water tank (EC06/02) (28 m3) is low, it will stop the operation of Davey Lift Pump set (Model: 2 x VM 10-6 with 200L cell) and Dual Davey Pressure pump (Model: X 50).

For F/S (6)

F/S (6) is activated if water level inside the overhead treated water tank (EC08/02) (50 m3) is high, it will stop the operation of Davey lift pump set (Model: 2 x VM 10-6 with 200L cell).

For F/S (7)

F/S (7) is activated if water level inside the Stainless-Steel RO storage tank (2000 L) is high, it will stop the operation of Dual Davey pressure pump (Model: X 50).

Overload

If Davey Lift pump set (Model: 2 x VM 10-6 with 200 L cell) are in abnormal situation, overload light will be ON and buzzer will be alarm at the control panel.

If Dual Davey Pressure pump (Model: X 50) are in abnormal situation, overload light will be ON and buzzer will be alarm at the control panel.

**Davey Transfer pumps set (Model: 2 x VM 10-4 with 200L cell), Dual Davey transfer pump (Model: Dynaflo 6210, Davey Lift pump Set (Model: 2 x VM 10-6 with 200 L cell) and Dual Davey Pressure Pump (Model: X 50) are alternatively operating (One Hour Duty and One Hour standby)

For convenience, the functionality of each float switch is tabulated as below:

FS #	Tank	Situation	Pump	Function
F/S-1	Reservoir Tank	Low Level (ALARM ON)	Transfer Pump Set (2 x VM 10-4 with 200L cell)	STOP
F/S-2	Raw water tank (EC 08/02) (50 m3)	High Level	Transfer Pump Set (2 x VM 10-4 with 200L cell)	STOP
F/S-3	Raw water tank (EC 08/02) (50 m3)	Low Level	Sand Filter Transfer Pump (2 x Dynaflo 6210)	STOP
F/S-4	Treated water tank (EC 06/02) (28 m3)	High Level	Sand Filter Transfer Pump (2 x Dynaflo 6210)	STOP
F/S-5	Treated water tank (EC 06/02) (28 m3)	Low Level	Lift Pump Set (2 x VM 10-6 with 200L & Pressure Pump (2 x X 50)	STOP
F/S-6	Overhead Treated water tank (EC08/02) (50 m3)	High Level	Lift Pump Set (2 x VM 10-6 with 200L	STOP
F/S-7	Stainless Steel RO storage tank (2000L)	High Level	Pressure Pump (2 x X 50)	STOP

By-Pass Arrangement and Backwashing for Maintenance

The Sand filter & Carbon filter are fitted with by-pass valves; hence it is very easy to carry out repairs and maintenance. These filters are mounted with multiport valves in order to do regular service easily as required.

- All pumps are protected by low level cut-off float switches.
- All filters can be by-passed by using the installed ball valves.
- Barrel unions are also installed for easy maintenance.

OUTLET WATER QUALITY FROM AMD SYSTEM

This outlet water quality is dependent on the existing feed water quality and the ongoing maintenance and service upon equipment operation according to the manual.

K-FUTURE

RAW WATER (Chemical Test Result)

Sr.	Item	Unit	WHO Guide Potable Water
1.	Turbidity	NTU	5 NTU
2.	pH		6.5 ~ 8.5
3.	Total Dissolved Solids	mg/l	1000 mg/l
4.	Total Hardness	mg/l as CaCO3	N/A
5.	Total Alkalinity	mg/l as CaCO3	N/A
6.	Iron (Fe)	mg/l	0.3 mg/l
7.	Manganese	mg/l as Mn	0.1 mg/l

TREATED WATER (Chemical Test Result)

Sr.	Item	Unit	WHO Guide Potable Water
1.	Turbidity	NTU	5 NTU
2.	pH		6.5 ~ 8.5
3.	Total Dissolved Solids	mg/l	1000 mg/l
4.	Total Hardness	mg/l as CaCO3	N/A
5.	Total Alkalinity	mg/l as CaCO3	N/A
6.	Iron (Fe)	mg/l	0.3 mg/l
7.	Manganese	mg/l as Mn	0.1 mg/l

K-FUTURE

CHAPTER 3: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1. INSTITUTIONAL FRAMEWORK FOR ENVIRONMENTAL CONSERVATION

Under Section 3 of the Environmental Impact Assessment Procedure (2015), pursuant to section 21 of the law and Articles 52, 53 and 55 of the Environmental Conservation Rules, all projects and project expansions undertaken by any organization, which may cause an impact on environmental quality, are required to obtain Prior Permission. This is to be in accordance with section 21 of the Environmental Conservation Law, and Article 62 of the Environmental Conservation Rules, having the potential to cause Adverse Impacts, are required to undertake IEE or EIA or to develop an EMP, and to obtain an Environmental Compliance Certificate (ECC) in accordance with this Procedure. Project proponent commitment letter and Third party (GOG) commitment letter are shown in Appendix 5.

3.1.1. NATIONAL LAWS AND REGULATIONS

There is no environmental and social policy in project propnent therefore the project proponent must follow to laws, policy, regulations, environmental management plan and environmental monitoring plan in this IEE report. National laws and regulations for environmental protection applicable to the proposed project are compiled and presented in **Error! Reference source not found.**.

Table: 2. 1- Relevant National Laws and Regulations of Myanmar

Laws and Regulations	Description
Constitution of the Republic of the Union of Myanmar (2008)	
The Constitution of the Union of Myanmar is the supreme law of the country and has provisions regarding the protection of the environment in Myanmar. Articles in the Constitution relevant to environmental protection are Articles 37, 42 and 390. They are quoted below:	
Article 37	The Union is the ultimate owner of all lands and all-natural resources above and below the ground, above and beneath the water and in the atmosphere in the Union; The Union shall enact necessary law to supervise extraction and utilization of State-owned natural resources by economic forces;
Article 42	The Union shall protect and conserve the natural environment.
Article 390	Every citizen has the duty to assist the Union in carrying out the following matters:

Laws and Regulations	Description
	Preservation and safeguarding of cultural heritage; Environmental conservation; Striving for development of human resources; Protection and preservation of public property. These three Articles in the Constitution provide a basis for legalizing and institutionalizing environmental health impact assessment and social impact assessment.
Myanmar National Environmental Policy (2019)	
Mission	To achieve a clean environment, with healthy and functioning ecosystems, that ensures inclusive development and wellbeing for all people in Myanmar.
Vision	To establish national environmental policy principles for guiding environmental protection and sustainable development and for mainstreaming environmental considerations into all policies, laws, regulations, plans, strategies, programs and projects in Myanmar.
National Land Use Policy (2016)	
Objectives	To promote sustainable land use management and protection of cultural heritage areas, environment, and natural resources in the interest of all people in the country; To strengthen land tenure security for the livelihoods improvement and food security of all people in both urban and rural areas of the country; To recognize and protect customary land tenure rights and procedures of the ethnic nationalities; To develop transparent, fair, affordable and independent dispute resolution mechanisms in accordance with the rule of law; To promote people centered development in land resources and accountable land use administration in order to support the equitable economic development of the country; To develop a National Land Law in order to implement the above objectives of the National Land Use Policy.
The Environmental Conservation Law (2012)	

Laws and Regulations	Description
The Pyidaungsu Hluttaw enacted this law by Law No. 9 of 2012 on the date of 30thMarch, 2012. March, 2012. The legal mechanism for ESHIA has been put in this law. This law was enacted with the objectives of: To enable to implement the Myanmar National Environmental Policy; To enable to lay down the basic principles and give guidance for systematic integration of the matters of environmental conservation in the sustainable development process; To enable to emerge a healthy and clean environment and to enable to conserve natural and cultural heritage for the benefit of present and future generations; To reclaim ecosystems as may be possible which are starting to degenerate and disappear; To enable to manage and implement for a decrease and loss of natural resources and for enabling the sustainable use beneficially; To enable to implement for promoting public awareness and cooperation in educational for dissemination of environmental perception; To enable to promote international, regional and bilateral cooperation in the matters of environmental conservation; To enable to cooperate with Government Departments, Government Organizations, International Organizations, non-government organizations and individuals in matters of environmental conservation. The following articles are particularly relevant to EIA requirements and this project: Article 7 of chapter 4 mentions the need for SIA and EIA for any project operated by the government or organizations or individuals. The duties and powers relating to the environmental conservation of the Ministry are as follows: Implementing the environmental conservation policies Laying down, carrying out and monitoring programs for conservation and enhancement of the environment and for conservation, control and abatement not to cause environmental pollution Specifying categories and classes of hazardous wastes generated from the production and use of chemicals or other hazardous substances in carrying out industry, agriculture, mineral production, sanitation and other activities; Prescribing categories of hazardous substances that may affect significantly at present or in the long run on the environment;	

Laws and Regulations	Description
Promoting and carrying out the establishment of necessary factories and stations for the treatment of solid wastes, effluents and emissions which contain toxic and hazardous substances; Prescribing the terms and conditions relating to effluent treatment in industrial estates and other necessary places and buildings and emissions of machines, vehicles and mechanisms; Laying down and carry out a system of Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) as to whether or not a project or activity to be undertaken by any Government department, organization or person may cause a significant impact on the environment; Managing to cause the polluter to compensate for the environmental impact, cause to contribute funds by the organizations which obtain benefit from the natural environment service system, cause to contribute a part of the benefit from the businesses which explore, trade and use the natural resources in environmental conservation works.″ Also, in this law, Article 14 and Article 15 are related to waste disposal in accordance with environmental standards and the developer will be abide all the statement and necessary measurement which stated in this law 14. A person causing a point source of pollution shall treat, emit, drainage and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards. 15. The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmentally sound methods. 16. A person or organization operating business in the industrial estate or business in the SEZ or category of business stipulated by the Ministry: is responsible to carry out by contributing the stipulated cash or kind in the relevant combined scheme for the environmental conservation including the management and treatment of waste; is responsible to carry out by contributing the stipulated cash or kind in the relevant combined scheme for the environmental conservation including the management and treatment of waste; shall contribute the stipulated users' charge s or management fees for the environmental conservation according to the relevant industrial estate, SEZ and business organization	

Laws and Regulations	Description
shall comply with the directives issued for environmental conservation according to the relevant industrial estate, SEZ or business.	
Employment and Skill Development Law (2013)	
Purpose: To ensure the job security and to develop the employee's skill with the fund of project owner: The project proponent has to appoint employees with the contract in line with the provision of section 5 of said law. The project proponent has to carry out the training programs with the policy of Skill Development Body to develop the employment skill of employees who is appointed or will be appointed, under section 14 of said law. The project proponent has to monthly pay to the fund, which is fund for development of skill of employees, not less below 0.5 percentage of the total payment to the level of worker supervisor and the workers below such level, under sub-section (a) of section 30 of said law. The project proponent has to promise not to deduct from the payment of employees for above mentioned fund, under sub-section (b) of section 30 of said law.	
Minimum Wages Law (2013)	
Purpose: To ensure the project owner pay the wages not less than prescribed wages and notify obviously this wage in work place, moreover to be inspected. The project proponent has to pay the wages in line with section 12 of said law. The project proponent has to notify the prescribed wages obviously in work place under sub-section (a) of section 13 of said law. The project proponent has to correctly record the lists, schedules, documents and wages and report these to the relevant department and give if these are asked while inspecting, in accord with the stipulations under sub-section (b)(c)(d) of section13 of said law. The project proponent has to allow to be inspected by the inspector, under sub-section (d) and (e) of section 13 and section 18 of said law. The project proponent has to allow holiday for medical treatment if the employee' health is not fit to work, under sub-section (f) of section 13 of said law. The project proponent has to allow holidays without deducting from the wages if one of parents or one of family dies, under sub-section (g) of section 13 of said law.	

Laws and Regulations	Description
The Environmental Conservation Rules (2014)	
The Ministry of Environmental Conservation and Forestry, in the exercise of power conferred under sub-section (a) of section 42 of the Environmental Conservation Law, issues this rule by No. 50 of 2014 on the date of 5th June, 2014.	
Rule 51	The Ministry shall assign duty to the Department for enabling to adopt and carry out the environmental impact assessment system.
Rule 52	The Ministry shall determine the categories of plan, business or activity which shall carry out environmental impact assessment
Rule 53	The Ministry shall to scrutinize whether or not it is necessary to conduct environmental impact assessment, determine the proposed plans, businesses or activities which do not include in stipulation under rule 52
Rule 56	The person who carries out any project, business or activity shall arrange and carry out for conducting the environmental impact assessment for any project, business or activity of a qualified third person or organization accepted by the Ministry.
Rule 58	The Ministry shall form the Environmental Impact Assessment Report Review Body with the experts from the relevant Government departments, Government organizations.
Rule 61	The Ministry may approve and reply to the EIA report or IEE or EMP with the guidance of the Committee
Rule 69	Any person shall not emit, cause to emit, dispose, cause to dispose, pile and cause to pile, by any means, the pollutants and the hazardous waste or hazardous material stipulated by notification under the Law and any of these rules at any place which may affect the public directly or indirectly. Any person shall not carry out to damage the ecosystem and the natural environment which is changing due to such system, except for carrying out with the permission of the Ministry for the interest of the people.
The Forest Law (1992)	
The State Law and Order Restoration Council had enacted the following Law in 3 November, 1992 as Forest Law.	
Chapter II: Basic Principles	3. This Law shall be implemented in accordance with the following basic principles:

Laws and Regulations	Description
	to implement the forestry policy of the Government; to implement the environmental conservation policy of the Government; to promote the sector of public co-operation in implementing the forestry policy and the environmental conservation policy of the Government.
Chapter IV: Management of Forest Land	9. The functions and responsibilities of the Forest Department are as follows: - implementation of the forestry policy of the Government; implementation of the plans relating to conservation of water, bio-diversity and environment, sustained yield of forest produces and protection of forest covered land; management of forest land in accordance with the provision of this Law; submitting proposals to the Minister for the determination, alteration or cancellation of reserved forest, protected public forest and species of reserved trees; Whoever, within a forest land and forest covered land at the disposal of the Government: is desirous of carrying out any development work or economic scheme shall obtain the prior approval of the Forestry Ministry.
Chapter XII: Offences and Penalties	40. Whoever commits any of the following acts shall, on conviction be punished with fine which may extend to Kyat 5,000 or with imprisonment for a term which may extend to 6months or with both: trespassing and encroaching in a reserved forest; pasturing domestic animals or permitting domestic animals to trespass in a reserved forest; breaking up any land, clearing, digging or causing damage to the original condition of the land without a permit in a reserved forest; causing damage to a water-course, poisoning in the water, using chemicals or explosives in the water in a reserved forest; catching animals, hunting or fishing in a reserved forest; kindling, keeping, carrying any fire or leaving any fire burning which may set fire to the forests in a reserved forest;

Laws and Regulations	Description
	h) violating any provision of the rule, procedure, order, directive or notification issued under this Law.
The Protection of Wildlife and Natural Areas Law (1994)	
The State Law and Order Restoration Council had enacted the Protection of wildlife and Natural Areas Law on 8th June, 1994.	
Objectives	The objectives of this Law are as follows: - to implement the Government policy for wildlife protection; to implement the Government policy for natural areas conservation; to carry out in accordance with the International Conventions acceded by the State in respect of the protection and conservation of wildlife, ecosystems and migratory birds; to protect endangered species of wildlife and their natural habitats.
Protected Wildlife	15. The Director General shall, with the approval of the Minister: determine and declare endangered species of wild animal which are to be protected according to the following categories: completely protected species of wild animals; normally protected species of wild animals; seasonally protected species of wild animals; determine and declare the endangered species of wild plants and their nature habitats thereof; lay down and carry out measures for the preservation of protected wildlife species;
Taking Administrative Action	31. A Forest Officer may pass an administrative order causing a fine that may extend to Kyat 10,000 to be paid, on a person who kills, hunts, wounds or raises a seasonally protected wild animal without permission during the closed season.
The Forest Law (2018)	
Purpose: To ensure in carrying out the project with the permission of Ministry of Natural Resources and Environmental Conservation if the project land is forest land or forest covered land. This law focuses as follow:	

Laws and Regulations	Description
The project proponent has to obtain the permission of Ministry of Natural Resources and Environmental Conservation before starting the work if the project land is forest land or forest covered under sub- section (a) of section 12.	
Protection of Biodiversity and Protected Area Law (2018)	
Purpose: To ensure abiding by the prohibitions and stipulations to protect biodiversity and protected area. The project proponent has to avoid entering the prohibited area located in protected area without permission under sub-section (a) of section35. The project proponent has to avoid digging on the land or carrying out any activity in protected area under sub-section (c) of section35. The project proponent has to avoid extracting, collecting or destroying in any manner, any kind of wild or cultivated plant in protected area under sub-section (d) of section35 The project proponent has to avoid polluting soil, water and air, damaging a water-course or poisoning water, electrification, using chemical or explosive materials in protected area under sub-section (a) of section39. The project proponent has to avoid possessing or disposing of toxic objectives or mineral wastes in protected area under sub-section (b) of section39.	
Public Health Law (1972)	
Purpose: to ensure the public health include not only employees but also resident people and cooperation with the authorized person or organization of health department. It is concerned with the protection of peoples' health by controlling the quality and cleanliness of food, drugs, environmental sanitation, epidemic diseases and regulation of private clinics. The project owner will cooperate with the authorized person or organization in line with the section 3 and 5 of said law. Section 3: The project owner will abide by any instruction or stipulation for public health. Section 5: The project owner will accept any inspection, anytime, anywhere if it is needed.	
Myanmar Hotel and Tourism Law (2018)	

Laws and Regulations	Description
Rights and Responsibilities of a Person who Operates Tourism Business 13. Any person who operates a tourism business has the right to: (a) apply for a tourism business licence in accordance with the stipulations; (b) report difficulties with regard to tourism services to the Tourism Executive Committee, the Ministry, the Regional Tourism Executive Committee or the Directorate, if necessary. 14. Any person who operates a tourism business has the responsibility to: (a) operate in a responsible and sustainable manner; (b) respect Myanmar cultural heritage, customs and traditions, and conserve the natural environment; (c) abide by the provisions of this Law, rules, notifications, orders and directives issued by this Law; (d) ensure the fundamental health, security and safety of tourists; (e) protect the privacy and personal data of tourists; (f) pay taxes and fees to the relevant departments in accordance with the existing laws; (g) abide by terms and conditions of the licence.	
Prevention and control of communicable Disease Law (1995)	
Purpose: to ensure the healthy work environment and prevention the communicable diseases by the cooperation with the relevant health department The project owner will cooperate with the health officer in line with the clause (9) of subsection(a) of section 3 of said law. The project owner will abide by any instruction or stipulation for public health. Section 4 The project owner will inform promptly to the nearest health department or hospital if the following are occurred; (section 9) (a) mass death of birds or chicken (b) mass death of mouse (c) suspense of occurring of communicable disease or occurring of communicable disease (d) occurring of communicable disease which must be informed The project owner will accept any inspection, anytime, anywhere if it is needed. (section 11)	

Laws and Regulations	Description
Social Security Law (2012)	
Purpose: The project proponent has to create the social security for the employees because the project is the business under the Myanmar Citizen Investment Law. To ensure the social security for employees of the project, the project owner has to register to the social security offices and to pay the prescribed fund. The project proponent has to register to the respected social security office, under sub-section (a) of section 11 of said law The project proponent has to pay the social security fund for at least four types of social security included in sub-section (a) of section 15, under section 15 of said law. The project proponent has to pay the fund which has to be paid myself and together with the fund which has to be paid from their salary by the employees .Moreover the project owner will pay the cost for paying the above mentioned fund only myself under sub-section (b) of section 18 of said law. The project proponent has to pay the fund for accidence, under sub-section(b) of section 48 of said law. (but this fund is not related to workmen compensation so if it is needed compensation must be separately paid by the Workmen compensation Act) The project proponent has to make correctly and submit the list and record provided in section 75 to respected social security office, under section 75 of said law.	
Myanmar Fire Services Law (2015)	
The objectives of Myanmar Fire Force Law are: To take precautionary and preventive measure and loss of state own property, private property, cultural heritage and the lives and property of public due to fire and other natural disasters To organize fire brigade systemically and to train the fire brigade To prevent from fire and to conduct release work when fire disaster, natural disaster, epidemic disease or any kind of certain danger occurs To educate, organize an inside extensively so as to achieve public corporation To participate if in need for national security, peace for the citizens and law and order The relevant Government Department or organization shall, for the purpose of precaution and prevention, obtain the approval of the Fire force Department before granting permission for the following cases: Constructing three-storied and above buildings market and condominium buildings,	

Laws and Regulations	Description
Operating hotel, motel, guest house enterprise Constructing factory, workshop, storage facilities and warehouse Operating business expose to fire hazard by using in inflammable materials or explosive materials Producing and selling fire-extinguishing apparatuses Doing transport business, public utility vehicles train, airplane, helicopter, vessel, ship, etc. The relevant government department or organization shall obtain the opinion of the Fire Services Department for the purpose of fire precaution and prevention, when laying down plans for construction for town, village and downtown or village development plans.	
Underground Water Act (1930)	
The underground water act enacted on the date of 21st June in 1930 whereas it is expedient to conserve and protect underground sources of water supply in the Union of Burma. This act prohibits sinking of a tube for the purpose of obtaining underground water except under and in accordance with the terms of a license granted by the water officer. Township Officer or sub-divisional officer had power to close a license tube after exercising jurisdiction over the local area concerned and the expense of such closure shall be recoverable from the owner of the tube as if it were an arrear of land-revenue.	
Farm Land Law (2012)	
To ensure the right to use the farm land and sufficient compensation for acquisition of the farmland. This law focuses the following matters; The project owner has to abide by the decision of relevant Ministry with the coordination with the Central Administrative Body of the Farmland for paying the compensation if it is needed acquisition farm land, under section 26 of said law. The project proponent has to obtain the permission of the Central Administrative Body of Farmland for the land use change from paddy field land to other land use under sub-section (a) of section 30. The project proponent has to obtain the permission of the Yangon Region Government with the recommendation of Yangon Region Administrative Body of Farmland for the land use change from farm land other than paddy field land to other land use under sub-section (b) of section 30.	
Vacant, Fallow and Virgin Land Management Law (2012)	

Laws and Regulations	Description
Purpose: To ensure the project land is clearly get as the project land. The project proponent will ensure to get permitted areas for the project land by the Central Administrative Body on Vacant, Virgin and Fallow Land, under sub-section (d) of section 10 of said law. The project proponent will promise to return the land if any antique object is found in the project area, under sub-section (a) of section 19 of said law. The project proponent will promise to return the land if any resource is found in the project, under sub-section (d) of section 19 of said law.	
The Settlement of Labor Dispute Law (2012)	
The Pyidaungsu Hluttaw hereby had enacted this Law for safeguarding the right of workers or having good relationship between employer and workers and making peaceful workplace or obtaining the rights fairly, rightfully and quickly by settling the dispute of employer and worker justly.	
Chapter II: Formation of the Workplace Coordinating Committee	
3. In any trade in which more than 30 workers are employed, the employer, with the view to negotiating and concluding collective agreement, shall: (a) if there is any labor organization, form the Workplace Coordinating Committee with the view to make a collective bargaining as follows: (i) two representatives of workers nominated by each of the labour organizations; (ii) an equivalent number of representatives of employer; (b) if there is no labor organization, form the Workplace Coordinating Committee as follows: (i) two representatives of workers elected by them; 5. The Coordinating Committee shall promote the good relationship between the employer and worker or labor organization, negotiation and coordination on the conditions of employment, terms and conditions and occupational safety, health, welfare and productivity. 6. (a) If the worker or labor organization or the employer, by themselves or by representative, request and complain their grievances to the Coordinating Committee, it shall be negotiated and settled by the Coordinating Committee within five days, not including the official holidays, from the day of the receipt of the request.	

Laws and Regulations	Description
(b) The Coordinating Committee shall keep the record of settlement and shall send report on the situation of performance in accord with the stipulation to the relevant Conciliation Body.	
Chapter III: Formation of the Conciliation Body	
10. The Region or State Government shall form the Conciliation Body in the townships.	
Chapter IV: Formation of the Dispute Settlement Arbitration Body	
16. (a) The Ministry shall, with the approval of the Union Government, form the Dispute Settlement Arbitration Body in the Regions or States.	
Chapter V: Formation of Dispute Settlement Arbitration Council	
19. The Ministry shall, with the approval of the Union Government, form the Dispute Settlement Arbitration Council with 15 qualified persons of good standing from legal experts and experts in labour affairs.	
Chapter VI: Settlement of Dispute	
23. A party, employer or worker, may complain individual dispute relating to his grievance to the Conciliation Body and if he is not satisfied with the conciliation of such body in accord with stipulated manners, may apply to the competent court in person or by the legal representative.	
Myanmar Hotel and Tourism Law (1993)	
Section 3 (b)	b) To enable tourists to observe Myanmar cultural heritage and natural scenic beauty. c) To prevent destruction and damage of Myanmar cultural heritage and natural scenic beauty, due to the hotel and tourism industry. e) To develop technical knowledge relating to hotel and tourism industry and to open up more employment opportunities.
Myanmar Citizens Investment Law (2013)	
a. Business which can affect the traditional culture Business which can affect the traditional culture and customs of the national races within the Union; b. Business which can affect public's environment, causing noise in the residing area; c. Business which can affect public health;	

Laws and Regulations	Description

d. Business which can cause damage to the natural environment and ecosystem;

e. Business which can affect the land and marine animals, trees, flowers, crops, antique heritage, resources;

f. Business which can bring the hazardous or poisonous waste into the Union; The factory which produce or the business which use hazardous chemicals under international agreements.

Building Regulations (2014)

The developer should follow the instructions made by concerned departments for the following activities: installation of electrical meters, installation of transformers, emergency exits, to develop systems for disposal of sewage and waste, fire safety system and matters relating to road and bridges.

Air Quality Guideline Value for NEQEG and ACGIH

No.	Parameters	Unit	Measuring Avg. Period	NEQG Guideline Value	ACGIH Guideline Value
1.	Nitrogen Dioxide	µg/m3	24 hours	*200 µg/m3	-
2.	Sulphur Dioxide	µg/m3	24 hours	*20 µg/m3	-
3.	Particulate matter PM10	µg/m3	24 hours	*50 µg/m3	-
4.	Particulate matter PM2.5	µg/m3	24 hours	*25 µg/m3	-
5.	Carbon Dioxide	ppm	24 hours	-	5000 ppm
6.	Carbon Monoxide	ppm	24 hours	-	35 ppm

Noise Quality Guideline Value for NEQEG

Receptor	One Hour LAeq (dBA)

Laws and Regulations	Description	
	Daytime 07:00 - 22:00 (10:00 - 22:00 for Public Holidays)	Nighttime 22:00 - 07:00 (22:00 - 10:00 for Public Holidays)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Wastewater Quality Guideline Value for NEQEG

No.	Parameters	National Environmental Quality (Emission) Guidelines for General
1.	5 day Biochemical Oxygen Demand (BOD)	50 mg/l
2.	Chemical Oxygen Demand (COD)	250 mg/l
3.	Oil & Grease	10 mg/l
4.	Total Coliform Bacteria	400
5.	Total Nitrogen	10 mg/l
6.	Total Phosphorus	2 mg/l
7.	Total Suspended Solids	50 mg/l
8.	pH	6-9

Drinking Water Quality for WHO Guideline (Geneva – 1993)

No.	Parameters	Unit	WHO Drinking Water Guideline (Geneva – 1993)
1.	pH	-	6.5-8.5
2.	Colour	-	15
3.	Turbidity	-	5
4.	Calcium	mg/l	-
5.	Hardness	mg/l as CaCo3	500
6.	Magnesium	mg/l	-
7.	Chloride	mg/l	250

Laws and Regulations	Description		
8.	Total Alkalinity	mg/l as CaCo3	-
9.	Iron	mg/l	0.3
10.	Sulphate	mg/l	500
11.	Total Solids	mg/l	-

International Guidelines

In the following Guidelines and standards are referred for Environmental Management Plan of the proposed project.

World Health Organization Standards.

World Bank Safeguard Policies

IFC performance standards

IFC, Environmental Health and Safety Guidelines for Waste Management Facilities, 2007.

CHAPTER 4: DESCRIPTION OF THE SURROUNDING ENVIRONMENT

In the EIA study, it is necessary to establish the baseline condition for environmental and social status of proposed project area and its surrounding area. The environmental impact assessments are done based on this information, and estimated the impacts whether these are positively or negatively affected on surrounding environment by proposed project.

In the EIA procedure does not define the study area for EIA study, the EIA study area for this project is roughly defined according to the project nature and location, within 1000-meter radius of the center of the proposed project area. While considering to define the study area, the study area supposed to cope the potential effected area of significantly impacted by the proposed project both environmentally and socio- economically.

This chapter describes environmental and socio-economic condition of the study area based on the available secondary information and primary information collected from field surveys.

4.1. PHYSICAL ENVIRONMENT

4.1.1. LAND USE

According to the township data and observation, the proposed project is located at inhibited island and there was no land use except for the development.

4.1.2. AIR QUALITY

The proposed project is located at the isolated and uninhabited area, there is no development that will disturb the current air quality of surrounding area of the project. The air quality measurement was conducted by GOG, Environmental Quality Team and equipment were deployed at two sampling stations, Station (1)- 10°33'37.95"N, 98°13'57.88"E and Station (2)- 10°33'18.45"N, 98°14'6.90"E. Air quality sampling stations were deployed in the vicinity of Bo Nat Kyaw island from (23rd May 2022 to 25th May 2022), to collect the current air quality data along with meteorological data of temperature and relative humidity. The data gathered from the sampling sites were compared with the applicable standards (such as National Environmental Quality (EMISSION) Guidelines, WHO Guidelines and IFC Guidelines).

Figure: 4. 1- air quality and noise quality sampling point

4.1.2.1. Methodology

AIR QUALITY SAMPLING INSTRUMENT

The air quality sampling survey used the Portable Haz Scanner EPAS Instruments.

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

Table: 4. 1- Air Quality Result for station 1

No	Parameters	Results		Avg. Period	Guideline value (NEQEG)	Avg. Period	Remarks
		Observed value	Converted value				
1	Nitrogen dioxide NO2	16.4 ppb 23.5 ppb*	30.8 (µg/m3) 44.2 (µg/m3)	24-hour 1-hour*	40 (µg/m3) 200 (µg/m3)	1-year 1-hour	
2	Ozone (O3)	15.6 ppb	30.6 (µg/m3)	8-hour	100 (µg/m3)	8-hour daily maximum	
3	Particulate matter PM10	21.6 (µg/m3)		24-hour	20 (µg/m3) 50 (µg/m3)	1-year 24-hour	

4	Particulate matter PM2.5	17.3 (µg/m3)		24-hour	10 (µg/m3) 25 (µg/m3)	1-year 24-hour	
5	Sulfur dioxide SO2	1 ppb	2.62 (µg/m3)	24-hour	20 (µg/m3) 500 (µg/m3)	24-hour 10 minute	
6	Carbon dioxide CO2	282 ppm		24-hour	-		
7	Carbon monoxide CO	200 ppb		24-hour	-		

* One hour in Max. Value of 24 hrs. period

Table: 4. 2- Air Quality Result for station 2

No	Parameters	Results		Avg. Period	Guideline value (NEQEG)	Averaging Period	Remarks
		Observed value	Converted value				
1	Nitrogen dioxide NO2	3.1 ppb 4.3 ppb*	5.8 (µg/m3) 8.1 (µg/m3)	24-hour 1-hour*	40 (µg/m3) 200 (µg/m3)	1-year 1-hour	
2	Ozone (O3)	1.3 ppb	2.6 (µg/m3)	8-hour	100 (µg/m3)	8-hour daily maximum	
3	Particulate matter PM10	16 (µg/m3)		24-hour	20 (µg/m3) 50 (µg/m3)	1-year 24-hour	
4	Particulate matter PM2.5	11 (µg/m3)		24-hour	10 (µg/m3) 25 (µg/m3)	1-year 24-hour	
5	Sulfur dioxide SO2	0.07 ppb	0.2 (µg/m3)	24-hour	20 (µg/m3) 500 (µg/m3)	24-hour 10 minute	
6	Carbon dioxide CO2	183 ppm		24-hour	-		
7	Carbon monoxide CO	3 ppb		24-hour	-		

* One hour in Max. Value of 24 hrs. period

According to the air quality baseline survey results, all of the resultant values of each parameter are within the National Environmental Quality (Emission) Guidelines (NEQG) (2015). It can be assumed that the current construction activites were not disturbed the air quality condition of the island.

4.1.3. NOSIE QUALITY

METHODS OF NOISE MONITORING

Noise monitoring LAeq (dBA) was conducted at the selected location that can reflect the exposure of the nearest local community and sensitive locations. Duration and frequency was measured for 24hr continuously at the selected site using the Noise Meter.

The monitoring procedures, data analysis and interpretation were carried out in accordance with the instrument's manufacture and National Environmental Quality (Emission) Guidelines,

WHO and IFC guidelines in order to be in line with Environmental Conservation Department, Ministry of Natural Resources and Environment. "National Environmental Quality (Emission) Guidelines" for Myanmar was also presented the value of noise level as LAeq (dBA).

The noise quality measurement was conducted by GOG, Environmental Quality Team and deployed at three sampling stations.

Table: 4. 3- National Environmental Quality (Emission) Guideline (NEQG) for Noise Level

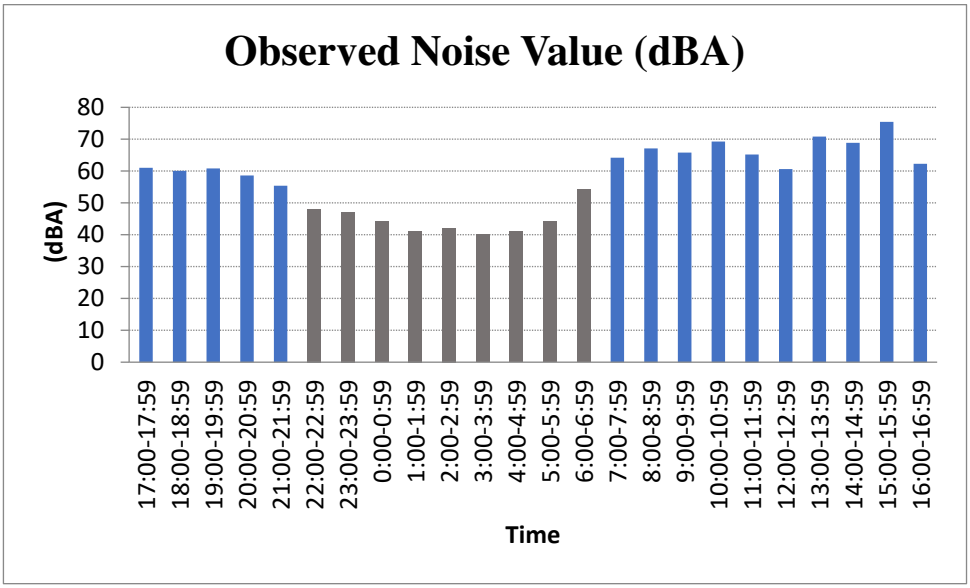
Receptor	**One Hour LAeq (dBA)a**	
	Daytime 07:00-22:00 (10:00-22:00 for Public holidays)	Night time 22:00-07:00 (22:00-10:00 for Public holidays)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

NOISE LEVEL RESULT

Table: 4. 4- Average Values of Noise Level (dB) at the survey point

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
1	15.5.2022	17:00-17:59	61.04	A	Day	
2	15.5.2022	18:00-18:59	60.07	A	Day	
3	15.5.2022	19:00-19:59	60.84	A	Day	
4	15.5.2022	20:00-20:59	58.62	A	Day	
5	15.5.2022	21:00-21:59	55.38	A	Day	
6	15.5.2022	22:00-22:59	48.07	A	Night	
7	15.5.2022	23:00-23:59	47.11	A	Night	
8	16.5.2022	0:00-0:59	44.12	A	Night	
9	16.5.2022	1:00-1:59	41.21	A	Night	
10	16.5.2022	2:00-2:59	42.09	A	Night	44.67
11	16.5.2022	3:00-3:59	40.11	A	Night	
12	16.5.2022	4:00-4:59	41.02	A	Night	
13	16.5.2022	5:00-5:59	44.26	A	Night	
14	16.5.2022	6:00-6:59	54.13	A	Night	
15	16.5.2022	7:00-7:59	64.18	A	Day	
16	16.5.2022	8:00-8:59	67.09	A	Day	
17	16.5.2022	9:00-9:59	65.78	A	Day	
18	16.5.2022	10:00-10:59	69.28	A	Day	
19	16.5.2022	11:00-11:59	65.20	A	Day	

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average
20	16.5.2022	12:00-12:59	60.63	A	Day	
21	16.5.2022	13:00-13:59	70.81	A	Day	
22	16.5.2022	14:00-14:59	68.84	A	Day	
23	16.5.2022	15:00-15:59	75.15	A	Day	
24	16.5.2022	16:00-16:59	62.30	A	Day	



According to the noise quality baseline survey results, all of the resultant values of each parameter are within the National Environmental Quality (Emission) Guidelines (NEQG) (2015). It can be assumed that the current construction activites were not disturbed the to the island. Although it is recommended to stop the construction activities during night time for health and safety and not to disturb the island's biodiversity.

4.1.4. WATER

The water samples are collected to know the current condition and to analyze the potential impact cause of the proposed development. Water samples were collected both marine water and freshwater.

Figure: 4. 2- The Water Sample (Fresh and Marine) collected locations

FRESH WATER

The water resource can be obtained from two resources, ground water and spring water. The current water usage will be sustained from ground water extraction.

Figure: 4. 3- Spring water

STROM WATER

In spite of the development is located at the open ocean there will high probability of influencing by storm surge than the other inland development. Rapid run off, even for the uncontaminated storm water, also degrades the quality of the receiving water by eroding stream beds and banks.

4.1.5. CLIMATE

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

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

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

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

4.1.6. REGIONAL GEOLOGY

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

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

exposed in the EHP. The geological map and succession of project site is shown in Figure (1) and Table 1.

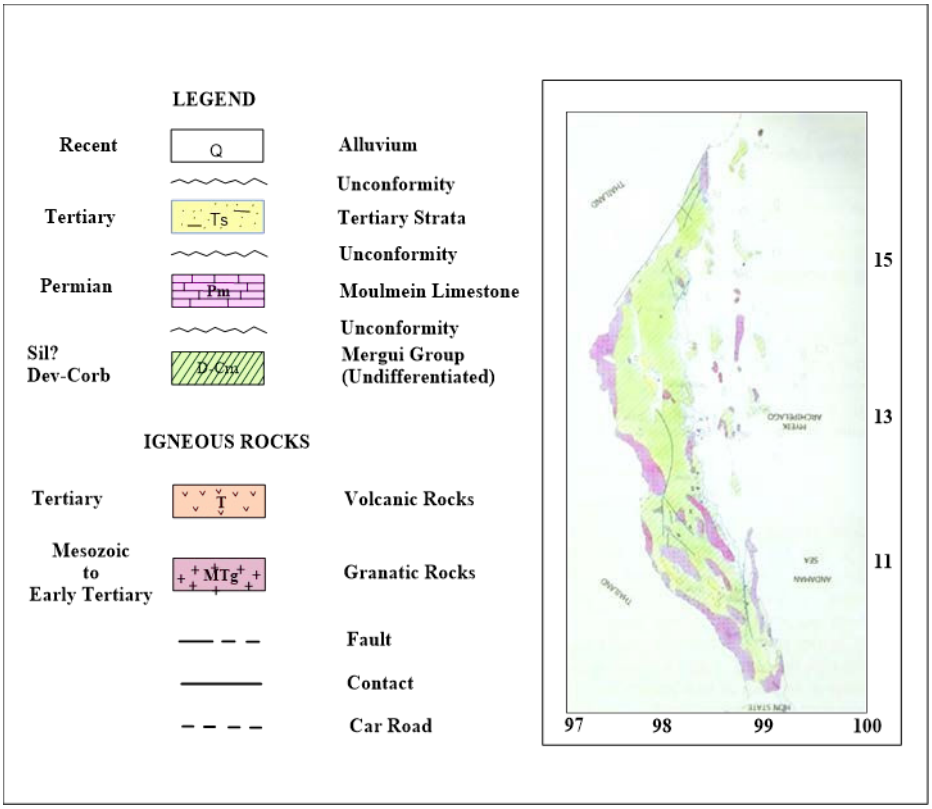


Figure: 4. 4- Geological Map of the project Site

Geological Succession of the project site

AGE	UNIT
QUETERNARY	Alluvium, raised marine terrace, and landslide material
	Unconformity
TERITARY	Tertiary Strata
	Unconformity
JURASSIC-CRETACEOUS?	Redbeds
	Unconformity
PERMAIN	Moulmein Group
	Unconformity
CARBONIFEROUS-PERMIAN	Mergui Group

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

MERGUI GROUP

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

MOULMEIN LIMESTONE

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

CONTINENTAL RED-BEDS

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

TERTIARY STRATA

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

QUATERNARY DEPOSITS

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

alluvium is reported to be up to 60 ft in thickness in some localities and some of them are a good source of placer tin in the Region.

IGNEOUS ROCKS

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

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

ECONOMIC GEOLOGY

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

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

STRUCTURAL GEOLOGY

The structural geology of Myanmar is not complex. The one of the major active fault is Sagaing Fault. It controls the structural geology. It passes through just east of Bago and enters western Gulf of Martaban. In the north-east part of the project site, the anticlinal ridge is located in the Thanlyin area. In the eastern part of this project, there has Kyauktan fault. The axis of the anticline is trending in the NW– SE direction. On that anticline, there have three numbers of oblique minor faults. The project site is located in a zone of low seismicity zone (I) according to the seismic zone map of Myanmar 2005 (Figure 4.12).

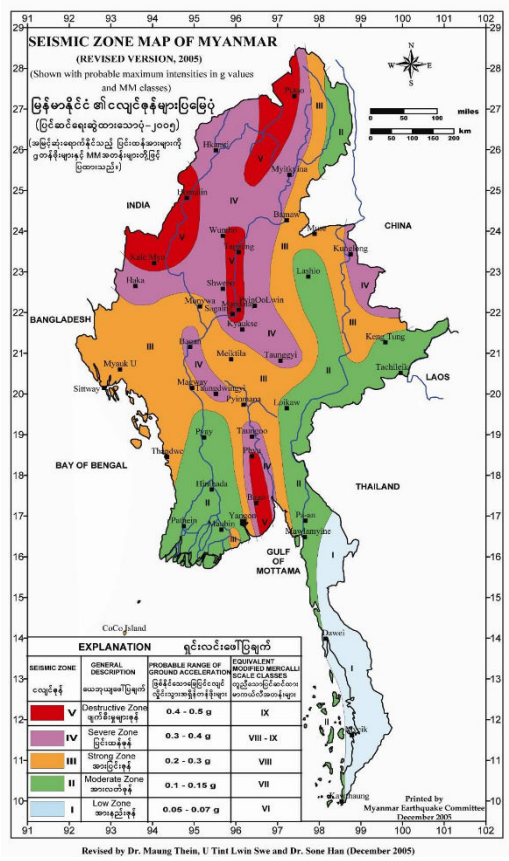


Figure: 4. 5- Seismic Zone Map of Myanmar (Revised by Dr. Maung Thein, U Thint Lwin Swe and Dr. Sone Han (December 2005)).

4.2. BIOLOGICAL ENVIRONMENT

4.2.1. BIODIVERSITY

The biodiversity survey was conducted by the Guardians of Green Environmental Services for the Environmental Impact Assessment (EIA) of K Future Resort Project in Taninthayi Region. Bo Nat Kyaw island is located at Kawthaung Township, Taninthayi region. Fauna and flora survey were carried out, within and around the Bo Nat Kyaw island and the survey was done in Raining season (August 21st - 25th, 2020).

The baseline study was included both terrestrial and aquatic fauna, the focus major groups are vertebrate (birds, reptiles, lizards, fishes and amphibians, especially visual observation) and invertebrate (butterflies, dragonflies, damselflies many kinds of insect and coral visually during survey).

4.2.1.1. Terrestrial Flora

OBSERVATION PERIOD AND THE STUDY AREAS

This flora survey was conducted from 22 August 2020 to 24 August 2020. The present study was conducted at the proposed project area, which is situated at Bo-Net-Kyaw Island, in Kawthaung Township and Tanintharyi Region, Myanmar. The project location is approximately 73km by waterway from Kawthaung Township. The nearest island to the project is Nyaung Wee island and Lampi Island MNP (Marine National Park) area is located about twenty kilometers north of the project area.

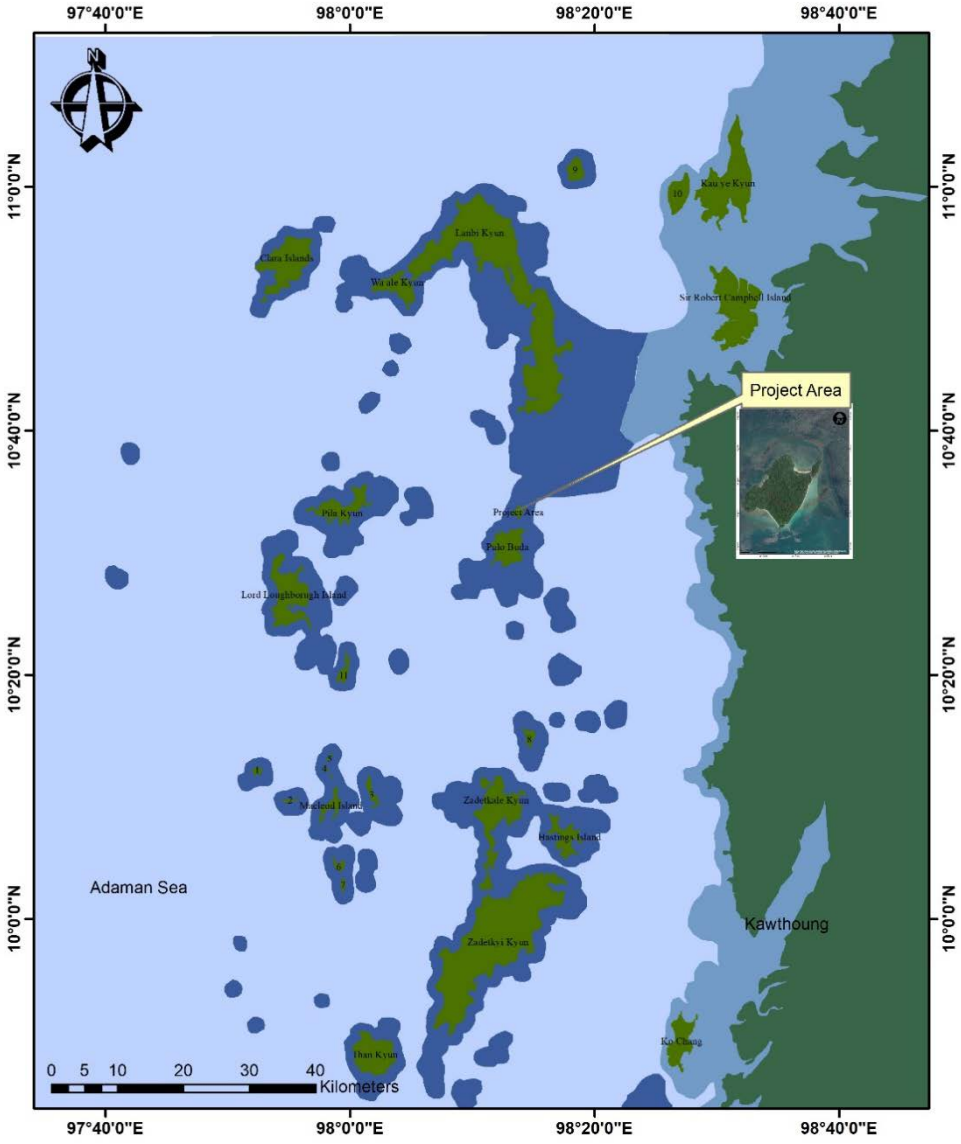


Figure: 4. 6- Map of Project Location (Bo Net Kyaw Island)

SAMPLING POINTS AND RECORDED PLANT SPECIES

In this survey, a total of (8) sampling points with 15 m x 15 m quadrats were set up and observed plant species in Bo-Net-Kyaw island. These sample quadrats were collected by random method and all plant species were also randomly collected using point.

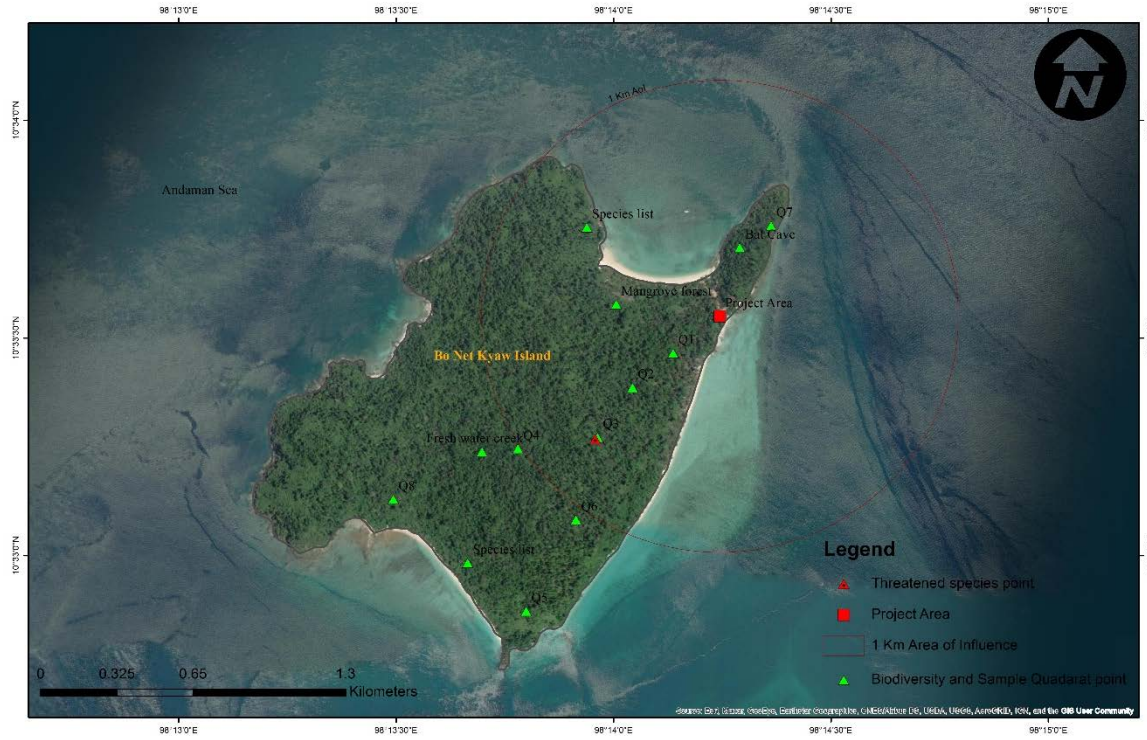


Figure: 4. 7- Biodiversity survey and sampling points map

The study areas and forest conditions

The study area, Bo-Net-Kyaw island has two habitat plant species. The first habitat is the permanent evergreen forest on the island, and the second habitat is the mangrove forest at the bottom of the island. The terrain on the island is a bit steep and very difficult to walk if the without road is paved. The condition of the forest is good for biodiversity and some very large trees can be seen in the forest.

Figure: 4. 8- Evergreen forest

Methodology

To clarify the small trees and tree species diversity and to calculate the important value index (I.V.I), total of (8) sample quadrats were randomly set up and observed. For plant identification, essential requirements such as DBH measurements (Diameter at Breast Height), collection, taken photographs, interviewing with local people, etc. were conducted in this field survey. After field trip, plant identification was conducted based on available literatures, verification with recorded photographs and some useful internet websites. The spatial location (latitude and longitude) of each quadrat and other recorded plant species was also recorded by using a GPS (Global Positioning System).

Data collection and techniques

For the collection of data, stratified random sampling technique was applied and quadrants were in the Bo Net Kyaw island area and were distributed spatially. Quadrants of the size 15 m × 15 m were used for tree species. Vegetation was analyzed quantitatively for basal area, frequency, density and abundance using appropriate methods (Mishra, 1968) [5]. Similarly, based on these observation relative frequency, relative density and relative dominance were calculated. The Importance Value Index (IVI) of all the plant species under study was finally computed (Phillips, 1959, Pala et al., 2016) [8, 7]. The following formulae were used for the calculation of ecological data:

Figure: 4. 9- Data Collection

DBH Measurements and Create Sampling Quadrat

$$\text{Frequency} = \frac{\text{Sampling units in which species occured}}{\text{Total sampling units studied}} \times 100$$

$$\text{Density} = \frac{\text{Total number of individuals of single species}}{\text{Total number of quadrates taken}} \times 100$$

Basal area = πr^2 [where, r = radius; = 3.14]

After calculating frequency, density and basal area of the identified herbs and shrubs, the relative frequency, relative density and relative dominance were calculated by using the following formulae:

(A) RELATIVE DENSITY

Relative density is the study of numerical strength of a species in relation to the total number of individuals of all the species and can be calculated as:

$$\text{Relative density} = \frac{\text{Number of individual of the species}}{\text{Number of individual of all the species}} \times 100$$

(B) RELATIVE FREQUENCY

The degree of dispersion of individual species in an area in relation to the number of all the species occurred.

$$\text{Relative frequency} = \frac{\text{Number of occurrence of the species}}{\text{Number of occurrence of all the species}} \times 100$$

(C) RELATIVE DOMINANCE

Dominance of a species is determined by the value of the basal cover. Relative dominance is the coverage value of a species with respect to the sum of coverage of the rest of the species in the area.

$$\text{Relative dominance} = \frac{\text{Total basal area of the species}}{\text{Total basal area of all the species}} \times 100$$

The total basal area was calculated from the sum of the total diameter of immerging

stems. In small trees and trees, the basal area was measured at breast height (1.5m).

Importance Value Index (IVI) =Relative frequency + Relative density + Relative dominance.

Table: 4. 5- Representative GPS points for (15m x 15m) quadrats and flora survey point.

No. of study area	Names	Site no.	Representative GPS Points	
			Longitude	Latitude
I	Sampling quadrats-1	1	10°33'27.93"N	98°14'8.24"E
	Sampling quadrats-2	2	10°33'23.20"N	98°14'2.62"E
	Sampling quadrats-3	3	10°33'16.33"N	98°13'57.81"E
	Sampling quadrats-4	4	10°33'14.75"N	98°13'46.82"E
	Sampling quadrats-5	5	10°32'52.35"N	98°13'47.96"E
	Sampling quadrats-6	6	10°33'4.96"N	98°13'54.84"E
	Sampling quadrats-7	7	10°33'45.49"N	98°14'21.75"E
	Sampling quadrats-8	8	10°33'7.77"N	98°13'29.64"E
II	Mangrove Forest	9	10°33'34.64"N	98°14'0.37"E
III	Bat Cave	10	10°33'42.47"N	98°14'17.42"E
IV	Fresh Water Creek	11	10°33'14.34"N	98°13'41.86"E
V	Plant Species Composition-1	12	10°33'45.27"N	98°13'56.32"E
	Plant Species Composition-2	13	10°32'59.01"N	98°13'39.89"E
VI	Threatened Species	14	10°33'15.74"N	98°13'57.62"E
VII	Project Area	15	10°33'33.00"N	98°14'14.66"E

Field survey results

In the present survey period, a total of 151 plant species were recorded. Of these,135 species were from the evergreen forest and the remaining 16 species were from the mangrove forest. The habitat of identified species consists of eight types, including tree, small tree, shrub, herb, creeper, climber, bamboo and grass. The recorded species were checked with the IUCN Red List of Threatened Species 2018 Version 3.1 and were found two Endangered (EN) species. There are Dipterocarpus dyeri Pierre (EN) and Dipterocarpus alatus Roxb. (EN). That species location point is (10°33'15.74"N 98°13'57.62"E).

PLANT SPECIES COMPOSITION

List of all species found within the Survey trail in the project area. To get representative checklists of the plant species. There are showing in table.1,2,3

Table: 4. 6- Tree and Small Tree species list

No	Scientific Name	Family Name	Local Name	Habit
1	Adenanthera pavonina L.	Fabaceae	Ywe-gyi	T
2	Albizia odoratissima (L.f.) Benth.	Fabaceae	Taung-ma-gyi	T
3	Alstonia scholaris (L.) R. Br.	Apocynaceae	Taung-mayo	T
4	Anacardium occidentale L.	Anacardiaceae	Thiho-thayet	T
5	Anthocephalus chinensis Rich	Rubiaceae	Ma-U	T
6	Antiaris toxicaria (Pers.) Lesch.	Moraceae	Hmya-seik	T
7	Aporosa frutescens Blume	Phyllanthaceae	Liyo	T
8	Aporosa villosula Kurz.	Phyllanthaceae	Thit-khauk	T
9	Aporosa wallichii Hook.f.	Phyllanthaceae	Ka-dauk	T
10	Aquilania agallocha Roxb.	Thymelaceae	Akyaw	T
11	Archidendron jiringa Jack	Fabaceae	Da-nyin	T
12	Ardisia polycephala Wall.	Primulaceae	Kyet-ma-oke	T
13	Artocarpus calophyllus Kurz	Moraceae	Taung-bein	T
14	Artocarpus chaplasha Roxb.	Moraceae	Taung-peinne	T
15	Baccaurea parviflora Muell. Arg.	Phyllanthaceae	Kana-so	T
16	Baccaurea sapida Muell. Arg.	Phyllanthaceae	Sha-yu-tar	T
17	Bauhinia acuminata L.	Caesalpiniaceae	Phalan	ST
18	Barringtonia racemosa (L.) Spreng	Lecythidaceae	Ye-kyi	T
19	Bischofia javanica Blume	Phyllanthaceae	Ye-pa-don	T
20	Bombax insigne Wall	Malvaceae	Taung-let-pan	T
21	Bouea burmanica Griff.	Anacardiaceae	Ma-yan	T
22	Bruguiera conjugata (L.) Merr.	Rhizophoraceae	Byu-u-talon	T
23	Bruguiera gymnorhiza (L.) Lamk.	Rhizophoraceae	Byu-oak-song	T
24	Calophyllum amoenum Wall.	Calophyllaceae	Tha-ra-phi	T
25	Calophylum inophyllum L.	Calophyllaceae	Pon-nyet	T
26	Carallia brachiata (Lour.) Merr.	Rhizophoraceae	Yap-pin	T
27	Castanopsis argyrophylla King	Fagaceae	Thit-tat	T

28	Casuarina equisetifolia Forst.	Casuarinaceae	Lae-tha-pin	T
29	Cerbera manghas L.	Apocynaceae	Ye-za-lat	T
30	Cinnamomum iners	Lauraceae	Hman-thin	T
31	Cinnamomum verum Pres	Lauraceae	Thit-kya-bo	T
32	Citrus hystrix DC.	Rutaceae	Bya-thi	ST
33	Coccoceras plicatum Muell. Arg.	Euphorbiaceae	Yaung-ban	T
34	Croton robustus Kurz.	Euphorbiaceae	Tha-yin-phyu	T
35	Cryptocarya griffithina Wight	Lauraceae	Ka-lak-thiang	T
36	Cynometra ramiflora	Fabaceae	Myin-ga	T
37	Derris indica Burrel	Fabaceae	Than-that	T
38	Dialium indum L.	Fabaceae	Taung-ka-ye	T
39	Dillenia parviflora Griff.	Fabaceae	Zin-byun	T
40	Diospyros peregrina (Gaertn) Gurte	Ebenaceae	Bot-the	T
41	Diospyros crumentata Thwaites	Ebenaceae	Taung-bok	T
42	Diospyros ehretioides Wall.	Ebenaceae	Auk-chin-sa	T
43	Dipterocarpus alatus Roxb.	Dipterocarpaceae	Ka-nyin-phyu	T
44	Dipterocarpus dyeri Pierre	Dipterocarpaceae	Ka-nyin	T
45	Dipterocarpus tuberculatus Roxb.	Dipterocarpaceae	In	T
46	Dolichandrone serrulata L.f.	Bignoniaceae	Tha-kut	T
47	Engelhardtia spicata Blume	Juglandaceae	Taung-min-sok	T
48	Erythrina stricta Roxb.	Fabaceae	Taung-kathit	T
49	Exoecaria agallocha L.	Euphorbiaceae	Ta-yaw	T
50	Ficus glomerata Roxb.	Moraceae	Taung-tha-phan	T
51	Ficus hispida L.	Moraceae	Kha-aung	T
52	Ficus pisocarpa	Moraceae	Nyaung	T
53	Firmiana colorata (Roxb.) R. Br.	Malvaceae	Gant-phyu	T
54	Garcinia heterandra Wall.	Clusiaceae	Taung-min-gut	T

55	Glycosmis cyanocarpa Spreng.	Rutaceae	Mat-paw	T
56	Gmelina arborea Roxb.	Lamiaceae	Ye-ma-nae	T
57	Heritiera fomes Buch._ham.	Malvaceae	Ye-ka-na-zo	T
58	Heritiera javanica (Blume) Kosterm.	Malvaceae	Kant-so	T
59	Hibiscus tiliaceus L.	Malvaceae	Pin-le-shaw	ST
60	Holigarna kurzii King	Anacardiaceae	Che-po	T
61	Homalium griffithianum Kurz.	Salicaceae	Taung-ka-byaw	T
62	Hypobathrum racemosum Kurz	Rubiaceae	Pinle-kyetyo	T
63	Lagerstroemia floribunda Jack	Lythraceae	Pyinma	T
64	Lagerstroemia tomentosa Presl.	Anacardiaceae	Le-sa	T
65	Lepisanthes tetraphylla (Vabl) Radlk	Sapindaceae	Myauk-nyo	T
66	Litsea lancifolia	Lauraceae	On-don	T
67	Macaranga gigantea	Euphorbiaceae	Phet-wun	T
68	Maesa ramentacea A.DC.	Euphorbiaceae	Nga-nwa	T
69	Mallotus floribundus Muell. Arg.	Euphorbiaceae	Taung-ka-do	T
70	Melanorrhoea glabra Wall.	Anacardiaceae	Thit-sae	T
71	Mesua nervosa Planch.&Triana	Calophyllaceae	Gan-gaw	T
72	Michelia champaca L.	Magnoliaceae	Sa-ga-pin	T
73	Millettia atropurpurea Dunn.	Papilionoideae	Kywe-da-nyin	T
74	Mitragyna rotundifolia Kuntze	Rubiaceae	Bin-ga	T
75	Morinda angustifolia Roxb.	Rubiaceae	Nibase	T
76	Oroxylum indicum (L.) Kurz	Bignoniaceae	Kyaung-sha	ST
77	Palaquium obovatum (Griff.) Engl.	Sapotaceae	Pinle-byin	T
78	Parashorea stellata Kurz	Dipterocarpaceae	Lay-tha-yet	T
79	Payena paralleloneura Kurz	Sapotaceae	Zin-zwel	T
80	Phoebe tavoyana Hook. F.	Lauraceae	Kye-se	T

81	Pterospermum acerifolium Willd.	Malvaceae	Taung-phet-wun	T
82	Pterygota alata (Roxb.) R.Br.	Malvaceae	Khok-thin-nya	T
83	Sapium insigne (Muell.Arg.) Trimen	Euphorbiaceae	Taung-kala	T
84	Senna timoriensis DC.	Fabaceae	Taw-me-za-li	T
85	Sterculia urens Roxb.	Malvaceae	Shaw	T
86	Swintonia floribunda Griff.	Anacardiaceae	Taung-tha-yet	T
87	Syzygium grande (ight) Walp.	Anacardiaceae	Thabye-ywet-gyi	T
88	Syzygium inophyllum DC.	Anacardiaceae	Thabye-satche	T
89	Tamarindus indica L.	Fabaceae	Ma-gyi	T
90	Tarennoidea wallichii (Hook.f.) D.	Rubiaceae	Khat-mya	T
91	Terminalia catappa L.	Combretaceae	Ban-da	T
92	Trema orientalis (L.) Blume	Cannabaceae	Kywe-sa	T
93	Vitex pubescens Vahl.	Lamiaceae	Kyet-yo	T

Table: 1. 3: Shrub, Herb, Creeper, Climber, Bamboo and Grass species list

No	Scientific Name	Family Name	Local Name	Habit
1	Abutilon indicum (L.) Sweet.	Malvaceae	Bauk-khwe	H
2	Acacia megaladena Desv.	Mimosaceae	Su-yit	CI,Cr
3	Acacia rugata Buch.-Ham.	Mimosoideae	Kin-mon-chin	S
4	Ageratum conyzoides L.	Asteraceae	Khwe-thay-pan	H
5	Argyreia capitiformis (Poir.) ooststr.	Convolvulaceae	Nwel-Pauk	Cr
6	Arundinella birmanica Hook. f.	Poaceae	Myat-pauk	G
7	Calamus aggregatus Burret	Arecaceae	Kyein	CI,Cr
8	Canna indica L.	Cannaceae	Budatharana	H
9	Chromolaena odorata	Asteraceae	Bezet	H

10	Cleome burmanii Wight & Arn	Capparaceae	Taw-hingala	H
11	Clerodendrum indicum (L.) Kuntze	Verbenaceae	Ngayan-padu	S
12	Cocculus villosus DC.	Menispermaceae	Kywet- Nabaung	CL
13	Commelina sp.	Commelinaceae	Wet-kyut	H
14	Costus speciosus Sm.	Zingiberales	Pa-laung-taung-hmwe	H
15	D.Indica Spreng D.malabarica L. Merr.	Poaceae	Myat-cho	G
16	Dendrocalamus longispathus (Kurz) Kurz	Poaceae	Wanet	B
17	Desmodium diffusum DC.	Fabaceae	Gyat	S
18	Dillenia indica L.	Dilleniaceae	Tha-byut-chin	S
19	Eclipta alba (L.) Hassk.	Asteraceae	Kyate-hman	H
20	Eragrostis bifaria Wt.ex Steud.	Poaceae	Myat-mwel	G
21	Euphorbia hypericfolia L.	Euphorbiaceae	Hmin-sae	H
22	Glycosmis pentaphylla Correa	Rutaceae	O-bok	S
23	Grewia hirsuta (Korth.) Vahl.	Tillaceae	Tayaw	H
24	Heliotropium indicum L.	Boraginaceae	Sin-hna-maung	H
25	Hibiscus sabdariffa L.	Malvaceae	Chin-baung-ni	S
26	Hygrophila auriculata (Schum.) Heine	Acanthaceae	Su-padaung	H
27	Hyptis suaveolens (L.) Poit	Lamiaceae	Nan-saw	H
28	Indigofera atropurpurea Bucb-Ham.	Fabaceae	Mae-yine	H
29	Murraya koenigii (L.) Spreng.	Rutaceae	Pyin-daw-thein	H
30	Musa sapientum L.	Musaceae	Nga-pyaw	H
31	Nerium oleander L.	Apocynaceae	Nwel-thargi	S
32	Phyllanthus urinaria L.	Euphorbiaceae	Mye-zi-phyu	H
33	Polygonum tomentosum Willd.	Polygonaceae	Kywe-ngakhaung	H

34	Polyscias scutellaria (N. L. Burn.) Fosberg	Araliaceae	Sonma Letthae	H
35	Pueraria collettii Prain	Fabaceae	Chin-yar	S
36	Rostellularia procumbuns L.	Acanthaceae	Pan-pyar	H
37	Ruellia humilis Nutt.	Acamthaceae	Nagama	H
38	Streptocaulon tomentosum Wight & Arn.	Asclepiadaceae	Myin-sagon-ni	CL
39	Tacca leontopetaloides (L.) Kuntze	Dioscoreaceae	Balu-taung-hmwe	H
40	Tephrosia purpurea pers.	Fabaceae	Tapin-shwehti	H
41	Thysanolaena maxima (Roxb.) Kuntze	Poaceae	Tamyat-si	G
42	Tridax procumbens L.	Asteraceae	Hmwe-zote	H
43	Urtica dioica L.	Urticaceae	Phat-yar	H

Table: 4. 7- Mangrove species list

No	Scientific Name	Family Name	Local Name	Habit
1	Acanthus illicifolius	Acanthaceae	Kha-ya	S
2	Acrostichum aureum	Pteridaceae	Nyet-kyi-taung-gyi	T
3	Acrostichum speciosum	Pteridaceae	Nyet-kyi-taung-thay	T
4	Aegiceras corniculatum	Primulaceae	Yae-kha-ya	T
5	Avicennia alba	Avicenniaceae	Tha-me-kyet-tet	T
6	Avicennia officinalis	Avicenniaceae	Tha-me-gyi	T
7	Bruguiera gymnorhiza	Rhizophoraceae	Byu-oak-sung	T
8	Calamus arborescens	Arecaceae	Da-non	T
9	Ceriops decandra	Rhizphoraceae	Ma-da-ma	T
10	Ceriops targal	Rhizphoraceae	Ma-da-ma-myaw	T
11	Erythrina indica	Fabaceae	Pin-le-ka-thit	T
12	Excoecaria agallocha	Euphorbiaceae	Thayaw	T

13	Nypa fruticans	Palmae	Da-ni	T
14	Rhizophora candelaria DC.	Rhizophoraceae	Byu-chidauk-apo	T
15	Terminalia catappa	Combretaceae	Ban-da	T
16	Xylocarpus granatum	Meliaceae	Pin-le-ohn	T

Habitat

T	-Tree
ST	-Small Tree
S	-Shrub
H	-Herb
C L	- Climber species
G	- Grass
B	- Bamboo

Kind of Plants	Total
Tree	105
Small Tree	3
Shrub	9
Herb	29
Climber	4
Bamboo	1
Grass	4
	151

Table: 1. 4: Kind of Plants

IMPORTANT VALUE INDEX (IVI) OF TREE SPECIES IN THE STUDY AREA

The total number of tree species with GBH ≥10cm was 20 species. Ranking of ecological significance by IVI of tree species in the study area were given in table (5). The tree layer in the study area is dominated by Syzygium grande (ight) Walp. (IVI= 73.50%), Pterospermum acerifolium Willd. (IVI = 60.05%) and Macaranga gigantea. (37.86%) was third. The number

of species greater than 10% and 10% IVI value was nine species (Table 5, Fig. 1). Those species could be considered as ecological indicator species of the study area.

Table: 4. 8- Ranking of Important Value Index (IVI) in the project area

No.	Scientific Name	Relative Density (%)	Relaitve Frequency (%)	Relative Dominance (%)	I.V.I
1	Syzygium grande (ight) Walp.	14.5907	10.9091	48.0099	73.5098
2	Pterospermum acerifolium Willd.	19.7509	9.0909	31.2104	60.0522
3	Macaranga gigantea	19.0391	9.0909	9.7314	37.8615
4	Archidendron jiringa Jack	10.4982	5.4545	3.7066	19.6594
5	Alstonia scholaris (L.) R. Br.	8.363	5.4545	1.4263	15.2438
6	Dillenia parviflora Griff.	4.8043	9.0909	1.3046	15.1998
7	Dipterocarpus tuberculatus Roxb.	5.1601	9.0909	0.5587	14.8097
8	Syzygium inophyllum DC.	4.8043	5.4545	0.9541	11.2129
9	Anthocephalus chinensis Rich	3.2028	5.4545	2.3313	10.9887
10	Vitex pubescens Vahl.	2.3132	7.2727	0.2572	9.8431
11	Ficus hispida L.	1.9573	3.6364	0.2129	5.8066
12	Ficus pisocarpa	0.8897	3.6364	0.0159	4.5419
13	Dialium indum L.	0.7117	3.6364	0.0727	4.4208
14	Gmelina arborea Roxb.	1.2456	1.8182	0.1376	3.2014
15	Melanorrhoea glabra Wall.	0.8897	1.8182	0.0509	2.7588
16	Hibiscus tiliaceus L.	0.5338	1.8182	0.0036	2.3556
17	Derris indica Burrel	0.3559	1.8182	0.0112	2.1853
18	Cinnamomum verum Pres	0.3559	1.8182	0.0023	2.1763
19	Erythrina stricta Roxb.	0.3559	1.8182	0.0022	2.1762
20	Bombax insigne Wall	0.1779	1.8182	0.0001	1.9962
Total		100	100	100	300

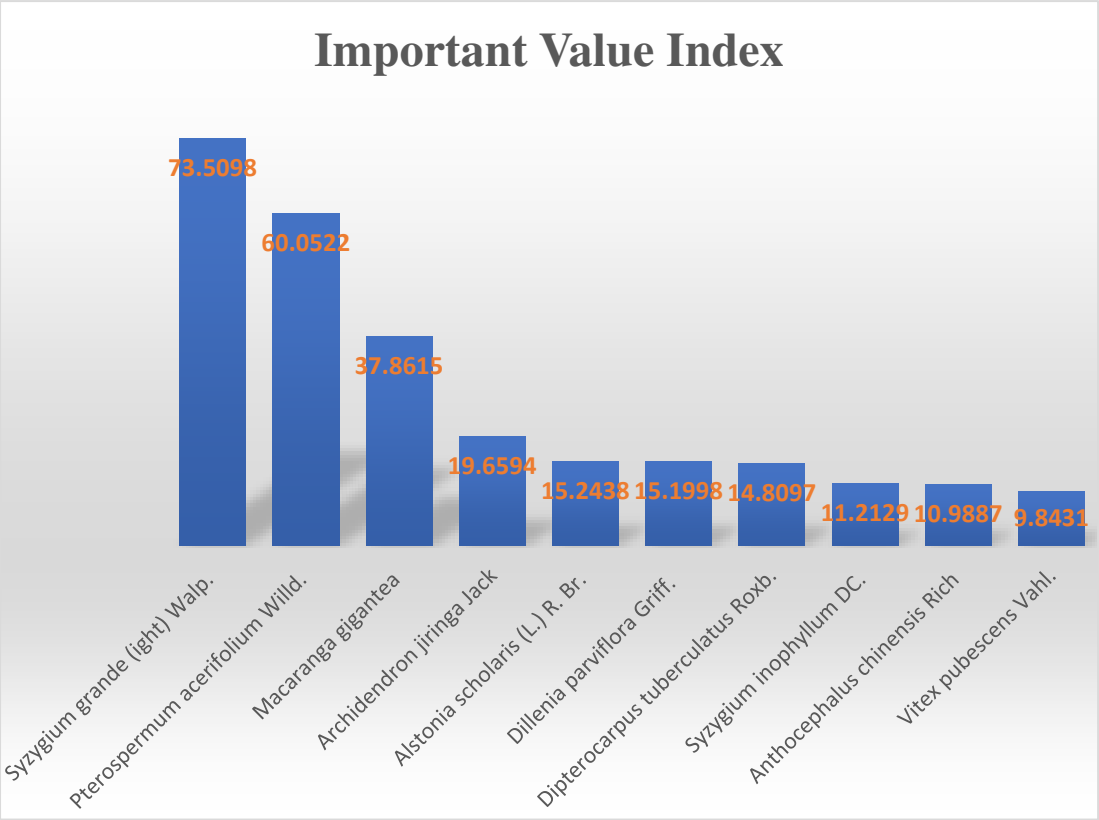


Figure: 4. 10- Important Value Index of top ten species in the project area

Picture (7 to 14) Highest Important Value Index species photos

Syzygium grande (ight) Walp. Thabye-ywet-gyi.

Pterospermum acerifolium Willd Taung-phet-wun

Macaranga gigantean

Phet-wun

Archidendron jiringa Jack

Da-nyin

Alstonia scholaris (L.) R. Br.

Taung mayoe

Dillenia parviflora Griff.

Zinbyun

Syzygium inophyllum DC.

Thabye-satche

Vitex pubescens Vahl.

Kyet yo

SPECIES DISTRIBUTION BY FREQUENCY CLASSES

In order to clarify the homogeneity or heterogeneity of the floristic distribution in the study area, species distribution by frequency classes was examined. According to the outcome of frequency chart, 35% of the total number of species was in lower frequency classes A, 15% and 20% was observed in frequency class, B and C respectively, while five percent was found in high frequency class D. The highest frequency class E has 25% of the total number of species (Table 6, Figure 2,3). The species which fall in highest frequency class E was Syzygium grande (ight) Walp., Pterospermum acerifolium Willd., Macaranga gigantea, Archidendron jiringa Jack, and Vitex pubescens Vahl. These species can be considered as the most common species in the study area.

Table: 4. 9- Species distribution by frequency classes

Frequency class	Frequency range	No. of species	% of total species frequency distribution
A	1-20%	7	35
B	21-40%	3	15
C	41-60%	4	20
D	61-80%	1	5
E	81-100%	5	25

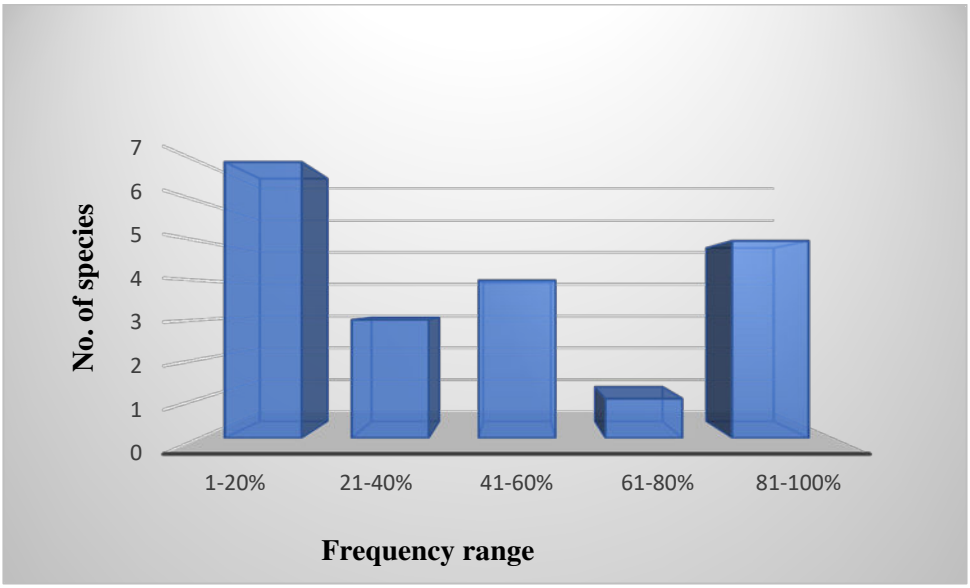


Figure: 4. 11- Species distribution by frequency classes

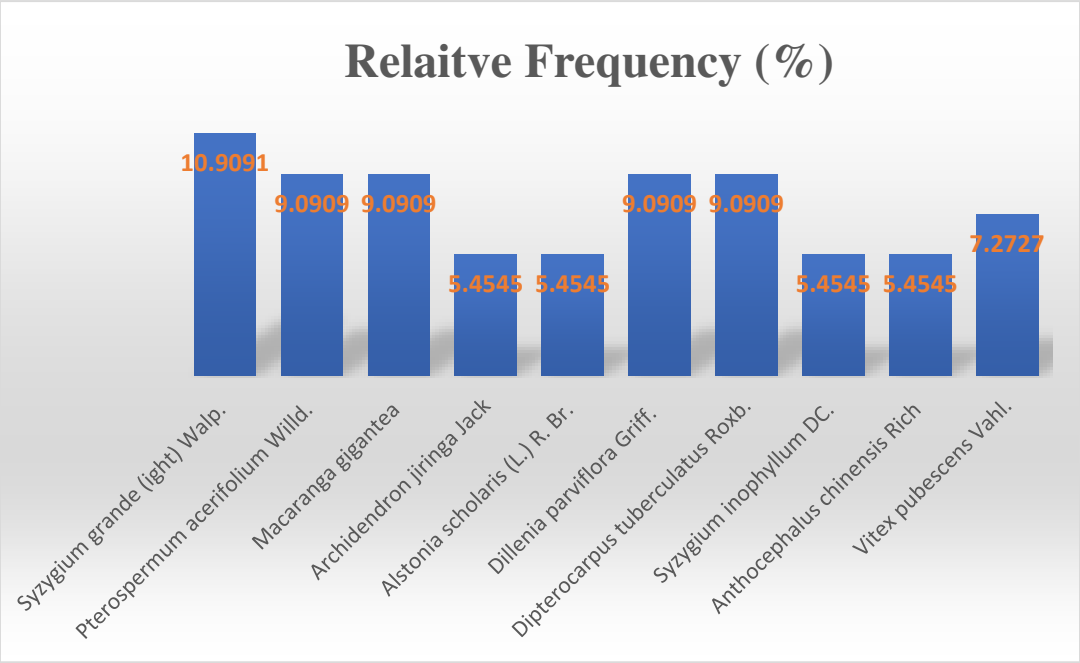


Figure: 4. 12- Relative frequency of top ten species of tree

RELATIVE DOMINANCE

The species Syzygium grande (ight) Walp. has highest relative dominance value (48.00%),Pterospermum acerifolium Willd. takes second highest relatively dominance value (31.21%), and Macaranga gigantea holds third relatively dominance value (9.73%) see table (8),

Table: 4. 10- Relative Dominance

No.	Scientific Name	Relative Dominance (%)
1	Syzygium grande (ight) Walp.	48.0099
2	Pterospermum acerifolium Willd.	31.2104
3	Macaranga gigantea	9.7314
4	Archidendron jiringa Jack	3.7066
5	Alstonia scholaris (L.) R. Br.	1.4263
6	Dillenia parviflora Griff.	1.3046
7	Dipterocarpus tuberculatus Roxb.	0.5587
8	Syzygium inophyllum DC.	0.9541
9	Anthocephalus chinensis Rich	2.3313

10	Vitex pubescens Vahl.	0.2572
11	Ficus hispida L.	0.2129
12	Ficus pisocarpa	0.0159
13	Dialium indum L.	0.0727
14	Gmelina arborea Roxb.	0.1376
15	Melanorrhoea glabra Wall.	0.0509
16	Hibiscus tiliaceus L.	0.0036
17	Derris indica Burrel	0.0112
18	Cinnamomum verum Pres	0.0023
19	Erythrina stricta Roxb.	0.0022
20	Bombax insigne Wall	0.0001

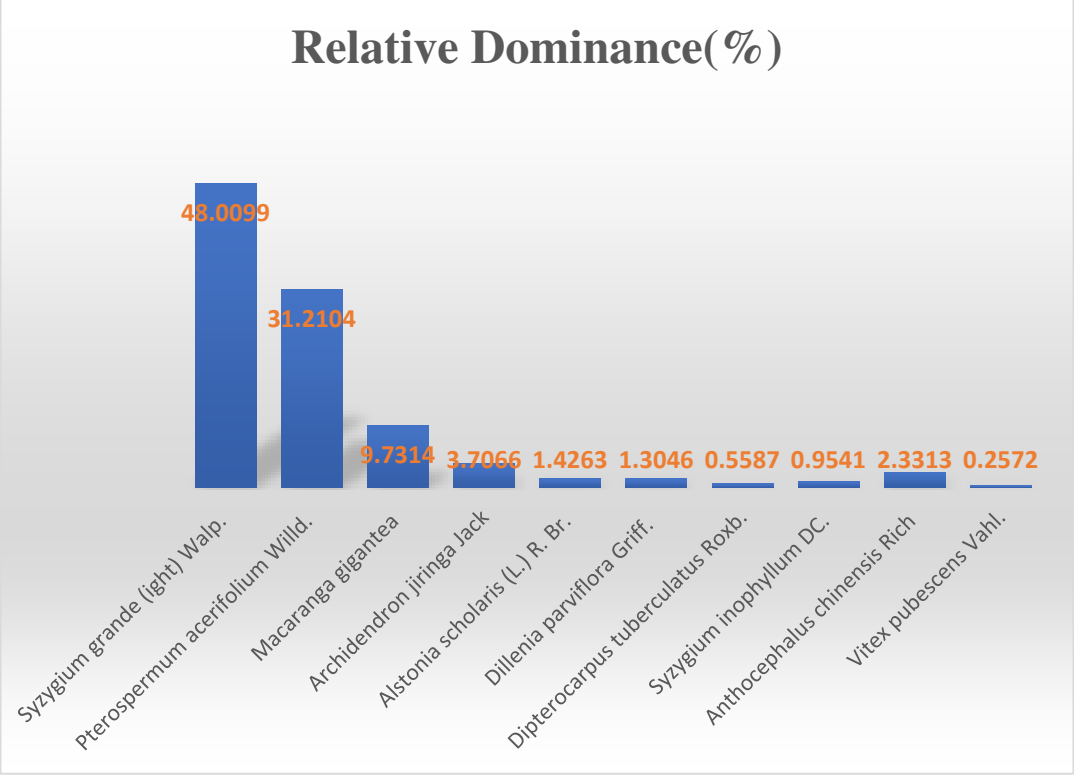


Figure: 4. 13- Relative Dominance of top ten species

Discussion

A total of 151 plant species representing various families were listed in the project area. The tree layer in the study area is dominated by Syzygium grande (ight) Walp. with the highest IVI value, the second most dominant species is Pterospermum acerifolium Willd. and Macaranga gigantea is third. The plant species that listed and recorded in recently study were checked with IUCN red list of threaten species and two threaten endangered species were found in IUCN red

list 2018. There are Dipterocarpus alatus Roxb. and Dipterocarpus dyeri Pierre endangered (EN) species and local name is Kanyin phyu and Kanyin.

4.2.1.2. TERRESTRIAL FAUNA

Myeik Archipelago is one of Myanmar's rich marine biodiversity areas in the Tanintharyi region of southern Myanmar. In addition, the Lampi Marine National Park is covered a group of islands in the Myeik Archipelago. The study of fauna takes substantial amount of time to understand the specific faunal characteristics of the area.

Survey Area

The project site is located N 10°33'33.0", E 98° 14' 14.66" at the Bo Net Kyaw Island, Kawthaung Township in Tanintharyi region. There is evergreen forest, mangrove, coral reefs and sea grass which good area to look out for a good diversity of bird and other aquatic species. Project area is about 20 km away from Lampi Marine National Park. The project site is not lies in the productive area (Lampi Marine National Park).

Figure: 4. 14- Project site and surrounding area

Protected/Reserved Area

There is Lampi Marine National Park which included one of the 43 protected areas of Myanmar and the only marine national park. It is located in the Myeik Archipelago which comprises over 800 islands distributed along 600km of coastline in the Andaman Sea. It conserves a variety of habitats such as evergreen forest, mangrove, coral reefs, sea grass bed and a rich diversity of marine fauna and other animals. Lampi marine National park is the only productive area in the Myeik Archipilago comprising Lampi island and about 20 smaller islands in its surrounding. The islands, raining in size from very small to hundreds of square kilometers, are covered by tropical lowland wet evergreen forests with a high biodiversity and surrounded by an extensive coral reef system.

Figure: 4. 15- Habitat Type of survey area

Figure: 4. 16- Habitat of fauna

Survey period

Fauna survey was conducted in August 2020 as a part of the Environmental Impact Assessment of that project. The survey period was starting from 21st to 28th August 2020.

Survey Method

Interview and Literature Survey for Fauna In addition to the field observation, secondary data were also surveyed by interviewing local residents and through literature review. In the interview survey, the surveyor visited the residents in and around the survey area where animals existing in and around the area. Also, the past situation of fauna, and the change in biodiversity and ecosystem in the area were asked.

Avifauna species present and relative abundance of species in different habitat were surveyed by random point count and opportunistic count method was used for the bird survey and took the photograph of birds. Point count and opportunistic count methods were used to morning and census the species richness and point counting were used to get the relative measure of bird abundance. Avifaunal species also identified using their call. Birds were noted and identified with the help of Nikon camera, binocular and standard field identification guides. All records were reviewed under IUCN for their conservation status.

Butterfly species were recorded transect method by observation and took the photograph of butterflies in the proposed project area. Butterfly were noted and identified with standard field

identification guides. All butterfly species were reviewed Least concern, common or uncommon status.

Mammal species cannot find easily during survey period therefore interview survey with local people. Mammal species were confirmed by interview survey with the local people and farmers, because some mammals only lived in the survey area in the past and they were no longer found during the survey period. Both observed and unobserved mammals were confirmed again through interview with local people.

Reptilian and Amphibian species were mainly collected by capturing them using the hands during the survey. Photos of reptiles and amphibians were taken as well. Information on some species was obtained from interviews with the local people.

Fishes species were collected from local fishermen during the survey period. Moreover, interview survey for landing fish was made randomly along survey. The fishes were photographed; the collection and measurements were also taken for key characteristics. The fishes were then identified according to Commercial fishes of Myanmar (2008).

Materials

The list of instruments, tools and materials used for the fauna survey as follow.

- Nikon camera
- Canon IXUS 210 camera
- Binocular 8x42 6.3º (Japan)
- Garmin GPS map 60Cx
- Field note book
- Field guide books

Survey result

Table: 4. 11- IUCN Red-list Fauna Species Composition

	Number of species				
	IUCN status				Total
	NE	DD	LC	EN	
Butterfly			1		16
Bird			65		65
Mammal			3	2	5
Reptile and Amphibian	1		4		5
Fish	11	3	49		63
Total					154

Identified Species of Fauna during the Survey Period number of species 16 Butterfly 71 55 Birds 5 Mammals 5 Reptilian and amphibian species 63 Fish, Note: NE: Not Evaluated; DD: Data Deficient; LC: Least Concern; EN: Endangered. (Source: Summarized by the EIA Study Team)

BUTTERFLY

A total of 17 butterfly species were listed around the project area during the survey period. The butterfly species were common in the project area. Butterfly population was no large in this area. No threatened butterfly species was found in the proposed area. All species were classified as very common and common except a species Euploea core is least concern (LC). During survey period, butterfly was pollinated this time therefore population is large but speices were less.

No.	Family name	Species name	Common name	Status
1	Papilionidae	Papilio polytes romulus	Common Mormon	Very common
2	Papilionidae	Papilio memnon agenor	Great Mormon	Common
3	Papilionidae	Papilio demoleus demoleus	Lime Butterfly	Common
4	Nymphalidae	Athyma perius	Common Sergent	Common
5	Nymphalidae	Parantica aglea melanoides	Glassy Tiger	Common
6	Nymphalidae	Danaus genutia	Common Tiger	Common
7	Nymphalidae	Danaus chrysippus chrysippus	Plain Tiger	Common
8	Nymphalidae	Hypolimnas bolina	Great Eggfly	Common
9	Nymphalidae	Junonia lemonias lemonias	Lemon Pansy	Common
10	Nymphalidae	Junonia hierta hierta	Yellow pansy	Common
11	Nymphalidae	Phalanta phalantha phalantha	Common Leopard	Common
12	Nymphalidae	Euploea core	Common Crow	LC
13	Nymphalidae	Phalantan phalantha	Common Leopard	Common
14	Lycaenidae	Castalius rosimon rosimon	Common Pierrot	Common
15	Pieridae	Appias olferna olferna	Striped Albatross	Common
16	Pieridae	Castopsilia pomona pomona	Lemon Emigrant	Common
17	Pieridae	Eurema hecabe hecabe	Common Grass Yellow	Very common

Phalanta Phalantha (Common lepord)

Table: 1. 5: Recorded Butterfly Species

BIRD

A total of 65 bird species were recorded during the survey period in the project area. The survey area is mainly characterized by primary forest; the species rock dove columba livia and

green imperial pigeon ducula aenea were common bird species in the area. No endanger species was found in the project area.

Recorded bird species were checked with the IUCN Red List of Threatened Species. All bird species were classified as LC. According to baseline survey there is no threatened species.

Arthrococeros albirostris Oriential Pied Hornbill

Halcyon pileato Black capped Kingfisher

Ducula aenea (Green Imperial Pigeon)

Copsycnus malabaricus White Rumped Shama

Table: 4. 12- Recorded Bird Species

Bird species composition of the survey area

Sr.No	Species Name	Common name	Family	IUCN status
1	Dinopium jovonense	Common Flameback	Picidae	LC
2	Hemicircus canente	Heart-spotted Woodpecker		LC

Bird species composition of the survey area

Sr.No	Species Name	Common name	Family	IUCN status
3	Psilopo oustrotis	Blue-eared Barbet	Mealaimidae	LC
4	Psilopogon asiaticus	Blue-throated Barbet		LC
5	Anthrococerosalbirostris	Oriental Pied Hornbill	Bucerotidae	LC
6	Eurystomus orientalis	Dollarbird	Coracliformes	LC
7	Halcyon smyrnensis	White-throated Kingfisher		LC
8	Halcyon pileato	Black-capped Kingfisher		LC
9	Ducula aenea	Green Imperial Pigeon	Columbidae	LC
10	Gelochelidon nilotica	Gull-billed Tern	Laridae	LC
11	Sterno olbifrons	Little Tern		LC
12	Milvus migrans	Black Kite		LC
13	Haliastur indus	Brahminy Kite		LC
14	Haliaeetus leucogaster	White-bellied Sea Eagle		LC
15	Accipiter badius	Shikra		LC
16	Hiercoccyxfugax	Malaysian Hawk Cuckoo	Cuculidae	LC
17	Eudynamys scolopocea	Asian Koel		LC
18	Phaenicophaeus tristis	Green-billed Malkoha		LC
19	Centropus sinensis	Greater Coucal		LC
20	Coflocalia esculenta	Glossy Swiftlet	Apodidae	LC
21	Aerodramus maximus	Black-nest Swiftlet		LC
22	Apus affinis	House Swift		LC
23	Hemiprocne longipennis	Grey-rumped Treeswift		LC
24	Glaucidium cuculoides	Asian Barred Owlet		LC
25	Tyta alba	Barn Owl	Tytonidae	LC
26	Caprimulgus macrurus	Large-tailed Nightjar	Caprimulgidae	LC
27	Columbo livia	Rock Pigeon	Columbidae	LC

Bird species composition of the survey area

Sr.No	Species Name	Common name	Family	IUCN status
28	Chalcaphaps indica	Emerald Dove		LC
29	Ducula aenea	Green Imperial Pigeon		LC
30	Dicrurus remifer	Lesser Racket-tailed Drongo		LC
31	Pachycephala cinerea	Mangrove Whistler	Pachycephalidae	LC
32	Hypothymis azureo	Black-naped Monarch	Monarchidae	LC
33	Terpslphone paradisi	Asian Paradise Flycatcher		LC
34	Aegithina tiphia	Common lora	Aegithino	LC
35	Monticola solitarius	Blue Rock Thrush	Muscicapidae	LC
36	Copsychus soularis	Oriental Magpie Robin		LC
37	Copsychus malabaricus	White-rumped Shama		LC
38	Gracula religioso	Hill Myna	Sturnidae	LC
39	Acridotheres fuscus	Jungle Myna		LC
40	Hirundo rustica	Barn Swallow		LC
41	Hlrundo tahitica	Pacific Swallow		LC
42	Pycnonotus goiavier	Yellow-vented Bulbul		LC
43	Prinia hodgsonii	Grey-breasted Prinia	Cisticolidae	LC
44	Prinia hodgsonii	Oriental White-eye		LC
45	Gerygone sulphurea	Golden-bellied Gerygone	Acanthizidae	LC
46	Butastur teesa	White-eyed Buzzard		LC
47	Butea buteo	Common Buzzard		LC
48	Falco tinnunculus	Common Kestrel	Falonidae	LC
49	Ardea cinerea	Grey Heron	Ardeidae	LC
50	Ardea alba	Great Egret		LC
51	Ardea intermedia	Intermediate Egret		LC
52	Bubulcus ibis	Cattle Egret		LC

Bird species composition of the survey area

Sr.No	Species Name	Common name	Family	IUCN status
53	Ardeola grayii	Indian Pond Heron		LC
54	Lanius cristatus	Brown Shrike		LC
55	Corvus macrorhynchos	Large-Billed Crow	Corvidae	LC
56	Platysmurus teucopterus	Black Magpie		LC
57	Cissa chinensis	Common Green Magpie		LC
58	Oriolus chinensis	Black-naped Oriole	Oriolidae	LC
59	Rhipidura albicollis	White-throated Fantail	Phipiduridae	LC
60	Oicrurus macrocercus	Black Drongo	Dicruridae	LC
61	Dicaeum agile	Thick-billed Flowerpecker	Dicaeidae	LC
62	Anthreptes simplex	Plain Sunbird	Nectarinildae	LC
63	Nectarinia asiatica	Purple Sunbird		LC
64	Arachnothera longirostra	Little Spider hunter		LC
65	Orthotomus sutorius	Common Tailorbird	Cisticolidae	LC

MAMMAL SPECIES

A total of 5 mammal species were collected around the project area by interview survey. Two threatened species as Orcaella brevirostris (Irrawwady dolphin) and Lutra sumatrana (Hairy nosted-otter) was get information from the local villagers in the sea. Bat cave is located 10 33’42.47”N 98 14’ 17 42” beside the sea bank.

All species were classified as EN (Endanger) and LC (Least concern). This area is good biodiversity but human settlements on the island therefore the species are less. This data was assessed by questionnaire interview and observation. According to interviewed surveyed other mammal species may have migrated five years or one decade ago from this area.

Callosciurus phayrei (Pharyre's squirrel)

Table: 4. 13- Mammal species composition of the survey area

Sr.No	Species Name	Common name	Family	IUCN Status	Remark
1	Hipposideros pomona	Pomona Roundleaf bat	Hipposideridae		Observed
2	Paradoxurus harmaphroditus	Common civet	Viveridae	LC	Intrviewed
3	Callosciurus phayrei	Pharyre's squirrel	Sciuridae	LC	Intrviewed
4	Orcaella brevirostris	Irrawaddy dolphin	Delphinidae	EN	Intrviewed
5	Lutra sumatrana	Hairy nosted-otter	Mustelidae	EN	Intrviewed

REPTILE AND AMPHIBIAN

A total of 5 species of belong to 4 families were record around the project area. Recorded reptile and amphibian species were checked with the IUCN Red List. Five species were classified as NE and LC. According to baseline survey there is no threatened species.

Table: 4. 14- Reptile and Amphibian species composition of the survey area

Sr.No	Species Name	Common Name	Family	IUCN Status
1	Dasia olivacea	Dasia olivacea	Scincidae	LC
2	Eutropis spp.	Skink	Scincidae	LC
3	Sphenomorphus maculatus	Spotted forest skink	Scincidae	NE
4	Bufo melanastictus	Common toad	Bufonidae	LC
5	Polypedates maculatus	Tree frog	Rhacophoridae	LC

FISH

A total of 63 fish species were recorded during the survey period. The fishes are important for the ecosystem of the sea. Recorded species were checked with the IUCN Red List of Threatened species. Most of the species were classified as NE (Not Evaluated), DD (Data Deficient) and LC (Least Concern). During the survey period fishermen and local people were interviewed surveyed for the commercial fish species.

Sillago sihama (Forsskal, 1775)

Terapon jarbua (Forsskal, 1775)

Siganus canaliculatus (Park, 1797)

Table: 4. 15- Fish species composition of the survey area

Sr.No	Species Name	Family	IUCN Status
1	Cephalopholis formosa	Serranidae	LC
2	Cephalopholis miniata		LC
3	Epinephelus aereolatus		LC
4	Epinephelus bleekeri		
5	Epinephelus chlorostigma		LC
6	Epinephelus coioides		LC
7	Epinephelus epistictus		LC
8	Epinephelus quoyanus		LC
9	Liza vaigiensis	Mugilidae	LC
10	Ablennes hians	Belonidae	LC
11	Hemiramphus far	Hemiramphidae	NE
12	Terapon jarbua	Terapontidae	LC
13	Lutjanus argentimaculatus		LC
14	L.erythropterus		LC
15	L.indicus		LC
16	L.erythropterus		LC
17	L.malabaricus		LC

18	L.quinquelineatus		NE
19	L.sebae		NE
20	L.vitta		NE
21	Caesio cuning	Caesionidae	LC
22	Pterocaesio tessellata		LC
23	Pomadasys furcatus		LC
24	P.kaakan		NE
25	Acanthopagrus berda	Sparidae	LC
26	Gymnocranius griseus	Lethrinidae	LC
27	Lethrinus lentjan		LC
28	Lethrinus microdon		LC
29	Lethrinus nebuosusl		LC
30	Nemipterus bipunctatus	Nemipterus	LC
31	Nemipterus furcosus		LC
32	Parapercis albovittata	Pinguipedidae	NE
33	Ichthyscopus lebeck	Uranoscopidae	LC
34	Ephippus orbis	Ephippidae	NE
35	Siganus fuscescens	Siganidae	DD
36	Siganus javus		LC
37	Siganus vermiculatus		LC
38	Trichiunus lepturus	Trichiuridae	LC
39	Acanthocybium solandri	Scambridae	LC
40	Auris thazard		LC
41	Rustelliger faughni		NE
42	Rustelliger kanagurta		DD
43	Sphyraena barracuda	Sphyraenidae	LC
44	Sphyraena putnamae		NE
45	Pampus argenteus	Stromateidae	NE

46	Lactarius lactarius	Lactariidae	NE
47	Sillago ciliata	Sillaginidae	LC
48	Sillago sihama		LC
49	Rachycentron canadum	Rachycentridae	LC
50	Alectis indica	Carangidae	LC
51	Atule mate		LC
52	Carangodies malabaricus		LC
53	Elagatis bipinnulata		LC
54	Megalaspis cordyla		
55	Parastromateus niger		LC
56	Gerres filamentosus	Gerreidae	LC
57	Mulloidichthys vanicolensis	Mulidae	LC
58	Parupeneus heptacanthus		LC
59	Parupeneus indicus		LC
60	Kyphosus vaigensis	Kyphosidae	LC
61	Lagocephalus spadiceus	Teraodontidae	LC
62	Acreichthys tomentosus	Monacanthidae	LC
63	Aluterus monceros		LC

Discussion

The list of bird species from the study area indicates that the island is still good for biodiversity. This area does not lie close to any Important Bird Area (IBA). The bird survey did not record any globally threatened birds. But the productive area closest is the Lampi marine National park which is over 200 native and migratory shore birds. Therefore, it could be concluded that the construction of this proposed project would cause a minimal impact on the avian fauna of this area. Project proponent might be implemented buffer zone for birds and other terrestrial species.

The list of fish from the sea indicated that the Andaman Sea still provides a good habitat for aquatic animals and the biodiversity in the sea is relatively high. Fishermen and local people can still depend on the sea for their livelihoods.

Two endanger mammal species was recorded from the Andaman sea which is very adjacent with the proposed project site therefore project proponent might be considered jetty design, transportation and waste management and waste water treatment system for aquatic animals.

4.2.1.3. AQUATIC

Corals are marine invertebrates within the class Anthozoa of the phylum Cnidaria. They typically live in compact colonies of many identical individual polyps. Corals species include the important reef builders that inhabit tropical oceans and secrete calcium carbonate to form a hard skeleton. Coral reefs are complex ecosystems with high biological diversity that occur in shallow waters throughout the tropics. There are numerous sea urchin beds recorded and some otters are spotted during the survey.

Coral reefs deliver ecosystem services for tourism, shoreline protection and productive fisheries which provide an essential source of protein and feeding, breeding and nursery grounds for many marine organisms. Coral reefs are fragile, partly because they are sensitive to water conditions and their proximity to the coast exposes coral reefs not only to subsistence pressures but also to other human induced (anthropogenic) stresses such as pollution (industrial, chemical and sewage) and sedimentation (land clearing, reclamation, mining) (English et al., 1997). Most anthropogenic threats are pollution, sedimentation, overfishing, climate change and direct physical damage.

The main objective of present study is to identify the diversity of coral reefs and to take an account on some mitigation measure for ecotourism development project at Bo Nat Kyaw island.

Methodology

Site Description: Samples were collected from 21-23 August 2020 at the three sites of Bo Nat Kyaw island, Myeik Archipelago, Tanintharyi Region, Myanmar. Station 1 and 2 located in the northern bay of the island (Figure 1). Station 3 was situated in the southeastern part of the island.

Coral Reef Survey: Random data collection method was used along the reef flats and edges to assess their diversity (Table 2). The sites were logged by using a GPS (Table 1). At each survey site, the observers move slowly along the flat and edge of the reefs by snorkeling and record with digital camera. Identification was done mainly base on “Coral of the World” Veron 2000, vol.1,2,3. IUCN red list level were also used and ranked as Data deficient (DD), Vulnerable (VU) and Nearly Threaten (NT).

Table: 4. 16- The site localities of marine survey area.

Station	Latitude	Longitude
1	10°33'47.39"N	98°14'00.09"E
2	10°33'44.81"N	98°14'17.24"E
3	10°33'01.99"N	98°14'10.07"E

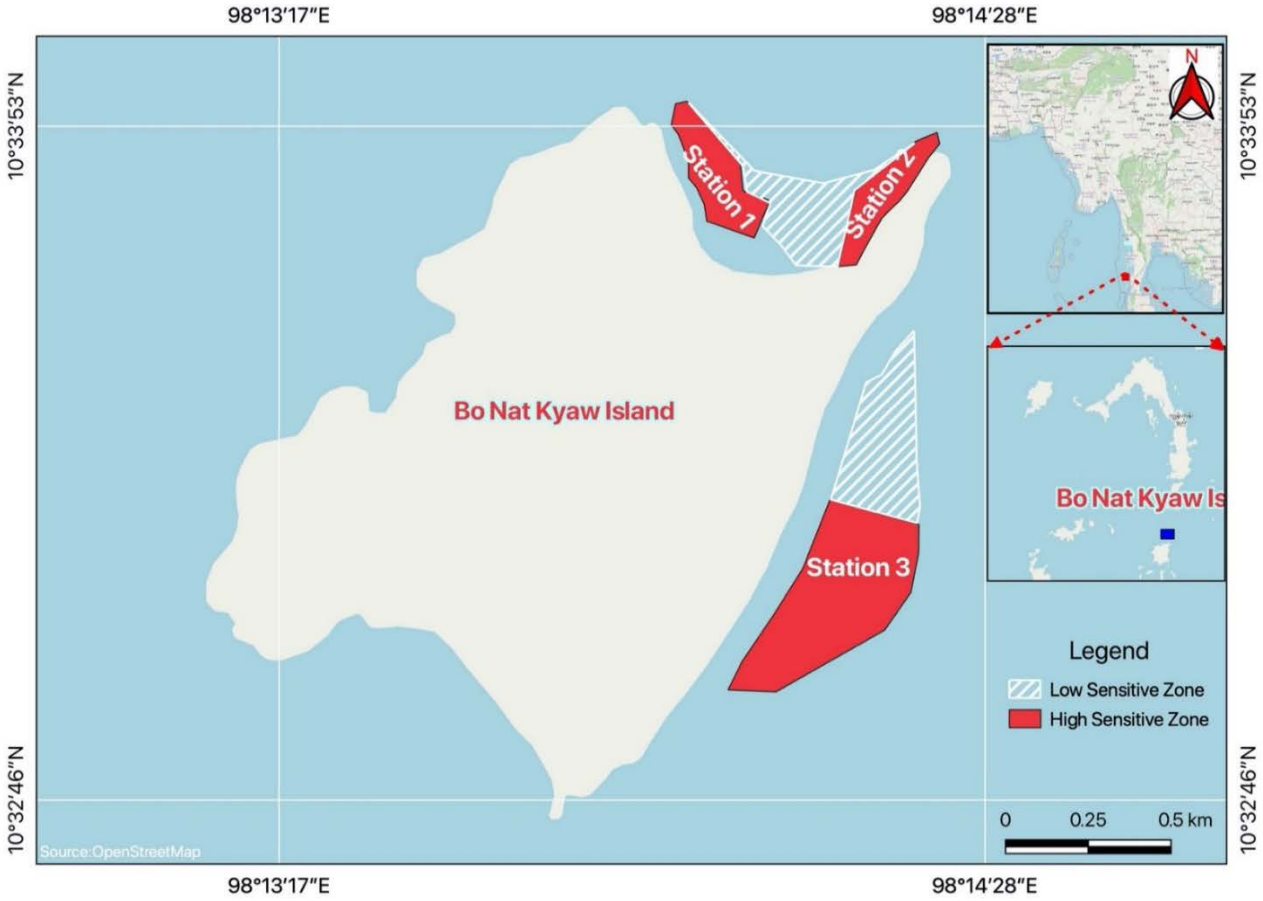


Figure: 4. 17- Detail description of study sites.

A total of 70 species of corals belongs to Cnidaria, Anthozoa and Scleractinia (Table 2). Among them, the species composition was higher in Arcropora (17 species), follow by Dipsastrea and Favites (7 species) and Porites (6 species) respectively. The identified species were described in Plates I-III.

The highest number of species were recorded in Station 3 (40%) while the lowest occurred in Station 2 (23%) (Table 3, Figure 2), because Station 2 has narrow area of reef flat. Therefore, Station 1 and 3 show high level of sensitivity because most of the corals were exposed during the low tides (Figure 1). Moreover, these two statins have higher number of nearly threaten (NT) species listed by IUCN (global scale) (Table 2, Figure 3).

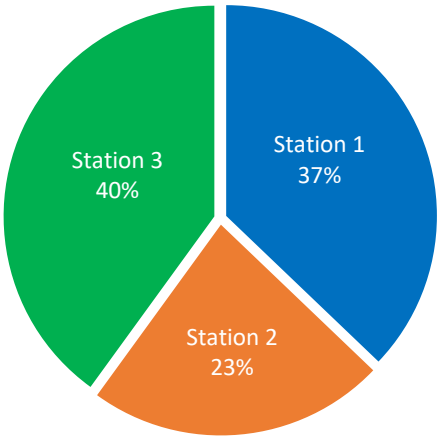


Figure: 4. 18- Species composition of coral in different stations.

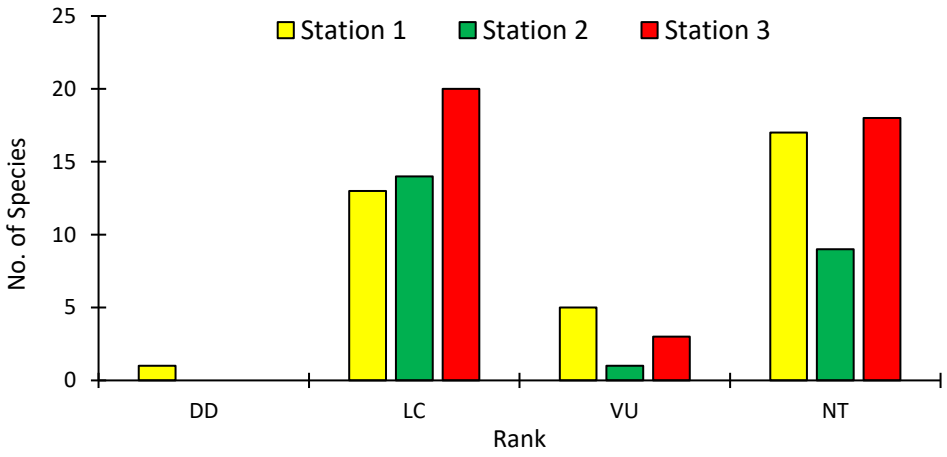


Figure: 4. 19- IUCN red list status of coral in each station.

Table: 4. 17- Classified list of coral with IUCN red list status.

Phylum	Class	Order	Family	Genus	No.	Species	Common Name	IUCN Red List
Cnidaria	Anthozoa	Scleractinia	Acroporidae	Acropora	1	Acropora austera	Staghorn coral	NT
					2	Acropora cerealis	Staghorn coral	LC
					3	Acropora clathrata	Table coral	LC
					4	Acropora florida	Branch coral	NT
					5	Acropora formosa	Staghorn coral	NT
					6	Acropora gemmifera	Digitate coral	NT
					7	Acropora grandis	Staghorn coral	LC
					8	Acropora humilis	Finger coral	NT
					9	Acropora hyacinthus	Brush coral	NT
					10	Acropora intermedia	Staghorn coral	LC
					11	Acropora microphthalma	Staghorn coral	LC
					12	Acropora nasuta	Staghorn coral	NT
					13	Acropora pulchra	Staghorn coral	LC
					14	Acropora robusta	Staghorn coral	LC
					15	Acropora spicifera	Table coral	VU

					16	Acropora yongei	Staghorn coral	LC
					17	Acropora aspera	Staghorn coral	VU
				Montipora	18	Montipora sp	Porous leaf coral	-
			Poritidae	Porites	19	Porites annae	Nodule coral	NT
					20	Porites compressa	Hump coral	LC
					21	Porites cylindrica	Hump coral	NT
					22	Porites lobata	Lobe coral	NT
					23	Porites lutea	Hump coral	LC
					24	Porites solida	Boulder coral	LC

Table 2. Continued

Phylum	Class	Order	Family	Genus	No.	Species	Common Name	IUCN Red List
			Merulinidae	Dipsastraea	25	Dipsastraea favus	Head coral	LC
					26	Dipsastraea lacuna	Knob coral	NT
Cnidaria	Anthozoa	Scleractinia			27	Dipsastraea matthaii	Knob coral	NT
					28	Dipsastraea pallida	Brain coral	LC

	29	Dipsastraea danai	Moon coral	LC
	30	Dipsastraea rotumana	Stony coral	LC
	31	Dipsastraea speciosa	Stony coral	LC
Goniastrea	32	Goniastrea australensis	Brain coral	LC
	33	Goniastrea minuta	Stony coral	NT
	34	Goniastrea sp.	Stony coral	-
Favites	35	Favites abdita	Larger star coral	NT
	36	Favites acuticollis	Larger star coral	NT
	37	Favites complanata	Larger star coral	NT
	38	Favites flexuosa	Larger star coral	NT
	39	Favites halicora	Larger star coral	NT
	40	Favites vasta	Stony coral	NT
	41	Favites russelli	Larger star coral	NT
Platygyra	42	Platygyra daedalea	Lesser valley coral	LC
	43	Platygyra sinensis	Lesser valley coral	LC
	44	Platygyra pini	Lesser valley coral	LC
Oulophyllia	45	Oulophyllia crispa	Intermediate valley coral	NT

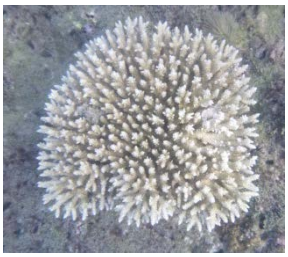
					46	Oulophyllia levis	Intermediate valley coral	LC
				Caulastraea	47	Caulastrea echinulata	Finger coral	VU
				Coelastrea	48	Coelastrea aspera	Lesser star coral	LC
				Leptoria	49	Leptoria phrygia	Lesser brain coral	NT
				Hydnophora	50	Hydnophora microconos	Small coned coral	NT

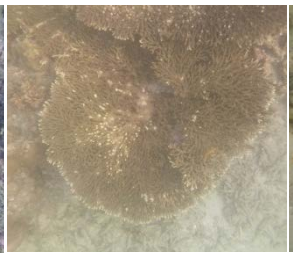
Table 2. Continued

Phylum	Class	Order	Family	Genus	No.	Species	Common Name	IUCN Red List
			Faviidae	Diploria	51	Diploria strigosa	Symmetrical brain coral	LC
				Colpophyllia	52	Colpophyllia natans	Boulder brain coral	LC
				Leptastrea	53	Leptastrea purpurea	Crust coral	LC
			Lobophyllidae	Lobophyllia	54	Lobophyllia agaricia	Brain coral	LC
					55	Lobophyllia flabelliformis	Stony coral	VU
					56	Lobophyllia radians	Breater brain coral	LC
			Agariciidae	Pavona	57	Pavona decussata	Cactus coral	VU
					58	Pavona danai	Stony coral	VU
Cnidaria	Anthozoa	Scleractinia	Pocilloporidae	Pocillopora	59	Pocillopora damicornis	Lace coral	LC
					60	Pocillopora effusa	Cauliflower coral	DD

				61	Pocillopora meandrina	Cauliflower coral	LC
		Dendrophylliidae	Turbinaria	62	Turbinaria sp1	Disc coral	-
				63	Turbinaria sp2	Disc coral	-
		Mussidae	Isophyllia	64	Isophyllia sinuosa	Sinuous cactus coral	LC
			Symphyllia	65	Symphyllia wilsoni	Sinuous cup coral	LC
		Oulastreidae	Oulastrea	66	Oulastrea crispata	Zebra coral	LC
		Psammocoridae	Psammocora	67	Psammocora sp	Stellar coral	-
		Euphylliidae	Galaxea	68	Galaxea fascicularis	Galaxy coral	NT
	Zoantharia	Sphenopidae	Palythoa	69	Palythoa caribaeorum	White encrusting zoanthid coral	LC
	Helioporacea	Helioporidae	Heliopora	70	Heliopora coerulea	Blue coral	VU


Acropora austera


Acropora cerealis

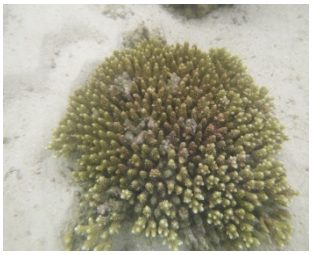

Acropora clathrata


Acropora florida


Acropora formosa


Acropora gemmifera


Acropora grandis


Acropora humilis


Acropora hyacinthus


Acropora intermedia


Acropora microphthalma


Acropora nasuta


Acropora pulchra


Acropora robusta


Acropora spicifera


Acropora yongei


Acropora aspera


Montipora sp


Porites annae


Porites compressa


Porites cylindrica


Porites lobata


Porites lutea


Porites solida

Plate I. Monograph of coral reefs.


Dipsastraea favus

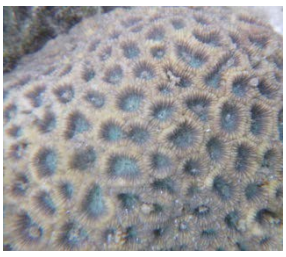

Dipsastraea lacuna


Dipsastraea matthaii


Dipsastraea pallida


Dipsastraea danai


Dipsastraea rotumana


Dipsastraea speciosa


Goniastrea australensis


Goniastrea minuta


Goniastrea sp


Favites abdita


Favites acuticollis


Favites complanata


Favites flexuosa

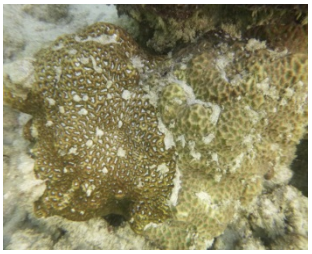

Favites halicora


Favites vasta


Favites russelli


Platygyra daedalea


Platygyra sinensis


Platygyra pini

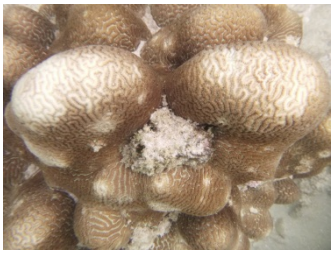

Oulophyllia crispa


Oulophyllia levis


Caulastrea echinulata


Coelastrea aspera

Plate II. Monograph of coral reefs.


Leptoria phrygia


Hydnophora microconos


Diploria strigosa


Colpophyllia natans


Leptastrea purpurea


Lobophyllia agaricia


Lobophyllia flabelliformis


Lobophyllia radians


Pavona decussata


Pavona danai


Pocillopora damicornis


Pocillopora effusa

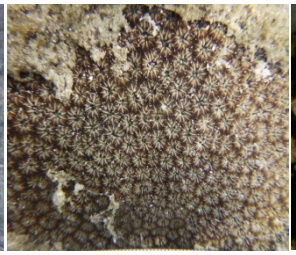

Pocillopora meandrina


Turbinaria sp1

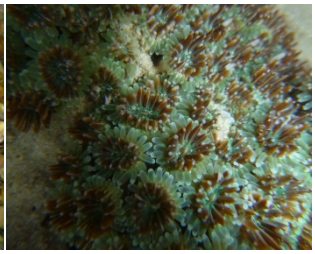

Turbinaria sp2


Isophyllia sinuosa


Symphyllia wilsoni


Oulastrea crispata


Psammocora sp


Galaxea fascicularis


Palythoa caribaeorum


Heliopora coerulea

Plate III. Monograph of coral reefs.

Table: 4. 18- Species occurrence of coral from different stations.

No.	Species	Station 1	Station 2	Station 3
1	Acropora austera	+	-	-
2	Acropora cerealis	-	+	-
3	Acropora clathrata	-	+	-
4	Acropora florida	-	+	-
5	Acropora formosa	+	+	+
6	Acropora gemmifera	-	+	-
7	Acropora grandis	+	-	+
8	Acropora humilis	+	+	+
9	Acropora hyacinthus	-	+	+
10	Acropora intermedia	+	-	+
11	Acropora microphthalma	+	-	+
12	Acropora nasuta	+	-	+
13	Acropora pulchra	+	+	+
14	Acropora robusta	-	+	-
15	Acropora spicifera	-	+	+
16	Acropora yongei	-	+	+
17	Acropora aspera	+	-	+
18	Montipora sp.	+	-	-
19	Porites annae	-	-	+
20	Porites compressa	-	-	+
21	Porites cylindrica	+	-	+
22	Porites lobata	+	+	+
23	Porites lutea	-	-	+
24	Porites solida	-	-	+
25	Dipsastraea favus	+	+	+
26	Dipsastraea lacuna	-	-	+

27	Dipsastraea matthaii	+	-	-
28	Dipsastraea pallida	+	-	-
29	Dipsastraea danai	-	+	+
30	Dipsastraea rotumana	-	-	+
31	Dipsastraea speciosa	-	-	+
32	Goniastrea australensis	-	-	+
33	Goniastrea minuta	+	-	+
34	Goniastrea sp.	-	-	+
35	Favites abdita	+	-	+
36	Favites acuticollis	+	-	+
37	Favites complanata	+	+	+
38	Favites flexuosa	+	-	+
39	Favites halicora	+	-	+

Table: 4. 19- Continued

No.	Species	Station 1	Station 2	Station 3
40	Favites vasta	+	+	+
41	Favites russelli	-	-	+
42	Platygyra daedalea	+	-	-
43	Platygyra sinensis	+	+	-
44	Platygyra pini	+	+	+
45	Oulophyllia crispa	-	+	+
46	Oulophyllia levis	-	-	+
47	Caulastrea echinulata	-	-	+
48	Coelastrea aspera	-	+	+
49	Leptoria phrygia	+	-	-
50	Hydnophora microconos	+	-	+
51	Diploria strigosa	+	-	-
52	Colpophyllia natans	-	+	-

53	Leptastrea purpurea	-	-	+
54	Lobophyllia agaricia	+	-	-
55	Lobophyllia flabelliformis	+	-	-
56	Lobophyllia radians	-	+	-
57	Pavona decussata	+	-	-
58	Pavona danai	+	-	-
59	Pocillopora damicornis	+	-	+
60	Pocillopora effusa	+	-	-
61	Pocillopora meandrina	-	-	+
62	Turbinaria sp.1	+	-	-
63	Turbinaria sp. 2	+	-	-
64	Isophyllia sinuosa	+	-	-
65	Symphyllia wilsoni	-	+	-
66	Oulastrea crispata	-	-	-
67	Psammocora sp.	-	-	+
68	Galaxea fascicularis	+	-	-
69	Palythoa caribaeorum	-	+	-
70	Heliopora coerulea	+	-	-
Total no. of species		39	24	42

Discussion

Although the diversity of corals was high, the impacts were low to medium because the operation are mainly carried out on the terrestrial base. However, there are proper mitigation processes were required in each sector. According to the data from present study, the site selection for the construction of jetty (floating bridge is recommended) should carry out between at the edges of Station 1 and 2 because this area has massive type (not easy to damage) coral reefs such as Porites species as well as in the northeastern part of island (north of Station 3). Moreover, all the stations could be used as tourist attraction sites; especially Station 1 and 3 are good for snorkeling sites when Station 2 is suitable for SCUBA diving site. In this situation, snorkeling could be impacted on coral reefs because they could be easily destroyed by snorkeler's fins. Therefore, the operator should aware to visitors to understand standard procedure (do and do not) before going to snorkeling and diving.

4.3. SOCIO-ECONOMIC COMPONENTS

Natural Disaster

Natural disaster that occurred from October 2018 to September 2019 are as follows:

No.	Type of disaster	Frequency	No. of Depth/Lost	No. of damaged building	Losses (MMK)
1	Strom	-	-	-	-
2	Tsunami	-	-	-	-
3	Earthquake	-	-	-	-
4	Flood	3	-	1	100,000
5	Fire	2	-	2	-
6	Wind hazard	14	-	26	10,394,500
7	Landslide	4	-	9	3,500,000
8	Thunderstorm	-	-	-	-

Socio-Economic Conditions

Population Data

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

Table: 4. 20- Population Data (2019)

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

Table: 4. 21- Number of Houses and Household Status (2019)

No	Description	House	Household	Quarter	Village Tract	Village
1	Urban	12520	14280	13	-	-

2	Rural	12427	12427	-	18	91
Total		24947	26707	13	18	91

Table: 4. 22- Rate of Population and Ratio of Male and Female

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

Table: 4. 23- Number of Population of Birth Rate, Mortality and Migration

Township	Initial Population	Birth rate Population	Mortality rate	Migration (In)	Migration (Out)	Current Population
Kawthaung	108431	124	47	10054	1765	116797
Kamoutkyi	10765	-	-	1307	427	11645
Total	119196	124	47	11361	2192	128442

Table: 4. 24-Percentage of different Races in Kawthaung Township

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

Economy and Livelihood

Kawthaung Township is located in Kawthaung District, Thanintharyi Region and is an ecolomically developed township. The local people are mainly working in fisheries and also working in rubber plantation. Moreover, Kawthaung Township has good transportation and main products fisheries products which are mainly exported to Thailand. According to information from the Township General Administration Department Offices, the occupational status of the targeted townships shows that the averages of about 94.75% of the workable persons are employee and 5.25% unemployed.

Table: 4. 25- Occupational Status

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

Table: 4. 26- Livelihood and Employment Status

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

Land Use

The land use of Kawthaung township is as follow:

No.	Types of Land	Area (acre)
1.	Net acre for plantation	151892

No.	Types of Land	Area (acre)
	Farmland	460
	Yar	-
	Cultivated land	-
	Orchid land	150214
	Nipa palm plantation	1218
2.	Fellow Land Area	-
	Farmland	-
	Yar	-
	Cultivated land	-
	Orchid land	-
	Nipa palm plantation	-
3.	Grazing Land	765
4.	Industrial land	49
5.	Urban Land	721
6.	Village Land	1202
7.	Other Land	99475
8.	Reserved forest and protected forest area	89092
9.	Wild forest	2230
10.	Wild land	43
11.	Area not to be cultivated	150013
Total		647374

Health Status

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

Education Sector

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

Cultural Heritage

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

Transportation and Communication

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

CHAPTER 5: IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1. INTRODUCTION

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

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

5.2. METHODOLOGY

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

5.2.1. METHODOLOGY APPROACH FOR THE ASSESSMENT OF POTENTIAL SIGNIFICANT IMPACTS ON PHYSICAL ENVIRONMENT

The assessment of each impact is based on consideration of four parameters, magnitude, duration, spatial and frequency of activities, which are going to be carried out during three phases and characteristics of the project site.

The following methodology has been applied to assess the environmental impacts of the hotel and resort development operation mainly on air, noise, water, waste disposal, hazardous materials and also includes human beings. Each source of impacts has been assessed by four parameters such as magnitude, duration, extent and probability and each access point have five scales as mentioned in the following Table.

Table: 5. 1- Impact Assessment Parameters and Its Scale

Assessment	Scale				
	1	2	3	4	5
Magnitude (M)	Insignificant	Small and will have no effect on the environment	Moderate and will result in minor changes in the environment	High and will result in significant changes on environment	Very high And will result in permanent changes on environment

Assessment	Scale				
	1	2	3	4	5
Duration(D)	0-1year	2-5year	6-15year	Longer than 15 year	Permanent
Extent(E)	Limited to the site	Limited to the local area	Limited to the region	National	International
Probability(P)	Very improbable	Improbable	Probable	Highly probable	Definite

Then, the significant point (SP) is calculated by following formula.

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

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

Table: 5. 2- Significance of Impacts

Significant Point (SP)	Impact Significance
<15	Very low
15-29	Low
30-44	Moderate
45-59	High
>60	Very High

5.2.1.1. CONSTRUCTION PHASE IMPACTS

Impacts on Air Quality

During the construction phase the ambient air quality in and around the proposed project site will have marginal adverse impacts due to the various activities which are part of construction phase. The various activities include during construction phase such as site preparation, approach roads, excavation, drilling, foundation, deployment of machinery, erection, transportation, dumping will cause dust and gaseous emissions. The pollutant released during the construction activities may cause immediate effect on the construction workers, directly exposed to them. Temporary increase in air pollution will result from the use of construction equipment, portable lights, and fugitive dust. Also, the movement of construction vehicles during earthworks and the transportation of construction material to and from the project site will lead to generation of dust. Dust is anticipated to be generated most significantly during the dry seasons from November to March. Diesel generator, truck and heavy machines will be emitted to the generation of gases such as (CO2, CO and SO2). Due to the short duration of the

Planned Action, any impacts on ambient air quality during construction activities are expected to be short term.

Mitigation Measures

- The working area for the uprooting of shrubs or vegetation or the removal of boulders or temporary or permanent structures shall be sprayed with water immediately before, during, and immediately after the operation to maintain the entire surface wet.
- All machinery to be used for construction purposes will be of the high standard and properly maintained.
- Acoustic laggings and silencers will be used in equipment wherever possible.
- Transport vehicles and construction equipment/machineries will be properly maintained to reduce air emissions.
- Equipment for measurent of air pollution wil be periodically checked
- Immediately before leaving a construction site, every vehicle will be washed to remove any dusty materials from its body and wheels.
- When a vehicle leaving a construction, site is carrying a load of dusty materials, the entire load will be covered by a clean tarpaulin (impervious sheeting) to ensure that the dusty materials do not leak from the vehicle.
- The working area of any excavation or earth moving operation will be sprayed with water immediately before during and immediately after the operation to maintain the entire surface wet.
- All loose material either stocked or transported will be provided with suitable covering such as tarpaulin, etc.
- Water sprinkling will be done at the location where the dust generation is anticipated.
- Over Burden (OB) waste dumps will be sprayed with water as they are major sources of airborne particulate matter/dust.
- OB waste dumps will be reclaimed/by planting with trees to bind the loose soil and to prevent soil erosion.

Impacts on Noise and Vibration

Foundation work will involve land excavation, affecting environment by noise. Structural work, deployment of machinery, approach of road construction and erection of roads will result in noise and vehicular traffic. Material handling and transportation would also lead to significant noise pollution. Continuous Exposure of workers to high sound levels may result in annoyance, fatigue. Albeit annoying, this negative impact will be short-term (limited to the duration of the road construction works) and is not considered to be a significant threat to the health or wellbeing of humans.

The vibration will be generated from transportation of heavy construction materials and heavy machines movements. Except the workers there was no residents on the island therefore it can be categorized as low impact.

Mitigation Measures

- Construction activities that will generate disturbing sounds which will be restricted to normal working hours from 7 a.m to 7 p.m...
- Workers operating equipment that generates noise will be equipped with noise protection gear. Workers operating equipment generating noise levels greater than 70 dBA continuously for 8 hours or more must use earmuffs. Workers experiencing prolonged noise levels of 70 – 80 dBA have to wear earplugs.
- The construction activities will be restricted to the daytime and no construction will be practiced during night.
- Barricades will be provided around the construction site to confine noise within the site.
- To reduce the impact of noise pollution and to provide a clean, healthy environment, it is necessary to create and maintain a green belt within the building complex and along the roadsides.

Impacts on Soil Quality

Vegetation clearance and excavation works related to construction will expose soils in the affected areas which could leave them vulnerable to erosion by surface run-off and create the threat of water turbidity and sediment deposition in drains and nearby stream. The topography of the site and the pervious nature of the soils will cause erosive surface flows during the construction works before landscaping and drainage works reduce the susceptibility to soil erosion. Significant surface features such as gullies, streams or rivers in close proximity to the site that could be affected by soil erosion. Contamination of soil may be occurred from spillage and leakage of engine oils and fuels from the transportation vehicles, generators, servicing, maintenances and fuel storage area. And then construction material waste and domestic waste will be impacted to soil contamination when these wastes direct disposed to on the ground.

Mitigation Measures

- Earthworks will be minimized and avoided, if possible, during the wet seasons;
- Maintenance and servicing of vehicles and equipment will be carried out at designated workshops which have paved surfaces (or any impermeable surface) to prevent oil leakage seeping into the ground;
- Fuel will be stored in a designated area on-site. The area is preferably roofed with a bunded impervious flooring (such as concrete);.

Impacts on Water Quality

Construction phase requires large quantities of water to be used in various processing such as material preparation in equipment. Change in quality of water forms an important concern associated the project particularly during the construction phase. Earth works, crushing of

stones, cutting and modification of the terrain, alteration of drainage systems and soil erosion are the major factors that affect the water quality during construction phase. During rainy season, the runoff water joining the water sources from nearby areas of the development sites will add more such debris and soil particles to enhance the level of suspended solids in the water bodies. This will adversely affect the fishes and other aquatic life forms apart from the human beings who are dependent on the surface water for their daily use.

Mitigation Measures

- Earthworks will be minimized and avoided, if possible, during the wet seasons;
- Maintenance and servicing of vehicles and equipment will be carried out at designated workshops which have paved surfaces (or any impermeable surface) to prevent oil leakage seeping into the ground;
- Fuel will be stored in a designated area on-site. The area is preferably roofed with a bunded impervious flooring (such as concrete);.

Waste Generation

Solid waste generated during site preparation and construction work would include cut vegetation and typical construction waste (e.g. wasted concrete, steel, wooden scaffolding and forms, bags, waste earth materials, etc.). This waste would negatively impact the site and surrounding environment if not properly managed and disposed of at an approved dumpsite. Vegetation and solid waste, if allowed to accumulate in drainage ways, could cause localized pooling and flooding. Pooling of water, in turn, would create conditions conducive to the breeding of nuisance and health threatening pests such as mosquitoes and rats. Poor construction waste management constitutes a short-term, possibly long-term, negative impact.

Mitigation Measures

- A site waste management plan will be prepared by the developer before the commencement of the use of the building. This should include the designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring. Preparation and implementation of the plan must be taken responsibility by the developer with the system being monitored independently.
- Special attention will be given to minimizing and reducing the quantities of solid waste produced during site preparation and construction. To reduce organic waste, softer vegetation may be composted onsite and used for soil amendment during landscaping.
- Most of the construction materials like soil, bricks, concrete will be reused in the backfilling, road construction, subgrade preparation, etc. Metals, wood scraps, and bitumen junks will be recycled either within the site or outside with the help of the local authority. The measures like reusing materials on-site and /or donating/selling salvaged items will reduce waste, and disposal costs.
- Vegetation and combustible waste must not be burned on the site.
- Reusable inorganic waste (e.g. excavated sand) should be stockpiled away from drainage features and used for infilling where necessary.

- Unusable construction waste, such as damaged pipes, formwork, and other construction material, must be disposed of at an approved dumpsite.
- Maintenance and servicing of vehicles and equipment will be carried out at designated workshops which have paved surfaces (or any impermeable surface) to prevent oil leakage seeping into the ground and
- Final wastes will be disposed of at the Pathein City Development Committee disposal site once a week.

Fire Hazards

In construction phase, fire hazards can be occurred due to oil barrel and diesel will be stored in project area for generator and heavy machines that can cause fire hazards. Other types of fire hazards may include improper handling or maintenance of electrical equipment and opening burning on site nearby.

Mitigation Measures

- Emergency contact numbers of township and district fire services department must be printed and tagged at easily visible places and firefighting training must provide to workers.
- Keeping adequate separation between combustibles and potential ignition sources is one of the easiest ways to minimize the chances of a fire at construction sites.
- Enforce a hot work "permit" system.
- Ensure that all temporary wiring and heating equipment is turned off when personnel are not present **Do no**t allow **ANY** smoking near combustibles.
- Properly dispose of any oil-soaked rags, especially diesel oil. soaked rags.
- Good housekeeping will include, but not be limited to: cleaning and properly discarding of any packaging; storing combustibles away from active work areas where ignition sources could be present; and regularly cleaning and removing any combustible, shavings, sawdust or scrap wood products that are produced.

Impacts on Occupational Health and Safety

Construction related activities will be confined only to project site area, hence no health-related impacts are envisaged within the project influenced area during the construction stage and will be limited to occupant levels.

At the project site much, direct exposure to dust generation and high noise generation sources likely to cause occupant health related impact such as asthma, bronchitis and noise induced hearing loss (NIHL) etc. on the construction workers. In order to offset such effects, proper drinking water, sanitation and first aid facility will be provided at the construction site, with trained shift supervisors, which will ensure minimum adverse occupational health impacts on the construction worker. In addition, accidental injuries from falling from elevation associated with ladder are among the most common cause of fatal or permanent disabling injury at construction. In addition, vehicle traffic and use of fliting equipment in the movement of

machinery and materials on a construction site may pose temporary hazard, such as physical contact, spill, dust emission and noise and then migrant workers may be impacted other workers contagious disease.

Mitigation Measures

- Construction-related activities will be confined only to the project site area, hence no health-related impacts are envisaged within the project influenced area during the construction stage and will be limited to occupant levels.
- At the project site, direct exposure to dust generation and high noise generation sources can likely to cause occupantional health-related impacts such as asthma, bronchitis and noise-induced hearing loss (NIHL), etc. on the construction workers. To offset such effects, proper drinking water, sanitation, and first-aid facility will be provided at the construction site, with trained shift supervisors, who will ensure minimum adverse occupational health impacts on the construction workers.

Table: 5. 3- Potential Impacts on During Construction Phase

Item	Environmental Impacts	Project Activities	Significance of Potential Environmental Impacts					Impact Significance
			M	D	E	P	SP	
1.	Air Quality	site preparation, approach roads, excavation, drilling, foundation, deployment of machinery, erection, transportation, dumping will cause dust and gaseous emissions. Diesel generator, truck and heavy machines will be emitted to the generation of gases such as (CO2, CO and SO2).	4	1	1	4	24	Low
2.	Noise and Vibration	Noise will be generated from construction activity such as earthworks, foundation works, concrete mixing, truck movement and heavy machine; Vibration will be generated from transportation of heavy construction materials and heavy machines movements;	3	2	2	4	28	Low

Item	Environmental Impacts	Project Activities	Significance of Potential Environmental Impacts					Impact Significance
			M	D	E	P	SP	
3.	Energy	Electricity will be obtained from 2 diesel generators on site. These generators have to be properly maintained so as to refrain from noise and emissions.	3	2	1	4	24	Low
4.	Soil Quality	Earthwork activities such as excavation of soil and leveling of landscape will be occurred soil erosion; Oil, grease and lubricants spillage and construction materials waste will be impacted to soil contamination	3	2	2	3	21	Low
5.	Water Quality	Construction materials waste and domestic wastes will be impacted to surface/ ground water; Increase ground water use will be occurred to reduce the ground water level. During rainy season, the runoff water joining the water sources from nearby areas of the development sites will add more such debris and soil particles to enhance the level of suspended solids in the water bodies.	3	2	3	4	32	Moderate
7.	Waste Generation	Solid Waste Accumulation of construction materials such as (concrete wastes, used wood formwork, glass, metals, etc.)	3	2	3	4	32	Moderate

Item	Environmental Impacts	Project Activities	Significance of Potential Environmental Impacts					Impact Significance
			M	D	E	P	SP	
		Domestic wastes such as (paper, cardboard, packaging, materials, etc.) generated from the project site Liquid Waste Wastewater such as (sewage waste, sullage, etc.) generated by workers Hazardous Waste Hazardous waste such as (waste oil, grease and lubricants) generated from machinery/ truck servicing and maintenance						
8.	Fire Hazards	Fuel handling and storage Improper handling or maintenance of electrical equipment Open burning on site or nearby	3	2	2	3	21	Low
9.	Occupational Health and Safety	Dust emission and noise pollution may be impacted to workers Accidents and injuries to workers; Contagious diseases due to the migrant workers and increased workers.	3	2	2	4	28	Low
10.	Community Health and Safety	Nuisance due to air and noise pollution; Traffic accident;	3	2	2	3	21	Low

Item	Environmental Impacts	Project Activities	Significance of Potential Environmental Impacts					Impact Significance
			M	D	E	P	SP	
		Contagious diseases due to the migrant workers and increased workers.						
11.	Social and economic condition	Job opportunities for local people; Create jobs, education, trasnportation, communitation.	x	x	x	x	x	Positive Impact

Socio-Economic Condition

POSITIVE IMPACTS

Income to the Equipment and Material suppliers

This project will promote the procurement of equipment and machineries for the various activities involved during the construction phase where it is technically and commercially feasible.

Procurement of material suppliers for various activities involved in the construction phase which will also promote the growth of the economy of the local material suppliers in and around the proposed Project site.

Employment Opportunities

- Proposed project will create employment opportunities to the local people present around the Project Site.
- These levels of short-term employment opportunities would have a positive impact on the local economy and on regional unemployment.

NEGATIVE IMPACTS

- OHS Risks to Construction Workers
- During construction phase of the proposed project the employers are subject to Health and Safety Risks.
- To eradicate the Health and Safety risks to the employers Personal Protective Equipment will be provided
- Ensuring good housekeeping and cleaning operations

- Sanitation Facilities
- Proper on-site Sanitation facilities will be provided for the employers
- The wastewater generated during construction phase will be treated in the Proposed Septic Tank and Wastewater treatment system.

5.2.1.2. OPERATION PHASE IMPACT

Air Quality

During the operation period the emission sources will be from air conditioning, emissions from standby generators.

Mitigation Measures

Air quality at the project site will be somewhat disturbed due to the movement of vehicles and operation of diesel generators. Regular maintenance of generators and vehicles.

Noise Quality

During the operation period the noise will generate from recreational activities. Noise will be lower than that produced during the construction phase.

Mitigation Measures

- All the activities on the beach should close out during the night time
- Avoid the camping on the beach with loud music

Water Quality

During the operation phase, the direct disposal of domestic waste, kitchen and household waste to the ground will occur groundwater and surface water pollution. The reckless extraction of groundwater resources will be reduced the ground water level. Liquid waste generated from the overload septic tank and domestic wastewater such as (sewage waste and sullage) that will be impacted to soil, water and groundwater.

Mitigation Measures

- Proper solid waste receptacles and storage containers and septic tanks should be provided in sufficient numbers, particularly for the disposal of lunch and drink boxes, so as to prevent littering of the site.
- Activated Sludge Wastewater treatment system will install.
- Do not directly discharge untreated water to the ground and oean
- Installation of high-pressure, low-volume nozzles on spray washers;
- Replacement of high-volume hoses with high-pressure, low-volume cleaning systems;
- Equipping spring-loaded shutoff nozzles on hoses;
- Reused the treated water
- All residents must follow the guideline and procedures of waste disposal not to impact the water quality;
- To prevent the overloading and spillage from the septic tank regular checking will be done every year.
- Regular checkup of the drainage system

Waste Generation

A significant amount of solid waste will be generated from the hotel and resort, the domestic waste would be primary constituent for example mainly food waste, oil and grease from kitchen, kitchen waste, paper and cardboard, and plastics as well as other waste materials such as textiles, glass, metal and special wastes (bulky items, consumer electronics, batteries, oil and rubber-based products) etc. Leachate that is generated from organic waste can contaminate soil, water and groundwater resources. The generation and disposal of domestic wastewater, i.e. sewage and sullage, can result in significant environmental impacts, if not managed properly. The discharge of untreated domestic wastewater which is high in organic pollutants can result in the pollution of the drainage system and the impact to water bodies.

Mitigation Measures

- Adequate waste bins will be sufficiently provided at the hotel areas and housing for collection and disposal of wastes;
- The waste bin must be separated by wet waste bin and dry waste bin;
- The temporary waste storage area must be well guarded, covered and sufficient;
- The temporary waste storage area must be separated by wet waste disposal area and dry waste disposal area;
- The wet waste disposal area must be far away from the water bodies and the dry waste disposal area must be far away from flammable source;
- Encourage the residents to be clean and green living standard;

Fire Hazards

During the operation, fire hazard can be occurred improper activities of residents, without the regular maintenance of electricity supply system, overloaded electricity usage and cause of natural disasters.

Table: 5. 4- Potential Impacts on During Operation Phase

Item	Environmental Impacts	Project Activities	Significance of Potential Environmental Impacts					Impact Significance
			M	D	E	P	SP	
1.	Water Quality	Increase ground water usage will be reduced the ground water level; Sewage, sullage disposal (unsystematically).	3	4	2	4	36	Moderate
2.	Waste Generation	Solid Waste Domestic wastes such as (mainly food waste, paper, cardboard and plastic, etc.) generated from the	3	4	3	4	40	Moderate

Item	Environmental Impacts	Project Activities	Significance of Potential Environmental Impacts					Impact Significance
			M	D	E	P	SP	
		apartments and other infrastructure Liquid Waste Wastewater such as (sewage waste, sullage, etc.) generated by apartments and other infrastructure						
3.	Energy	During the operation phase, it is expected that electricity will be obtained from the generators. The most energy efficient facilities will be used for Air Conditioning. For use of Refrigerants, use of ozone friendly refrigerant type such as R410 A will be used instead of HCFC (R22) which was banned starting from 30th June 2016 in Myanmar.	3	4	3	4	40	Moderate
4.	Fire Hazards	Improper handling or maintenance of electrical supply system Improper activities of residents overloaded electricity usage Natural disaster Electric shocking	3	4	2	3	27	Low
5.	Air quality	Air quality at the project site will be somewhat disturbed due to the operation of diesel generators.	2	4	2	4	24	Low
6.	Noise	As the project area is located in remote area, the noise emission cannot be disturbed to local environment except for wild life.	2	4	2	4	24	Low

Item	Environmental Impacts	Project Activities	Significance of Potential Environmental Impacts					Impact Significance
			M	D	E	P	SP	
		As there is only 2 generators operating it is envisaged that the noise level will below then construction level and acceptable. Generators with sound-proof housing will be used to generate low noise. The recreational activities will be limited during the night.						
7.	Social and economic condition	Provide standard living environment Job opportunities	x	x	x	x	x	Positive Impact

5.2.2. METHODOLOGY APPROACH FOR THE ASSESSMENT OF POTENTIAL SIGNIFICANT IMPACTS ON BIOLOGICAL ENVIRONMENT

Bo Nat Kyaw island is rich in biodiversity especially on marine environment. The methodology is determined based on the recorded ecological parameters and applied to most suitable and applicable method. The methodology of Ecological Impact Assessment (IEEM 2006) was applied during this impact identification and assessment.

SENSITIVITY OF RECEPTORS

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

Table: 5. 5- Sensitivity Criteria

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

MAGNITUDE OF IMPACT

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

Table: 5. 6- Definition of Magnitude

Magnitude	Definition

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

SIGNIFICANCE OF IMPACTS

The approach to the assessment of significance has considered the sensitivity of the receiving environment and the magnitude of change. Table (6.3) below provides an indication of how significance has been determined, although it should be noted that this is meant to be a general approach and has not been treated as a strict matrix.

Table: 5. 7- Impact Assessment

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

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

- Major Adverse
- Moderate Adverse
- Minor Adverse
- Negligible

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

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

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

DEVELOPMENT PHASES

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

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

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

IMPACT TYPES

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

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

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

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

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

IDENTIFICATION OF POTENTIAL IMPACTS ON BIODIVERSITY																		
Environmental Impacts	Likely Impacted biodiversity									Impact Types						Receptors' sensitivity	Magnitude of impact	Impact Assessment
	Terrestrial					Marine				Duration		Positive		Negative				
	Birds	Reptiles	Mammals	Tree	Invertebrate	Coral	Fish	Mammals	Benthic Fauna	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant			
Construction Phase																		
Site Clearance	☑	☑	☑	☑							☑			☑		High	Low	Moderate
Light pollution	☑	☑	☑								☑			☑		Medium	Low	Minor
Air pollution	☑	☑	☑								☑			☑		Medium	Low	Minor
Noise	☑		☑								☑			☑		Medium	Medium	Moderate
Water Pollution			☑			☑	☑	☑	☑	☑	☑			☑		High	Medium	Moderate
Change access rights and resource usage		☑	☑							☑				☑		Medium	Medium	Moderate

Diesel and oil spills		☑	☑			☑	☑	☑	☑	☑				☑		High	Medium	Moderate
Sewage disposal		☑	☑	☑					☑		☑			☑		High	Low	Moderate
Solid waste production		☑	☑	☑					☑		☑			☑		High	Medium	Moderate
Anchoring						☑			☑		☑				☑	High	Medium	Moderate
Operation Phase																		
Resource consumption		☑	☑	☑						☑				☑		Medium	Medium	Moderate
Chang access rights and usage		☑	☑							☑					☑	Medium	Medium	Moderate
Sewage disposal		☑	☑	☑	☑					☑				☑		High	Medium	Moderate
Solid waste production and disposal		☑	☑	☑	☑	☑	☑	☑		☑				☑		High	Medium	Moderate
Light pollution	☑		☑					☑			☑			☑		Medium	Low	Minor
Nosie	☑		☑							☑					☑	High	Low	Moderate
Landscaping	☑	☑	☑	☑	☑					☑		☑				High	Low	Moderate
Less illegal trading	Positive impact																	
Diesel and oil spills		☑	☑	☑		☑	☑	☑		☑				☑		High	Medium	Moderate
Anchoring						☑			☑		☑			☑		High	Medium	Moderate
Shipping movement							☑	☑			☑					Medium	Low	Minor
Decommissioning Phase																		

Site Clearance	☑	☑	☑	☑	☑						☑			☑		High	Medium	Moderate
Air pollution	☑	☑	☑	☑							☑			☑		v	Medium	Moderate
Noise											☑			☑		Medium	Medium	Moderate
Solid waste production		☑	☑		☑						☑			☑		Medium	Medium	Moderate
Replantation	Positive Impact																	
Shipping movement						☑	☑	☑			☑			☑		Medium	Low	Minor

5.2.2.1. CONSTRUCTION PHASE IMPACTS

Site Clearance

The Bo Nat Kyaw island is dominated by two plant habitats as permanent evergreen forest habitat and a mangrove forest habitat. The site clearance of the construction activities will impact one island's biodiversity such as changes in access rights, loss of habitats and, disturb the structure of forest type. Although the occurrence is irreversible implementation of mitigation measures can reduce the severity of the impact.

Mitigation Measures

- Site clearance should be performed with intensive search and identify the endemic species and biological valuable species.
- Collect and maintain these plants for the replanting and landscaping purpose.
- These activities should be guided by an appropriate and approved management plan.
- Site clearance should be carried out in a manner that retains the large trees.
- Landscaping should also use native flowering plants to provide habitat and host plants for butterflies.
- All construction contractors should be exposed to the environmental management plan and sensitized to the environmental issues.

Light Pollution

If the construction process will carry out during the night and light from the labor camp there will disturb the islands' biodiversity, especially during the breeding season. There was no evidence observed of marine turtle nesting but according to the oral survey the sea otter and whale shark are occasionally spotted at east wing of the island. The occurrence of lighting is periodic and short-term.

Mitigation Measures

- All construction activities should not start before 6 AM and all construction activities should stop after 6 PM.
- The light on beach should be light out after 7 PM except for emergency light.

Air Pollution

It can be anticipated that a certain amount of air borne particulate matter (dust) will be generated by building construction. This situation will be worst during the dry season. Given the relative remoteness of the site, air borne particulates should not pose a hazard to island's biodiversity in the vicinity or downwind of the construction site. The occurrence of dusting is periodic and short-term, lasting for the duration of the construction activity.

Mitigation Measures

- Exposed ground should be regularly wetted in a manner that effectively keeps down the dust.
- Stockpiles of fine materials should be wetted or covered up during windy conditions.

Noise Pollution

The use of heavy equipment during site clearance and road construction works will inevitably generate noise, which may create a nuisance for the biodiversity of the island. Although it is not considered to be a significant threat to the health or well-being of humans and there will have limited use of machinery and no heavy machinery on the island, if the construction works take place during on the breeding season of islands' biodiversity, it could be significant impact on them.

Mitigation Measures

- Construction activities that will generate disturbing sounds should be restricted to normal working hours.
- Construction and decommissioning should avoid breeding season of both terrestrial and marine biodiversity.

Water Pollution

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

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

Mitigation Measures

- The stockpiling of construction materials should be properly controlled and managed. fine grained materials (sand, cement, etc.) should be stockpiled away from surface drainage channels and features.
- Low berms should be placed around the piles and/or tarpaulin used to cover open piles of stored materials to prevent them from being washed away during rainfall.
- Safe storage areas should be identified and retaining structures put in place prior to the arrival and placement of material.

Solid Waste Production and Disposal

Solid waste generated during site preparation and construction work would include cut vegetation and typical construction waste (e.g. wooden scaffolding and forms, bags, waste earth materials, etc.). This waste would negatively impact the site and surrounding environment if not properly managed and disposed of at an approved dumpsite. Cleared vegetation burned onsite would generate smoke, possibly impacting negatively on ambient air quality and human health. Pooling of water, in turn, would create conditions conducive to the breeding of nuisance

and health-threatening pests such as mosquitoes. Poor construction waste management constitutes a short-term, possibly long-term, negative impact.

Mitigation Measures

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

Sewage Disposal

Inadequate provision of toilets for use by workers can lead to the improper and unhealthy condition, thus creating of unsanitary conditions and sources of fly infestation. Improper disposal of food cartons and other domestic forms of construction camp garbage could lead to littering of the site and pollution of adjacent coastal waters.

Mitigation Measures

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

Diesel and Oil Spills

The requirement for construction materials will be obtained and transported to the site by using boat and sea route. In the case of accidents, typically oil spillages occur in the marine water between source and site, oil spills can damage the water quality and biodiversity of the marine environment. These occurrences represent indirect, short-term, reversible, negative impacts on marine environment and safety.

Mitigation Measures

- The transportation of lubricants and fuel to the construction site should only be done in the appropriate vehicles and containers.

Transportation and Anchoring

The various materials required for construction and building (e.g. steel, blocks, lumber, heavy machinery, etc.) will be obtained from sources elsewhere and transported to the site by using boat and sea route. During the study, the condition of coral community surrounding the Bo Nat Kyaw island was recorded as good condition and self recovering state. The anchoring of the boat causes the damage to the benthic environment especially on coral formation.

Mitigation Measures

- All fine earth materials must be enclosed during transportation to the site to prevent spillage and dusting.
- To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible.
- The transportation of lubricants and fuel to the construction site should only be done in the appropriate vehicles and containers.
- Installation of boat mooring buoys at the site for use of dive boats and banning of anchoring directly over reef.
- Provision of educational and environmental sensitization material on coral reef and marine environment for contractor and construction workers.

Employment

The proposed development will potentially offer employment or sub-contracting to local communities for during construction period. This will represent a positive short-term impact.

MAGNITUDE

The construction process will maintain a safe working environment during construction and afterward. It will have limited use of machinery and heavy machinery on the island. All the building establishment will be environmentally friendly and all the construction activities will be done least disturbance to the environment. During the construction process in order to reduce the cement usage, H.Beam (Steel) were used in structure member. The hardwoods were restricted in building instead of local bamboo were used in decoration. In order to avoid the disruption of sand dunes and beach all the buildings were about 40 feets far from the beach. All the trekking route are determined and waste-bins were provided along side of the route. K Future installed activated sludge treatment system for wastewater treatment and domestic water usage. The decommissioning activities may or may not be performed after the contract period end. Therefore, the magnitude of both construction and decommissioning processes are able to assume that medium in intensity.

REVERSIBILITY

During the construction phase, some impacts are recognized as irreversible such as landscaping, site clearance activities. These impacts can be reduced with the proper establishment of EMP and BMP.

5.2.2.2. OPERATION PHASE IMPACT

Resource Consumption

The resort expects to install its own water supply and electricity. The main source of water will be generated by groundwater and the electricity requirement rely on generators. Only relying on ground water extraction can cause the reduction of ground water level and might disturb the spring water resources which can be impacted on island's biodiversity as in consequence. The exhaust gas emission from generators can cause the air quality degradation.

Mitigation Measures

- Collect the rain water.
- Garden design and plant selections to enable irrigation water requirements to be met by rainwater and natural water percolation in soils.
- Use water-saving equipment such as ultra-low-flush toilets, spray nozzles etc.
- Reduce losses in energy distribution
- Implement water management plan

Change Access Rights and Usage

Although Bo Nat Kyaw island is inhibited and the island resources were occasionally used by Salone people from Nyaung Wee village. During the opening season, the iflux of people from different regions and culture might disturb these salone people.

Mitigation Measures

- Solely avoid the movement of Salone people and do not disturb their activities

Solid Waste Production and Disposal

Poor garbage management at the resort would lead to unsanitary conditions including vermin and fly infestation and odors as well as unsightly conditions. Although the means of solid waste collection and disposal have not been determined, it is expected that garbage management and good housekeeping will be practiced on the resort and that problems arising from the improper storage of solid waste will therefore be avoided.

Mitigation Measures

- Use the proper and systematic waste management
- Sort the type of waste, practice reuse, recycle, renew system
- Adequate waste bins will be sufficiently provided at the hotel areas and housing for collection and disposal of wastes;
- The waste bin must be separated by wet waste bin and dry waste bin;
- The temporary waste storage area must be well guarded, covered and sufficient;
- The temporary waste storage area must be separated by wet waste disposal area and dry waste disposal area;
- The wet waste disposal area must be far away from the water bodies and the dry waste disposal area must be far away from flammable source;
- Encourage the residents to be clean and green living standard;
- Apply pits that covered with concrete or linen to avoid the ground water contamination before transport to Kautthaung Township Development Committee Dumping site.

Water Pollution

The proposed development is situated in a naturally vibrant environment. However, without an adequate sewage and wastewater disposal system, it has the potential to exert a significant impact on the natural surroundings. Discharging wastewater directly from showers, toilets, and kitchens into the environment, particularly in marine ecosystems, can lead to a decline in water

quality and have adverse effects on aquatic biodiversity. These consequences may include toxic algal blooms, coral discoloration, and damage to coral reef systems.

Mitigation Measures

- Proper solid waste receptacles and storage containers and septic tanks should be provided in sufficient numbers, particularly for the disposal of lunch and drink boxes, so as to prevent littering of the site.
- Activated Sludge Wastewater treatment system will install.
- Do not directly discharge untreated water to the ground and oean
- Installation of high-pressure, low-volume nozzles on spray washers;
- Replacement of high-volume hoses with high-pressure, low-volume cleaning systems;
- Equipping spring-loaded shutoff nozzles on hoses;
- Reused the treated water
- All residents must follow the guideline and procedures of waste disposal not to impact the water quality;
- To prevent the overloading and spillage from the septic tank regular checking will be done every year.
- Regular checkup of the drainage system

Light Pollution

During the operation period of the development, there will occur lighting from the guest rooms and activities on the beach. These activities can disturb the islands' biodiversity.

Mitigation Measures

- All the activities on the beach should close out at night time
- All the light should switch off during the night time except for the emergency light

NOISE

During the operation period, noise index will increase due to the recreational activities and guest activities. It may disturb the island's biodiversity such as birds and mammals. During their breeding season, this noise level increasing will negatively be impacted on the mammals.

Mitigation Measures

- All the activities on the beach should close out during the night time
- Avoid the camping on the beach with loud music

Transportation and Anchoring

It is noted that the main access to proposed project area only by the sea route. In case of accidents, there will be oil spillage, traffic and vehical collision. Minimize the transportation frequency as much as possible and for the safety, continuously monitor the vehicle maintenance and weather condition. The anchoring of the boat may damage on the benthic communities and coral reef system, therefore Mooring buoys, floating docks or platform are recommended.

Misuse of Marine Resources

One of the practices that will be offered by the resort is SCUBA diving, snorkeling and water sports. Unless the marine resource is properly managed the increased use of the site for

recreational diving could result in degradation of the habitat by damaging to corals from boat anchors, souvenir collection, and poor diving practice.

Mitigation Measures

- Installation of boat mooring buoys at the sites for use of dive boats and banning of anchoring directly over reef.
- Ban collection of coral reef souvenirs
- Provision of educational and environmental sensitization material on coral reef and marine environment for guests and for hotel staff.

LESS ILLEGAL TRADING

Bo Nat Kyaw island is known to be rich in biodiversity and located as inhibited area. There may or may not have occurred illegal trading in this region but as per one of the positive impacts of the development, the population growth on the island may reduce the occurrence of these activities.

MAGNITUDE

The long-term impact of the operation period varies in magnitude, with certain activities having significant effects while others do not. For instance, the availability of water resources and energy demand would experience substantial impacts on both the biological and physical environment, leading to issues such as water scarcity, fossil fuel combustion, and greenhouse gas emissions. Additionally, the improper installation and maintenance of waste management systems would also face significant long-term consequences.

The misuse of marine resources through water sports activities like SCUBA diving and snorkeling poses a threat to marine biodiversity, particularly the damage caused to coral reef habitats. However, if marine resources are effectively managed, these negative effects can be mitigated over time.

Regarding concerns about the project's impact on local businesses, interviews conducted with residents from Nyaung Wee Village revealed that there were no commercial fishing or other business activities on the island. Therefore, the worries regarding negative effects on local businesses can be disregarded.

DURATION

In this category, it can be divided into short term and long-term period. The operation phase of the proposed development will be categorized as long-term period.

REVERSIBILITY

During the operation phase, some impacts are recognized as irreversible such as fresh water source with the proper implementation of restoration plan and conservation plan, these impact can be mitigated into low intensity impact.

5.2.2.3. SOCIAL IMPACT ASSESSMENT AND MITIGATION

Sections 5.9 below provide an understanding of the social impacts from the construction and operation of the project activities.

DESCRIPTION OF THE STUDY

For the purpose of the social impact assessment we included 1 villages in the Project Area: Nyaung Wee Village is located about 4 mile far from the project area and were chosen for relative proximity to the project and may be indirectly affected by the activities of the project such as walking tours, visits to the ethnic Salone (Moken) villages (to be described below). The survey target used 5% sampling size for each village using Random Sampling. The language of survey was Burmese.

This freshly collected primary data is used to complement desktop researched secondary data from research carried out by organizations active in this area. The key variables covered in the survey include: identification and enumeration of the affected population; demography, social organization, literacy level, income level and expenses level, access to health facilities and schools.

The Nyung Wee village had a population of 639 individuals, with 314 males and 325 females. The village comprised a total of 130 households. It was established in 2006, and its population grew with the arrival of migrant workers in 2009. The primary occupation of the villagers was fishing, with over 90% engaging in offshore fishing, while the remaining 10% were involved in cultivation. The village primarily relied on generators for its electricity supply, while wood and charcoal served as the main sources for domestic usage. The village had one private healthcare facility and one primary school. The overall literacy rate in the village ranged from education obtained in monasteries to completion of middle school.

[1]CULTURAL EXCHANGE ETIQUETTE

General recommendations to be followed during any encounters with the local population (including the indigenous peoples Moken) during construction, operation and decommissioning of the proposed project:

Particular recommendations for inclusion in the rules and instructions for tourists visiting Myeik Archipelago

- Don't take any photos that make people embarrassed (e.g. ladies taking shower). When you take a photo it is polite to ask for a permission
- Be polite, friendly and open, smile
- Don't point your foot (pointing with your feet means disrespect)
- Wear decent clothes when visiting sacred places (religious sites, cemeteries etc). Cover your shoulders and knees, take off your shoes and socks when visiting pagodas)
- Do tuck away your feet when you sit (your legs should not be stretched, and your feet should never face the Buddha)
- Don't touch anyone on the head (the head is the most esteemed part of the body, and to be touched on the head is considered aggressive)
- Learn basic words in Myanmar and other ethnic languages (people will be delighted to hear foreigners make attempts to speak their language)
- Woman travellers are generally very safe in Myanmar but it is recommended that woman dress decently
- Don't kiss in public – displaying physical closeness in public places is frowned upon in Myanmar
- Don't disturb people praying or meditating (avoid talking loudly and ensure not to touch people meditating
- Calling with your finger means calling for a challenge (calling with your fingers down is considered polite)
- Learn the local customs before visiting ethnic minority villages (ethnic minorities have their own local customs. e.g. when tourists visit Akha villages they should know not to take pictures of pregnant women
- Support local transport facilities (trishaws where available)
- Electricity shortages are common in Myanmar, be prepared and understanding
- Don't touch the robe of a monk
- Refuse to purchase wildlife products (protect Myanmar wildlife)
- Buy arts and crafts from the local communities
- Do ask for a local guide to take you around the village and the jungle trails. You can support local guides through donations. Do make sure you have good shoes for the jungle trail.

[1] Reference: http://www.myanmartourism.org/index.php/tourist-information/dos-don-ts; http://www.dosanddontsfortourists.com/

- Don't give sweets, money or gifts directly to children, their parents do not appreciate this practice and this only leads to a begging mentality.
- Don't litter. If there are no litter bins immediately available, then please take your litter back to your boat or resort.
- Don't buy or use illegal drugs.
- Don't collect seashells along the beaches as many are used for habitation by marine species including snails, clams and crustaceans.
- Don't enter the mangrove rivers with engine boats. Only kayaks and canoes are allowed.
- Familiarise yourself with the culture and traditions of Moken people, Sea Nomads of the Myeik Archipelag, for better appreciation and sensitivity to their culture when visiting their communities (refer to the pages 46-66 ' Human History' of 'Lampi Marine National Park guidebook' available at http://www.istituto-oikos.org/files/download/2016/LampiMNPGuideBook_1.pdf)
- Consult local NGOs and communities on what their expectations in cultural exchange with future tourists

Objectives (IFC Performance Standard 7)

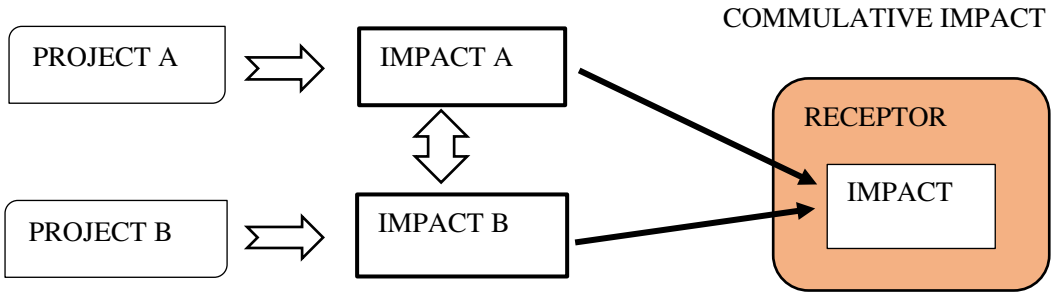
- To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples.
- To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts.
- To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.
- To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle.
- To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present.
- To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.

5.2.2.4. CUMULATIVE IMPACT ASSESSMENT

In reference to the scope for an impact assessment, IFC"s Performance Standards specify that:

Risks and impacts will be analyzed in the context of the project's area of influence. This area of influence encompasses area potentially impacted by cumulative impacts from further planned development of the project. any existing project or condition, and other project related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken, and areas potentially affected by impacts from unplanned but

predictable developments caused by the project that may occur later or at a different location" (IFC, 2006).



In the previous chapter, we discussed the direct and indirect impacts associated with the K Future hotel and resort project. Now, this section will address the cumulative effects of the project and other related impacts in relation to development. An essential aspect of the impact assessment is evaluating the potential cumulative impacts.

Cumulative impacts refer to the combined effects that arise from one or more projects on society, economy, and the environment. These impacts occur when various developments accumulate and interact within the same area or over a similar operational timeframe as the project under evaluation. In the case of the K Future project and other development activities, their environmental effects can be attributed to shared locations, overlapping schedules, or the utilization of the same infrastructure, services, and resources.

The majority of cumulative impacts are associated with the proposed project and other projects or commercial activities located near the project site. The assessment of impacts focuses on water quality, waste accumulation, tourism activities, and fisheries in the project vicinity. However, after conducting interviews with local residents from Nyaung Wee Village, it was determined that there were no commercial fishing or other business activities on the island. Consequently, concerns regarding negative effects on local businesses can be dismissed.

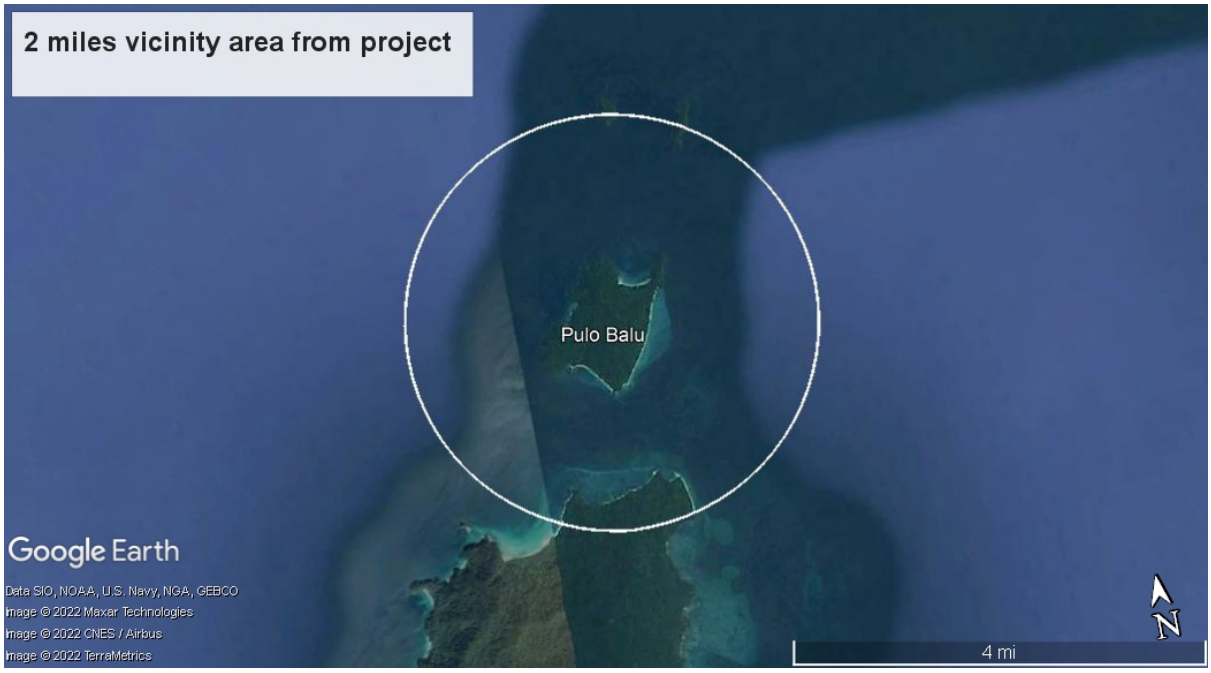


Figure: 5. 1- 2miles vicinity area from the proposed project

Although there were no development activities within two kilometers of the proposed project area, according to the published article from FFI the proposed project itself as recognized as tourism attraction and around 4 miles from the project one of the renowned tourist attraction village, Nyaung Wee Village is located. The influx of tourisms from outside visitors can be pressured toward the management system of project.

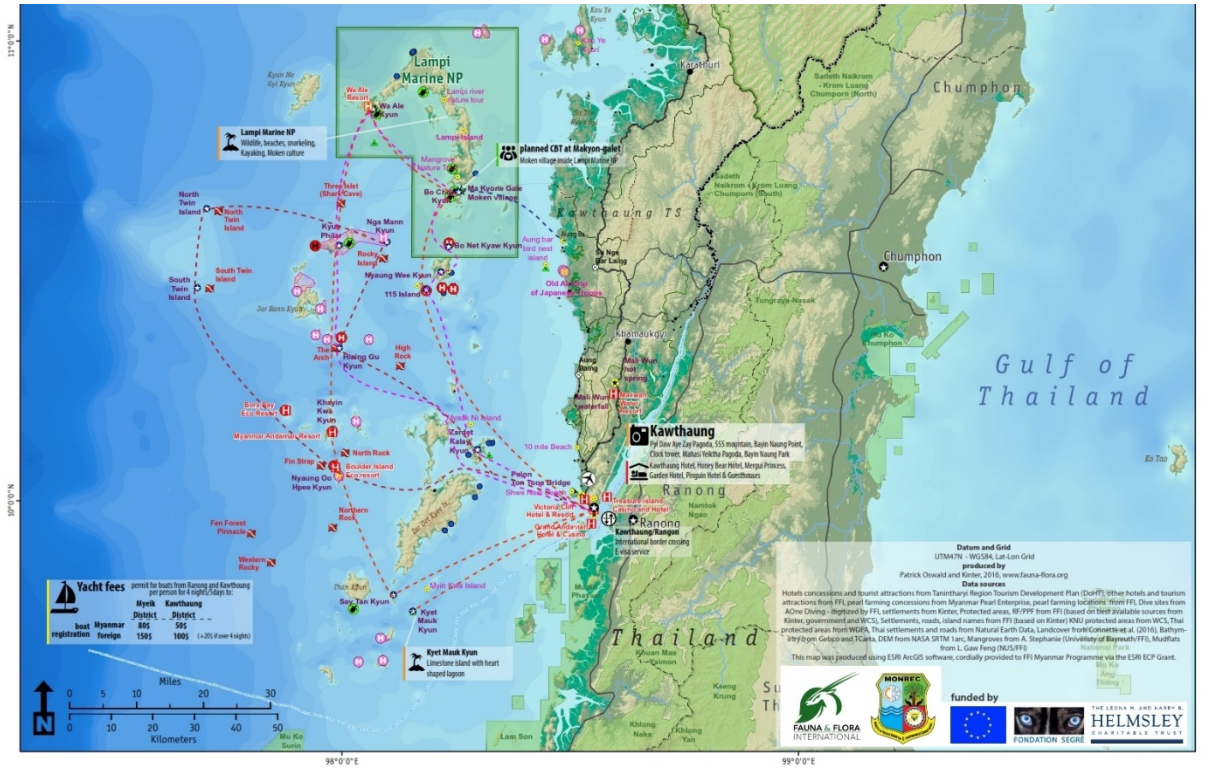


Figure: 5. 2- Tourist attraction of Myeik Archipelago (source:FFI)

Figure: 5. 3- The developed projects in vicinity area of K Future (Source: FFI)

According to the Lampi Ecotourism Plan (2015-2018), the visitor number are growing throughout the years. The number of yachting tours registered with MOHT journeying into the Myeik Archipelago increased from 55 in 1997, to 324 in 2014. Tours have increased steadily over this time although declines have occurred that were likely related to the 2004 Tsunami and cyclone Nargis in 2008. According to the Ministry of Hotels and Tourism, Tanintharyi Region, the tourist entries within 2014 to 2016 were steadily increased in both domestic and international visitors. The blooming tourism in Taninthary was abruptly halted and severely affected by Covid-19.

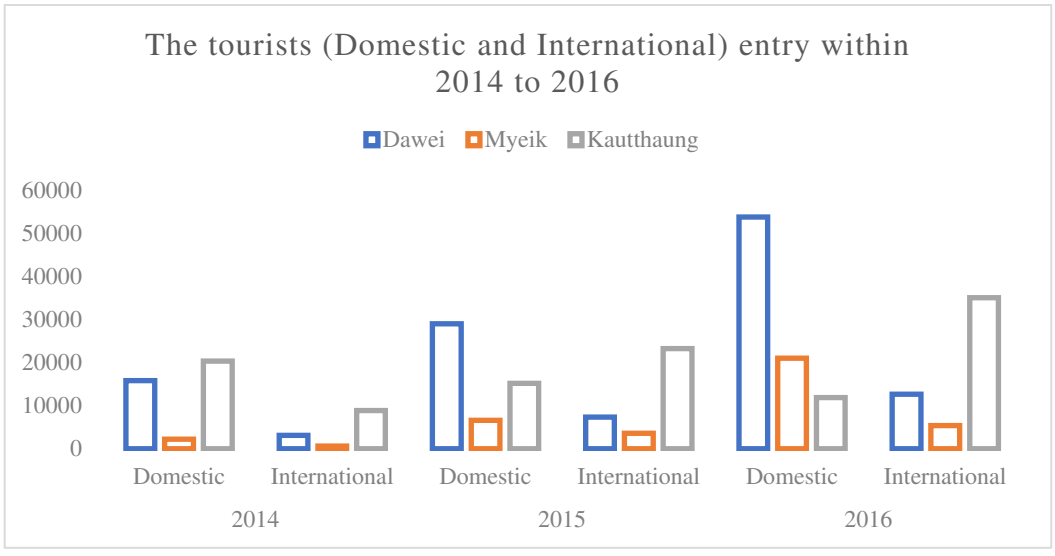


Figure: 5. 4- The visitor entries between 2014-2016 (Source: MOHT Tourism Development Plan, Tanintharyi).

Chin Crop (Myanmar) Co., Ltd.	Moe Thauk Kyun	applied at MIC	Kawthaung
Green Vision Construction Co., Ltd.	Saung Gauk Kyun	applied at MIC	Kawthaung
Myan Shwe Pyi Tractor Co., Ltd.	Nga Lone Let Phal Kyun	applied at MIC	Kawthaung
NKB Co., Ltd.	Nar Kho Kyun	applied at MIC	Kawthaung
NKL Development Co., Ltd.	Sunge Snanngin Beach, Sunge Bar Lai Vi	applied at MIC	Kawthaung
Shwe Taung Thiri Co., Ltd	Nget Khar Kyun	applied at MIC	Kawthaung
Shwe Taung Thiri Co., Ltd	Nar Nat Thee Kyun	applied at MIC	Kawthaung
Shwe Taung Thiri Co., Ltd.	Bo Wel (2) Kyun	applied at MIC	Kawthaung
Shwe Taung Thiri Co., Ltd.	Bo Wel (1) Kyun	applied at MIC	Kawthaung
Shwe Taung Thiri Co., Ltd.	Jalan Kyun	applied at MIC	Kawthaung
Supreme Services Co., Ltd.	Nga Htwe Yue	applied at MIC	Kawthaung
Amata Hotel Group	Barlar Kyun @ Than Yoke Kyun	MIC approved	Kawthaung
Amata Hotel Group	Pho Ni Kyun @ Bo Yar Nyunt Kyun	MIC approved	Kawthaung
Cocoon Hotel Co., Ltd	115 Kyun	MIC approved	Kawthaung
K Future Co., Ltd.	Bo Net Kyaw Kyun	MIC approved	Kawthaung
KNL Development + Infinite Creation Co.	Hlaing Gu Kyun	MIC approved	Kawthaung
Moken International Co., Ltd.	Kyun Phila, Bo Ywal, Ngaman Kyun	MIC approved	Kawthaung
Myanmar Andaman Co., Ltd.	Khayin Kwa Kyun	MIC approved	Kawthaung
TZK Co., Ltd.	Nyaung Oo Hpee Kyun	MIC approved	Kawthaung
United Hotels and Resort Co., Ltd.	Nga Khin Nyo Gyi Kyun	MIC approved	Kawthaung

Figure: 5. 5- The MIC approved proposed hotel and resort project (Source: baseline Assessment and responsible tourism strategy for Tanintharyi)

MARINE LITTER

Waste accumulation of marine litter is one of the significance impact in cumulative impacts for this proposed development than the other impacts such as water quality deterioration, tourism activities and fishery. According to the observed information, there are no commercially developed tourism around the two miles vicinity area of the project and the fishing ground were far away from the proposed development. To manage the waste accumulation of these marine litter is one of the biggest challenge for island resort.

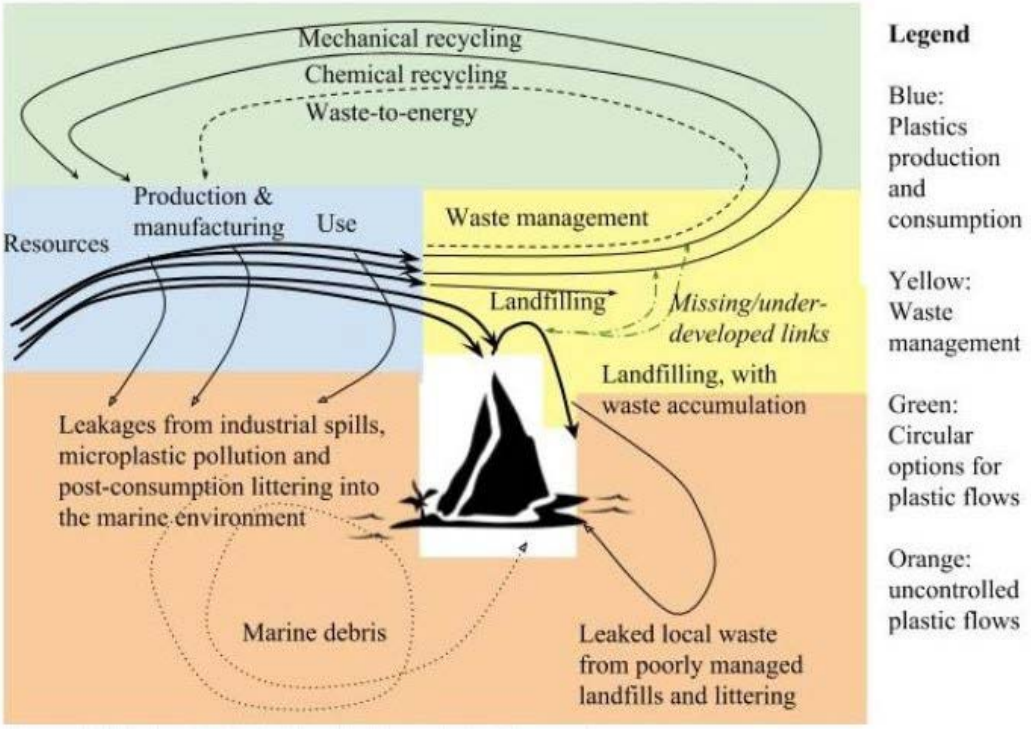


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Figure: 5. 6- *Source: Marine litter in the plastic material flow system

Marine litter (debris) includes all objects that do not naturally occur in the marine and coastal environment but are nevertheless found there. Marine litter is the collective term for any man-made object present in the marine and coastal environment.

Marine litter consists of articles that have been made or used by people and, subsequently, deliberately discarded or accidentally lost. In most cases, it is the result of careless handling or disposal of items of solid waste, including containers of liquid waste. However, it can also be material lost at sea in hard weather (fishing gear, cargo). Marine litter consists of mostly very slowly degradable waste items — items made of persistent materials such as plastic, polystyrene, metals and glass — from a large number of different sources.

Marine litter can blow around, remain floating on the water surface; drift in the water column; get entangled on shallow, tidal bottoms; or sink to the deeper seabed. Marine litter are items and material that are either discarded directly (thrown or lost directly into the sea); brought indirectly to the sea with rivers, sewage, storm water or winds; or left by people on beaches and shores.

Marine litter is found everywhere, around the world, in the marine and coastal environment.

Marine litter is found floating on the water surface. Almost 90 per cent of floating marine debris is plastic.

2 Marine Litter in the plastic material flow system

Marine litter is found mixed in the water column. Marine litter is found on the seabed. It could be that as much as 70 per cent of the entire input of marine litter sinks to the bottom and is found on the seabed, both in shallow coastal areas and in much deeper parts of seas and oceans. Marine litter is found lying on beaches and shores.

The main sea-/ocean-based sources of marine litter:

- Merchant shipping, ferries and cruise liners.
- Fishing vessels.
- Military fleets and research vessels.
- Pleasure craft.
- Offshore oil and gas platforms.
- Fish farming installations.

Figure: 5. 7- Marine Litter (debris) observed at Bo Nat Kyaw island

To manage the waste accumulation of these marine litter is one of the biggest challenge for island resort. The project proponent should have considered the cleanup activities for marine litters once a year.

CHAPTER 6: ENVIRONMENTAL MANAGEMENT PLAN

This Environmental Management Plan (EMP) is an action plan that addresses the potential impacts and risks identified by the environmental impact assessment. Environmental Management Plan (EMP) is prepared as an environmental management framework for the Urban and Housing Development Project. The environmental management practices, procedures, and responsibilities are defined here to be in full compliance with the existing environmental policy, laws, rules, and regulations of the Republic of the Union of Myanmar. This objective is to be achieved through the preparation of an Environmental Management Plan (EMP) that addresses the potential impacts and risks identified by the environmental assessment. Environmental Management Plan (EMP).

6.1. ENVIRONMENTAL MANAGEMENT PLAN

This chapter describes the activities to be taken for the implementation of the proposed mitigation measures described in the impact analysis process. It proposes the institutional responsibilities for the implementation of the management actions, the implementation indicators, the timeframe for monitoring and follow up and also the estimated costs for the effective implementation. The environmental management plan of K Future is organized with the following sections:

1. Environmental Management Plan
2. Environmental Monitoring Plan
3. Occupational Health and Safety Plan
4. Community Health and Safety Plan
5. Emergency Preparedness and Response Plan
6. Waste Management Plan
7. Water Management Plan
8. Corporate Social Responsible Plan
9. Community Grievance Redress Mechanism
10. Biodiversity Management Plan
11. Coral Conservation Plan

The specific objectives of the EMP are to;

- Serve as a commitment and reference for the proponent to implement the EMP including the conditions of approval from the Environmental Conservation Department (ECD), Ministry of Natural Resources, and Environmental Conservation (MONREC).
- Serve as a guiding document for the environmental and social monitoring activities.
- Provide detailed specifications for the management and mitigation of activities that have the potential for negative impacts on the environment.

RESPONSIBLE PERSON FOR EMP

Implementation of the EMP management practices and procedures is the responsibility of all site personnel: however, the key personnel who involved in “Environmental and Social

Engaging Committee" are responsible for implementing EMP including Managing Director, Operation Manager, HSE and Environmental Officer, Community Liaision Officer and Ministry of Natural Resources and Environmental Conservation (MONREC). Workers and the Environmental team members are responsible for communicating environmental matters and ensuring management practices and procedures are being implemented are as follows:

Table: 6. 1- Responsible person for emp implementation

No.	Position	Department	Responsibilities
1.	Environmental and Social Engaging Committee	K Future	Overall responsibility for the implementation of the EMP
2.	Managing Director		Approving and endorsing the HSE Plan, Community Health and Safety Plan, CSR plan and overall EMP and EMoP. Ensuring that resources are available to execute the HSE Plan, Monitoring and adjusting the HSE Plan.
3.	Social and Environmental Welfare Manager		Oversight of overall implementation of the project environmental activities Supervision, monitoring plan, environmental management plan an CSR plan Developing the HSE Plan. Monitoring the HSE Plan and reporting its status, deviations and any need for adjustments. Enforcing & coordinating the overall workings of the HSE Plan. Training all HSE Representatives and Managers on the HSE Plan, procedures & notifying all changes. Keeping the Managing Director immediately informed at all times on the occurrence of all accidents and anomalies together with all other HSE matters.

No.	Position	Department	Responsibilities
4.	HSE and Environmental Officer		Implementation of the EMP on site Supervision HSE, monitoring, and reporting of EMP implementation at the site level.
5.	Community Liaison Officer		Conduct interview and assessment to local people needing and solved social issue. Follow up the Grievance redress mechanism program. Implement CSR program and monitoring, reporting the Social response in time.
6.	Department	MONREC	Monitoring and inspection of projects to determine compliance with all environmental and social requirements The Ministry may impose penalties and/ or require the project proponent to undertake corrective action Where, the Ministry views that the project is not in compliance, it will: Promptly inform the project proponent Indicate specific non-compliances of the project environmental and social requirements; and Specify a period for the project proponent to bring the project into compliance In the event of noncompliance Inform the project proponent indicating the specific non-compliances with environmental and social requirements; Where a project is not in compliance or not likely to comply with its environmental and social requirements, take enforcement action including: Suspension of project operation; and Employing third parties to correct non-compliance

No.	Position	Department	Responsibilities
			Source: Environmental Impact Assessment Procedure (2015).

Moreover, the K Future company limited will organize the Environmental and Social Engaging Management Committee for the city development and will response with the timely manner for issues, complaints and follow up the all Environmental Management Plan. The organization chart of committee members are as follow:

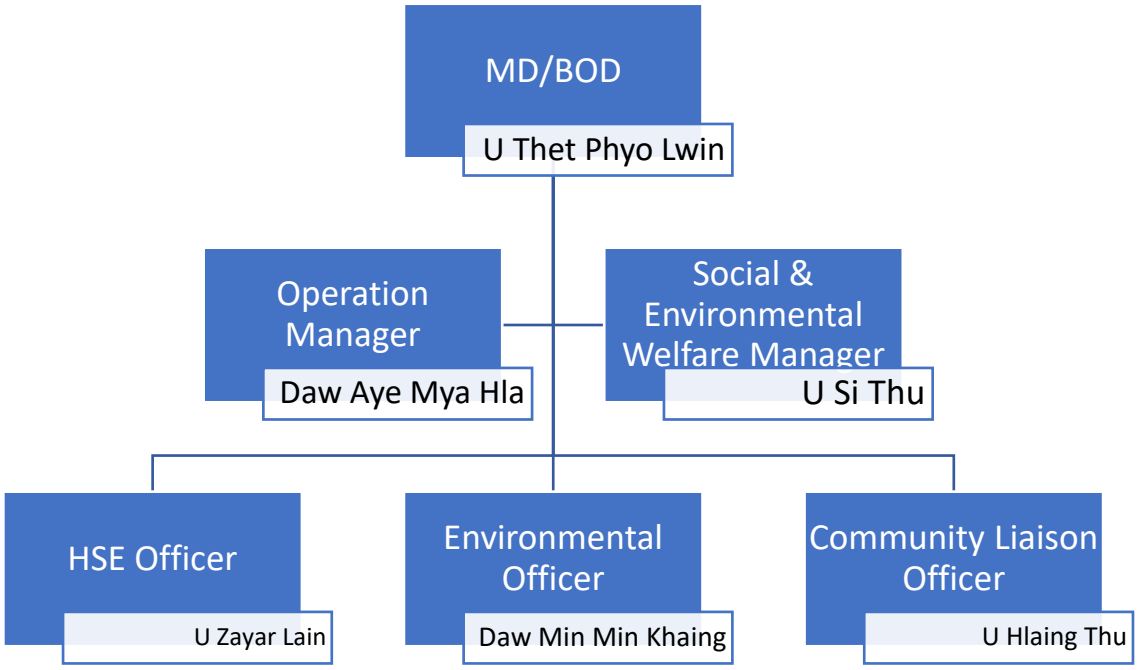


Table: 6. 2- Environmental Management Plan

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
Construction Phase: This phase that corresponds to any event, process, or activity that occurs during the construction of the project.						
Appointment of HSE Coordinator/ HSE Assistant			(2) yrs			K Future Co., Ltd.
Appointment of Biodiversity Officer			(2) yrs			K Future Co., Ltd.
Water quality	All Construction site	Adequate waste bins will be sufficiently provided at the project site for collection and disposal of wastes Toilets with temporary soak pits and septic tanks will be constructed on the site during the construction phase to prevent wastewater from entering the groundwater or surrounding water bodies. To prevent surface and groundwater contamination by oil/grease, leak-proof containers will be used for storage and transportation of oil/grease. Controlled withdrawal of groundwater during construction.	Throughout the constructio n period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
Soil Erosion and Landslide	All Construction site	Temporarily bund exposed soil and redirect flows from heavy runoff areas that threaten to erode or result in substantial surface runoff to adjacent marine waters. Monitor areas of exposed soil during periods of heavy rainfall throughout the construction phase of the project Earthworks will be minimized and avoided, if possible, during the wet seasons; Maintenance and servicing of vehicles and equipment will be carried out at designated workshops which have paved surfaces (or any impermeable surface) to prevent oil leakage seeping into the ground; Fuel will be stored in a designated area on-site. The area is preferably roofed with a bunded impervious flooring (such as concrete);	Throughout Construction period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
Air quality	All Construction site	Site clearance, excavation and earthmoving The working area for the uprooting of shrubs or vegetation or the removal of boulders or temporary or permanent structures shall be sprayed with water immediately before, during, and immediately after the operation to maintain the entire surface wet. Construction Equipment All machinery to be used for construction purposes will be of a high standard and properly maintained. Acoustic laggings and silencers will be used in equipment wherever possible. Transport vehicles and construction equipment/machineries will be properly maintained to reduce air emissions. Equipment for measuring of air pollution will be periodically checked Use of vehicle	Throughout Construction period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		Immediately before leaving a construction site, every vehicle will be washed to remove any dusty materials from its body and wheels. When a vehicle leaving a construction, site is carrying a load of dusty materials, the entire load will be covered by a clean tarpaulin (impervious sheeting) to ensure that the dusty materials do not leak from the vehicle. Excavation and earthmoving The working area of any excavation or earth moving operation will be sprayed with water immediately before during and immediately after the operation to maintain the entire surface wet. Stock Piles All loose material either stocked or transported will be provided with suitable covering such as tarpaulin, etc.				

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		Water sprinkling will be done at the location where the dust generation is anticipated. Over Burden (OB) waste dumps will be sprayed with water as they are major sources of airborne particulate matter/dust. OB waste dumps will be reclaimed/by planting with trees to bind the loose soil and to prevent soil erosion.				
Noise	All Construction site	Construction activities that will generate disturbing sounds which will be restricted to normal working hours from 7 a.m to 7 p.m... Workers operating equipment that generates noise will be equipped with noise protection gear. Workers operating equipment generating noise levels greater than 70 dBA continuously for 8 hours or more must use earmuffs. Workers experiencing prolonged noise levels of 70 – 80 dBA have to wear earplugs.	Throughout Construction period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		The construction activities will be restricted to the daytime and no construction will be practiced during night. Barricades will be provided around the construction site to confine noise within the site. To reduce the impact of noise pollution and to provide a clean, healthy environment, it is necessary to create and maintain a green belt within the building complex and along the roadsides.				
Solid waste disposal	All Construction site	A site waste management plan will be prepared by the developer before the commencement of the use of the building. This should include the designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring.	Throughout Construction period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		Preparation and implementation of the plan must be taken responsibility by the developer with the system being monitored independently. Special attention will be given to minimizing and reducing the quantities of solid waste produced during site preparation and construction. To reduce organic waste, softer vegetation may be composted onsite and used for soil amendment during landscaping. Most of the construction materials like soil, bricks, concrete will be reused in the backfilling, road construction, subgrade preparation, etc. Metals, wood scraps, and bitumen junks will be recycled either within the site or outside with the help of the local authority. The measures like reusing materials on-site and /or donating/selling salvaged items will reduce waste, and disposal costs.				

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		Vegetation and combustible waste must not be burned on the site. Reusable inorganic waste (e.g. excavated sand) should be stockpiled away from drainage features and used for infilling where necessary. Unusable construction waste, such as damaged pipes, formwork, and other construction material, must be disposed of at an approved dumpsite. Maintenance and servicing of vehicles and equipment will be carried out at designated workshops which have paved surfaces (or any impermeable surface) to prevent oil leakage seeping into the ground.				
Biodiversity	All Construction site	Where possible the design and the site construction team should seek to retain the trees, reducing the visual impact as possible. The project alignment should be carefully selected to minimize potential adverse	Throughout Construction period	Moderate	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		impacts on the environment and surrounding communities. Equipped the noise barriers during the breeding season Stop the construction activities during night time Light out during night time Do not discharge the waste in the forest				
Occupational health and safety	All construction site	Posters shown in Myanmar language and any other language appropriate for the contractors drawing attention to relevant health regulations should be made or obtained from the appropriate sources and be displayed prominently at the site. Personal Protective Equipment such as safety gloves, helmets, goggles, earmuffs etc., be provided during construction. Construction-related activities will be confined only to the project site area, hence	Throughout Construction period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		no health-related impacts are envisaged within the project influenced area during the construction stage and will be limited to occupant levels. At the project site, direct exposure to dust generation and high noise generation sources can likely to cause occupational health-related impacts such as asthma, bronchitis and noise-induced hearing loss (NIHL), etc. on the construction workers. To offset such effects, proper drinking water, sanitation, and first-aid facility will be provided at the construction site, with trained shift supervisors, who will ensure minimum adverse occupational health impacts on the construction workers.				
Marine biodiversity	All construction site	All fine earth materials must be enclosed during transportation to the site to prevent spillage and dusting.	Throughout Construction period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		To avoid unnecessary accidents, the transportation frequency should be reduced as much as possible. The transportation of lubricants and fuel to the construction site should only be done in the appropriate vehicles and containers. Installation of boat mooring buoys at the site for use of dive boats and banning of anchoring directly over reef. Provision of educational and environmental sensitization material on coral reef and marine environment for guests and for hotel staff.				
Fire Hazard	All construction site	Keeping adequate separation between combustibles and potential ignition sources is one of the easiest ways to minimize the chances of a fire at construction sites. Enforce a hot work "permit" system. Ensure that all temporary wiring and heating equipment is turned off when personnel are	Throughout Constructio n period	Minor	Already included in cost estimation for EMP	

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		not present Do not allow ANY smoking near combustibles. Properly dispose of any oil-soaked rags, especially diesel oil. soaked rags. Good housekeeping will include, but not be limited to: cleaning and properly discarding of any packaging; storing combustibles away from active work areas where ignition sources could be present; and regularly cleaning and removing any combustible, shavings, sawdust or scrap wood products that are produced.				
Operation/ Service Phase: The main project activities of services and maintenance are, total 20 bungalows services for guests, restaurants, bar, SPA, Swimming Pool						
Water conservation	Kitchen and guest rooms	The hotel should be planned to use proper wastewater drainage and efficient machines should be used in the guest rooms and kitchen. Procedures for spill preventive measures will be developed such as due care to be taken to	Throughout Operation period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		prevent from spillage while filling diesel oil and lubricants and also adequate secondary containment will be provided for the diesel and engine oil storage containers. Water-saving equipment such as ultra-low flush toilets, spray nozzles, urinals, faucet aerators and low-flow shower head, infrared and ultrasonic sensor, water spigots, and pressure-control valves should be installed to reduce wastewater generation.				
Energy conservation	All the proposed operation area	Energy saving devices such as energy saving bulbs, intelligent door lock and energy saving switch card will be used to reduce energy consumption. Auto switching off electrical equipment will be installed to control energy conservation. For air conditioning purposes air conditioners with R143 will be used to minimize ozone depletion.	Throughout Operation period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
Sewage disposal and Solid waste disposal	All the proposed operation area	Proper solid waste receptacles and storage containers and septic tanks should be provided in sufficient numbers, particularly for the disposal of lunch and drink boxes, so as to prevent littering of the site. Use the proper and systematic waste management Sort the type of waste, practice reuse, recycle, renew system Call for the clean up activities for marine litter once a year, Apply pits that covered with concrete or linen to avoid the ground water contamination.	Throughout Operation period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.
Water Quality Control	All the proposed operation area	Regularly tested the wastewater and treated water Choose ecofriendly pool chemicals, regularly clean up the pool filters		Minor	Already included in cost estimation for EMP	

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		Regular check up and maintain the drainage system				
Noise	Guest room, kitchen and generator	Windows with sound-reduction materials should be installed. As biological control of noise impact of the proposed hotel, the investor has greening and landscaping plan including planting trees at the perimeter of the boundary line. All activities on the beach need to light out after 7:00 PM	Throughout Operation period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.
Human activities	All the proposed operation area	Anti-slip stair tape treads should be equipped along the for highlighting step edge and avoid slipping. Workers should not be allowed to enter kitchen without kitchen wear. Site plan should be provided at the lobby. Qualified first-aider be provided at all times.	Throughout Operation period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		A good ventilation rest room for provided at a level appropriate for the purpose of the facility. Food-handling, preparation and storage areas for dry and wet food adapted to workers and guests' food hygiene. 24 hours' security in the proposed hotel should be managed for the guest safety Life-guard are appointed necessary area such as swimming pool, beach and water activities area Emergency contact numbers of Management must be printed and tagged at easily visible places. Regular check-up of the electricity supply system. Encourage the guest not to store flammable substance near electrical devices, or fire sources				

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
Biodiversity	All the proposed operation area	Management should alert not to hunt in order to avoid wildlife extinction. Landscaping should also use native flowering plants to provide habitat and host plants for butterflies To balance the forest ecosystem services lost by project development, buffer zone should be implemented around the project area High IVI value species should be considered priority species for plantation which could tolerate and grow well in the climate. All activities one the beach should close out during the night time. Give training and awareness to employee about the IUCN Redlist species Post Dos and Don'ts and information about the IUCN Redlist species in guest rooms	Throughout Operation period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
Marine Environment	All the proposed operation area	Installation of boat mooring buoys at the site for use of dive boats and banning of anchoring directly over reef especially high sensitive zone. Provision of educational and environmental sensitization material on coral reef and marine environment for guests and for hotel staff Light out during the night except for emergency light	Throughout Operation period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.
Decommissioning Phase: After 30 years later, this is the final phase of the project and it will be in relation to the condition as stated in the investment contract. Decommissioning would require use of the demolishing equipment. Where needed, any existing hazardous material used in demolition of these would be properly handled and disposed of in accordance with governing authority requirements.						
Air quality	All the decommissioning site	Fenced the site for safety and security reasons Personal Protective Equipment (PPE) such as dust masks shall be provided where dust levels are high.	Throughout Decommissioning period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		Burning of waste materials shall not be allowed and the best decommissioning practices should be applied.				
Water	All the decommissioning site	Contaminate water shall be reduced by discharging wastewater properly Temporary toilet for labor and leak proof containers should be used for storage and transportation of oil and grease, and keeping the impervious floors of oil and grease handling areas.	Throughout Decommissioning period	Minor	Already included in cost estimation for EMP	
Noise	All the decommissioning site	Installation of control devices such as mufflers and noise suppressors to all decommissioning equipment to help minimize noise generated. Decommissioning workers must be provided with personal protective equipment (PPE), e.g. earmuffs.	Throughout Decommissioning period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.
Solid waste production and disposal	All the decommissioning site	Avoid, minimize, reuse and recycle wastes generated at the project site.	Throughout Decommiss	Minor	Already included in cost	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		To reduce and control of solid waste disposal, demolition activities should be conducted with the use of appropriate health and safety procedures in accordance with the regulatory requirements.	ioning period		estimation for EMP	
Occupational health and safety	All the decommissioning site	In order to control occupational health and safety, Mitigate demolition workers' accidents by enforcing adherence to safety procedures and preparing contingency plan for accident response. Adherence to the Occupational Health and Safety Rules and Regulations should be adopted. Appropriate personal protective equipment should be provided as well as ensuring a safe and healthy environment for demolition workers.	Throughout Decommissioning period	Minor	Already included in cost estimation for EMP	K Future Co., Ltd.
Biodiversity	All the site	To prevent impact on wildlife sanctuary during decommissioning phase,	Throughout Decommiss	Minor	Already included in	K Future Co., Ltd.

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Mitigation Cost	Responsible Person
		Hotel management and development committee should be guided by a long-term vision that incorporates ecosystem and biodiversity. In this regard, as detailed described in the following Biodiversity Management Plan, the hotel project has carefully planned to implement all necessary precaution measures to avoid any potential negative impact on the wildlife and its ecosystem	ioning period		cost estimation for EMP	

6.1.1. ENVIRONMENTAL MONITORING PLAN

The following table describes the Environmental Monitoring Plan for the proposed project.

Table: 6. 3- Environmental Monitoring Plan

No.	Environmental Concerns	Parameters	Guidelines	Frequency	Location	Estimated Cost (USD)	Responsible Party
Construction Phase							
1.	Ambient Air Quality	PM2.5, PM10, CO2, CO, SO2, NO2	NEQEG guideline value (PM2.5 – 25 µg/m3), (PM10 - 50 µg/m3), (SO2 – 20 µg/m3) and (NO2 – 200 µg/m3) ACGIH guideline value (CO2 – 5000 ppm) and (CO – 35 ppm)	Twice a year for two consecutive years of the construction phase	Station (1)- 10°33'37.95"N, 98°13'57.88"E and Station (2)- 10°33'18.45"N, 98°14'6.90"E	Already included in cost estimation for EMOP	K Future Co., Ltd.
2.	Noise Quality	Noise (dBA)	NEQEG guideline value Residential, institutional, educational (Day	Twice a year for two consecutive years of	Station (1)- 10°33'37.95"N, 98°13'57.88"E and Station (2)-	Already included in cost estimation for EMOP	K Future Co., Ltd.

No.	Environmental Concerns	Parameters	Guidelines	Frequency	Location	Estimated Cost (USD)	Responsible Party
			time – 55 dBA & Night time – 45 dBA) & Industrial, commerical (Day time – 70 dBA & Night time – 70 dBA)	construction phase	10°33'18.45"N, 98°14'6.90"E		
3.	Water Quality	Chemical Oxygen Demand (COD), 5 days Biochemical Oxygen Demand (BOD), Oil and grease, Total Nitrogen, Total phosphorus and Total suspended solids	NEQEG guideline value (5 days BOD – 50 mg/l), (COD – 250 mg/l), (oil and grease – 10 mg/l), (pH – 6-9), (Total coliform bacteria – 400), (Total nitrogen – 10 mg/l), (Total phosphorus – 2 mg/l) and (Total suspended solids – 50 mg/l)	Twice a year for two consecutive years of construction phase	Station (1)- Latitude - 10.561712°N, Longitude - 98.235220°E, Station (2)- Latitude - 10.558386°N, Longitude - 98.238301°E, Station (3) Latitude - 10.558456° N, Longitude - 98.233119°	Already included in cost estimation for EMOP	K Future Co., Ltd.

No.	Environmental Concerns	Parameters	Guidelines	Frequency	Location	Estimated Cost (USD)	Responsible Party
4.	Waste Generation	Solid waste, liquid waste, and Hazardous waste	-	Monthly	At the project site	Already included in cost estimation for EMOP	K Future Co., Ltd.
5.	Fire Hazardous	Visual inspection, fire extinguishers and regular check of combustible materials	-	Monthly	At the project site	Already included in cost estimation for EMOP	K Future Co., Ltd.
Operation							
1.	Ambient Air Quality	PM2.5, PM10, CO2, CO, SO2, NO2	NEQEG guideline value (PM2.5 – 25 µg/m3), (PM10 - 50 µg/m3), (SO2 – 20 µg/m3) and (NO2 – 200 µg/m3) ACGIH gudieline value	Twice a year	Station (1)- 10°33'37.95"N, 98°13'57.88"E and Station (2)- 10°33'18.45"N, 98°14'6.90"E	Already included in cost estimation for EMOP	K Future Co., Ltd.

No.	Environmental Concerns	Parameters	Guidelines	Frequency	Location	Estimated Cost (USD)	Responsible Party
			(CO2 – 5000 ppm) and (CO – 35 ppm)				
2.	Noise Quality	Noise (dBA)	NEQEG guideline value Residential, institutional, educational (Day time – 55 dBA & Night time – 45 dBA) & Industrial, commerical (Day time – 70 dBA & Night time – 70 dBA)	Once a year	Station (1)- 10°33'37.95"N, 98°13'57.88"E and Station (2)- 10°33'18.45"N, 98°14'6.90"E	Already included in cost estimation for EMOP	K Future Co., Ltd.
3.	Water Quality	Chemical Oxygen Demand (COD), 5 days Biochemical Oxygen Demand (BOD), Oil and grease, Total Nitrogen, Total phosphorus and	NEQEG guideline value (5 days BOD – 50 mg/l), (COD – 250 mg/l), (oil and grease – 10 mg/l), (pH – 6-9), (Total coliform bacteria –	Twice a year	At outlet water from wastewater treatment plan	Already included in cost estimation for EMOP	K Future Co., Ltd.

No.	Environmental Concerns	Parameters	Guidelines	Frequency	Location	Estimated Cost (USD)	Responsible Party
		Total suspended solids	400), (Total nitrogen – 10 mg/l), (Total phosphorus – 2 mg/l) and (Total suspended solids – 50 mg/l)				
4.	Waste Generation	Solid waste and liquid waste	-	Monthly	Temporal waste disposal area	Already included in cost estimation for EMOP	K Future Co., Ltd.
5.	Fire Hazards	Visual inspection of fire extinguishers and regular check of combustible materials	-	Monthly	At the project site	Already included in cost estimation for EMOP	K Future Co., Ltd.
Decommissioning Phase							
1.	Ambient Air Quality	PM2.5, PM10, CO2, CO, SO2, NO2	NEQEG guideline value (PM2.5 – 25 µg/m3), (PM10 - 50 µg/m3),	Once a year	Station (1)- 10°33'37.95"N, 98°13'57.88"E and Station (2)-	Already included in cost	K Future Co., Ltd.

No.	Environmental Concerns	Parameters	Guidelines	Frequency	Location	Estimated Cost (USD)	Responsible Party
			(SO2 – 20 µg/m3) and (NO2 – 200 µg/m3) ACGIH guideline value (CO2 – 5000 ppm) and (CO – 35 ppm)		10°33'18.45"N, 98°14'6.90"E	estimation for EMOP	
2.	Noise Quality	Noise (dBA)	NEQEG guideline value Residential, institutional, educational (Day time – 55 dBA & Night time – 45 dBA) & Industrial, commerical (Day time – 70 dBA & Night time – 70 dBA)	Once a year	Station (1)- 10°33'37.95"N, 98°13'57.88"E and Station (2)- 10°33'18.45"N, 98°14'6.90"E	Already included in cost estimation for EMOP	K Future Co., Ltd.
3.	Water Quality	Chemical Oxygen Demand (COD), 5 days Biochemical	NEQEG guideline value	Once a year	Station (1)- Latitude - 10.561712°N, Longitude - 98.235220°E, Station (2)-	Already included in cost	K Future Co., Ltd.

No.	Environmental Concerns	Parameters	Guidelines	Frequency	Location	Estimated Cost (USD)	Responsible Party
		Oxygen Demand (BOD), Oil and grease, Total Nitrogen, Total phosphorus and Total suspended solids	(5 days BOD – 50 mg/l), (COD – 250 mg/l), (oil and grease – 10 mg/l), (pH – 6-9), (Total coliform bacteria – 400), (Total nitrogen – 10 mg/l), (Total phosphorus – 2 mg/l) and (Total suspended solids – 50 mg/l)		Latitude - 10.558386°N, Longitude - 98.238301°E, Station (3) Latitude - 10.558456° N, Longitude - 98.233119°	estimation for EMOP	
4.	Waste Generation	Solid waste, liquid waste, and Hazardous waste	-	Monthly	At the project site	Already included in cost estimation for EMOP	K Future Co., Ltd.
5.	Fire Hazards	Visual inspection, fire extinguishers and regular check of combustible materials	-	Monthly	At the project site	Already included in cost estimation for EMOP	K Future Co., Ltd.

6.1.2. COST ESTIMATION FOR EMP & EMOP

The following table shows the expenditures for the implementation of the Environmental Management Plan for the operation phase annually. It can change according to the situation and the below mentions the allocation of budget for mitigation measures and monitoring plan throughout the life cycle.

Table: 6. 4- Cost Estimation for EMP and EMOP implementation

No.	Item	Unit	Quantity	Unit Cost (USD)	Cost (USD)
Mitigation Measures					
1.	Personal Protective Equipment (PPEs) and first aid kits	Lump-Sum			1,000
2.	Hygiene and Health	Lump-Sum			1,000
3.	Water spraying	Daily	365	5	1,825
4.	Waste disposal	Monthly	48	40	1,000
5.	Install fire extinguishers	Lump-Sum			1,000
6.	Maintenance and servicing of vehicle and equipment	Quarterly	4	200	800
7.	Wastewater Treatment System	Lump-Sum			5,000
Subtotal					11,625
Monitoring Program					
1.	Air Quality	Year	2	700	1,400
2.	Noise Quality	Year	2	100	200
3.	Water Quality	Year	2	400	800
Environmental Management and Capacity Building					
1.	HSE Officer	Year	1	400	4,800
2.	Environmental Officer	Year	2	200	4,800
3.	Training	Yearly	1	1000	1000
Subtotal					13,000
Contingency					1,231
Total					25,856

6.1.3. OCCUPATIONAL HEALTH AND SAFETY PLAN

The project proponent should appoint one Health, Safety, and Environment (HSE) Coordinator for Health, Safety and Environment (HSE) issues throughout the lifespan of the Hotel and Resort Development project. Environmental and Social Engaging Committee is responsible for the implementation and monitoring of the Environmental Management Plan (EMP) and Monitoring Plan as well as coordination with Proponent, local authorities, and the nearby communities.

HSE matters are a line management responsibility requiring the active participation of all levels of management and supervision. Management provides visible, strong and pro-active leadership and commitment to develop, implement, measure and improve the HSE Management System. This is achieved through active participation in safety practices such as Management HSE walkthroughs, Safety Toolbox meetings, Accident / Incident investigation, risk assessment and work site training etc.

The Managing Director is responsible for:

- Approving and endorsing the HSE Plan,
- Ensuring that resources are available to execute the HSE Plan,
- Monitoring and adjusting the HSE Plan.
- The Social and Environmental Welfare Manager, as custodian of the HSE Plan has the responsibility for:
- Developing the HSE Plan.
- Monitoring the HSE Plan and reporting its status, deviations and any need for adjustments.
- Enforcing & coordinating the overall workings of the HSE Plan.
- Training all HSE Representatives and Managers on the HSE Plan, procedures & notifying all changes.
- Keeping the Managing Director immediately informed at all times on the occurrence of all accidents and anomalies together with all other HSE matters.

The Operation Manager/ Site Manager has the responsibility for:

- Enforcing an accident-free work environment.
- Enforcing the overall workings of the HSE Plan.
- Ensuring that the HSE Manager follows his/her responsibilities.
- Calling with immediate effect of an accident an HSE investigation meeting with all personnel involved

The Environmental and Social Engaging Committee is the highest body that enforces the implementation of the HSE program and meets not less than once every six months and/or when there is an emergency. It:

- Formulates amends and reviews HSE plan and the HSE Manual.
- Reviews the enforcement of the HSE plan.
- Reviews all legal and statutory matters of HSE plan.
- Reviews training and performance of HSE representatives and workforce.
- Reviews investigations of occupational accidents/incident, injuries.
- Looks into employee safety suggestions.
- Appoints new HSE Representatives.
- Appoints HSE Officer when necessary.

- Any other matters

The HSE Policy shall meet the following objectives:

- Develops and pursues, through all stages of construction and operation, a systematic approach to risk reduction.
- Co-ordinates all health / safety/ environment objectives considering economical constraints.
- Includes all activities within the general Sustainable Development Objectives of the HSE.
- Ensures that all requirements are fully met, all hazards associated with each employee's job description is systematically identified and evaluated, as well as any related risk reducing measures.
- The overall goal is to reduce residual risks to a level that is As Low as Reasonably Practicably with respect to: (i) Protection of human life (ii) environmental impacts (iii) safeguarding of assets.

The K Future will also ensure the following applicable laws and regulations related to HSE for the proposed project:

- National laws and regulations in force.
- International laws and regulations when and where applicable.
- Industry guidelines, codes of practice, etc.

6.1.3.1. OCCUPATIONAL HEALTH AND SAFETY ACTION PLAN

The K Future will implement the following for the proposed project.

- Adopt a policy for "ZERO tolerance" on accident and Incident.
- Clearly define HSE line management responsibilities and objectives.
- Identify and assess all significant HSE risks and place measures which eliminate or minimize these risks to a level, which is feasibly as low as reasonably practicable.
- Employ trained and qualified people; provide effective supervision, personnel performance appraisals and supplementary training as necessary to enable all employees to work safely.
- Taken action when safety concerns are raised and to support anyone who stops the work if they believe it is unsafe.
- Visibly imbibe safety through behavior, implement regular HSE tours, and communicate effectively all HSE messages.
- Promote open dialogue with personnel, and everyone working with the project proponent with a view to achieving continuous improvement.

An effective and open communication/reporting system is also established and maintained in order to ensure the correct implementation and constant improvement of the HSE Management System including safety signs, notice boards, and awards. Moreover, HSE monthly meeting, weekly HSE

representative meeting and daily tool box meeting should be carried out to ensure HSE manners for the project. The following practices shall also be implemented by the project proponent.

Personal Protective Equipment (PPE): A list of PPE requirements is placed on the notice boards. Enforcement of PPE procedure is done by the HSE Manager and the HSE Representatives. The procedure is enforced by a color card system as depicted in the HSE Violation Chart.

3 yellow cards = 1 blue card

2 blue cards = 1 red card

The blue card results to suspension from work, while the Red card is a referral to the Executive Committee for more severe disciplinary action which can include dismissal from work.

Medical Facilities: The K Future maintains close by medical facilities that meet or exceed local reference standards.

Medical Fitness: To maintain a healthy and productive work force, every prospective employee must undergo a pre-employment medical check to ascertain state of health and medical fitness prior to employment. Periodic medical checks will also be carried out on old employees. In both categories a certified employee shall be issued with a certificate of fitness which must be stamped and signed by a certified Doctor.

First Aid: The K Future maintains First Aid trained representatives at ratio 1 to 30 employees. For severe cases, while the First Aid treatment is administered the medical facility is notified and transportation is provided.

Drug and Alcohol Abuse: Use of alcohol and drugs is forbidden.

Smoking: Smoking is permitted only in designated smoking areas

Material and Safety Datasheet (MSDS): All MSDS used for construction and operation are recorded into a Safety Data Sheet Register and made available to First Aiders for reference in the case of an emergency. MSDS sheets are pasted on the HSE Notice board in the Foundry. It is the responsibility of the HSE department to collate and keep MSDS sheets up to date and conduct a COSHH Assessment for each material used.

6.1.4. COMMUNITY HEALTH AND SAFETY PLAN

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

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

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

Developing an annual medical surveillance program for project employees to monitor the trend and pattern of communicable disease and foresee health awareness raising campaigns as part of them heal and safety induction.

- Safety and Security
- Trespassing by workers must be prohibited and the appropriate disciplinary action must be taken
- Precaution and warning sign for health and safety risks must be placed around the project site
- Installation of appropriate temporary road signs points on the roads used by Project traffic in particular at bends, junctions and steep slope area.
- Public awareness programmes must be carried out regularly to know the potential impact and mitigation measures
- Follow the grievance mechanism with the aim of receiving and facilitating resolution of affected communities' concerns and grievances related health.

6.1.4.1. COMMUNITY HEALTH AND SAFETY ACTION PLAN

The K Future's appointed Environmental and Social Welfare Manager, HSE Manager, Environmental Officer and Social Welfare Officer/CLO will cooperate and response to the observed risks in timely manner.

The communicable disease breakout occurred such as COVID-19, the Environmental and Social Engaging Committee will contact with local health authorities and immediately launched the health and safety plan.

The committee will monitor an annual medical surveillance program for project employees to monitor the trend and pattern of communicable disease and foresee health awareness raising campaigns as part of them heal and safety induction.

The committee will develop and implement the health awareness training to all the workers and encourage the residents to be follow.

The HSE Manager and Environmental Officer regularly check-up the hygrines and cleanness of compound and if the irregularities were found corrective and preventive measures will follow up as soon as possible.

The Environmental and Social Engaging Committee Environmental and Social Engaging Committee will assure all the Environmental Management Plans and Actions will be established collectively and progressive with the cooperation of both guest and operation staffs.

6.1.5. EMERGENCY PREPAREDNESS AND RESPONSE PROCEDURES

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

- Prevent fatalities and injuries to workers
- Protect the environment and people in the community
- Reduce damage to building, stock and equipment

The project proponent should prepare an emergency preparedness plan to prevent the consequences of natural disasters such as fire, earthquake, strom and man-made disasters. The purpose of the Emergency Plan is to minimize the danger to life and property in the event of disasters in the proposed project. An emergency response plan will be developed by the project proponent and trained to all employees according to the proposed training schedule. All the people who live around the project compound have to leave the site as soon as possible for all emergency cases. The prevention, preparedness, and response plan for first aid supplies, training, earthquake, fire hazards and emergency communication are described as follows:

FIRST AID SUPPLIES

The most critical equipment required on site is adequate and appropriate first aid equipments and facilities. This equipment is essential for response to any illness or injury that persons may sustain. This first aid equipment must be adequate and appropriate.

- Identify hazards which may cause an injury or illness (also consider workers' existing illness (e.g., diabetes, asthma, epilepsy, heart condition etc.)
- Assess the risk based on the type and extent of injuries or illness that may occur.
- Decide on the appropriate first aid equipment and facilities
- Obtain the identified first aid equipment and facilities
- Monitor and review first aid equipment facilities and services to ensure they continue to meet requirements
- The first aid kit must be appropriate for the types of injuries and illness likely to occur at the coal fired power plant which will meet the immediate needs such as:
- The first aid kit can be any size but must be large enough to fit all the required contents
- A portable kit or multiple kits may be required
- Consider placing appropriate kits in all mobile equipment
- First aid kit locations must be clearly signed.
- Include single use disposable items in the kit where possible. Reusable items must be cleaned, sterilized and disinfected.

TRAINING

All workers must receive basic first aid training as part of their induction. There is also a need to train some workers in more advanced first aid. Keep training records of the first aid training that workers have received. Names of first aid personnel and their competencies must be kept as part of the first aid team and displayed prominently in the work place.

Workers must have access at all times to trained first aid personnel who can undertake initial management of work-related injuries or illness. If ongoing medical care or special medical care assistance is required, first aid personnel must recommend that a worker seeks further medical assistance.

First aid personnel must have current certified first aid qualifications. The level of these qualifications has to be based upon the following:

- Be reliable
- Be competent and familiar with the ERP and first aid equipment on site.
- Have current certified first aid qualifications
- Undertake the initial management of injuries and illness
- Record details of first aid given, and
- Remain calm in an emergency

6.1.5.1. RESPONSE MEASURE FOR NATURAL DISASTER

Disaster is an abrupt adverse or unfortunate extreme event, which causes severe damage to human beings, plants, and animals. The emergency response plan is considered because of the buildings in the project area. The project proponent has to be aware of the natural disasters that may affect on lives by physical and emotional and loss of productivity.

EARTHQUAKE

Earthquake is one of the most destructive elements of natural hazards and with many damage to human beings and buildings.

Measures to be undertaken before an earthquake occurs

- Find “safe places” such as those under a sturdy table or against an interior wall away from the area to avoid due to heavy falling object;
- Practice pre-earthquake drills to be an automatic response and make sure that everybody is involved during drill exercise;
- Keep first-aid kits for emergency cases and replace items each year thus the kit has to contain preserved food, radio, torch lamp, drinking water, matches and batteries and
- Convey the earthquake danger information among the community.
- Measures during and after an earthquake occurs
- During the earthquake, identify safe places to avoid heavy falling object;

- After the earthquake, help people who get hurt or trapped inside and make sure that houses are in safe condition in case of another earthquake and
- Earthquakes can become stronger and go quickly to the higher ground or shelter and listen to the warnings. from the authorities and follow their suggestions

Natural hazard

CYCLONES

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

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

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

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

STROM SURGE

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

TSUNAMI

A tsunami, also known as a seismic sea wave, is a series of waves in a water body caused by the displacement of a large volume of water, generally in an ocean or a large lake. Earthquakes,

volcanic eruptions and other underwater explosions (including detonations of underwater nuclear devices), landslides, glacier calving, meteorite impacts and other disturbances above or below water all have the potential to generate a tsunami. Unlike normal ocean waves which are generated by wind or tides which are generated by the gravitational pull of the Moon and Sun, a tsunami is generated by the displacement of water.

6.1.5.2. NATURAL HAZARD RESPONSE PLAN

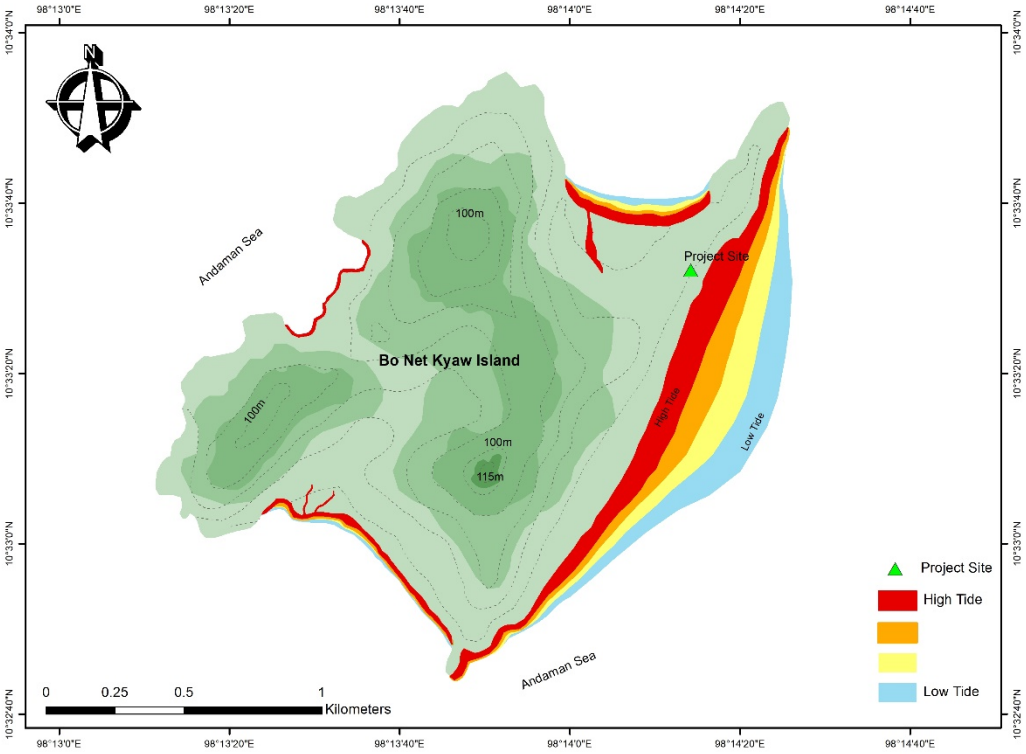


Figure: 6. 1- Bo Nat Kyaw island Topography, High- sea level above

- Cyclone shelters are necessity and for the construction of cyclone shelters, the most appropriate sites should be selected with a detail consideration of the density of population, transportation and communication conditions, distance from areas where the cyclones took landfall in the past and the topography of the area.
- A proper flood management should be installed. Improve drainage system, raised-platform for flood shelter and elevate shelter on stilts.
- Improve vegetation cover; create coastal shelterbelt plantations such as mangrove shelterbelt plantation.
- Raise embankment or levees.
- Weather station should be established to get proper and on time report about the Tsunamis. (if possible)

- For tsunami warning, connection should be made with the established regional Tsunami station like India, for access to Tsunami Warning System for receiving notifications and warnings.
- The proper and timely response plan should be developed and implement in accordance with the plan for both employees and guests.

6.1.5.3. FIRE PREVENTION, PREPAREDNESS AND RESPONSE

Diesel oil will be stored in the project compound for the generator use; without proper storage, these petroleum products are volatile substances and can be very dangerous if they are not looked after carefully. Therefore, it is important to take proper procedures when handling or storing them. Always keep oil storage at room temperature and away from all heat sources. Ensure that a container is tightly sealed to avoid spillage. Oil should always be stored in secure areas with safety precautions.

Fire drills will conduct regularly and firefighting teams also need well trained and organized. Fire alarms, fire hoses and hydrants, fire extinguishers, and excavation routes should inspect and proper maintenance regularly.

The emergency preparedness plan for fire hazards is described as follows:

- Keep the use and storage of combustibles to a minimum.
- Store flammable liquids in approved containers in well-ventilated storage areas.
- Smoking is strictly prohibited near the storage area of flammable liquids.
- Place oily oil-soaked rags or waste in covered metal cans.
- Store adequate quantity of water for firefighting

Fire extinguishers should be provided on the project site. It is a very effective life-saving tools, if they are used properly. Fire extinguishers come in different varieties. It is important to choose the right kind of extinguishers for putting out different types of fire. Check for the following symbols on the label of fire extinguishers as shown in the following **Error! Reference source not found.**.

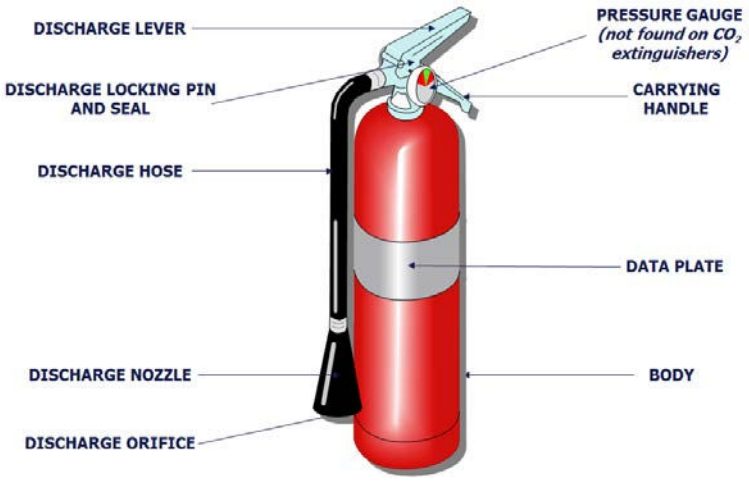


Figure: 6. 2- Components of a fire extinguisher

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

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

Type A, B and C of fires can occur at the mine site during preparation, operation and decommissioning/closure phase. Although there are many kinds of fire extinguishers, the most appropriate fire extinguishers should be used as shown in **Error! Reference source not found.**.

CLASS	A	B	B	C	D	K
PICTURE SYMBOL						
TYPE	Common Combustibles Solids (wood, paper, cloth, etc.)	Flammable liquids Gasoline and solvents	Flammable gases Propane	Live electrical equipment Computers, fax machines	Combustible Metals Magnesium, Lithium, Titanium	Cooking Media Cooking oils and fats
Water	Yes	No	No	No	No	No
Foam	Yes	Yes	No	No	No	Yes (ABF Foam Only)
Dry Powder	Yes	Yes	Yes	Yes	No	No
M28/L2	No	No	No	No	Yes	No
Carbon Dioxide CO2	No	Yes	No	Yes	No	No
Wet Chemical	Yes	No	No	No	No	Yes

Figure: 6. 3- Types of fire extinguishers

When using a fire extinguisher, stand six to eight feet away from the fire and Remember to PASS:

Pull: Pull the pin at the top to break the tamper seal

Aim: Aim the extinguisher low, point the nozzle at the base of the fire. Do not aim at the flames themselves.

Squeeze: Squeeze the handle to release the extinguishing agent

Sweep: Sweep the extinguisher from side to side, continuing to aim at the base of the fire until it appears to be out.

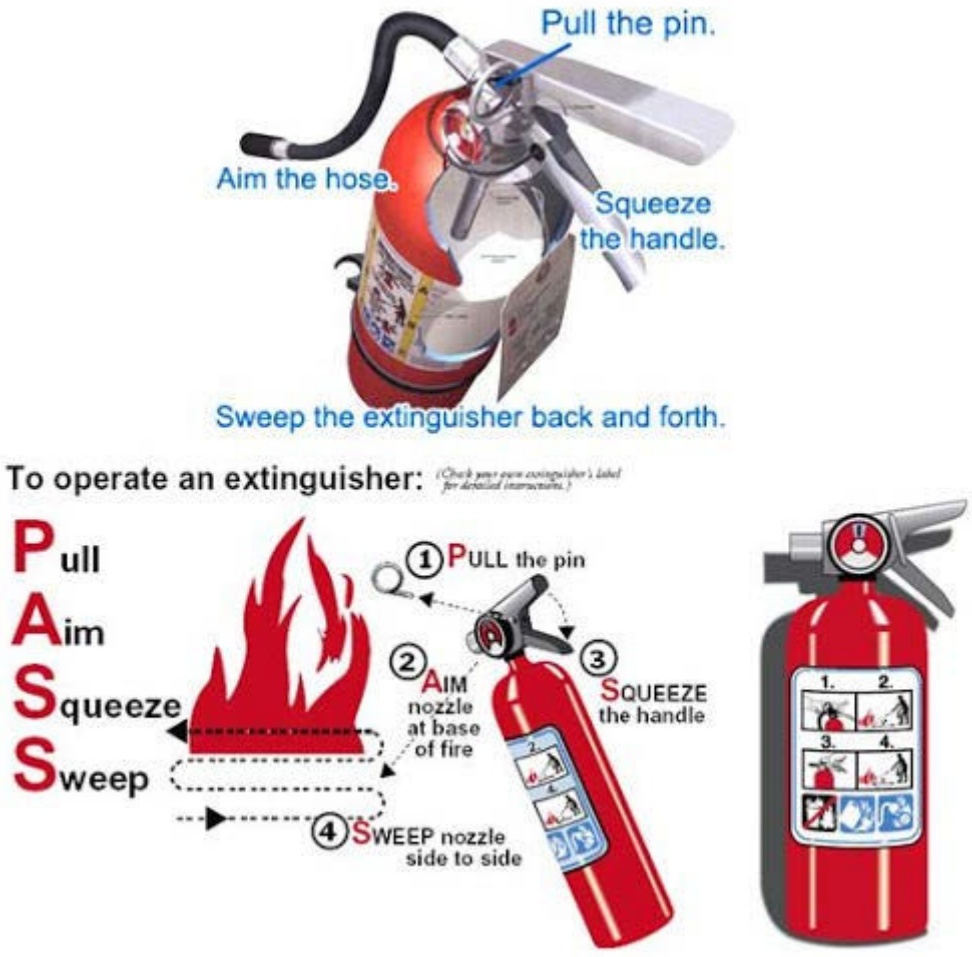


Figure: 6. 4- Steps of using a fire extinguisher

Safety Tips on Fire

Do's to prevent a fire	Dont's to prevent a fire
Keep fire extinguishers in the project site.	Do not let children play with fire. Do not use lamps, candles, etc. near bamboo sheet/ wooden partitions or mosquito nets.

Do's to prevent a fire	Dont's to prevent a fire
Keep a separate water tank for fire extinguishing. .	Do not pile hay or corn stems near houses. Do not use petrol for lighting or start a fire. Do not store fuel and fuel oil near the fireplace. Do not use lighter or candlelight near fuel oil. .

In case of Fire, the following emergency response plan should be done immediately.

- Alert other people through fire alarm
- If small case of fire, control by using an extinguisher or fire hose reel
- Contact fire brigade if not under immediate control
- Attend to human life in immediate danger
- Turn off power before fighting for the case of an electrical fire
- DO NOT USE WATER rather use fire extinguisher for oil and lubricant fire
- Once out of the building, stay out. Do not allow people to go back into the burning building to collect valuables. While exiting the building, close doors (but do not lock) to slow down the spread of fire
- Obey all instructions
- Proceed to emergency evacuation area
- First-aid measures should be followed to all injured persons and transfer to the hospital if necessary.
- Emergency Communications
- All emergency contact such as fire department, hospital, police department and ambulance should be identified and listed display on the project area in a visible place.

6.1.6. WASTE MANAGEMENT PLAN

PURPOSE

An essential part of a Waste Management Plan is to identify, classify, store and dispose of hazardous, non-hazardous and other wastes generated on site and to initially limit the amount of generated waste within the property.

SCOPE

The scope of the waste management plan covers all activities at K Future and its integration with all employees, staffs, customers, business partners, owners, guests, and other workers.

The K Future has to follow the Waste Management Principles in line with the Environmental Assessment Procedures (2015) and any existing laws and regulations issued in the Union of Myanmar such as limiting the types of waste, categories, amounts of waste (liquid, solid, emissions) generated, methods and system of collection, storage, handling, transport, treatment, disposal and recycling or final disposal of wastes. In line with ECD procedure K Future is responsible for the generation of wastes, storage, and management of these wastes.

The Waste Management Plan will attempt to minimize waste production by applying the principles of Reducing the use of materials, Reusing materials whenever possible, Recycling materials and Recovering value from used materials.

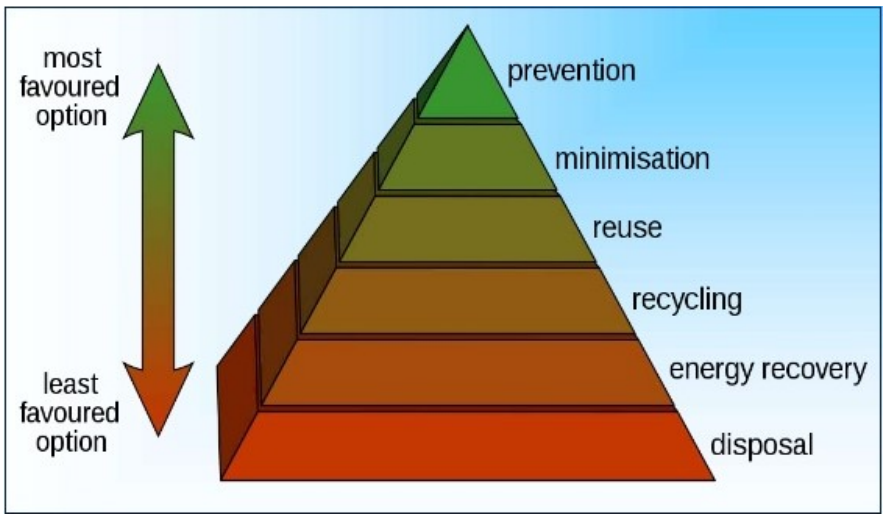


Figure: 6. 5- Typical Waste Management Hierarchy

Prevention: Waste prevention at source. Departments must plan activities to avoid the generation of waste.

Minimization: Reduce the amount of waste produced.

Reuse: Reuse materials where ever possible.

Recycle: Transfer waste to approved recycling plants to minimize environmental impact.

Energy recovery: not feasible to be carried out as hotel waste does not have a high calorific value.

Disposal: Sending of waste to landfill is a last resort. Hazardous waste will be disposed of and treated by authorized disposal contractors and facilities.

During the construction period, the wastes from the construction site are classified into three categories: construction waste, domestic wastes, and wastewater such as septic tank sludge.

Construction wastes during construction phases such as woods, drywall, masonry, metals, plastics, the cardboard will be collected by K Future and the calculations of the construction wastes are as follows.

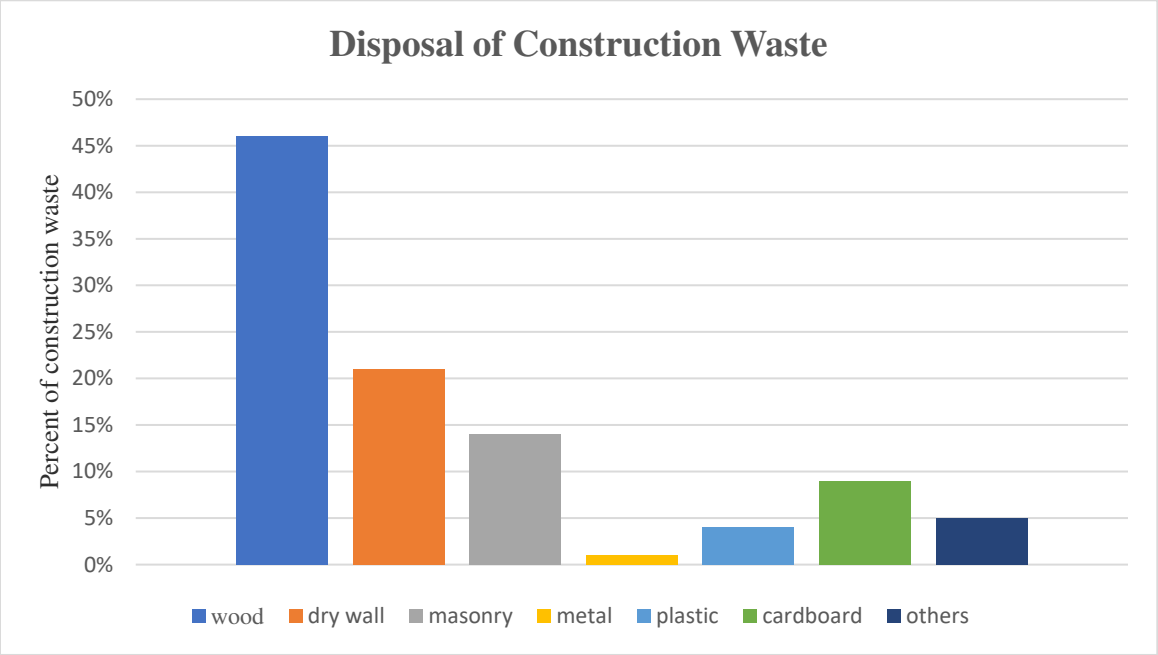


Figure: 6. 6- Disposal type of waste

DISPOSAL OF CONSTRUCTION WASTE AT K FUTURE

In domestic wastes, there are generally plastics, papers, food, and cans. The domestic wastes are collected by K Future twice a week and solid wastes from the construction site and from indoor rooms such as meeting rooms, office rooms, and toilets are stored in small plastic bins (4'×11/2'×3'). And this is a temporary location for waste storage in the project site.

For domestic wastes, the standard municipal solid waste generation is 0.53 kg/capita/day. And for K Future Project, the total workers in a day are total staff 45 persons and estimated guest number 40 person for peak seson. So, the total number of person is 95 persons and the municipal solid waste generation is 45.05 kg/day.

For sewage and wastewater, the total K Future is during the opening season the estimated water usage was 3,000 gallons per day and during the closing season the estimated water usage was 200 gallons per day. A total of 144,000 gallons per year.

IDENTIFICATION OF WASTE TYPES/CATEGORIES

The proposed resort project is located on the isolated island associated both terrestrial and marine environment. To protect and reduce the impact on these environments, waste management plan plays the critical role.

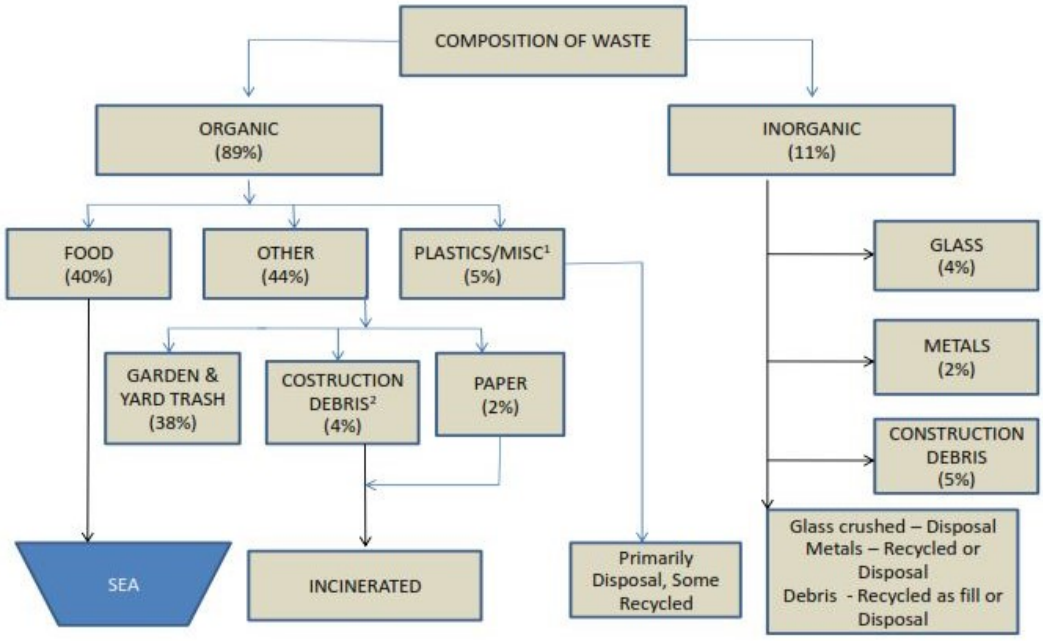


Figure: 6. 7- typical type of waste

In this scope, main objective will be considered on the waste generation and waste minimization plan for the proposed hotel and resorts project. The improper management of waste and wastewater leads to severely damage to the natural environment, especially on the hotel and resort development at the island.

In general waste can be divided into hazardous and non- hazardous waste, the type of waste and sources that can produce in hotel industry are described as follow:

Table: 6. 5- Types of Waste and sources

Type of Non-hazardous waste type in hotel industry:		
Non-hazardous Waste Type	Components	Source
Household wastes	Food/kitchen waste, used or dirty paper and wrapping, plastic	Hotel's different departments

	wrapping or bags, composite wrappers	
Cardboard	Packaging	Hotel's purchasing and other departments
Paper	Printed documents, brochures, menus, maps, magazines, newspaper	Administration, reception, guest rooms, restaurants
Plastic	Bags, bottles (that did not contain hazardous material), household goods, individual portion wrappers for various products	Kitchen, restaurants, guest rooms, administration
Metal	Tin cans, jar lids, soda cans, food containers, aluminum packaging,	Kitchen, guest rooms, restaurants, bars
Glass	Bottle, jars, flasks, bulbs	Kitchen, guest rooms, restaurants
Cloth	Table cloth, bed-linen, napkins, clothes, rags, toilette	Kitchen, restaurants, bars, guest rooms, bathrooms
Wood	Wooden packaging, pallets	Purchasing department
Organic waste	Fruit and vegetable peelings, flowers and plants, branches, leaves, grass, food/kitchen waste	Kitchen, restaurants, bars, guest rooms. gardens

Type of the hazardous waste in the hotel industry:

Hazardous Waste Type	Source
Frying oil	Kitchen, restaurants
Mineral oil	Maintenance services
Paint and solvent residues	Maintenance services
Flammable material (gas, patrol etc.)	Kitchen, garden, maintenance services
Fertilizers and chemicals (insecticides, herbicides, fungicides)	Garden
Cleaning chemicals	Maintenance services
Ink cartridges, IT disks and CDs	Administration, guest rooms

Batteries	Maintenance services, administration, guest rooms
Cleaning chemicals and solvent used in dry cleaning	Laundry services
Fluorescent lights, neon tubes and long-life bulbs, LED bulbs	Maintenance Services

WASTE COLLECTION AND STORAGE

In the classification of wastes, kitchen waste, garden waste, and paper are the components of organic waste and the rest of waste is organic waste. In general, most of the waste categories are sorted into the correct trash bins. Thus, training for separation skills for the hotel and resort is practiced. Firstly, the daily waste from each room is collected and wrapped in a small plastic bag and directly dumped in garbage bins which are placed at outside of the building.

6.1.6.1. WASTE MANAGEMENT ACTION PLAN

The following control measures will be employed within K Future to reduce the environmental impacts from waste generation, handling, storage, and disposal:

- Open burning of waste or the dumping of waste at an undesignated area within the property is prohibited.
- Separate labeled waste receptacles will be provided for, plastic, cardboard/paper, tins, glass.
- The dilution of hazardous waste is prohibited.
- The mixing of hazardous and non-hazardous waste is prohibited.
- All hazardous waste will be provided with secondary containment and suitably bunded to meet legal requirements, where necessary.
- A program for regular collection and removal of skips and bins will be implemented
- All litter will be controlled within K Future by means of good housekeeping.
- Where possible, performance measurement and targets for reduction reuse and recycling will be developed and implemented.
- Any wastes that cannot be reused and recycled will be transported and disposed of in accordance with KCDC requirements.
- Volumes and types of waste will be monitored to establish whether additional opportunities for improvements in waste management (avoid, reduce, reuse, recycle) can be adopted, where practicable.
- All colleagues will be trained on the implementation of the Waste Management Plan, through shift briefs, etc.

6.1.7. WATER MANAGEMENT PLAN

PURPOSE:

Proper water management of the K Future so as not to constrain water use in the surrounding environment.

SCOPE:

Hotel and Resort development such as K Future will drill tube wells as water source for every day use. It is estimated that water consumption in accommodation establishments at the international level to be 1.3 km3 per year.

Broadly defined, water quantity refers to the amount of clean water available for use while water quality refers to the safety and accessibility of water for human consumption. There are several reasons why the Hotel and Resort development should engage in effective water management practices.

It is a primary concern for Hotel and Resort development like K Future to recognize the awareness and engagement about water issues.

Water consumption for Hotel and Resort development is determined by various factors including "the facilities provided, their age, number, efficiency and configuration, the multiplicity of water-using appliances and the practices and behavior of guest at the resort.

The shortcomings for water management in the Hotel and Resort development depend on factors such as:

- Lack of provision of water meters for measuring water use
- Lack of motivation guest and residents to get involved in water management
- Lack of vigilant for leaks in and around the resort
- Lack of Immediate fixing of the equipment to reduce water loss
- Lack of vigilant of cleaners about leakages in common areas
- Using running tap water to defrost food
- Lack of wash dishes or laundry only on full machine loads
- Lack of control temperature and water flow of dishwashers and washing machines
- Lack of requesting guests to be careful with water
- Lack of channeling gray water produced from laundry room, kitchen, sinks and showers into purified gray water using adequate facilities for watering gardens or outdoor cleaning and flush water for toilets.
- Lack of collecting rainwater in order to lower the impact on local water sources as water can be collected and stored for usage during dry seasons when pipe water supply could become low

- Lack of conducting in-house training for its employees to nurture awareness as well as environmental friendly attitudes and culture within K Future.
- Lack of indirectly educating occupants through their policies, operational standards to inform customers of their environmentally friendly management philosophy
- The above framework provides shortcomings about how K Future can address the challenges of implementing water management. It allows also finding innovative ways forward according to their knowledge level and technological capabilities.

6.1.7.1. WATER MANAGEMENT ACTION PLAN

Water audit to be carried out at K Future so as to find out where the major water costs are and to find out the key areas of water consumption

- Compare the actual consumption figures are to be compared with benchmarks
- Records of monthly occupancy figures to keep for the calculation of the water use per user
- Water audit results use to establish realistic goals of water use for K Future
- All employees are to be communicated about the management commitment and explain the objectives and goals clearly. Show them the current consumption data and the cost
- Encourage workforce to encourage participating and to put forward their ideas and proposals on how to reduce water consumption
- Water savings to be implemented through changes in routine works
- Leaks from cisterns, taps, and pipes to be checked regularly and also to check plugs in basins are fit properly
- Sensors have to be installed for low-flow and other saving fittings in kitchens, bathrooms, and public washrooms
- Use opportunities to divert and capture rainwater for use in the resort compound
- Monitoring and targeting system have to be established to monitor results continuously, and report on progress and take corrective action as necessary
- Training to be provided so as to have the guest and employee of the resort to understand how to make prudent use of water and how to maintain equipment for optimum energy efficiency.

6.1.8. CORPORATE SOCIAL RESPONSIBILITY (CSR) PLAN

K Future has a plan to implement and donate 2 percent of the net profit (2%) per year for Corporate Social Responsibility (CSR) and Employee Welfare Arrangement.

Table: 6. 6- Corporate Social Responsibility Plan

Area	Priority Item	Detailed Targets	%
Community Involvement and Development	Donation to local community	Donate to local charities with a worthy cause Actively participate in community events Encourage staff to participate, and to form a community engagement team to actively support community events Embedding understanding and consciousness about human rights issues among the employees Development of sexual harassment and "power harassment" (workplace bullying & harassment) prevention efforts Infrastructure development	20%
Sustainable Environment	Implementation of EMP and BMP	Replanting of trees Water quality control Raise awareness training Implement monitoring and management plan Implement Clean up activities such as ghost net, marine litter	30%
Human Rights	Raising awareness of human rights	Establish a workplace culture where human rights issues do not arise	30%
Compliance to law	CSR Procurement	Sharing values regarding the promotion of CSR activities with business partners and avoiding procurement risks with key partners Effect extensive compliance and adherence to laws and regulations about procurement tasks	20%

		Continuous compliance to environmental regulations	

6.1.9. COMMUNITY GRIEVANCE REDRESS MECHANISM

OVERVIEW

Grievances are complaints or comments received by K FUTURE and/ or its subcontractors from stakeholders. Implementing a Grievance Mechanism for projects is stipulated under the IFC guidelines.

Grievance Mechanisms has to be proportionally scaled to the project and potential impacts and should consider local cultures and contexts. The mechanism is a living process- this means that it should be appropriately staffed, monitored and take necessary action, and be adjusted and improved over the life of the project where necessary.

According to the preliminary feedback system, stakeholders were able to phone, email or postal mail to K Future. A Grievance Mechanism is required for the project's construction and operations phases, and this is presented.

Disclosure of the Grievance Mechanism to stakeholders is required, and this is to be undertaken in a manner appropriate to the scale of the project, potential impacts, the local context, and cultures.

Recommended disclosure channels include:

- Community Liaison Officer to attend the pre-operation meetings with government officials
- Provide posters and fact sheets at community places
- Make local FM radio announcements (prior to and during the survey)
- Display documents via the proponent's website, if any prior to and during the survey.

KEY ELEMENTS

Receive

It is recommended that K Future engage a Myanmar National Community Liaison Officer (CLO) to manage the grievance mechanism for the project. Grievances can be lodged to the CLO by stakeholders via a number of channels including:

- Telephone to K Future's CLO in site.
- Written correspondence by postal mail to K FUTURE Office in Yangon/Site.
- Through community leaders / traditional authorities e.g. Township Administrator.
- Direct contact with the CLO during meetings prior to and during the survey.

Assess and Assign

The CLO will register the grievance on K Future Grievance Register and make an initial assessment of the complaint and assign a Complaint Owner. For straightforward complaints, the Complaint Owner may be the CLO. For complex issues, the Complaints Owner may be other personnel/Departments within K Future Senior Management, Grievance Committee, Third Party Mediation, etc.

Acknowledge

Grievances will be acknowledged by K Future via written response to the complainant within 48 hours of receiving the complaint. The acknowledgment will be via email or letter- whichever mode is most appropriate to the communication requirements of the stakeholders. All communications (written and verbal) should be conducted in a language which is understood completely by the Complainant e.g. Myanmar Language.

Investigate

The Complaint Owner investigates the complaint and proposes options to resolve the issue, in consultation with other personnel as required. The identity of the complainant should only be disclosed to the extent necessary internally and should not be shared with any third parties.

Solutions may be determined by:

- The proponent proposes a solution.
- Community and proponent agree on a solution.
- The third party defines solutions, or
- Traditional or customary defined solutions.

The grievance will be resolved within five (5) working days, however complex complaints may take longer to resolve. For complex complaints, the CLO will notify the stakeholder of the delay and the expected timeframe for resolution.

Provision should be made for instances where there are an individual or group claims of loss of assets, etc.

The process should be recorded in the K Future Grievance Register. The database should capture:

- Record number.
- Stakeholder name and contact details.
- Date received.
- Responsible personnel within K Future
- Nature of grievance (details).
- Response and any associated documentation.

- Date of close-out

Respond

The Complaint Owner and the CLO will agree on a response. The response should communicate the findings of the investigation, set out the proposed corrective actions, define timeframes, responsible parties, monitoring requirements and seek feedback from the Complainant.

The Complaint Owner and CLO determine the next steps based on feedback from the Complainant. If the Complainant accepts the resolution, K Future will precede to implement.to the elating agency. If the Complainant does not accept the resolution, the complaint will be escalated to the Relating Committee consisting of Tanintharyi Region ECD, FD, KCDC, for review and development of a final resolution. The Complainant's response will be documented in the Grievance Register.

Resolve

If the complainant accepts the response, the agreed actions are then implemented. The Complaint Owner is responsible for assigning action parties, actions and timeframes to implement the resolution. The Complaint Owner informs the CLO once the resolution has been implemented.

Review

K Future will seek to reach a resolution with the complainant that is satisfactory to both sides. If K Future and the Complainant are unable to agree on a solution, the Complaint may be sent to receive for review and sent to the K Future Representative for review and final decision.

Closed-out

A Complaint is closed out when no further action can be or needs to be taken. The closure status of the complaint and any other final information is recorded in the Grievance Register.

MONITORING, REPORTING, AND IMPROVEMENT

The Grievance Mechanism is a living process, which should be reviewed, updated and improved as the project progresses. K Future will develop KPIs, gather data and report on performance, which will enable the organization to analyze trends in complaints received and identify any underlying systemic issues. A grievance report is completed once a month during the operations period and submitted to the K Future representative.

The following diagram shows steps of the Grievance Redress Mechanism of K Future Company Limited.

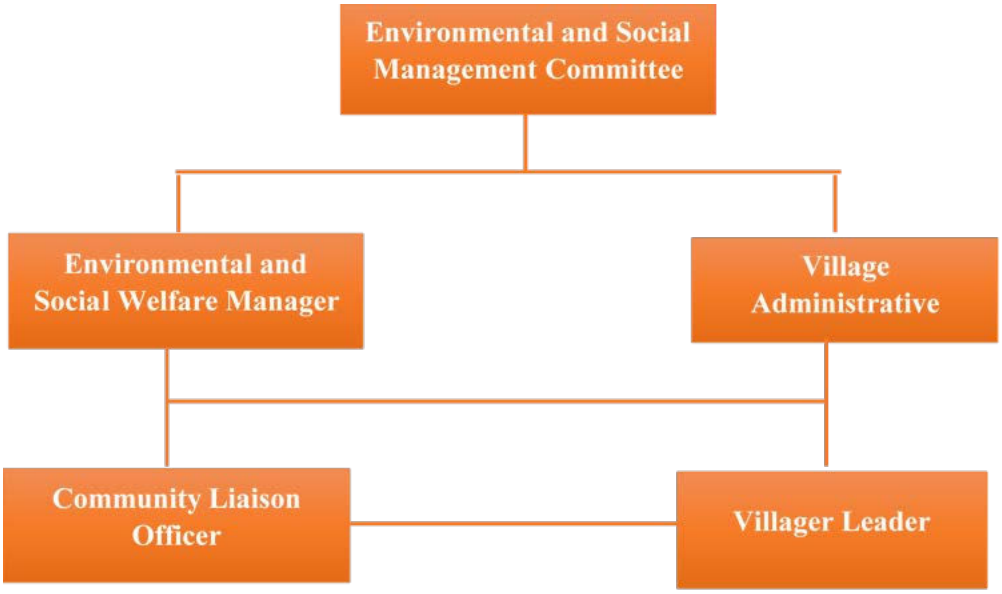


Figure: 6. 8- GRM Committee

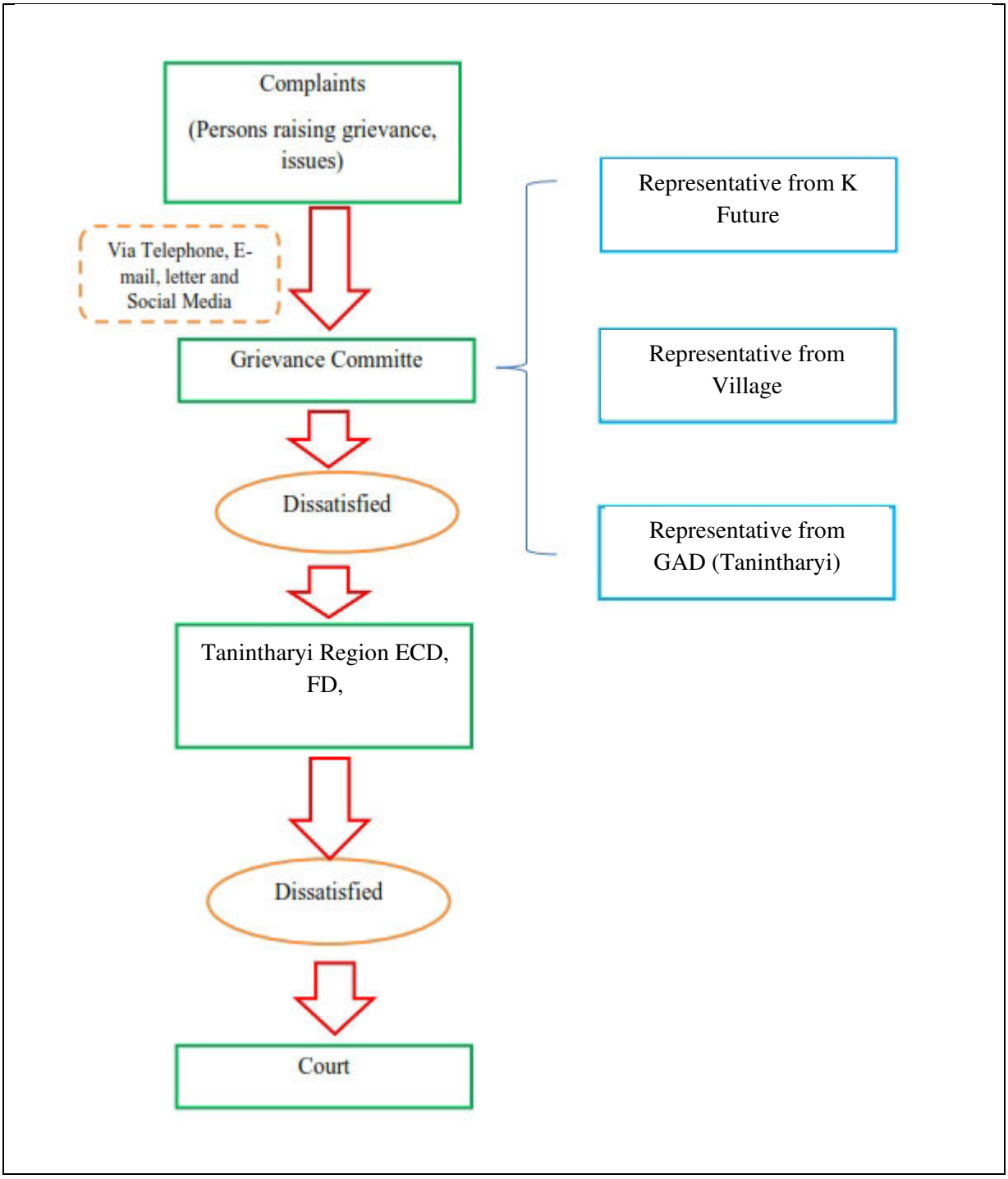


Figure: 6. 9- Grievance Redress Mechanism (GRM)

6.1.10. BIODIVERSITY MANAGEMENT PLAN

The study area, Bo-Net-Kyaw island is inhibited and biodiversity rich nature. The island has two habitat forest type. The first habitat is the permanent evergreen forest on the island, and the second habitat is the mangrove forest at the bottom of the island. The terrain on the island is a bit steep and very difficult to walk if the without road is paved. The condition of the forest is good for biodiversity and some very large trees can be seen in the forest.

A total of 151 plant species representing various families were listed in the project area. The tree layer in the study area is dominated by Syzygium grande (ight) Walp. with the highest IVI value, the second most dominant species is Pterospermum acerifolium Willd. and Macaranga gigantea is third. The plant species that listed and recorded in recently study were checked with IUCN red list of threaten species and two threaten endangered species were found in IUCN red list 2018. There are Dipterocarpus alatus Roxb. and Dipterocarpus dyeri Pierre endangered (EN) species and local name is Kanyin phyu and Kanyin.

A total of 154 fauna species were recorded during the study, among them 16 Butterfly species, 65 Birds species, 5 Mammals, 5 Reptilian and amphibian species and 63 Fish species were recorded. This area does not lie close to any Important Bird Area (IBA). The bird survey did not record any globally threatened birds. But the productive area closest is the Lampi marine National park which is over 200 native and migratory shore birds. Therefore, it could be concluded that the construction of this proposed project would cause a minimal impact on the avian fauna of this area. Project proponent might be implemented buffer zone for birds and other terrestrial species. Two endanger mammal species was recorded from the Andaman sea which is very adjacent with the proposed project site therefore project proponent might be considered jetty design, transportation and waste management and waste water treatment system for aquatic animals.

Sr.	Activity	Residual Impacts	Responsibility	Timing	Estimated Budget (USD)
1.	Awareness raising and comprehensive information of "DOs" and "DONTs" to all visitors and employees at their arrival to the resort. In case of discovery of new species, report to FD) not to discharge any kind of waste to inform any kind of irregularities (such as dead birds and animals) to responsible officer (forest department) not to hunt or catch any wildlife including their eggs and offspring not to bring or left-over any non-native species of plants and animals not to purchase any kind of wildlife and products related to wildlife not to disturb their daily habitat not to feed any exotic food not to take a picture with the flash mode on tend to quite as much as possible during hiking and trekking activities	Minor	Environment and social management committee	Distribution of "DOs" and "DONTs" pamphlets and thorough explanation to all new visitors and employees. Daily monitor and control. Renew yearly.	3,000

Sr.	Activity	Residual Impacts	Responsibility	Timing	Estimated Budget (USD)
	not to make the noise during the breeding season not to touch or disturb the nesting area not to step or break the coral reef during snorkeling and diving activities to be fully compliance with Protection of Wildlife and Conservation of Natural Areas Law (1994) and Rules (2002)				
2.	Cooperation with nearby communities and other tourism parties and raise the pros and cons awareness of eco-tourism Form a responsible eco-tourism society and conduct awareness raising campaigns, such as public education on threatened species and discussion on protection of alien invasive species Organize to observe common silent time (e.g., from 9 pm. to 8 am) among travel and tour interested parties Reduce the impact of hotel presence on nocturnal environments by avoiding lightning that extends off site or into the night sky	Minor	Environment and social management committee	Regular contacts and cooperation with nearby communities and local authorities. Renew yearly	5,000

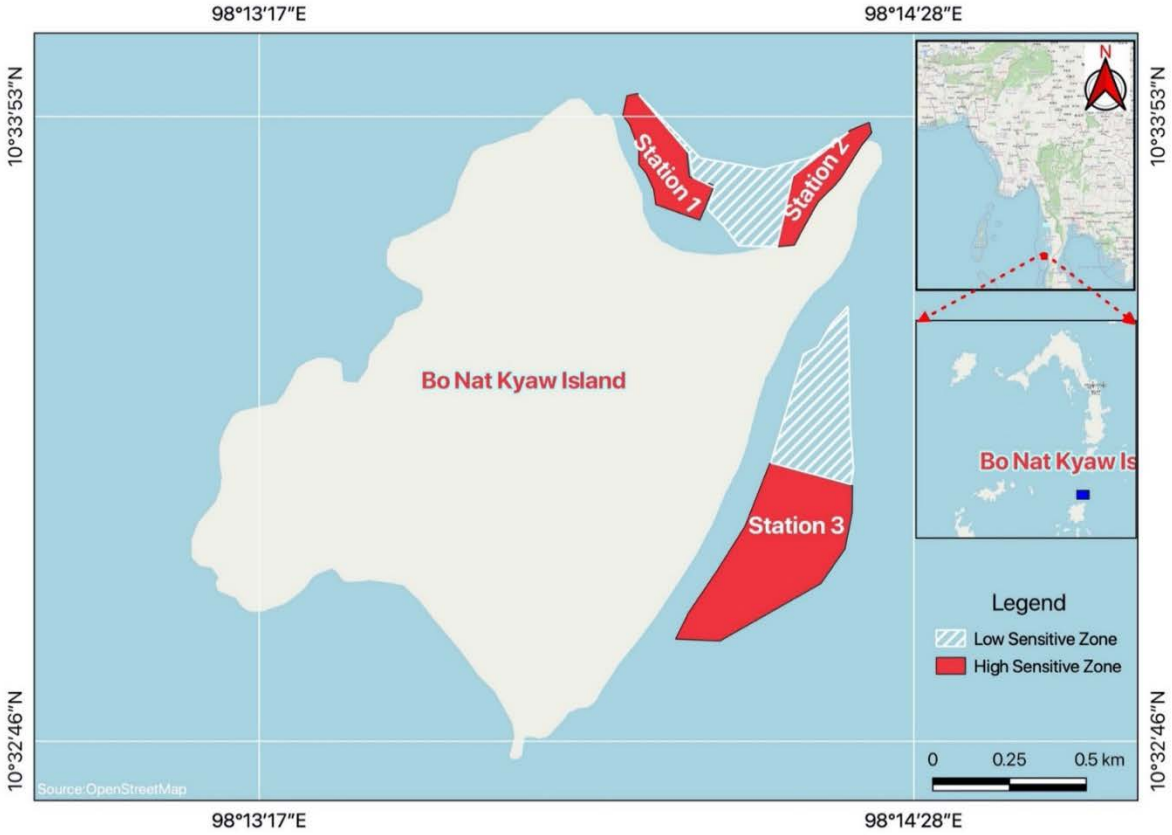
Sr.	Activity	Residual Impacts	Responsibility	Timing	Estimated Budget (USD)
	Promote appropriate guest and staff behaviors and also codes of conduct for sustainable practices in tourism related activities (e.g., walking trekking, and bird watching) with the assistance of staff encourage all hotels/resorts and local communities to protect, conserve and enhance native plants and animals Cooperate with University and publish scientific journal about the island's biodiversity. Promote clean up activities such as island's marine litter, ghost net surrounding the coral reef.				
	Total				8,000

Table: 6. 7- Biodiversity Management plan

6.1.11. CORAL CONSERVATION PLAN

Coral reefs deliver ecosystem services for tourism, shoreline protection and productive fisheries which provide an essential source of protein and feeding, breeding and nursery grounds for many marine organisms. Coral reefs are fragile, partly because they are sensitive to water conditions and their proximity to the coast exposes coral reefs not only to subsistence pressures but also to other human induced (anthropogenic) stresses such as pollution (industrial, chemical and sewage) and sedimentation (land clearing, reclamation, mining) (English et al., 1997). Most anthropogenic threats are pollution, sedimentation, overfishing, climate change and direct physical damage.

The recorded coral reef system of Bo Nat Kyaw island is fringing reefs. A total of 70 species of corals belongs to Cnidaria, Anthozoa and Scleractinia were recorded during the study of Bo Nat Kyaw island. Among them, the species composition was higher in Arcropora (17 species), follow by Dipsastrea and Favites (7 species) and Porites (6 species) respectively. Two zone such as High sensitive and low sensitive zone were divided according to their vulnerability, morphology and sensitivity. At the edges of Station 1 and 2 because this area has massive type (not easy to damage) coral reefs such as Porites species as well as in the northeastern part of island (north of Station 3).



While coral reefs cover less than 1 percent of the world's ocean floor, they provide essential habitat for onequarter of all known marine species. Nevertheless, coral reef health around the world has suffered a dramatic decline. This dramatic coral reef decline is the result of both global and local

factors. Impacts such as coral bleaching, caused by rising ocean temperatures driven by climate change. However, increasing the capacity of reefs to resist and recover from these bleaching events at the local level is possible through the reduction of local threats, such as overfishing, pollution, and habitat destruction.

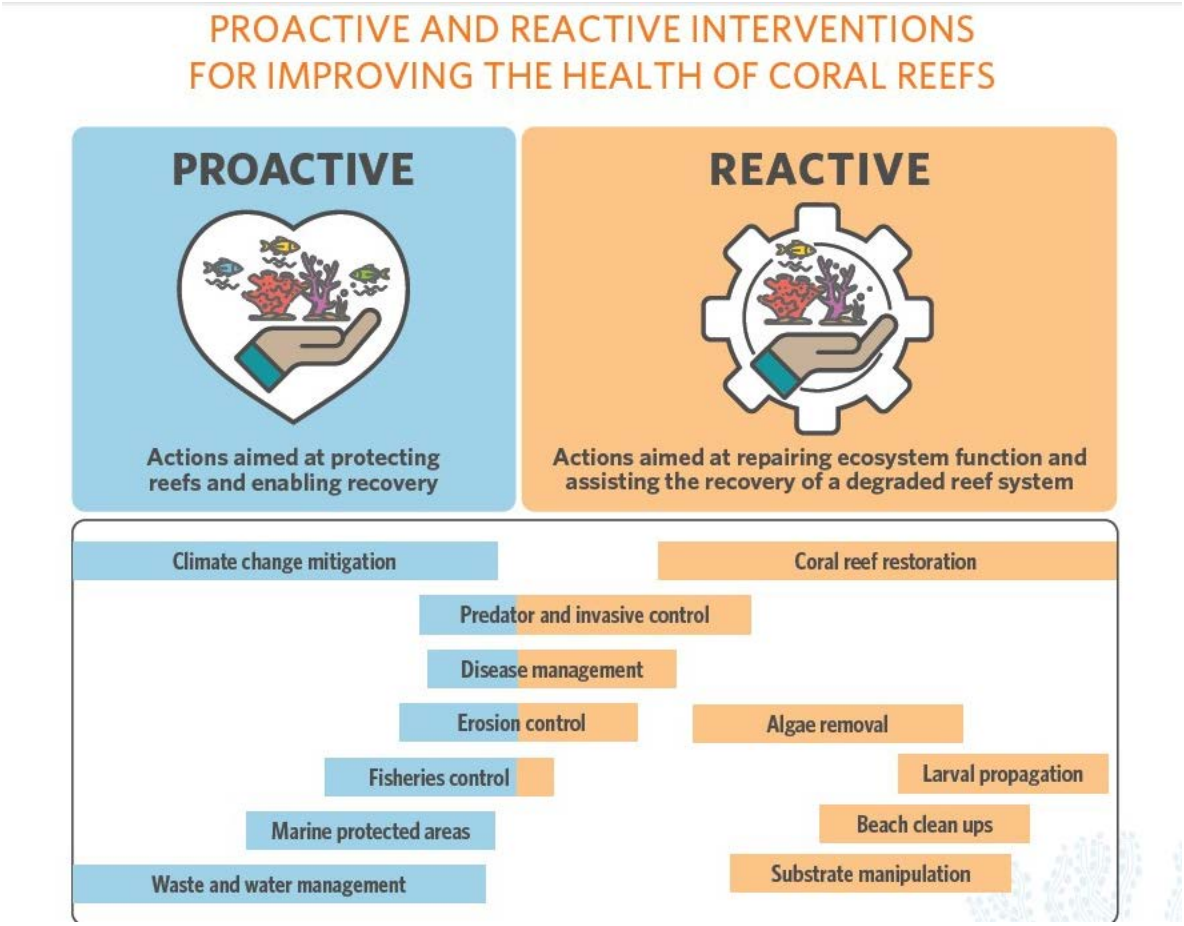


Figure: 6. 10- Continuum of actions for coral reef conservation and restoration with examples of proactive and reactive intervention types. Adapted from UNEP guidelines (Hein et al. 2020).

According to the published articles of FFI (Marine biodiversity of Myeik Archipelago, 2018) there are 288 species observed, in 68 genera and 17 families. Species accumulation curves predicted a total of 309 species would be obtained with the same method of sampling. The 2014 and 2016 surveys of coral disease prevalence in the Myeik Archipelago show levels of disease to be similar overall (at 4.9%) compared to the other locations in Asia-Pacific. For the high prevalence of disease are contributed by the village that are closet to the reef with non-existence of waste management system. Dynamite fishing, directly dumping plastic waste to the ocean and irresponsible tourism activities are fueled to the reef communities.

Therefore, the Environmental and Social Management Committee of K Future is encouraged to promote the coral reef conservation activites around Bo Nat Kyaw island.

- Implementation of Waste Management System
- Implementation of Wastewater Management System
- Building on the staff capacity on the technical aspects of coral reef conservation
- Promote the cleanup activities such as beach cleanup, ghost nest cleans up, collect the marine litter
- Continuously monitor the coral mass and species distribution
- Implement the research activities on island biodiversity and continuous learning
- Provision of educational and environmental sensitization material to coral reef and marine environment
- Installation of boat mooring buoys at the sites for use of dive boats and banning of anchoring directly over reef.
- Ban collection of coral reef souvenirs

CHAPTER 7: PUBLIC CONSULTATION

According to the EIA procedure (Article 40) public disclosure meeting has to be performed during the preparation of the EIA report. Information about the K Future should be disclosed to the public, so as to accept for the project. As the public disclosure meeting could not be able to held up to the moment, it will not be included in the EIA report.

DEFINE PROJECT STAKEHOLDERS

Public Consultation meeting was held at Kawthaung Township, Thanintharyi Division with various stakeholders including government organizations, administrative and local people. Considering the project scope, the legal and institutional framework for environmental and social impact management applicable to the project, the following project stakeholders were invited:

- Government sector concerned with the regional and township levels.
- Local communities, potentially Affected Person (PAPs) in the project area, and other interested people related with this project.
- Objectives of Public Stakeholders Meeting

The key objectives of the SHM are as follows:

- To disclose and inform well about the project information, potential positive and negative impacts due to project activities to the stakeholder in the earliest stage of the implementation of the project
- To ensure that consultation meetings are undertaken in a meaningful, effective way by actively participation of PAPs, stakeholders and local communities.
- To ensure that the concerns of, and issues raised by the PAPs, stakeholders and local communities are incorporated and adequately addressed in the further ESIA study.

CHAPTER 8: CONCLUSION

This Environmental Impact Assessment (EIA) Report and Environmental Management Plan (EMP) was prepared by GOG for Hotel and Resort Development Project of K Future Company Limited. The main objective of the study is to identify the major environmental impacts due to the implementation of the project activities in three phases (construction phase, operation phase, and decommissioning phase). Environmental Management Plan (EMP) has been conducted for the proposed project under the Environmental Impact Assessment Procedure as per the comments of the Environmental Conservation Department (ECD). The project proponent has to implement the proposed project in compliance with the National laws and regulations for environmental protection.

Based on the construction activities and services procedure a total of 9 impacts are identified during construction period and 6 impacts are identified during operation period for the physical environment. Among them 7 impacts are identified as low and 2 impacts are identified as medium in construction period and 3 impacts are identified as low and 3 impacts are identified as medium impact for operation period. The employment opportunities, less illegal trading and economic improvement are identified as positive impacts.

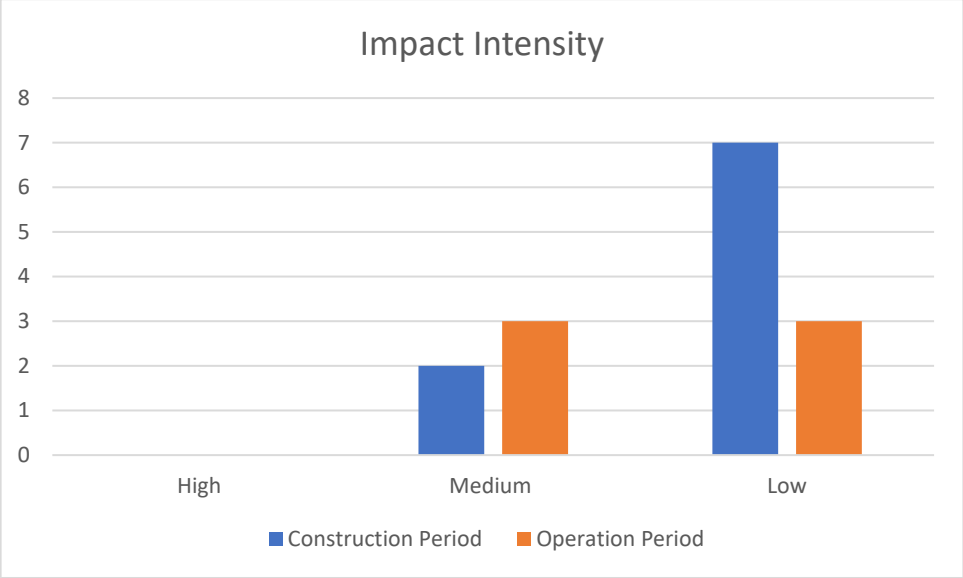


Figure: 8. 1- Summary of impacts for physical environment

For the biological environment, 8 moderate impacts and 2 minor impacts are identified during construction period such as change access rights and usage, noise, light and air pollution, site clearance etc. There are a total of 12 impacts are identified during operation period for biological environment. Among them 9 are identified as moderate and 3 are identified as minor. Such as resource consumption, change access rights and usage, solid waste disposal, wastewater disposal, misuse of marine resources etc.

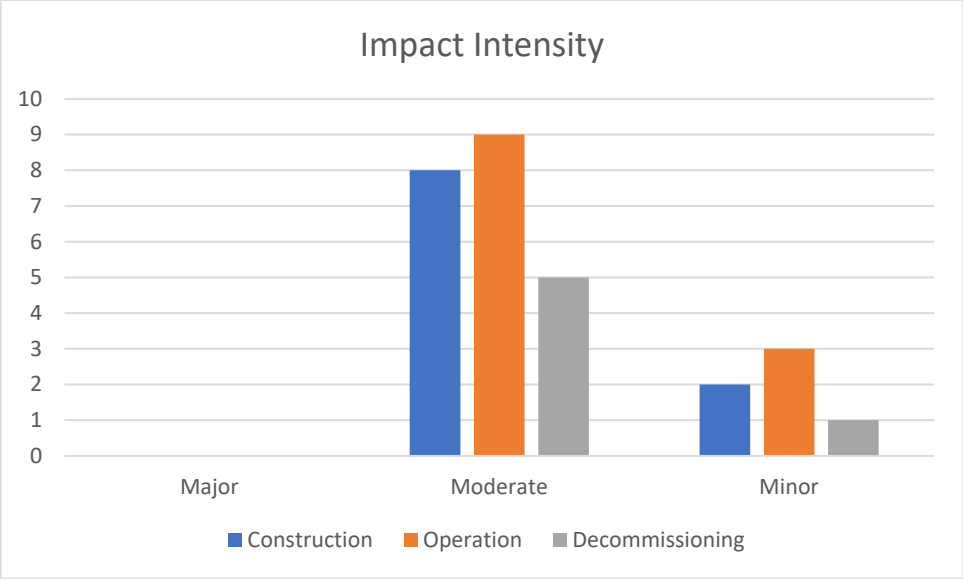


Figure: 8. 2- Summary of impact for biological environment

All the potential negative impacts need to mitigate and reduce by following the Mitigation Measures, Environmental Management plan and Environmental Monitoring plan. All the potential positive impacts need to enhance and maintain by following the Environmental Management plan and Environmental Monitoring plan.

According to the data interpretation for ambient air quality, noise level, and water quality results were compared with National and Environmental Quality (Emission) guidelines and international guidelines and standards. Moreover, most of the tube well water lab results parameters are within WHO Drinking Water Guideline. Surface runoff water lab results are within the limit of NEQG guidelines. Therefore, a significant impact on the environment and socio-economic are expected to be quite low.

This project can create job opportunities for local people in all three phases. The positive impacts during operational period are employment opportunity for 47 locals which is long term in nature. There will be less illegal trading due to the activities on the island and procurement opportunities for local communities.

Development activities such as K Future may impact upon environmental values as result of overlap locations, scheduling overlap or utilization of the same infrastructure, services and resources. The majority of the cumulative impacts associated with the proposed project and other/proposed projects in or other commercial activities near vicinity of the project. Impacts related to water quality, waste accumulation, tourism activities, and fishery are assessed in the vicinity of the project site. According to the interview with local people from Nyaung wee Village, there was no commercial fishing activites and other business activites were done at the island. Therefore, the distress on local business can be omitted.

Although there were no development activities within two miles of the proposed project area, according to the published article from FFI the proposed project itself as recognized as tourism attraction and around 4 miles from the project one of the renowned tourist attraction village, Nyaung Wee Village is located. The influx of tourisms from outside visitors can be pressured toward the management system of project.

Waste accumulation of marine litter is one of the significance impact in cumulative impacts for this proposed development than the other impacts such as water quality deterioration, tourism activities and fishery. To manage the waste accumulation of these marine litter is one of the biggest challenge for island resort. There is no concrete plan to avoid this impact other than that project proponent should have considered the cleanup activities for marine litters once a year.

A total of 151flora species and 154 fauna species and a total of 70 species of corals belongs to Cnidaria, Anthozoa and Scleractinia were recorded during the study of Bo Nat Kyaw island. There are Dipterocarpus alatus Roxb. and Dipterocarpus dyeri Pierre endangered (EN) species and local name is Kanyin phyu and Kanyin. This area does not lie close to any Important Bird Area (IBA). The bird survey did not record any globally threatened birds. But the productive area closest is the Lampi marine National park which is over 200 native and migratory shore birds. Therefore, it could be concluded that the construction of this proposed project would cause a minimal impact on the avian fauna of this area. Project proponent should be implemented buffer zone for birds and other terrestrial species. Two endanger mammal species was recorded from the Andaman sea which is very adjacent with the proposed project site therefore project proponent should be considered jetty design, transportation and waste management and waste water treatment system for aquatic animals.

To be concluded, Bo Nat Kyaw Island is a biodiversity-rich environment, particularly known for its abundant forests and coral communities. The island's diverse ecosystem can serve as an attraction for tourists and be utilized for ecotourism purposes. The coral stations, specifically Station 1 and 3, offer excellent snorkeling opportunities, while Station 2 is suitable for SCUBA diving. However, it is crucial to implement a comprehensive management system to prevent pollution resulting from irresponsible tourist activities. Therefore, the Environmental and Social Management Committee of K Future must adhere to all existing rules and regulations and diligently follow the environmental management plan and its associated sub-plans.

CHAPTER 9: RECOMMENDATION

The following recommendations have been made for efficient and effective implementation of environmental conservation, health and safety, and social responsibilities through the lifespan of the proposed project.

- ✓ Comments and suggestions made by ECD after reviewing this EIA report will be followed.
- ✓ Once EMP is approved by concerned authorities, strict implementation is essential.
- ✓ For full and proper implementation of EMP, well understanding and supports by proponent and authority is deemed a necessity.
- ✓ Well experienced and knowledgeable HSE Manager and HSE Assistants will be appointed.
- ✓ Daily, monthly, and annual action plan will be formulated based on this EMP and practiced at the operation level.
- ✓ Full records of environmental management activities will be kept and present to annual independent third-party environmental audit.
- ✓ The audit report and comments will be followed.
- ✓ K Future will abide by environmental policy, laws, rules, and instructions of the Republic of the Union of Myanmar.
- ✓ K Future will implement the Grievance Redress Mechanism (GRM) to solve the complaints and Corporate Social Responsibility (CSR) plan.
- ✓ Implement EMP and EMOP for balancing development and environmental conservation.
- ✓ Three high sensitive zone of coral should be avoid anchoring, shipment activities.

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

K-FUTURE

Appendix 1. 1- Commitments Letter (Project Proponent)

K Future Company Limited

No.106, Pansodan Road, Kyauktada Township, Yangon, Myanmar.
Tel: +951-8373566, +959-420031990
E-mail - *admin@aquamarinemyanmar.com*

K. Future Co., Ltd. No..... Date..... Yangon, Myanmar

To follow commitments and Mitigation Measures stated in the Environmental Management Plan of Environmental Impact Assessment Report

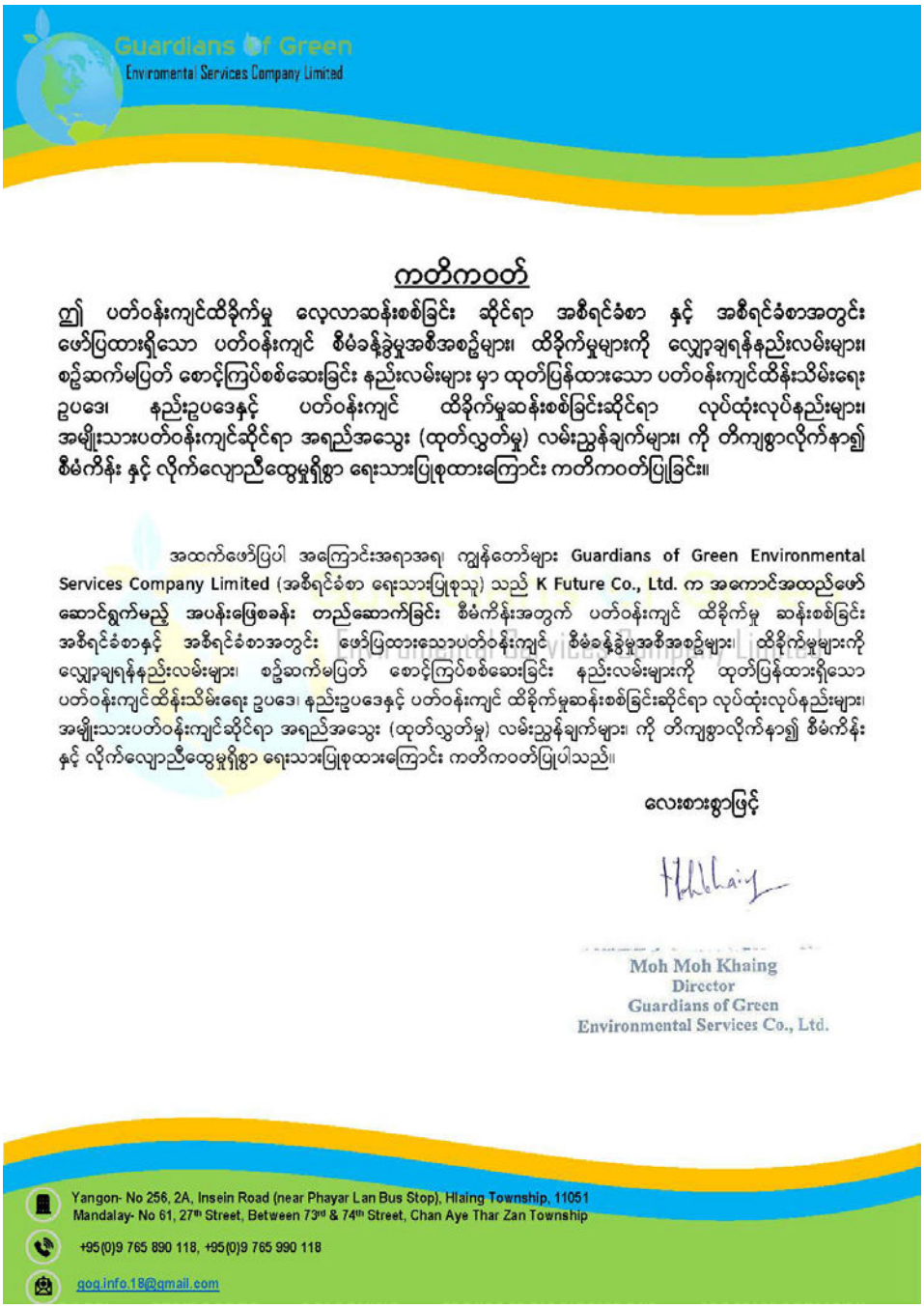
We, K Future Company Limited guarantee that the Environmental Impact Assessment Report for our Hotel and Resort Development Project is robust and comprehensive. The report has been prepared in strict adherence to EIA procedures. We are committed to executing the prescribed mitigation measures as outlined in the Environmental Management Plan, Environmental Monitoring Plan, CSR Plan, and Grievance Redress Mechanism, all of which are detailed in the Environmental Impact Assessment Report.

Furthermore, should there be any recommended methods or techniques that enhance the approved Environmental Management Plan during the operational phase, we will promptly incorporate these improvements into our system and align with the necessary business requirements. Additionally, we have devised plans to prevent environmental and social impacts during the project closure stage.

Signature

Aung Thu Lwin
Managing Director
K Future Co.,Ltd.

Appendix 1. 2- Commitment Letter (Third Party)



Guardians of Green
Environmental Services Company Limited

ကတိကဝတ်

ဤ ပတ်ဝန်းကျင်ထိခိုက်မှု လေ့လာဆန်းစစ်ခြင်း ဆိုင်ရာ အစီရင်ခံစာ နှင့် အစီရင်ခံစာအတွင်း ဖော်ပြထားရှိသော ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်များ၊ ထိခိုက်မှုများကို လျှော့ချရန်နည်းလမ်းများ၊ စဉ်ဆက်မပြတ် စောင့်ကြပ်စစ်ဆေးခြင်း နည်းလမ်းများ မှာ ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ၊ နည်းဥပဒေနှင့် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ၊ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ၊ ကို တိကျစွာလိုက်နာ၍ စီမံကိန်း နှင့် လိုက်လျောညီထွေမှုရှိစွာ ရေးသားပြုစုထားကြောင်း ကတိကဝတ်ပြုခြင်း။

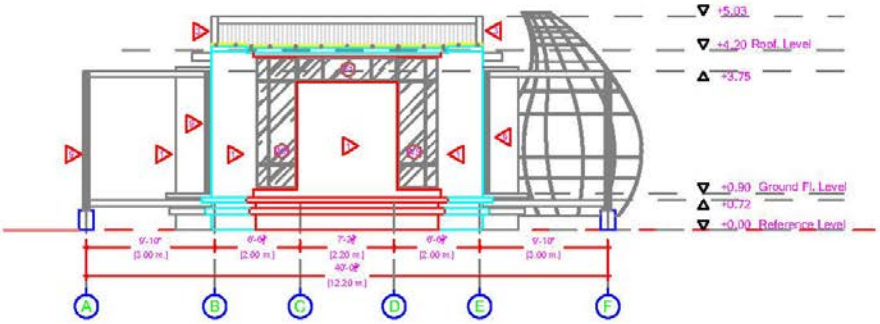
အထက်ဖော်ပြပါ အကြောင်းအရာအရ၊ ကျွန်တော်များ Guardians of Green Environmental Services Company Limited (အစီရင်ခံစာ ရေးသားပြုစုသူ) သည် K Future Co., Ltd. က အကောင်အထည်ဖော်ဆောင်ရွက်မည့် အပန်းဖြေစခန်း တည်ဆောက်ခြင်း စီမံကိန်းအတွက် ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာနှင့် အစီရင်ခံစာအတွင်း ဖော်ပြထားသော ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်များ၊ ထိခိုက်မှုများကို လျှော့ချရန်နည်းလမ်းများ၊ စဉ်ဆက်မပြတ် စောင့်ကြပ်စစ်ဆေးခြင်း နည်းလမ်းများကို ထုတ်ပြန်ထားရှိသော ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ၊ နည်းဥပဒေနှင့် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ၊ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ၊ ကို တိကျစွာလိုက်နာ၍ စီမံကိန်း နှင့် လိုက်လျောညီထွေမှုရှိစွာ ရေးသားပြုစုထားကြောင်း ကတိကဝတ်ပြုပါသည်။

လေးစားစွာဖြင့်

Moh Moh Khaing
Director
Guardians of Green
Environmental Services Co., Ltd.

Yangon- No 256, 2A, Insein Road (near Phayar Lan Bus Stop), Hlaing Township, 11051
Mandalay- No 61, 27th Street, Between 73rd & 74th Street, Chan Aye Thar Zan Township
+95(0)9 765 890 118, +95(0)9 765 990 118
gog.info.18@gmail.com

Appendix 1. 3- LAYOUT PLANS OF K FUTURE HOTEL AND RESORT DEVELOPMENT BANGLOWS



ELEVATION - 3
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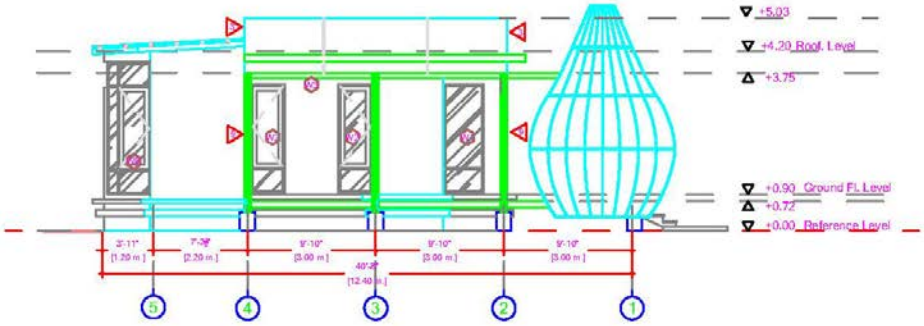

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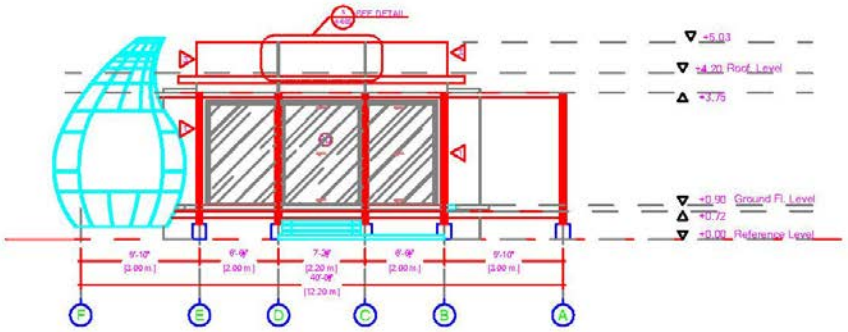
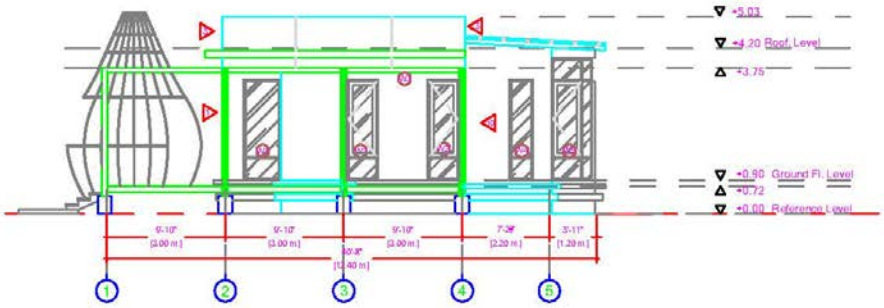


ELEVATION - 1
SCALE 1 : 10 @ A3



ELEVATION - 2
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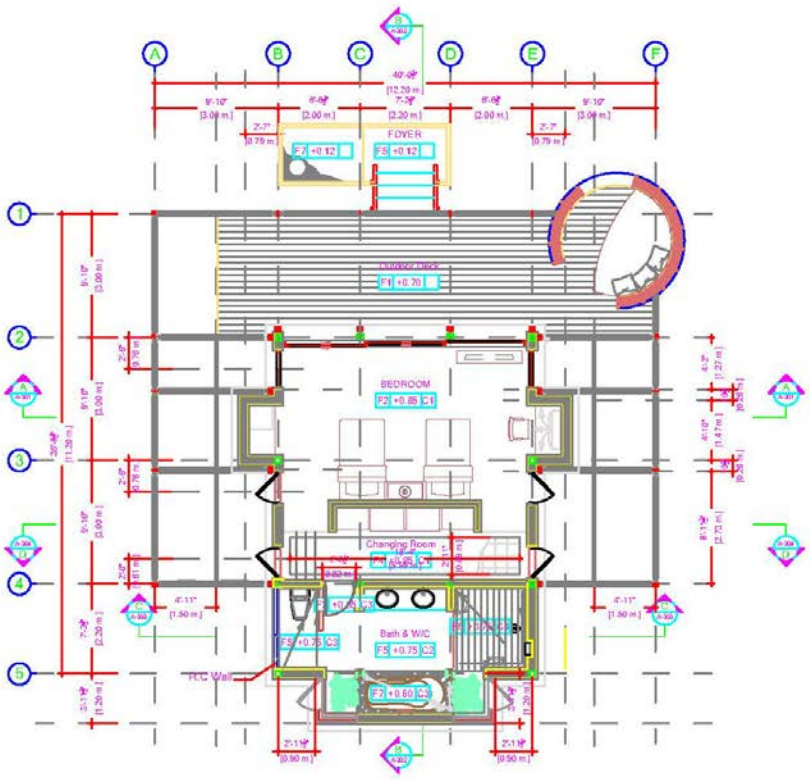
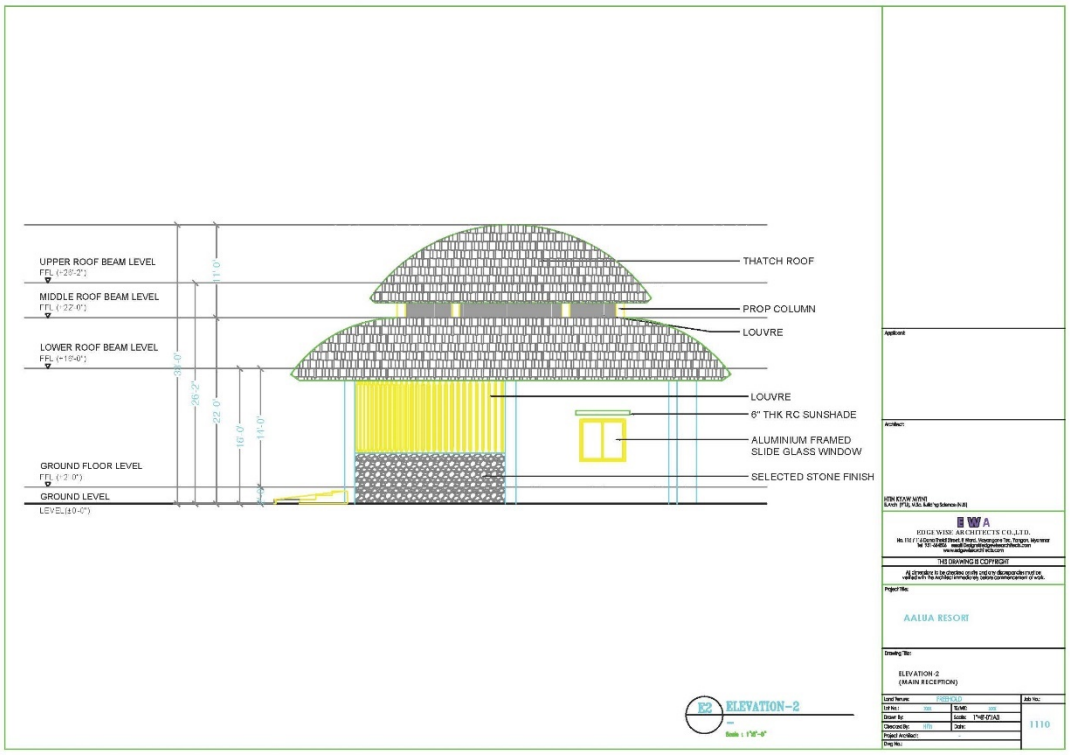
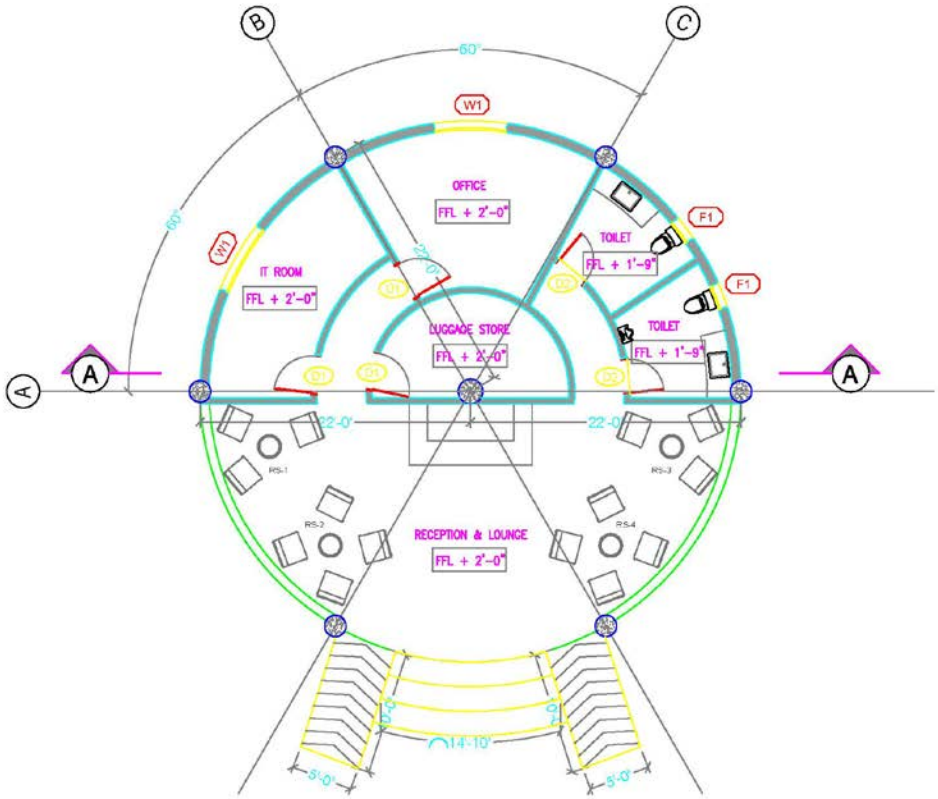


GROUND FLOOR PLAN
SCALE 1 : 10 @ A3

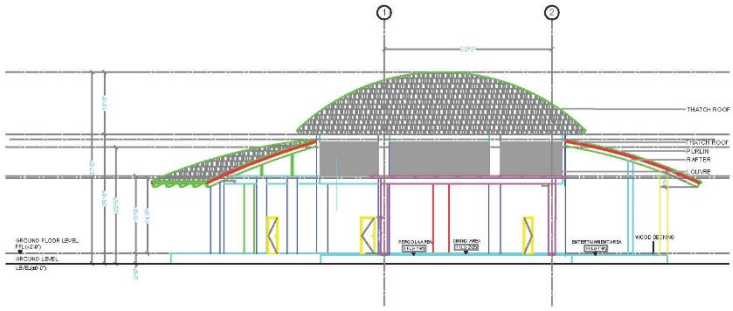
K-FUTURE

MAIN RECEPTION



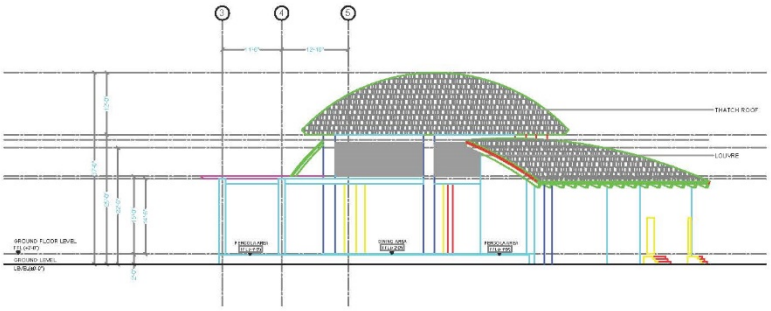


MULTIPURPOSE



E1 ELEVATION–1

Scale : 1"=1'-0"



E2 ELEVATION–2

Scale : 1"=1'-0"

Applicant:

Architect:

HTIN KYAW MYINT

EDGEWISE ARCHITECTS CO.,LTD.

THIS DRAWING IS COPYRIGHT

All dimensions to be checked on site and any discrepancies must be verified with the Architect immediately before commencement of work.

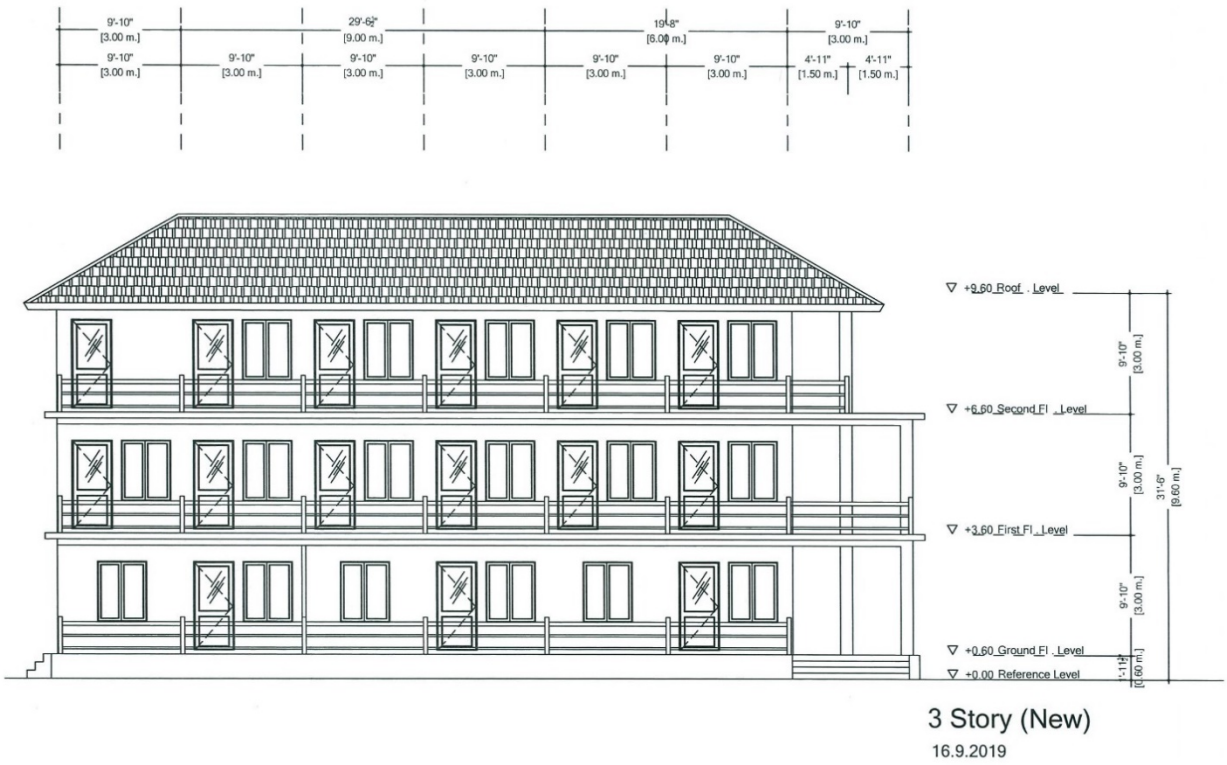
Project Title:

AALUA RESORT

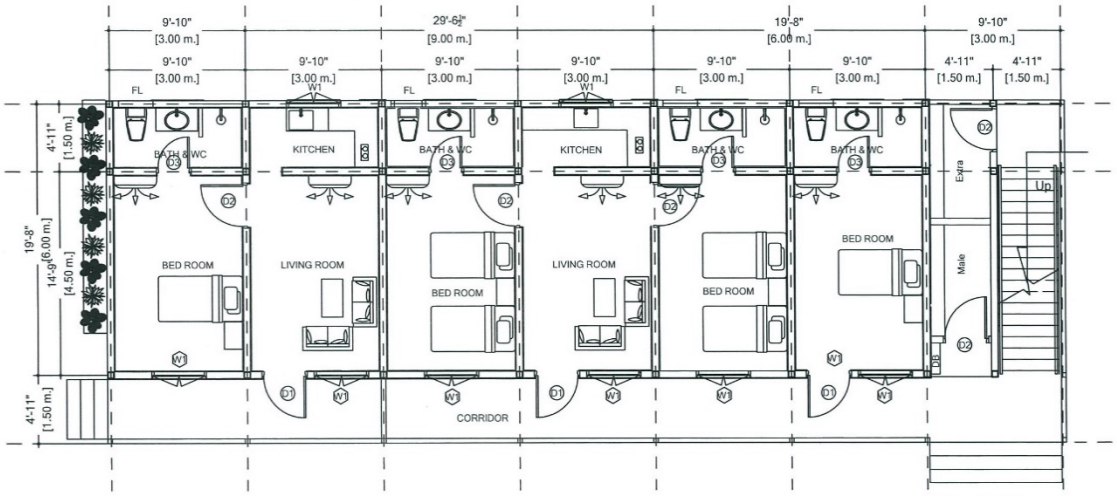
Drawing Title:

ELEVATION-1 & 2
(MULTI PURPOSE BUILDING)

Land Tenure:	FREEHOLD		Job No.:
Lot No.:	MM	TUNE:	MM
Drawn By:		Scale:	1"=1'-0"/A3
Checked By:	HH	Date:	10.7.2019
Project Architect:			1110
Dwg No.:			


9'-10" [3.00 m.]
29'-6" [9.00 m.]
19'-8" [6.00 m.]
9'-10" [3.00 m.]
9'-10" [3.00 m.]
9'-10" [3.00 m.]
9'-10" [3.00 m.]
9'-10" [3.00 m.]
9'-10" [3.00 m.]
9'-10" [3.00 m.]
4'-11" [1.50 m.]
4'-11" [1.50 m.]
+9.60 Roof . Level
+6.60 Second Fl . Level
+3.60 First Fl . Level
+0.60 Ground Fl . Level
+0.00 Reference Level
9'-10" [3.00 m.]
9'-10" [3.00 m.]
9'-10" [3.00 m.]
1'-11" [0.60 m.]
31'-6" [9.60 m.]
3 Story (New)
16.9.2019

THREE STORY

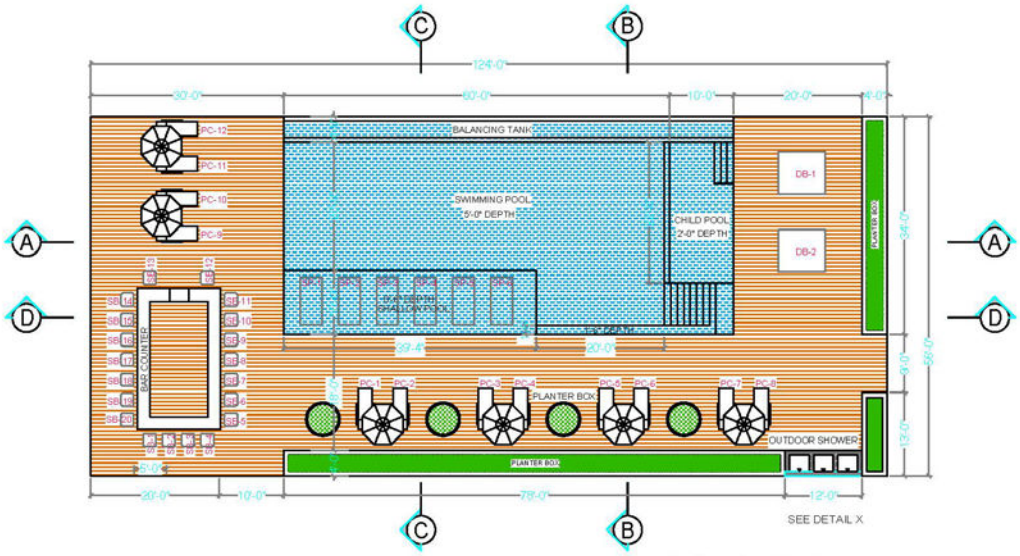


3 Story (New)

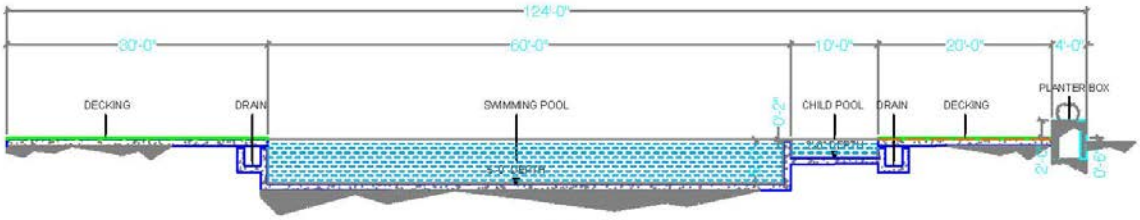
Ground Floor

16.9.2019

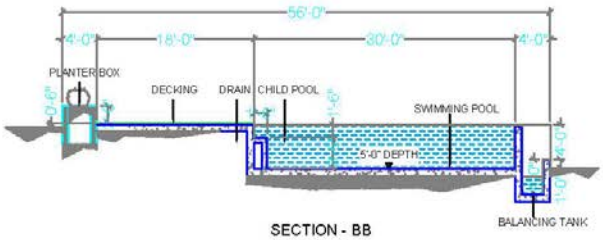
SWIMMING POOL



Swimming Pool

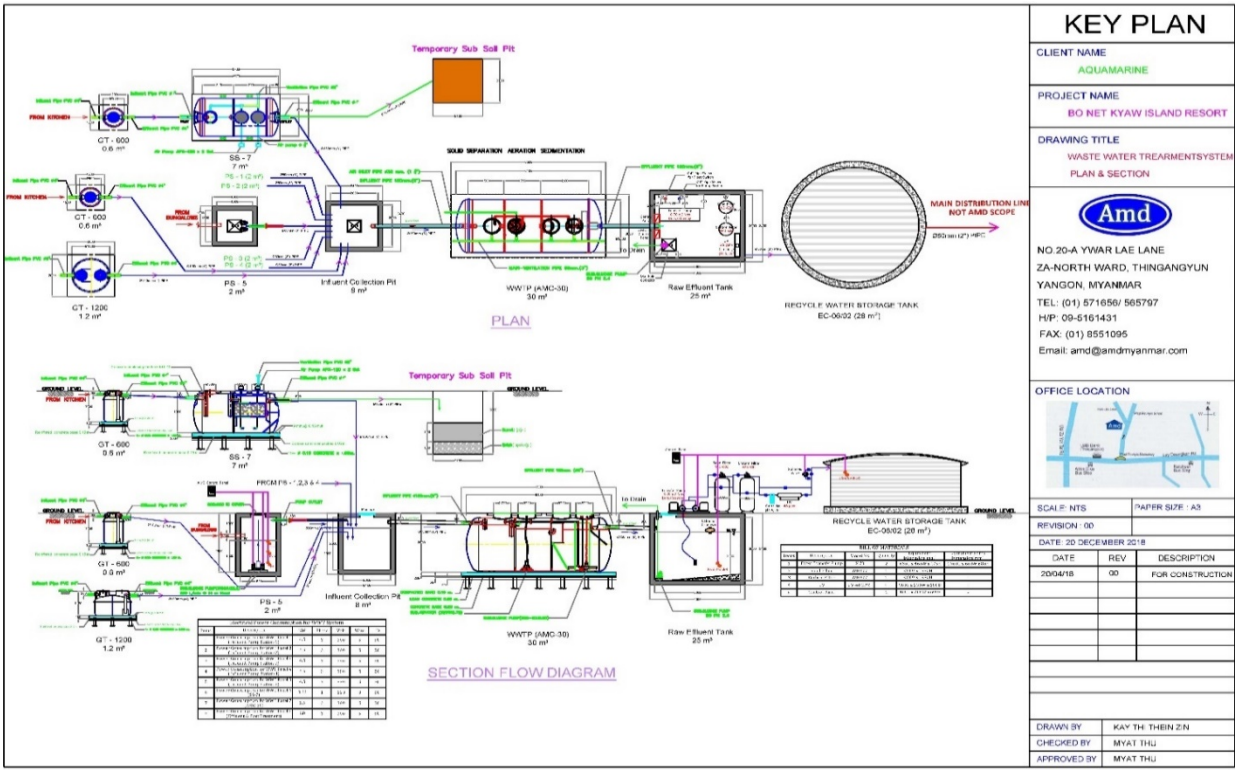


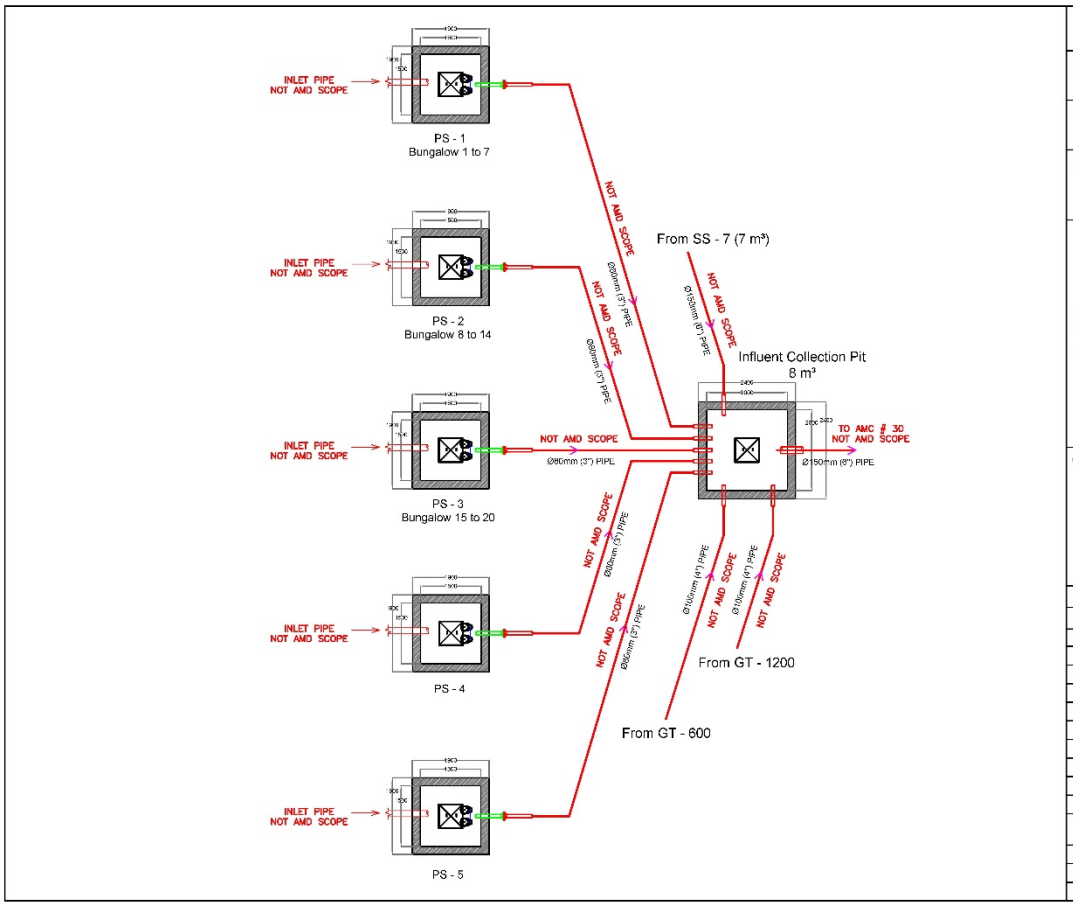
SECTION - AA
(DETAIL AS PER SWIMMING POOL SPECILIST)



SECTION - BB
(DETAIL AS PER SWIMMING POOL SPECILIST)

Appendix 1. 4- WASTEWATER TREATMENT SYSTEM





KEY PLAN

CLIENT NAME
AQUAMARINE

PROJECT NAME
BO NET KYAW ISLAND RESORT

DRAWING TITLE
PUMP STATION & INFLUENT PIT
TRANSFER PIPE LINE PLAN

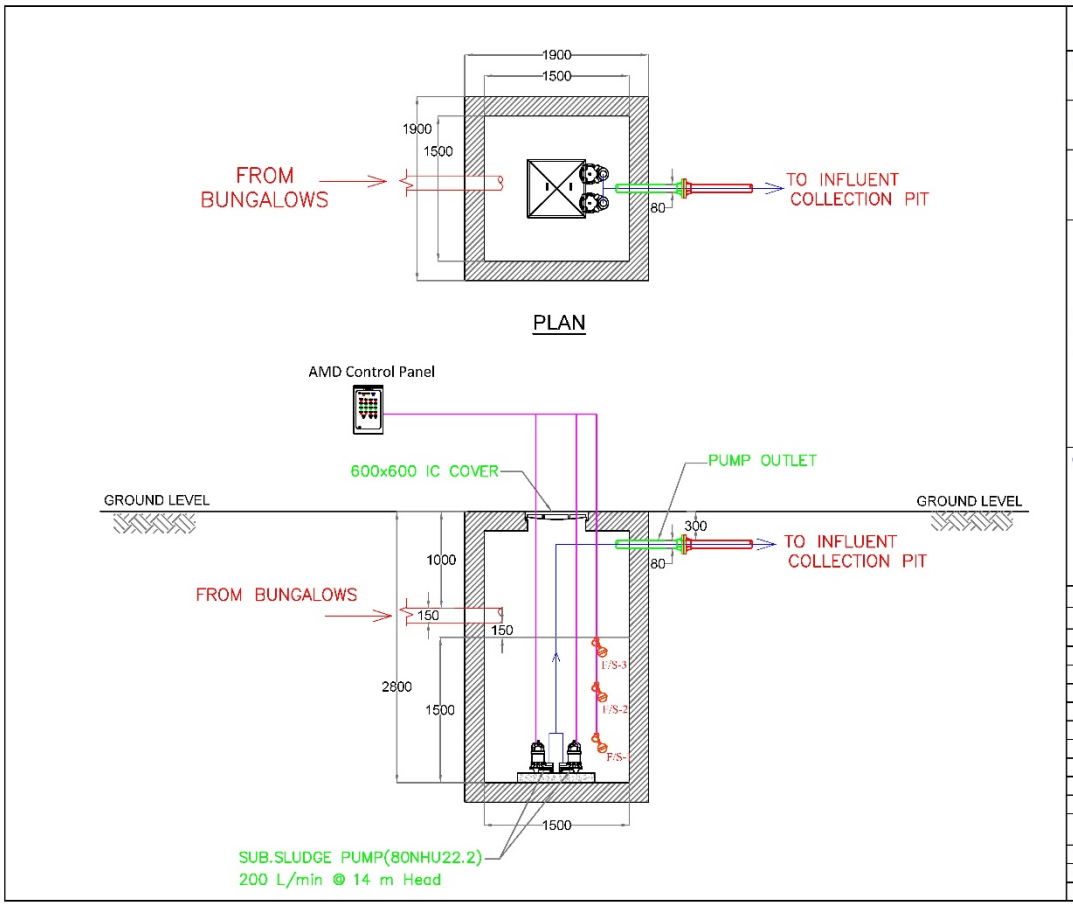
Amd
NO.20-A YWAR LAE LANE
ZA-NORTH WARD, THINGANGYUN
YANGON, MYANMAR
TEL: (01) 571656/ 565797
H/P: 09-5161431
FAX: (01) 8551095
Email: amd@amdmyanmar.com

OFFICE LOCATION

SCALE: NTS	PAPER SIZE : A3
REVISION : 00	
DATE: 27 FEBRUARY 2019	

DATE	REV	DESCRIPTION
27/02/19	00	FOR CONSTRUCTION

DRAWN BY	KAY THI THEIN ZIN
CHECKED BY	AUNG HTUN LIN
APPROVED BY	MYAT THU



KEY PLAN

CLIENT NAME
AQUAMARINE

PROJECT NAME
BO NET KYAW ISLAND RESORT

DRAWING TITLE
PUMP STATION - 1 TO 5
PLAN & SECTION

Amd
NO.20-A YWAR LAE LANE
ZA-NORTH WARD, THINGANGYUN
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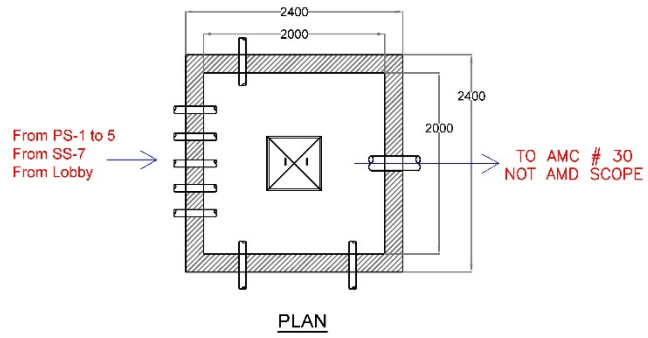
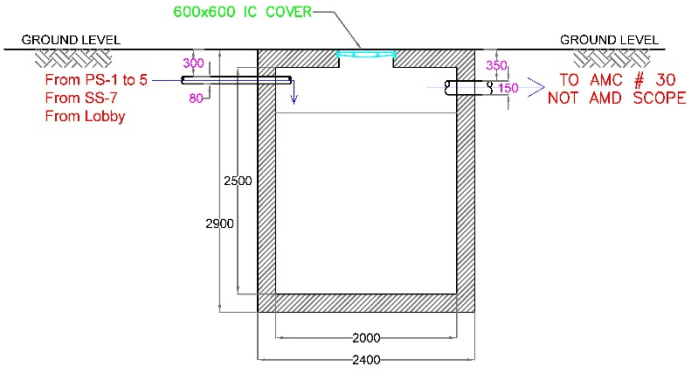
CHECKED BY	AUNG HTUN LIN
APPROVED BY	MYAT THU



PLAN



SECTION

KEY PLAN

CLIENT NAME
AQUAMARINE

PROJECT NAME
BO NET KYAW ISLAND RESORT

DRAWING TITLE
INFLUENT COLLECTION PIT (8m3)
PLAN & SECTION

NO.20-A YWAR LAE LANE
ZA-NORTH WARD, THINGANGYUN
YANGON, MYANMAR
TEL: (01) 571656/ 565797
H/P: 09-5161431
FAX: (01) 8551095
Email: amd@amdmyanmar.com

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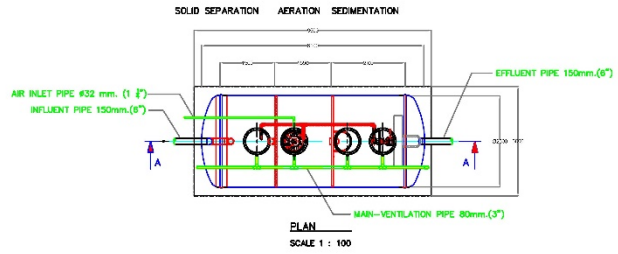
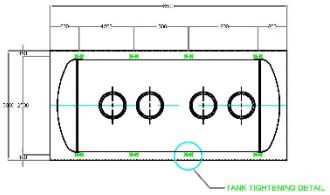
REVISION : 00	
DATE: 27 FEBRUARY 2019	

DATE	REV	DESCRIPTION
27/02/19	00	FOR CONSTRUCTION

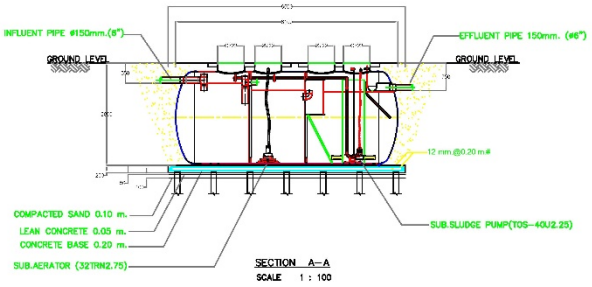
DRAWN BY	KAY THI THEIN ZIN
CHECKED BY	AUNG HTUN LIN
APPROVED BY	MYAT THU



PLAN
SCALE 1 : 100



PLAN
SCALE 1 : 100
SHOW LAY-OUT OF STEEL ANCHOR STRIP



SECTION A-A
SCALE 1 : 100

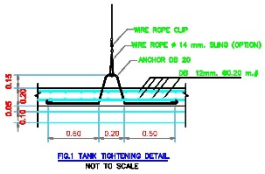
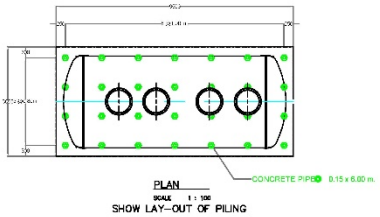


FIG.1 TANK TIGHTENING DETAIL
NOT TO SCALE

REMARK

- PILING AND FOUNDATION DESIGN,SHALL BE DETERMINED OR OMITTED BASED ON ACTUAL SOIL BEARING CAPACITY BY CONSULTING WITH CIVIL ENGINEER.
- SLING OPTION : THIS ITEM IS NOT SUBJECT TO DESIGN STANDARD AND SUPPLY



PLAN
SCALE 1 : 100
SHOW LAY-OUT OF PILING

SPECIFICATION (AMC-30)

NO.		ITEM	CAPACITY OF WATER (CU.M.)	BODY MATERIAL
1.		TANK	---	FIBERGLASS , THICKNESS 8 MM.
	1.1	SEPARATION	6.45	
	1.2	AERATION TANK	6.82	
	1.3	SEDIMENTATION TANK	7.65	
	1.4	TOTAL	22.98	
2.		EQUIPMENT	CONTENT	
	2.1	SUBMERSIBLE AERATOR	32 A, 0.80 KG.O2/HR. (AT 3500 MMAQ.)	
		(AERATION TANK)	0.75 KW., 380 /3/ 50 ,3000 RPM. (1 SET)	
	2.2	SEWAGE SUBMERSIBLE PUMP	40 A, 0.14 CU.M./MIN (TOTAL HEAD 4.0 M.)	
		(SEDIMENTATION TANK)	0.25 KW. 380 /3/ 50 , 3000 RPM. (1 SET)	

KEY PLAN

CLIENT NAME
AQUAMARINE

PROJECT NAME
BO NET KYAW ISLAND RESORT

DRAWING TITLE
AMC - 30
PLAN & SECTION

Amd
NO.20-A YWAR LAE LANE
ZA-NORTH WARD. THINGANGYUN
YANGON, MYANMAR
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H/P: 09-5161431
FAX: (01) 8551095
Email: amd@amdmyanmar.com

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20/12/18	00	FOR CONSTRUCTION

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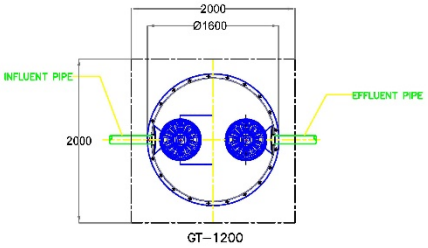
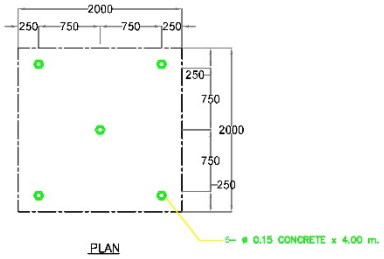
CHECKED BY	MYAT THU
APPROVED BY	MYAT THU

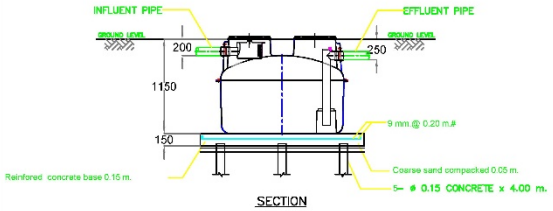


GT–1200

PLAN



PLAN



SECTION

DIMENSION

MODEL	ø	H	INFLUENT	EFFLUENT	IN–OUT PIPE
GT–1200	1.60	1.15	0.20	0.25	4"

KEY PLAN

CLIENT NAME
AQUAMARINE

PROJECT NAME
BO NET KYAW ISLAND RESORT

DRAWING TITLE
GT - 1200
PLAN & SECTION

NO.20-A YWAR LAE LANE
ZA-NORTH WARD, THINGANGYUN
YANGON, MYANMAR
TEL: (01) 571656/ 565797
H/P: 09-5161431
FAX: (01) 8551095
Email: amd@amdmyanmar.com

OFFICE LOCATION

SCALE: NTS	PAPER SIZE : A3
REVISION : 00	
DATE: 20 DECEMBER 2018	

DATE	REV	DESCRIPTION
20/12/18	00	FOR CONSTRUCTION

DRAWN BY	KAY THI THEIN ZIN
CHECKED BY	MYAT THU
APPROVED BY	MYAT THU

Appendix 1. 5- WATER QUALITY (MARINE), LAB ANALYSIS

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

ISO 9001:2015 Cert. No. 688600

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0820 783

WATER QUALITY TEST RESULTS FORM

Client: K Future
Nature of Water: Ground Water
Location:
Date and Time of collection: 25.8.2020
Date and Time of arrival at Laboratory: 26.8.2020
Date and Time of commencing examination: 27.8.2020
Date and Time of completing: 29.8.2020

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	6.7		6.5 - 8.5
Colour (True)	Nil	TCU	15 TCU
Turbidity	5	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	34	mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron	0.26	mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	500 mg/l
Total Solids	122	mg/l	1500 mg/l
Total Suspended Solids	15	mg/l	
Total Dissolved Solids	107	mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature: Zaw Hein Oo
Name: B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by
Signature: Soe Thit
Name: B.E (Civil) 1980
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)
No.18. Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

K-FUTURE

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E(Delft) Lecturer of YIT (Retd). Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

ISO 9001:2015 Cert. No. 688600

W0820 783

WATER QUALITY TEST RESULTS FORM

Client: K Future
Nature of Water: Ground Water
Location:
Date and Time of collection: 25.8.2020
Date and Time of arrival at Laboratory: 26.8.2020
Date and Time of commencing examination: 27.8.2020
Date and Time of completing: 29.8.2020

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)	Nil	mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia Nitrogen (NH_3)		mg/l	
Ammonium Nitrogen (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)		mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)		mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Calcium (Ca)	20	mg/l	
Magnesium (Mg)	16	mg/l	
Silica (Si)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980
Technical Officer
ISO TECH Laboratory

K-FUTURE

SGS

ORIGINAL

Job Ref : 2000249/2020
Date : 24 JULY 2020,

REPORT OF ANALYSIS

Customer Name : **GOG Environmental Services**
N 16˚ 46' 37" , E 94˚ 45' 14"

The following sample was submitted and identified by client and analyzed at our lab with the following results.

Sample Description : **Surface Water**
SW (sampling date & time: 20-Jul-2020, N/A)
Sample Condition : Ambient
Lab Code : W-3

Date Received : 21-Jul-.2020 Testing Period: 21-Jul-.2020 - 23-Jul-2020

Test Items	Method	Results	Unit
Oil & Grease	APHA 5520 B (Partition-Gravimetric Method) (22nd Edition)	<5	mg/L

********** End of Report **********

SGS (Myanmar) Limited
(Thin Thin Maw)
Laboratory Manager