BENCHMADE ASIA MYANMAR LTD

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR

WA ALE ECO TOURISM RESORT PROJECT

NOVEMBER, 2017

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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
BOT	Build, Operate and Transfer
MIC	Myanmar Investment Commission
GIIP	Good International Industry Practice
WHO	World Health Organization
USEPA	United States Environmental Protection Agency
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
EHP	Eastern Highlands Province
GPS	Global Positioning System
IUCN	International Union for Conservation of Nature
LMPN	Lampi Marine National Park
GHG	Green House Gas
BAM	Benchmade Asia Myanmar Ltd

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အစီရင်ခံစာ အကျဉ်းချုပ်

ဤပတ်ဝန်းကျင်ထိခိုက်မှု လေ့လာဆန်းစစ်ခြင်း ဆိုင်ရာ အစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၂)၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး စည်းမျဉ်းဥပဒေ (၂၀၁၄) နှင့် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅) အရ Benchmade Asia Myanmar Co., Ltd မှ အကောင်အထည်ဖော် ဆောင်ရွက်မည့် ဝအလယ် သဘာဝအခြေခံ အပန်းဖြေစခန်း တည်ဆောက်ရာတွင် လိုအပ်သော ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းစဉ်များကို ဖော်ပြရန် အတွက် E Guard 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 ပတ်ဝန်းကျင်အရည်အသွေး အပေါ် သက်ရောက်နိုင်မည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အမျိုးအစား လုပ်ဆောင်ရမည်ဟု သတ်မှတ်သော လုပ်ငန်း လုပ်ကိုင်မည့် မည်သည့် ဝန်ကြီးဌာန၊ အစိုးရဌာန၊ အဖွဲ့အစည်း၊ စီးပွားရေးလုပ်ငန်းရှင်များ၊ တရားဝင်အုပ်ချုပ်မှုအဖွဲ့များ၊ ဖွံ့ဖြိုးတိုးတက်မှု ကော်မတီ၊ ဒေသအစိုးရ (သို့) လုပ်ပိုင်ခွင့်ရှိသောသူများ၊ ကုမ္ပဏီများ၊ ပူးပေါင်းဆောင်ရွက်နိုင်သော အဖွဲ့အစည်း၊ စီးပွာရေးကုမ္ပဏီလုပ်ငန်း၊ လုပ်ငန်းအစုဝင်များ၊ ပူးတွဲလုပ်ငန်း (သို့) ကိုယ်ပိုင်လုပ်ငန်းရှင်များ၏ လုပ်ငန်းသည် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး စည်းမျဉ်းဥပဒေ (၂၀၁၄)၊ အပိုင်း (၂၁) နှင့် ပုဒ်မ (၆၂) နှင့်အညီ ပထမဦးစွာ ခွင့်ပြုချက်ကို ရယူရန် လိုအပ်ပါသည်။ ပတ်ဝန်းကျင်ကို ထိခိုက်နိုင်ခြေရှိသော စီမံကိန်း များသည် 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။

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

ဝအလယ် သဘာဝအခြေခံအပန်းဖြေစခန်း စီမံကိန်းနှင့် ပတ်သက်သော ဥပဒေ နှင့် နည်းဥပဒေ များမှာ အောက်ပါ အတိုင်း ဖြစ်ပါသည်။

ဥပဒေ နှင့် နည်းဥပဒေများ	ခုနှစ်
မြန်မာနိုင်ငံ ဖွဲ့စည်းပုံ အခြေခံ ဥပဒေ	၂၀၀၈
ပတ်ဝန်းကျင် ဆိုင်ရာ မူဝါဒ	၁၉၉၄
အမျိုးသား ဆိုင်ရာ မြေအသုံး ချမှု မူဝါဒ	၂၀၁၆
ပတ်ဝန်း ကျင်ထိန်းသိမ်းရေး ဥပဒေ	၂၀၁၂
ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး နည်းဥပဒေ	၂၀၁၄
ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ	၂၀၁၅
အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ	၂၀၁၅
ရေအရင်း အမြစ်နှင့် မြစ်ချောင်းများ ထိန်းသိမ်းရေးဥပဒေ	၂၀၁၆
သစ်တော ဥပဒေ	၁၉၉၂
တောရိုင်းတိရစ္ဆာန်များ ကာကွယ် ခြင်း နှင့် ဒေသဆိုင်ရာ အပင် နှင့် သတ္တဝါ များ ထိန်းသိမ်းကာကွယ်ခြင်း ဥပဒေ	၁၉၉၄
တိုင်းရင်းသားလူမျိုးများ၏ အခွင့်အရေး ကာကွယ်စောင့်ရှောက်သည့် ဥပဒေ	၂၀၁၅
ယဉ်ကျေး မှု အမွေ အနှစ်ဒေသများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ	၁၉၉၈
သဘာ ဝ ဘေးအန္တရာယ် ကာကွယ်ခြင်း ဥပဒေ	၂၀၁၃
မြန်မာရင်းနှီးမြှုပ်နှံမှု ဆိုင်ရာ ဥပဒေ	၂၀၁၃
မြန်မာနိုင်ငံ ဟိုတယ် နှင့် ခရီးသွားလာရေး ဥပဒေ	၁၉၉၃
ဖွံ့ဖြိုးမှု လုပ်ငန်း ကော်မတီ ဥပဒေ	၁၉၉၃
မြေသိမ်းအက် ဥပဒေ	၁၈၉၄
အများပြည် သူ ကျန်းမာရေး ဥပဒေ	၁၉၇၂
လူမှု ဖူလုံရေး ဥပဒေ	၂၀၁၂
အမျိုးသား ဆိုင်ရာ အစားအသောက် ဥပဒေ	၁၉၉၇
အလုပ် အမား အဖွဲ့အစည်း ဥပဒေ	၂၀၁၁
အလုပ်အကိုင် နှင့် ဖွံ့ဖြိုးတိုးတက်မှု ဥပဒေ	၂၀၁၃

အနည်းဆုံး အခကြေးငွေ ဥပဒေ	၂၀၁၃
နိုင်ငံတကာ နှင့်ဆိုင်သော လမ်းညွှန်ချက်များ အသုံးချ ခြင်း	
နိုင်ငံတကာ ဘဏ္ဍာ ရေးပူးပေါင်း ဆောင်ရွက်မှု အဖွဲ့ ပတ်ဝန်းကျင် ၊ ကျန်းမာရေး နှင့် လုံခြုံ မှု လမ်းညွှန်ချက်များ	၂၀၁၇
ရေ နှင့် သန့်စင်ခြင်း အပေါ် နိုင်ငံတကာ ဘဏ္ဍာ ရေးပူးပေါင်း ဆောင်ရွက်မှု အဖွဲ့ လမ်းညွှန်ချက်များ	၂၀၁၇
အညစ်ကြေးထိန်းသိမ်းစီမံခြင်း အပေါ် နိုင်ငံတကာ ဘဏ္ဍာ ရေးပူးပေါင်း ဆောင်ရွက်မှု အဖွဲ့ လမ်းညွှန်ချက်များ	၂၀၁၇
ခရီးသွားလုပ်ငန်းနှင့် ဆေးရုံများ ဖွံ့ဖြိုးတိုးတက်မှု များအတွက် နိုင်ငံတကာ ဘဏ္ဍာ ရေးပူးပေါင်း ဆောင်ရွက်မှု အဖွဲ့ လမ်းညွှန်ချက်များ	၂၀၁၇

အဆိုပြု စီမံကိန်းကို Benchmade Asia Myanmar Ltd မှ အကောင်အထည်ဖော်ဆောင်ရွက်ပါသည်။ ထိုကုမ္ပဏီ သည် ၁၀၀% နိုင်ငံခြားသားရင်းနှီးမြှုပ်နှံမှု ဖြစ်သည်။ အဆိုပြု စီမံကိန်း သည် တနင်္သာရီတိုင်း ဒေသကြီး၊ ကော့သောင်းခရိုင် ၊ ဘုတ်ပြင်းမြို့နယ်၊ လန်ပိ အမျိုးသား အဏ္ဏဝါဥယျာဉ်၊ မြောက်လတ္တီကျူ ၁၀ ဒီဂရီ နှင့် ၅၁.၁၃၁၂ မိနစ် နှင့် အရှေ့လောင်ဂျီကျူ ၉၈ ဒီဂရီ နှင့် ၀၃.၇၇၄ မိနစ်ရှိ၊ ဝအလယ်ကျွန်းတွင် တည်ရှိပါသည်။ ကော့သာင်းမှ ရေ မိုင် ၆၀ အကွာဝေးတွင် ရှိပြီး၊ စက်လေဖြင့် ၄၅ မိနစ်ခန့် ကြာမြင့်ပါသည်။ ဝအလယ်ကျွန်းသည် မြိတ်ကျွန်းစု၏အကြီးဆုံး ကျွန်းဖြစ်သော လန်ပိကျွန်းနှင့် ကပ်လျက်တည်ရှိပါသည်။ ဝအလယ်ကျွန်း ၏ အကျယ်အဝန်းမှာ (၃၉၃၄) ဧက ရှိပါသည်။ အဆိုပြု စီမံကိန်းကို ဝအလယ်ကျွန်း၏ နေရာ (၃) နေရာ တွင် တည်ဆောက်ပါမည်။ ဇရိယာ (၁) သည် (၁၅၈၈.၂၂ စတုရန်းမိုင်)၊ ၃၉.၂၅ ဧက၊ ဇရိယာ (၂) သည် (၂၁၇၃၈၂ စတုရန်းမိုင်)၊ ၅၃.၇၀ ဧက နှင့် ဇရိယာ (၃) သည် (၂၉၁.၂၂ စတုရန်းမိုင်)၊ ၇.၂၀ ဧက ကျယ်ဝန်းပါသည်။ အဆိုပြုစီမံကိန်း၏ စုစုပေါင်းဇရိယာမှာ (၁၀၀.၁၅) ဧက ဖြစ်ပြီး ၄င်းကို သယံဇာတ နှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဦးစီးဌာန (ယခင် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာ ဝန်ကြီးဌာန) မှ ၄ားရမ်းခဲ့ပါသည်။ မြေအမျိုးအစားမှာ အမျိုးသား ဥယျာဉ်မြေ ဖြစ်ပါသည်။ အဆို ပြုစီမံကိန်း လုပ်ငန်းလည်ပတ်ချိန်၏ ပထမသက်တမ်းမှာ နှစ် (၅၀) ဖြစ်ပြီး (၁၀) နှစ်သက်တမ်း (၂) ကြိမ်အထိတိုး၍ လုပ်ဆောင်နိုင်သည်။

အပန်းဖြေ စခန်း တည်ဆောက်မည့် နေရာ (၃) ခု လုံးကို တည်ဆောက်၊ လည်ပတ် ၊ လွှဲပြောင်း စနစ် (BOT) ဖြင့် တည်ဆောက်မည် ဖြစ်သည်။ ဝအလယ် သဘာဝအခြေခံ အပန်းဖြေစခန်း ဆောက်လုပ်ခြင်းကို (အောက်တိုဘာ ၂၀၁၅) မှ (မတ်လ ၂၀၁၉) အထိ ဆောင်ရွက်မည်။ ဝအလယ် သဘာဝအခြေခံ အပန်းဖြေစခန်း ကို ဝအလယ်ကျွန်း၏ နေရာ (၃) ခုတွင် အကောင်ထည်ဖော်ဆောင်ရွက်မည်။

ဇရိယာ(၁)တွင် ပင်လယ်ပြင်ကို မျက်နှာမူ၍ ဆောက်ထားသော သဘာဝအခြေခံ အဆင့်မြင့် ဗီလာ (၃၀)-အခန်း ၁ ခန်း မှ ၄ ခန်း အထိ ပါသော ဘန်ဂလို၊ စားသောက်ဆိုင်၊ မီးစက်၊ နေရောင်ခြည် စွမ်းအင်၊ Kubota

အမှိုက်နှင့် အညစ်အကြေးများ သန့်စင်စနစ် တို့ပါဝင်သည်။ ဇရိယာ (၂) တွင် ပင်လယ်ပြင်ကို မျက်နှာမူ၍ ဆောက်ထားသော သဘာဝအခြေခံ ဗီလာ (၃၀) ၊ စားသောက်ဆိုင်၊ ဧည့်ကြိုဆောင်၊ ဝန်ထမ်းဆောင်၊ Spa၊ မီးစက်၊ နေရောင်ခြည်စွမ်းအင် (သဘာဝ အလှအပများကို ထိခိုက်ခြင်း မရှိ) နှင့် Kubota အမှိုက်နှင့် အညစ်အကြေးများ သန့်စင်စနစ် ဇရိယာ (၃) တွင် ပင်လယ်ပြင်ကို မျက်နှာမူ၍ ဆောက်ထားသော အဆောက်အဦး ထဲတွင် အခန်း (၁၀) ခန်းပါဝင်သော သဘာဝအခြေခံ ဗီလာ၊ စားသောက်ဆိုင်၊ မီးစက်၊ နေရောင်ခြည်စွမ်းအင် (သဘာဝအလှပများကို ထိခိုက်ခြင်းမရှိ)၊ Kubota အမှိုက်နှင့် အညစ်အကြေးများ သန့်စင်စနစ် တို့ပါဝင်သည်။

လက်ရှိအချိန်တွင် ရရှိထားသောသတင်းအချက်များ ဟုဆိုရာတွင်၊ လက်တွေ့ကွင်းဆင်း ရရှိသော အချက်အလက်များနှင့်၊ သုတေသနစာတမ်းများ နှင့် ကိုးကားစာတမ်း များမှ ရရှိသော အချက်အလက်များ အပေါ်တွင် မူတည်၍ သဘာဝပတ်ဝန်းကျင်၊ လူမှုစီးပွားဝန်းကျင်ဆိုင်ရာ အချက်အလက်များကို ဖော်ပြထားရှိပါသည်။ သဘာဝပတ်ဝန်းကျင်နှင့်ဆိုင်သော အချက်အလက်များတွင် ရာသီဥတု၊ လေအရည်အသွေး၊ ဆူညံသံ၊ ရေအရည်အသွေး၊ ဒေသဆိုင်ရာ ဘူမိဗေဒအချက်အလက်များ၊ အမှိုက်နှင့် အညစ်အကြေးများ၊ မီးဘေးအန္တရာယ် ကြိုတင်ကာကွယ်မှုများ စသည်တို့ ပါဝင်သည်။

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။

အဆိုပြုစီမံကိန်း၏ ဖွံ့ဖြိုးမှုအဆင့်ပေါ် မူတည်၍ ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများကို ခွဲခြားသတ်မှတ်နိုင်သည်။ ၎င်းတို့မှာ၊

- လုပ်ငန်းတည်ဆောက်ဆဲ ကာလ သက်ရောက်မှုများ၊
- လုပ်ငန်းဆောင်ရွက်စဉ် ကာလ သက်ရောက်မှုများ၊
- လုပ်ငန်း ဖျက်သိမ်းစဉ် ကာလ သက်ရောက်မှုများ။

အဆိုပြုစီမံကိန်း၏ လုပ်ငန်းတည်ဆောက်ခြင်း နှင့် လုပ်ငန်းလည်ပတ်ခြင်း မှ တိုက်ရိုက်သက်ရောက်မှုများ အပြင် အခြားသော သက်ရောက်မှု အမျိုးအစားများလည်း ဖြစ်ပေါ်နိုင်သည်။ ၎င်းတို့မှာ အောက်ပါအတိုင်းဖြစ်သည်။

- ကောင်းကျိုး (သို့) ဆိုးကျိုး၊
- သက်ရောက်ချိန် ကာလ၊
- ပြန်လည်ပြုပြင်နိုင်စွမ်း၊
- စုပေါင်းသက်ရောက်မှုများ နှင့် ဆက်စပ်သက်ရောက်မှုများ ။

လက်ခံရသော ဝန်းကျင်၏ လက်ခံနိုင်စွမ်းကို သတ်မှတ်ရာ၌ လက်ခံထားသော လမ်းညွှန်ချက်များ၊ ပြဌာန်းထားသောဥပဒေများနှင့် ကျွမ်းကျင်ပညာရှင်၏ ဆုံးဖြတ်သတ်မှတ်ချက် တို့ပေါ်အခြေခံ၍ သတ်မှတ်သည်။ သိသာထင်ရှားသော သက်ရောက်မှုများကို အကဲဖြတ်ရာ၌ လက်ခံရသော ဝန်းကျင်၏ လက်ခံနိုင်စွမ်းနှင့် သက်ရောက်သောပမာဏ အပေါ်မူတည်၍ ဆန်းစစ်အကဲဖြတ်သည်။

ဆောက်လုပ်ရေး ကာလ၊ လုပ်ငန်းလည်ပတ်ဆဲကာလ နှင့် ပြန်လည်ဖျက်သိမ်းစဉ် ကာလ တို့အတွက် ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများနှင့် ဆိုးကျိုးများ လျော့ချခြင်းကို သတ်မှတ်ပါသည်။ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားဝန်းကျင် စောင့်ကြပ်ရာတွင် ဆိုးကျိုးများလျော့ချခြင်း အစီအစဉ်၏ အသုံးဝင်မှုကို အကဲဖြတ်ရန် လိုအပ်ပါသည်။ ဆောက်လုပ်ဆဲကာလ နှင့် လုပ်ငန်းလည် ပတ်စဉ်ကာလတွင် ဆိုးကျိုးများလျော့ချခြင်း အစီစဉ်သည် ဆိုးကျိုးများကို လျော့ချနိုင်ရုံသာမက ကောင်းကျိုးများကို တိုးပွားနိုင်ခြင်းရှိမရှိ စဉ်ဆက်မပြတ် စောင့်ကြပ်စစ်ဆေးရမည်။

စဉ်ဆက်မပြတ် စောင့်ကြပ်စစ်ဆေးရမည့် စံချိန်စံညွှန်း များကို သတ်မှတ်ရာတွင် Benchmade Asia Myanmar Ltd ၏ ဆောက်လုပ်ဆဲကာလ၊ လုပ်ငန်းလည်ပတ်ချိန် နှင့် ဖျက်သိမ်းသည့်ကာလတို့တွင် ဖြစ်ပေါ်လာနိုင်သော ဆိုးကျိုးများကို အခြေခံပြီး ရွေးချယ်သတ်မှတ်သည်။

ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေစခန်းစီမံကိန်း ၏ ဆောက်လုပ်ရေးကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ဆိုးကျိုးများမှာ အောက်ပါအတိုင်းဖြစ်သည်။

- နေရာနှင့် အသုံးပြုနိုင်ခွင့်များ ပြောင်းလဲခြင်း
- မြေနေရာ ရှင်းလင်းခြင်း
- ဆူညံသံများ
- ဆောက်လုပ်ရေးပစ္စည်းများ သိုလှောင်ခြင်း
- မိလ္လာအညစ်အကြေးများ စွန့်ပစ်ခြင်း
- အမှိုက်စွန့်ပစ်ပစ္စည်းများထွက်ရှိခြင်း
- အလင်းနှောက်ယှက်မှုများ

ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေစခန်းစီမံကိန်း ၏ ဆောက်လုပ်ရေးကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ကောင်းကျိုးများမှာ အောက်ပါအတိုင်း ဖြစ်သည်။

- အလုပ်အကိုင်များရရှိနိုင်ခြင်း

ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေစခန်းစီမံကိန်း ၏ လုပ်ငန်းလည်ပတ်စဉ်ကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ဆိုးကျိုးများမှာ အောက်ပါအတိုင်းဖြစ်သည်။

- အရင်းအမြစ်များ သုံးစွဲခြင်း
- နေရာနှင့် အသုံးပြုနိုင်ခွင့်များ ပြောင်းလဲခြင်း
- မိလ္လာအညစ်အကြေးများ နှင့် စွန့်ပစ်ခြင်း
- အမှိုက်စွန့်ပစ်ပစ္စည်းများထွက်ရှိခြင်း
- အလင်းနှောက်ယှက်မှုများ
- အဏ္ဏဝါအရင်းမြစ်များ မှားယွင်းအသုံးပြုခြင်း
- ဒီဇယ်နှင့် ဓါတ်ဆီများ ယိုဖိတ်ခြင်း

ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေစခန်းစီမံကိန်း ၏ လုပ်ငန်းလည်ပတ်စဉ်ကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ကောင်းကျိုးများမှာ အောက်ပါအတိုင်းဖြစ်သည်။

- အလုပ်အကိုင် ရရှိခြင်းနှင့် ဝန်ထမ်းများ အတွေ့အကြုံများရရှိခြင်း
- ဒေသခံ အဖွဲ့စည်းများအတွက် အခွင့်လမ်းများ ရရှိနိုင်ခြင်း
- မြေယာအလှဆင်ခြင်း နှင့် မြေသားထိန်းသိမ်းခြင်း
- အတွေ့အကြုံသစ်များ ရရှိနိုင်ခြင်း (ပင်လယ်ပြင် အသုံးချမှုနှင့် သက်ဆိုင်သော)
- ပြည်သူ့ဝန်ဆောင်မှုများတိုးများလာခြင်းနှင့် ကျန်းမာရေးဝန်ဆောင်မှုများတိုးလာခြင်း
- တရားမဝင် ရောင်းဝယ်မှု နည်းပါးလာခြင်း

အရင်းအမြစ်များ သုံးစွဲခြင်း

ဝအလယ်ကျွန်းသည် လျှပ်စစ်မီး မရရှိသောကျွန်းဖြစ်သောကြောင့် အခြားလျှပ်စစ်စွမ်းအင်အရင်းအမြစ် တစ်ခုအနေဖြင့် Bemchmade Asia Myanmar Ltd သည် နေရောင်ခြည်စွမ်းအင် နှင့် မီးစက်များ အသုံးပြုပါမည်။ နေရောင်ခြည်စွမ်းအင်အပေါ် လုံးလုံးလျားလျား အခြေခံခြင်းသည် ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေစခန်းစီမံကိန်း၏ အဓိကပန်းတိုင်ဖြစ်သည်။ ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေစခန်းစီမံကိန်း၏ လိုအပ်သော စွမ်းအင်ပမာဏအား နေရောင်ခြည်စွမ်းအင် အရင်းမြစ်မှာ ပံ့ပိုးမပေးနိုင်သော အခြေအနေမျိုးတွင်လည်း အနေဖြင့် ပို၍ သန့်ရှင်းသော၊ ပို၍စွမ်းဆောင်ရည်ကောင်းသော အခြားနည်းလမ်းများကို ဆက်လက်ရှာဖွေသွားမည်ဖြစ်သည်။ နေရောင်ခြည် စွမ်းအင်ကို သတ်မှတ်ထားသော နေရာများတွင်ထားရှိပါမည်။ နေရောင်ခြည်စွမ်းအင်မှ လုံလောက်သော စွမ်းအင်ပမာဏ မရရှိခဲ့ပါက ဓာတ်ဆီ သို့ ဒီဇယ် မီးစက်များထက် ပိုမို၍ သန့်ရှင်းသော Propane မီးစက်များကို အသုံးပြုမည်။

ရေ

ဝအလယ်ကျွန်းတွင် ရေချို့ရရှိနိုင်သော နေရာအများအပြား ရှိပါသည်။

- ရေတွင်း မတူးဖော်ခြင်း
- ဝီလာများ အနားတွင် မိုးရေဖမ်းယူစုဆောင်းခြင်း
- ပင်လယ်ရေသုံး ရေကူးကန်
- Kubota ရေဆိုးနှင့် အညစ်အကြေးသန့်စင်သည့် စနစ်

ကျွန်းပေါ်မှ ရေအရင်းမြစ် အသုံးပြုမှုအား ကန့်သတ်ခြင်းကို အထက်ဖော်ပြပါ မူဝါဒများဖြင့် အကောင်အထည်ဖော်ဆောင် သွားမည်ဖြစ်သည်။ ကျွန်းပေါ်တွင် ရေတွင်း တူးဖော်ခြင်းသည် ရေရှည်တွင် ရေအရင်းအမြစ်အား ထိခိုက်နိုင်သည်။ ထို့ကြောင့် ရေလှောင်ကန် နှင့် ရေသိုလှောင်သည့် နေရာများမှ တဆင့် မိုးရေ နှင့် ချောင်းရေကို စုဆောင်းထိန်းသိမ်းယူခြင်းသည် ပတ်ဝန်းကျင် နှင့် လိုက်လျောညီထွေမှု အရှိဆုံးဖြစ်သည်။

အမှိုက်စွန့်ပစ်ခြင်း

မိလ္လာ နှင့် ရေဆိုး

ဝအလယ် သဘာဝအခြေခံ အပန်းဖြေစခန်းစီမံကိန်းတွင် Kubota ရေဆိုးနှင့် အညစ်အကြေးသန့်စင်သည့် စနစ်ဖြင့် တပ်ဆင်ဆောင်ရွက်မည်။ Kubota ရေဆိုးနှင့် အညစ်အကြေး သန့်စင် စနစ်သည် မိလ္လာစနစ် သာမကပဲ ရေဆိုးသန့်စင်နိုင်သော စနစ်ဖြစ်ပါသည်။ ကန်ထဲတွင် လေမဲ့သန့်စင်ခြင်း၊ လေရှိသန့်စင်ခြင်း၊ အနည်ထိုင်စေခြင်း နှင့် ရောဂါပိုးမွှားသန့်စင်ခြင်း စသောစနစ်များပါဝင်သည်။ BOD removal ratio > 90 %, effluent BOD <20mg/L. Centralized sewage system နှင့် မတူညီသည်မှာ Johkasou system သည် ကုန်ကျ စရိတ် ၈၀% သက်သာပြီး ဆောက်လုပ်ချိန်လည်း လျော့နည်းသည်။ Kubota FRP Johkasou သည် ပုံမှန် RC ကန်အမျိုးအစားထက် တည်ဆောက်ချိန် တိုတောင်းပြီး ပို၍အရည်အသွေး မြင့်မားသည်။

Johkasou သည် ဆောက်လုပ်ရာတွင် အရည်အသွေး မြင့်မားပြီး စံချိန်မှီသော FRP ပစ္စည်းများကို အသုံးပြုသည်။ Kubota FRP Johkasou သည် ကုန်ကျစရိတ် နည်းပါးပြီး ပြင်ဆင်ထိန်းသိမ်းရန် လွယ်ကူသည်။ ခဲတ်မီ နည်းပညာ ပိုမြင့်သော ပစ္စည်း များသည် လုပ်ဆောင်ချက်များ ပို ကောင်းသည်သာမက ပြင်ဆင်ရန်လည်း လွယ်ကူသည်။ ထိုစနစ်သည် လူဖြင့်ထိန်းချုပ်ရန်မလိုအပ်ပေ။ ထို စနစ်သည် မည်သည့် ရေဆိုးမဆို သန့်စင်ပေးနိုင်သည်။ (မီးဖိုချောင်၊ အိမ်သာ၊ အဝတ်လျှော်စက် နှင့် ရေချိုးရေ) ။

အမှိုက်များနှင့် စွန့်ပစ်ပစ္စည်များ

ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေစခန်း စီမံခန့်ခွဲမှု အစီအစဉ် တွင် စွန့်ပစ်အမှိုက်ပစ္စည်းများကို အပတ်စဉ် ကော့သောင်းသို့ ကုန်ပစ္စည်းတင် သင်္ဘောများဖြင့် စွန့်ပစ်မည်ဟု ပါရှိသည်။ ကျွန်းပေါ်တွင် ပလပ်စတစ် အမှုန့် ကြိတ်စက်များ ထားရှိ၍ ပလပ်စတစ်အမှိုက်များကို အမှုန့်ကြိတ်ပြီး လျော့နည်းအောင် ပြုလုပ်နိုင်သည်။ ထိုအပိုင်းအစများကို ဆောက်လုပ်ရေးလုပ်ငန်းများ တွင် အသုံးပြုမည် သို့မဟုတ် ကော့သောင်းသို့ ပြန်လည် ပို့ဆောင်မည်။

ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေစခန်း တာဝန်ရှိသူများသည် ထုပ်ပိုး ပစ္စည်းများ နှင့် အမှိုက်ထွက်ရှိမှု လျော့ချနိုင်ရန်အတွက် ဒေသမှ အစားအစာများ ဝယ်ယူမည်ဖြစ်သည်။ ထို့အပြင် ပလပ်စတစ် အမှိုက်များ လျော့ချရန်အတွက် ပလပ်စတစ်ရေဗူးများကို ကျွန်းပေါ်နှင့်ဟိုတယ်တွင် အသုံးမပြုရန် တားမြစ်ထားမည်။ ပင်လယ် သို့မဟုတ် သစ်တော အတွင်းသို့ ခါတုပစ္စည်းများ နှင့် စွန့်ပစ်ပစ္စည်းများ ကို မစွန့်ပစ်ပါ။

ဆက်စပ်သက်ရောက်မှုများ

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

အဆိုပြုစီမံကိန်းအတွက် ပင်လယ်မှအမှိုက်များ စုပုံခြင်းသည် အခြားသော ဆက်စပ်သက်ရောက်မှု များဖြစ်သည့် ရေအရည်သွေးကျဆင်းလာမှု၊ ခရီးသွားလုပ်ငန်းများ နှင့် ငါးဖမ်းလုပ်ငန်းများထက် သိသာထင်ရှားသည်။ လေ့လာတွေ့ရှိချက်များ အရ စီမံကိန်း၏ အနီးအနား (၂) မိုင် ပတ်လည်တွင် စီးပွားဖြစ် ဖွံ့ဖြိုးတိုးတက်သည့် ခရီးသွားလုပ်ငန်းများ နှင့် ငါးဖမ်းလုပ်ငန်းများ 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။

ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် (EMP)

Benchmade Asia Myanmar Ltd ၏ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်ကို အောက်ပါ အတိုင်း ခွဲခြားနိုင်သည်။

(၁) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်

(၂) စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်

(၃) လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် လုံခြုံရေး အစီအစဉ်

(၄) အရေးပေါ်တုန့်ပြန်မှု အစီအစဉ်

(၅) ဆီများယိုဖိတ်မှုတုန့်ပြန်မှု အစီအစဉ်

(၆) စွန့်ပစ်အမှိုက်နှင့် အညစ်အကြေးများစီမံခန့်ခွဲမှု အစီအစဉ်

(၇) လူမှုရေးဆိုင်ရာ တာဝန်ခံဆောင်ရွက်မှု အစီအစဉ်

(၈) ယဉ်ကျေးမှုများရောယှက်ခြင်း ထိန်းသိမ်းမှုအစီအစဉ်

(၉) ဇီဝမျိုးစုံမျိုးကွဲများ စီမံခန့်ခွဲမှု အစီအစဉ်

ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်၏ ရည်ရွယ်ချက်များ

ပတ်ဝန်းကျင်စီမံခန့်ခွဲ မှု အစီအစဉ်၏ ရည်ရွယ်ချက်များမှာ-

(၁) စီမံကိန်းကာလအတွင်း စီမံကိန်းအဆိုပြုသူမှ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်အား ဆောက်လုပ်ရေးကာလ၊ လုပ်ငန်းလည်ပတ်ချိန်ကာလ နှင့် လုပ်ငန်းဖျက်သိမ်းစဉ်ကာလ တစ်ခုစီတွင် အကောင်အထည်ဖော် ဆောင်ရွက်ပါမည် ဟူသော ကတိကဝတ်အား မှတ်တမ်းတင်ထားရှိနိုင်စေရန်၊

(၂) သယံဇာတ နှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာန လက်အောက်ရှိ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဦးစီးဌာန မှ တောင်းဆိုချက်များကို ဖြည့်ဆည်းပေးနိုင်ရန်၊

(၃) စီမံကိန်း၏ သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုရေးဆိုင်ရာ လုပ်ငန်းများကို စောင့်ကြပ်ရန် အတွက် လမ်းညွှန်စာတမ်း အနေဖြင့်ထားရှိရန်၊

(၄) သဘာဝပတ်ဝန်းကျင် အပေါ် ထိခိုက်နိုင်သည့် ဆိုးကျိုးများကို လျော့ချရန် အခြေခံမူဘောင်အဖြစ် ထားရှိနိုင်ရန်နှင့်၊ စီမံကိန်းအား ကောင်းမွန်သင့်လျော်စွာ အကောင်ထည်ဖော်ဆောင်ရွက်နိုင်ရန်။

စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်

သတ်မှတ်ထားသည့် စံချိန်စံညွှန်း များကို စောင့်ကြည့်လေ့လာခြင်း

သတ်မှတ်ထားသည့် စံချိန် စံညွှန်း များကို စောင့်ကြည့်လေ့လာခြင်းတွင် ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေ စခန်း စီမံကိန်း ၏ ဆောက်လုပ်စဉ် ကာလ ၊ လုပ်ငန်းလည်ပတ်ချိန် ကာလ နှင့် ဖျက်သိမ်းစဉ် ကာလ တို့တွင် ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများအပေါ် အခြေခံ၍သတ်မှတ်ထားသည်။ သတ်မှတ်ထားသည့်စံချိန် စံညွှန်း များ စောင့်ကြည့်လေ့လာခြင်းကို စီမံကိန်း၏ အောက်ဖော်ပြပါ အဆင့်ဆင့်တွင် လုပ်ဆောင်ရမည်။

ဆောက်လုပ်စဉ် ကာလ။ ။ ဆောက်လုပ်ရေး လုပ်ငန်းများ လုပ်ဆောင်ချိန်အတွင်း ထွက်ပေါ်လာနိုင်သော ညစ်ညမ်းမှု အဆင့်ကို စောင့်ကြည့်ရန်၊

လုပ်ငန်းလည်ပတ်စဉ်ကာလ။ ။ လုပ်ငန်းများ စတင်လည်ပတ်ချိန် အတွင်း ဟိုတယ်လည်ပတ်မှုနှင့် ရုံးခန်းများကြောင့် ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများကို စောင့်ကြည့်ရန်၊

လုပ်ငန်းဖျက်သိမ်းစဉ် ကာလ။ ။ ပြန်လည် ဖျက်သိမ်းသည့်ကာလတွင် ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများသည် ဆောက်လုပ်ရေးကာလတွင် ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများနှင့် တူညီသည်ဟု ယူဆနိုင်သောကြောင့် ဆောက်ရေးကာလတွင် သတ်မှတ်ထားသော စံချိန် စံညွှန်းများ အတိုင်းလေ့လာစောင့်ကြည့်နိုင်သည်။

ဖြစ်ပေါ်လာနိုင်သော ဆိုးကျိုးများ အားလုံးကို လျော့ချနိုင်ရန်အတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ် ၊ လျော့ချရန်နည်းလမ်းများ နှင့် စောင့်ကြည့်စစ်ဆေးခြင်း အစီအစဉ် များအတိုင်း လိုက်နာဆောင်ရွက်ရမည်။

ဖြစ်ပေါ်လာ နိုင်သော ကောင်းကျိုးများ ကိုလည်း ပို၍ တိုးတက်ကောင်းမွန်လာစေရန် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် နှင့် စောင့်ကြည့်စစ်ဆေးခြင်း အစီအစဉ် များ အတိုင်းလိုက်နာရမည်။

ဆောက်လုပ်စဉ်ကာလ အတွင်း ဆိုးကျိုးအများစုကို လျော့ကျစေရန်အတွက် ဖော်ပြထားရှိသော လျော့ချရန် နည်းလမ်းများအတိုင်း လိုက်နာရမည်။ ဥပမာအားဖြင့် အလင်းအနောက်ယှက် ဖြစ်ခြင်းကို လျော့ချရန် ဆောက်လုပ်ရေး လုပ်ငန်းများအား မနက် (၆) နာရီ နှင့် ညနေ (၆) နာရီအတွင်းတွင် ဆောင်ရွက်သင့်သည်။ အရေးပေါ်မီး မှ လွဲ၍ ည (၇) နာရီအချိန်တွင် ကမ်းခြေရှိ မီးအားလုံးကို မှိတ်ထားသင့်သည်။

လုပ်ငန်းလည်ပတ်ချိန်တွင် ဆိုးကျိုးအများစုကို လျော့ကျစေရန်အတွက် ဖော်ပြထားရှိသော လျော့ချရန် နည်းလမ်းများအတိုင်း လိုက်နာရမည်။ အရင်းအမြစ်များ သုံးစွဲခြင်း၊ နေရာနှင့် အသုံးပြုနိုင်စွင့်များ ပြောင်းလဲခြင်း၊ မိလ္လာအညစ်အကြေးများ နှင့် စွန့်ပစ်ခြင်း၊ အမှိုက်စွန့်ပစ်ပစ္စည်းများထွက်ရှိခြင်း၊ အလင်းနှောက်ယှက်မှုများ၊ အဏ္ဏဝါအရင်းမြစ်များ မှားယွင်းအသုံးပြုခြင်း၊ ဒီဇယ်နှင့် ဓါတ်ဆီများ ယိုဖိတ်ခြင်းး စသည်တို့ဖြစ်သည်။

လုပ်ငန်းလည် ပတ်ချိန် ကာလအတွင်း ကောင်းကျိုးများမှာ ဒေသခံပြည်သူ (၂၁၀) အတွက် ရေရှည် အလုပ်အကိုင်များ ရရှိနိုင်သည်။ ကျွန်းပေါ်ရှိလုပ်ငန်းများကြောင့် တရားမဝင် ရောင်းဝယ်ဖောက်ကား ခြင်းများ လျော့နည်းနိုင်ပါသည်။ ထို့အပြင် ဝါးအလယ် အပန်းဖြေစခန်း စီမံကိန်းကြောင့် ဒေသခံများ အနေဖြင့် အလုပ်အကိုင် အခွင့်အလမ်းများ ပိုများပြားလာနိုင်ခြင်း နှင့် ကျန်းမာရေး ဝန်ဆောင်မှု တိုးတက်လာနိုင်ပါသည်။

ဝအလယ် သဘာဝအခြေခံ အပန်းဖြေစခန်း စီမံကိန်း သည် ဇီဝမျိုးစုံ မျိုးကွဲများ နှင့် သဘာဝအရင်းမြစ်များ ပေါများ သည့် လန်ပိအဏ္ဏဝါ အမျိုးသား ဥယျာဉ် တွင် တည်ရှိပါသည်။ စီမံကိန်း အမျိုးအစားသည် သဘာဝ ပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေမှု ရှိပြီး သဘာဝကိုထိခိုက်မှု နည်းပါးသော်လည်း လုပ်ဆောင်ချက် အချို့နှင့် အချို့လုပ်ငန်းစဉ်များသည် ဖော်ပြထားရှိသော လျော့ချရန်နည်းလမ်းများအတိုင်း တိတိကျကျ လိုက်နာ ဆောင်ရွက်ရန် လိုအပ်သည်။

အမှိုက်များထွက်ရှိခြင်းနှင့် စွန့်ပစ်မှုများသည် ဟိုတယ်နှင့် အပန်းဖြေ စီမံကိန်းအမျိုးအစား အထူးသဖြင့် ကျွန်းပေါ်ရှိ စီမံကိန်းအမျိုးအစားတွင် ကြုံတွေ့ရသော အဓိကစိန်ခေါ်မှုဖြစ်သည်။ ထို့ကြောင့် စီမံကိန်းအဆိုပြုသူအနေဖြင့် သင့်လျော်၍စနစ်ကျသော အမှိုက်နှင့်အညစ်အကြေးများ စီမံခန့်ခွဲမှု အစီစဉ်အား အကောင်အထည်ဖော်ရမည်။ ထို့အပြင် စီမံကိန်းတာဝန်ရှိသူအနေဖြင့် အလုပ်သမားများအား သတ်မှတ်ထားသော အမှိုက်စွန့်ပစ်နေရာတွင်သာ စွန့်ပစ်ရန် လမ်းညွှန်ချက်များ ထားရှိပေးရမည်။ စီမံကိန်း အဆိုပြုသူသည် ဇီဝမျိုးစုံ စီမံခန့်ခွဲမှု အစီအစဉ် ၊ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် နှင့် အမှိုက်နှင့်အညစ်အကြေးများ စီမံခန့်ခွဲမှု အစီအစဉ်တို့ ကို လိုက်နာအကောင်ထည်ဖော်ဆောင်ရွက်ရမည်။

အပန်းဖြေခြင်းနှင့် ခရီးသွားလုပ်ငန်းများသည် စွမ်းအင် နှင့် အရင်းအမြစ်များ ကို အများအပြား ကုန်ဆုံးစေသော်လည်း၊ ဝအလယ် သဘာဝအခြေခံ အပန်းဖြေစခန်း စီမံကိန်းအနေဖြင့် ၎င်းတို့၏ သဘာဝဝန်းကျင်နှင့် လိုက်လျောညီထွေရှိစေရန် ဆိုသော ပန်းတိုင်သို့ရောက်ရှိရန် ဆောင်ရွက်လျက်ရှိသည်။

နေရောင်ခြည်စွမ်းအင်အပေါ် လုံးလုံးလျားလျား အခြေခံခြင်းသည် ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေစခန်းစီမံကိန်း၏ အဓိကပန်းတိုင်ဖြစ်သည်။ ဝအလယ်သဘာဝအခြေခံ အပန်းဖြေစခန်းစီမံကိန်း၏ လိုအပ်သော စွမ်းအင်ပမာဏအား နေရောင်ခြည်စွမ်းအင် အရင်းမြစ်မှာ ပံ့ပိုးမပေးနိုင်သော အခြေအနေမျိုးတွင်လည်း ပို၍ သန့်ရှင်းသော၊ ပို၍စွမ်းဆောင်ရည်ကောင်းသော အခြားနည်းလမ်းများကို ဆက်လက်ရှာဖွေသွားမည်ဖြစ်သည်။

ဝအလယ်ကျွန်းပေါ် တွင် ရေချိုးအရင်းအမြစ်များ အများအပြား ရှိပါသည်။ ကျွန်းပေါ်မှ ရေအရင်းမြစ် အသုံးပြုမှုအား ကန့်သတ်ခြင်းကို ရေတွင်း မတူးဖော်ခြင်း၊ ဗီလာများ အနားတွင် မိုးရေဖမ်းယူစုဆောင်းခြင်း၊ ပင်လယ်ရေသုံး ရေကူးကန်၊ Kubota ရေဆိုးနှင့် အညစ်အကြေးသန့်စင်သည့် စနစ်ထားရှိခြင်း၊ အစရှိသော မူဝါဒများဖြင့် အကောင်အထည်ဖော်ဆောင်သွားမည်။

ကွင်းဆင်းလေ့လာခြင်း အချက်အလက်များအရ ဝအလယ်ကျွန်းပေါ်တွင် နိုင်ငံတကာ သဘာဝ ကာကွယ်ထိန်းသိမ်းရေးအဖွဲ့အစည်း၏ စာရင်းတွင် ပါဝင်နေသော မျိုးစိတ် (၉) မျိုးရှိပါသည်။ စီမံကိန်း အဆိုပြုသူသည် ထိုမျိုးစိတ်များအပေါ် ထိခိုက်မှုများကို ရှောင်ရှားနိုင်ရန် ဇီဝမျိုးစုံမျိုးကွဲများနှင့် ဆိုင်သော စီမံခန့်ခွဲမှုအစီအစဉ်ကို လိုက်နာရန် လိုအပ်သည်။ ဝအလယ်ကျွန်းသည် ဇီဝမျိုးစုံ မျိုးကွဲများ နှင့် သဘာဝအရင်းအမြစ်များ ပေါများသည့် နေရာတစ်ခု အဖြစ် သတ်မှတ်ထားရှိသော်လည်း ထိုကျွန်းရှိ ဇီဝမျိုး ကွဲများနှင့် ၎င်းတို့၏ နေထိုင်ရာအလေ့အထများ၊ အထူးသဖြင့် ပင်လယ်သတ္တဝါ နှင့်ဆိုင်သော သတ္တဝါ များအကြောင်းကို လေ့လာဖော်ထုတ်ရန် လိုအပ်နေပါသေးသည်။ သို့ဖြစ်ပါ၍ စီမံကိန်းအဆိုပြုသူသည် ဝအလယ်ကျွန်းရှိ ဇီဝမျိုးစုံ မျိုးကွဲများ နှင့် ၎င်းတို့၏ နေထိုင်ရာအလေ့အထများ ကို တက္ကသိုလ်များ၊ ကျွမ်းကျင်သော ပညာရှင်များနှင် ပူးပေါင်း၍ စာတမ်းများ၊ ဂျာနယ်များ ထုတ်ပြန်သင့်ပါသည်။

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။

ဝအလယ် သဘာဝအခြေခံ 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။

အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (အပိုဒ် ၆၀) အရ စီမံကိန်း နှင့် ပတ်သက်သော သတင်းနှင့် အချက်အလက်များကို Benchmade Asia Myanmar Ltd မှ ဒေသခံ ပြည်သူလူထု ထံသို့ လူထုတွေ့ဆုံပွဲ ပြုလုပ်၍ သတင်းအချက်အလက်များ မျှဝေရမည်။ အခန်း (၆၁) အရ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်း ဆွေးနွေးပွဲ ကို ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာ၏ နောက်ဆုံးအဆင့် တွင် ပြုလုပ်ပြီး နောက်ဆုံးအစီရင်ခံစာတွင် ထည့်သွင်းဖော်ပြရမည်။

အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အခမ်းအနားများကို တနသာရီတိုင်းဒေသကြီးအတွင်းရှိ ကော့သောင်းမြို့ ဂါးဒင်းဟိုတယ်တွင်လည်းကောင်း၊ စစ်တပ်ကလပ်ကျေးရွာတွင်လည်းကောင်း ပြုလုပ်ခဲ့ပါသည်။ စီမံကိန်းနှင့်သက်ဆိုင်သူများ၊ သတင်းမီဒီယာများ၊ အစိုးရအဖွဲ့အစည်များ၊ အစိုးရမဟုတ်သော အဖွဲအစည်းများ နှင့် စိတ်ပါဝင်စားသူများအား ဖိတ်စာများနှင့်လည်းကောင်း၊ သတင်းစာများတွင်လည်းကောင်း အခမ်းအနားမပြုလုပ်မီ ရက်သတ္တပတ်မတိုင်ခင်ကပင် အသိပေးကြေငြာ ဖိတ်ကြားခဲ့ပါသည်။ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အခမ်းအနား ကျင်းပမည့် နေ့ရက်၊ အချိန်၊ နေရာကျဲ နေ့စဉ်ထုတ်သတင်းစာများ ဖြစ်သော မြန်မာ့အလင်းနှင့် ကြေးမုံသတင်းစာတွင် (၂၂.၁၂.၂၀၁၆) ရက်နေ့၌ အသိပေးကြေငြာခဲ့ပါသည်။

အဆိုပါအခမ်းအနားတွင် စီမံကိန်းနှင့်သက်ဆိုင်သော အကြောင်းအရာများ၊ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း၊ စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော ထိခိုက်မှုများကို အများပြည်သူများအား ရှင်းလင်းတင်ပြခဲ့ပါသည်။ ထို့နောက် တက်ရောက်လာသူများမှလည်း သိရှိလိုသော အကြောင်းအရာများကိုမေးမြန်းခဲ့ပြီး အပြန်အလှန်ဆွေးနွေးကြကာ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် အများပြည်သူများမှ စီမံကိန်းနှင့်ပတ်သက်၍ သဘောထားမှတ်ချက်များပေးခဲ့ကြပါသည်။ ကော့သောင်းမြို့နယ်တွင်ပြုလုပ်သော အခမ်းအနားတွင် ဌာနဆိုင်ရာမှ တာဝန်ရှိသူ (၁၉)ဦး၊ ဒေသခံပြည်သူများ (၁၂)ဦး၊ အစိုးရမဟုတ်သော အဖွဲ့အစည်းများမှ တာဝန်ရှိသူ (၂၄)ဦး၊ သတင်းမီဒီယာမှ တာဝန်ရှိသူ (၃)ဦး၊ ကုမ္ပဏီများမှ တာဝန်ရှိသူ (၈)ဦး၊ စုစုပေါင်း (၆၆)ဦး တက်ရောက်ပြီး စီမံကိန်းနှင့်သက်ဆိုင်သည်များကို ဆွေးနွေးခဲ့ကြကာ သဘောထားမှတ်ချက်များပေးခဲ့ကြပါသည်။ စစ်တပ်ကလပ်ကျေးရွာတွင် ပြုလုပ်သော အဆိုပါအခမ်းအနားကို စီမံကိန်းနှင့်သက်ဆိုင်သော သူများ စုစုပေါင်း(၃၄)ဦး တက်ရောက်ပြီး စီမံကိန်းနှင့် သက်ဆိုင်သည်များကို ဆွေးနွေးခဲ့ကြပါသည်။ (အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းနှင့် သက်ဆိုင်သည့်အကြောင်းအရာများကို အခန်း(၇)တွင် အသေးစိတ်ဖော်ပြထားပါသည်။)

ဒုတိယအကြိမ်မြောက် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်း အခမ်းအနားများကို တနသာရီတိုင်းဒေသကြီးအတွင်းရှိ ကော့သောင်းမြို့နယ်ရှိ ကော့သောင်း ဟိုတယ်တွင်လည်းကောင်း၊ ဘုတ်ပြင်းမြို့နယ်၊ စစ်တပ်ကလပ်ကျေးရွာ တွင်လည်းကောင်း ပြုလုပ်ခဲ့ပါသည်။ စီမံကိန်းနှင့်သက်ဆိုင်သူများ၊ သတင်းမီဒီယာများ၊ အစိုးရအဖွဲ့အစည်များ၊ အစိုးရမဟုတ်သော အဖွဲအစည်းများ နှင့် စိတ်ပါဝင်စားသူများအား ဖိတ်စာများနှင့်လည်းကောင်း၊ သတင်းစားများတွင်လည်းကောင်း အခမ်းအနားမပြုလုပ်မီ ရက်သတ္တပတ်မတိုင်ခင်ကပင် အသိပေးကြေငြာ ဖိတ်ကြားခဲ့ပါသည်။ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အခမ်းအနား ကျင်းပမည့် နေ့ရက်၊ အချိန်၊ နေရာကျဲ နေ့စဉ်ထုတ်သတင်းစာများ ဖြစ်သော မြန်မာ့အလင်းနှင့် ကြေးမုံသတင်းစာတွင် (၁၂.၁၀.၂၀၁၇) ရက်နေ့၌ အသိပေးကြေငြာခဲ့ပါသည်။

အဆိုပါအခမ်းအနားတွင် စီမံကိန်းဇရိယာအတွင်း၌ တိုင်းတာရရှိခဲ့သော ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးအချက်အလက်များ၊ တွေ့ရှိမှတ်တမ်းတင်ခဲ့သော ဇီဝမျိုးစုံမျိုးကွဲများနှင့် လူမှုစီးပွားဆိုင်ရာအခြေအနေများ၊ စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော ထိခိုက်မှုဆန်းစစ်ခြင်း နည်းလမ်းများ၊ ခွဲခြမ်းစိတ်ဖြာခြင်းနည်းလမ်းများ၊ စီမံကိန်း၏ သက်ရောက်မှုများကို လျော့ချရန်နည်းလမ်းများ၊ ပတ်ဝန်းကျင်ဆိုင်ရာစီမံခန့်ခွဲမှု အစီအစဉ်များကို ရှင်းလင်းတင်ပြခဲ့ပြီး၊ တက်ရောက်လာသူများမှ သဘောထားမှတ်ချက်များပေးကာ ဆွေးနွေးခဲ့ကြပါသည်။ ကော့သောင်းမြို့နယ်တွင်ပြုလုပ်သော အခမ်းအနားတွင် ဌာနဆိုင်ရာမှ တာဝန်ရှိသူ (၈)ဦး၊ လွှတ်တော်အမတ်များ (၅) ဦး၊ ဒေသခံပြည်သူများ (၆)ဦး၊ သတင်းမီဒီယာမှ တာဝန်ရှိသူ (၅)ဦး၊ ကုမ္ပဏီများမှ တာဝန်ရှိသူ (၂၀)ဦး၊ စုစုပေါင်း (၄၄)ဦး တက်ရောက်ပြီး စီမံကိန်းနှင့် သက်ဆိုင်သည်များကို ဆွေးနွေးခဲ့ကြပြီး သဘောထားမှတ်ချက်များပေးခဲ့ကြပါသည်။ စစ်တပ်ကလပ်ကျေးရွာတွင် ပြုလုပ်သော အဆိုပါအခမ်းအနားကို အများပြည်သူ စုစုပေါင်း(၅၅)ဦး တက်ရောက်ပြီး စီမံကိန်းနှင့် သက်ဆိုင်သည်များကို ဆွေးနွေးခဲ့ကြပါသည်။ (အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းနှင့် သက်ဆိုင်သည့်အကြောင်းအရာများကို အခန်း(၇)တွင် အသေးစိတ်ဖော်ပြထားပါသည်။)

Benchmade Asia Myanmar Ltd သည်စာချုပ်ပြီးဆုံးပြီးနောက် ဝအလယ် အပန်းဖြေစခန်းအား နိုင်ငံတော်အစိုးရထံသို့ လွှဲပြောင်းရာတွင် စနစ်ကျသောလုပ်ထုံးလုပ်နည်းတစ်ခုအား သတ်မှတ်ရေးသား၍ စနစ်တကျ လွှဲပြောင်းပေးရမည်။

ဝအလယ် သဘာဝအခြေခံ အပန်းဖြေ စခန်း တာဝန်ရှိသူသည် ပြည်ထောင်စုသမ္မတ မြန်မာနိုင်ငံတော်မှ ချမှတ်ထားသော မူဝါဒများ၊ ဥပဒေများ နှင့် နည်းဥပဒေများ၏ ရည်ညွှန်းချက်များကို လိုက်နာရမည်။

ဤပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာသည် လေ့လာဆန်းစစ်ရန် လိုအပ်သော သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုစီးပွားဝန်းကျင် အချက်အလက်များကို ဆုံးဖြတ်ရာတွင် သင့်တင့်မျှတ၍ မှန်ကန်သော သုံးသပ်ချက်များဖြင့် ပြုစုရေးသားထားပါသည်။

EXECUTIVE SUMMARY

This Environmental Impact Assessment (EIA) report is prepared by E Guard Environmental Services for Wa Ale Eco-tourism resort project which is implemented by Benchmade Asia Myanmar Ltd 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 Environmental Impact Assessment Procedure (2015) an EIA type projects undertaken by any ministry, government department, organization, corporation, board, development committee, local government or authority, company, cooperative , institution , enterprise, firm , partnership, or individual etc., which may cause impact on environmental quality are required to obtain prior permission in accordance with section 21 of the Environmental Conservation Law (2012) and article 62 of Environmental Conservation Rules (2014). Projects having potential to cause adverse impacts are required to undertake IEE or EIA or to develop an EMP, which is decided by Environmental Conservation Department (ECD) to obtain an Environmental Compliance Certificate (ECC) in accordance with the EIA procedure (2015).

The purpose of EIA process is to identify key environmental issues specific to the proposed project or the receiving environment (receptor), which are addressed in detail in this EIA report. The determination of the significant issues to be assessed for the potential significant impacts were determined through the research of primary and secondary data. Primary baseline data, baseline environmental data, relateding to physical, biological and socio-economic sources were collected directly during the field studies.

The fieldwork consisted of environmental quality measuring (air, water testing), socio-economic surveys, informal interviews and direct observations, and was conducted on December to determine the potential impacts during the construction, operation and decommissioning phases of the project to complement, the secondary data sourced from published reports and literature from available in the internet.

Relevant policies, legislations and institutional framework of Myanmar and the International guidelines in the context of environmental and socio-economic aspects of the project have been reviewed in the EIA process.

The following legislations are relevant to this Wa Ale Eco Resort Project;

Laws and Regulations	Year
Myanmar Constitution Law	2008
Environmental Policy	1994
National Land Use Policy	2016

Laws and Regulations	Year
The Environmental Conservation Law	2012
The Environmental Conservation Rules	2014
Environmental Impact Assessment Procedure	2015
Guidelines of National Environment Quality (Emission)	2015
The Conservation of Water Resources and Rivers Law	2006
Forestry Law	1992
The Wild Life Protection and Conservation of Local Flora and Fauna Law	1994
Protection of Ethnic Minority Rights	2013
Protection and Preservation of Cultural Heritage Regions Law (Amended by Law No. 1 of 2009)	1998
Natural Disaster Prevention Law	2013
Myanmar Investment Law	2016
Myanmar Hotel and Tourism Law	1993
Development Affairs Committee Law	1993
Land Acquisition Act	1894
Public Health Law	1972
Social Security Law	2012
National Food Law	1997
Myanmar Fire Services Law	2015
Labour Organization Law	2011
Labour Dispute Law	2012
Employment and Skill Development Law	2013
Minimum Wage Law	2013
Application of International Guidelines	
IFC Environmental, Health and Safety (EHS) Guidelines	2007
IFC Guidelines on Water and Sanitation	2007
IFC Guidelines on Waste Management Facilities	2007
IFC Guidelines for Tourism and Hospitality Development	2007

This proposed project is undertaken by Benchmade Asia Myanmar Ltd which is 100% foreign investment. The proposed project is located at Wa Ale Kyun, North Latitude 10’ 51.1321’and

East Longitude 98’03.774’, Lampi Island Marine National Park, Bokpyin Township, Kawthaung District, Tanintharyi Region. Wa Ale is part of the Myeik archipelago which located in southern Myanmar. It is 60 Nautical miles far away from Kawthaung, 45 minutes from Kawthaung and 45 minutes boat rides to Wa Ale from new port. Wa Ale is adjacent to Lampi island, one of the largest island in the archipelago.

The area of Wa ale Kyun is (3934) acres. The proposed project will be used in (3) areas of Wa Ale island. The areas (1) is (158,822 sq.m) 39.25 acres, the area (2) is (217,328 sq.m) 53.70 acres and the area (3) is (29,122 sq.m) 7.20 acres. A total area of the proposed development is about 100.15 rented from the Ministry of Environmental Conservation and Forestry. The type of Land is National Park Land. The lease rate of the proposed project operation will be for initial period of (50) years extendable twice at 10 years, at a time.

The Eco resort hotel development will be implemented with Build, Operate and Transfer system (BOT) for 3 areas on the Wa Ale island. The construction period will be from October 2015 to March 2019.

Area No. (1) will be in a higher-end Luxury Eco Villas which includes 30 Eco Villas facing the sea, structure for a restaurant and kitchen as well as reception areas and staff housing, spa, generator, solar powered electricity (to the extent possible without affecting the beauty of the scenery) and Kubota Waste Management System. The area No. (2) will be in a higher-end luxury Eco Villas which includes 30 high-end 1-4-bedroom bungalows or Eco villas facing the seas, restaurants, generator, solar powered electricity (to the extent possible without affecting the beauty of the scenery) and Kubota Waste Management System. The area No. (3) will be in a higher-end hotel which includes 10 room lodges or Eco villas facing the sea, restaurant, generator, solar powered electricity (to the extent possible without affecting the beauty of the scenery and Kubota Waste Management System.

Description on the environmental and social conditions are presented based on the latest available primary and secondary information. The environmental data include climate, air quality, noise, water quality and consumption, regional geology, waste, fire-fighting facilities etc. Also, social and cultural resources and occupational status were detaily described in Chapter 4.

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 were 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).

Potential impacts have been classified into the following project phases: Construction, Operation and Decommissioning phases. Potential impacts are categorized into the following:

- Positive or negative
- Duration
- Reversibility
- Cumulative Impacts and In-combination impacts

Criteria for the determination of sensitivity or of importance or value of receptors have been broadly established based on approved guidance, legislation, statutory designation and /or professional judgment. Significant of Impacts are assessed based on a matrix taken into account the sensitivity of the receiving environment and magnitude of change.

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

The monitoring parameters are selected based on impacts identified in the construction, operation and decommissioning phases of the Benchmade Asia Myanmar. The parameters determined will reflect the effectiveness of the mitigation measures and general environmental performance of the project.

The potential significant negative impacts of the Wa Ale Eco-tourism project, during the construction phase are as follows;

- Change access rights and usage
- Site clearance
- Noise
- Material storage
- Sewage disposal
- Solid waste production
- Light pollution

The potential significant positive impacts of Wa Ale Eco-tourism project, during the construction phase are as follow;

- Employment

During the operation phase, significant negative impacts of Wa Ale Eco-tourism project are as follow;

- Resource consumption
- Change access rights and usage
- Sewage disposal
- Generate Solid waste and disposal
- Light pollution

- Misuse of marine resources
- Diesel and oil spills

During the operation phase, positive impacts of Wa Ale Eco-tourism project are as follow;

- 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

RESOURCE CONSUMPTION

Wa Ale island is off grid with no power from the mainland, therefore, as an alternative energy source, BAM will be relying on solar power and generators. Although fully depends on the solar energy for the energy need is a certain goal for Wa Ale resort but while solar energy could not able to support the energy needs, BAM will continuously look for the alternative ways which are more clean, green and efficient. The solar farms will be planting in designated areas. If the solar energy source fall short, the propane generators which is a cleaner alternative to petrol or diesel generators will support.

WATER:

There are several areas where we will be water efficient and responsible on Wa Ale Kyune.

- No drilling of deep water wells
- Rain water capture near villas
- Sea water swimming pool
- Kubota Waste Management System

The water usage from island resources will be very limited due to the policies that will be implemented above. Drilling deep into the island will harm its long-term water sources but capturing river and rain water through cisterns and large capture areas is the most environmentally friendly path.

WASTE DISPOSAL

Wa Ale project will install the Kubota Waste Management System. Kubota sewage treatment system is not just a septic tank but a wastewater treatment system. The tank features various functions such as anaerobic, aerobic, sedimentation and disinfection. The treatment of wastewater is as same quality as a centralized sewage system. **BOD removal ratio > 90%, effluent BOD < 20mg/l**. However unlike a centralized sewage system, Johkasou can save customers up to 80% of costs and construction time required. Kubota FRP Johkasou can be customizable to cater for any undividual requirements and installed in a short time frame. Higher quality than regular RC type tanks.

Johkasou uses standardized high quality FRP materials in construction. Kubota FRP Johkasou is low cost and easy to maintain. This advanced technology not only increases the treatment efficiencies (better performance) but also makes it easy to maintain. The system can be operated by automatic control panel, it is not necessary to arrange a resident operator. **The system can treat any type of wastewater including kitchen, toilet, and laundry and bathrom sewage**.

TRASH WASTE

According to the Wa Ale eco-resort management plan, the trash waste will be transported to the Kautthaung on a weekly basis via the cargo boats. On the island, there will be a recycle plastic grinder which will take all plastic waste and reduce them into pellets. These pellets will be used in construction or will be transported back to the Kautthaung.

The Wa Ale management intend to buy as much as produce and food from local sources in order to reduce packaging and thus trash consumption. Moreover, to reduce the plastic waste there will not allow the plastic water bottles on the island and will not use at the hotel. There will be no chemicals used or waste emitted into the ocean or the forest.

CUMULATIVE IMPACT ASSESSMENT

Development activities such as Wa Ale Eco Tourism project 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 Wa Ale Eco Tourism 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.

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. 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.

ENVIRONMENTAL MANAGEMENT PLAN

The environmental management plan of Benchmade Asia Myanmar Ltd is organized with the following sections:

1) Environmental Management Plan
2) Environmental Monitoring Plan
3) Occupational Health and Safety Plan
4) Emergency Response Plan
5) Oil Spill Response Plan
6) Waste Management plan

7) Corporate Social Responsibility Plan
8) Biodiversity Management Plan
9) Cultural exchange control plan

OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The objectives of Environmental Management Plan are:

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

ENVIRONMENTAL MONITORING PLAN

MONITORING PARAMETERS

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

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

Operation Phase: To determine the impacts that might arise from the operation of hotel and office complex activities

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

All the potential negative impacts need to be mitigated and reduced by following the Mitigation Measures, Environmental Management Plan and Environmental Monitoring Plan. All the potential positive impacts need to be enhanced and maintained by following the Environmental Management Plan and Environmental Monitoring Plan.

During the construction period, most of the negative impacts can be reduce by following the mitigation measures, for example, the negative impact of light pollution can be mitigated as all the construction activities should not start before 6 AM and should stop after 6 PM. All the light on beach should light out after 7 PM except for emergency light.

During the operation period, the negative impacts can be reduced by following the mitigation measures. The impacts are concerned with resource consumption, change access rights and usage, sewage disposal, generation of solid waste and disposal, light pollution, misuse of marine resources, diesel and oil spills.

The positive impacts during operational period are employment opportunity for 210 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 and increase in the provision of public services with the introduction of municipal and medical services are the positive impacts due to the Wa Ale Eco-tourism project.

Wa Ale Eco-tourism project is located in the Myanmar Marine National Park which has rich biodiversity and resourceful nature. Although the project nature itself is environmental friendly and all throughout the processes are less harmful to the nature, some actions and processes need to strictly follow the mitigation measures and plans.

Solid waste production and disposal is one of the difficult challenge to control in hotel and resort project type, especially on island ones. For this action, the project proponent has to implement proper waste management system and need to give proper awareness to the workers and employee to dispose the waste at the garbage can and dispose the collected waste at the designated waste disposal area. The proponent need to implement and follow up the waste management plan, environmental management plan and biodiversity management plan.

Although hospitality industry consumes a lot of energy and resources Wa Ale Eco-tourism project intend to persuade their environmental friendly goals. Although fully depends on the solar energy for the energy need is a certain goal for Wa Ale resort but while solar energy could not able to support the energy needs, BAM will continuously look for the alternative ways which are more clean, green and efficient.

For the freshwater source, there are several areas where will be water efficient and responsible on Wa Ale island. According to the resources conservation plan there will no drilling of deep water wells, rain water capture near villas and Kubota Waste Management System. The water usage from island resources will be very limited due to the policies.

According to the data from field survey, there were 9 species recorded in IUCN red-list status. Project proponent need to follow biodiversity management plan to avoid harmful impact on them. Wa Ale island is recognized as rich biodiversity and its resourceful nature, but it is still need to study and explore more about its biodiversity status and habitat, especially in marine biodiversity. The project proponent should collaborate with universities, invite professionals to study the Wa Ale island and publish scientific journal or report about the island's biodiversity and habitats.

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 disclosed such reports to Project Affected Persons (PAPs) upon request.

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

Wa Ale management body have to fully implement Corporate Social Responsibility (CSR) Plan as an ethical obligation, so as to be regarded as 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.

PUBLIC CONSULTATION AND DISCLOSURE

According to the EIA procedure (Article 60 and 61) public consultation meeting has to be performed during the preparation of the scoping report and information about Benchmade Asia Myanmar Ltd have to be made available to stakeholders, so as to understand the project. Likewise, public disclosure has to be made during the final stage of the EIA report and to be included in the final EIA report.

PURPOSE OF PUBLIC CONSULTATION IN EIA PREPARATION

The purpose of the Public Consulting meeting is to organize, responsible persons and procedures to be applied for public engagement that is mandatory according to Myanmar Environmental Impact Assessment Procedure (2015).

Two public consultation were held for this proposed project. First public consultation was held at Garden Hotel, Kauthaug Township and Sitta Galet Village, Tanintharyi Division. Invitation letters together with the notice of the meeting was sent to respective stakeholders one week in advance to the meetings. The public announcement for the public consultation was advertised in Myanma Alinn and Kyaymone Newspaper at 22/Dec/2016.

In this public consultation meeting, explained about the outline of project activities, EIA Procedure, Potential impacts of the proposed project and answered to questions and having the comments from the stakeholders. A total of 66 persons were attend the meeting which held at Kauthaung Township, among them 19 persons from Government sector, 12 persons from public, 24 persons form NGOs, 3 persons from media and 8 persons from private company were attend to this public consultation meeting and asked the questions about the project and comment to it. A total of 34 persons were attend to the meeting which held at Sitta Galet Village (overview of the public consultation meeting was described in Chapter- 7).

The second public consultation and disclosure meeting was held at Kauthaung Hotel, Kauthaug Township and Sitta Galet Village, Bokpyin Township, Tanintharyi Division. Invitation letters together with the notice of the meeting was sent to respective stakeholders one week in advance to the meetings. The public announcement for the public consultation was advertised in Myanma Alinn and Kyaymone Newspaper at 12/Oct/2017.

In this public consultation meeting, explained about the recorded Environmental Quality data, observed Biodiversity and Socio-economic data, impacts methodology, analysis, mitigation measures and management plans and answered to questions and having the comments from the stakeholders. A total of 44 persons were attend the meeting which held at Kauthaung

Township, among them 8 persons from Government sector, 5 persons from Hlutt Taw, 6 persons from public, 5 persons from media and 20 persons from private company were attend to this public consultation meeting and asked the questions about the project and comment to it. A total of 55 persons were attend to the meeting which held at Sitta Galet Village (overview of the public consultation meeting was described in Chapter- 7).

Benchmade Asia Myanmar Ltd should have implement the systematic procedure to transfer the Wa Ale resort to government after the contract end.

Wa Ale Eco-tourism management body have to abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar.

This EIA report has identified environmental and social issues, which need to be investigated. in order to keep the impacts in an acceptable manner. Mitigation measures should be carried out in line with applicable guidelines, regulations and Good International Industry Practice (GIIP).

CHAPTER 1: OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

INTRODUCTION

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

The following are the legislations relevant to this Wa Ale Eco Resort Project;

Laws and Regulations	Year
Myanmar Constitution Law	2008
Environmental Policy	1994
The Environmental Conservation Law	2012
The Environmental Conservation Rules	2014
Environmental Impact Assessment Procedure	2015
National Environment Quality (Emission) Guidelines	2015
Protection of Ethnic Minority Rights	2013
The Conservation of Water Resources and Rivers Law	2006
Forest Law	1992
The Wild Life Protection and Conservation of Local Flora and Fauna Law	1994
Protection and Preservation of Cultural Heritage Regions Law (Amended by Law No. 1 of 2009)	1998
Natural Disaster Prevention Law	2013
Myanmar Investment Law	2016
Myanmar Hotel and Tourism Law	1993
National Land Use Policy	2016
Land Acquisition Act	1894
The Underground Water Act	1930
Development Affairs Committee Law	1993
Social Security Law	2012
National Food Law	1997
Labour Organization Law	2011

Employment and Skill Development Law	2013
Minimum Wage Law	2013
Public Health Law	1972
Application of International Guidelines	
IFC Environmental, Health and Safety (EHS) Guidelines	2007
IFC Guidelines on Water and Sanitation	2007
IFC Guidelines on Waste Management Facilities	2007
IFC Guidelines for Tourism and Hospitality Development	2007

1.1 RELEVANT LEGISLATIONS

MYANMAR CONSTITUTION LAW (2008)

The Union shall protect and conserve natural environment.

Every citizen has the duty to assist the Union carrying out the environmental conservation.

ENVIRONMENTAL POLICY (1994)

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

ENVIRONMENTAL CONSERVATION LAW (2012)

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

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

The law serves as the basic for founding of Environmental Conservation Department (ECD) under the Ministry of Natural Resources and Environmental Conservation (MONREC), both of which will be explained later. Following the Environmental Conservation Law are two legal instruments: Environmental Conservation Rules (2014) and EIA Procedures (2015).

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

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

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

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

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

Section 10: Environmental Quality Standards

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

(a) Suitable surface water quality standards in the usage in rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs and other inland water sources of the public;
(b) Water quality standards for coastal and estuarine areas;
(c) Underground water quality standards;
(d) Atmospheric quality standards;
(e) Noise and vibration standards;
(f) Emissions standards;
(g) Effluent standards;

(h) Solid wastes standards;
(i) Other environmental quality standards stipulated by the Union Government.

Section 13: Monitoring

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

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

Section 14:

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

Section 15:

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

ENVIRONMENTAL CONSERVATION RULES (2014)

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

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

Rules 58:

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

Rules 60:

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

Rules 61:

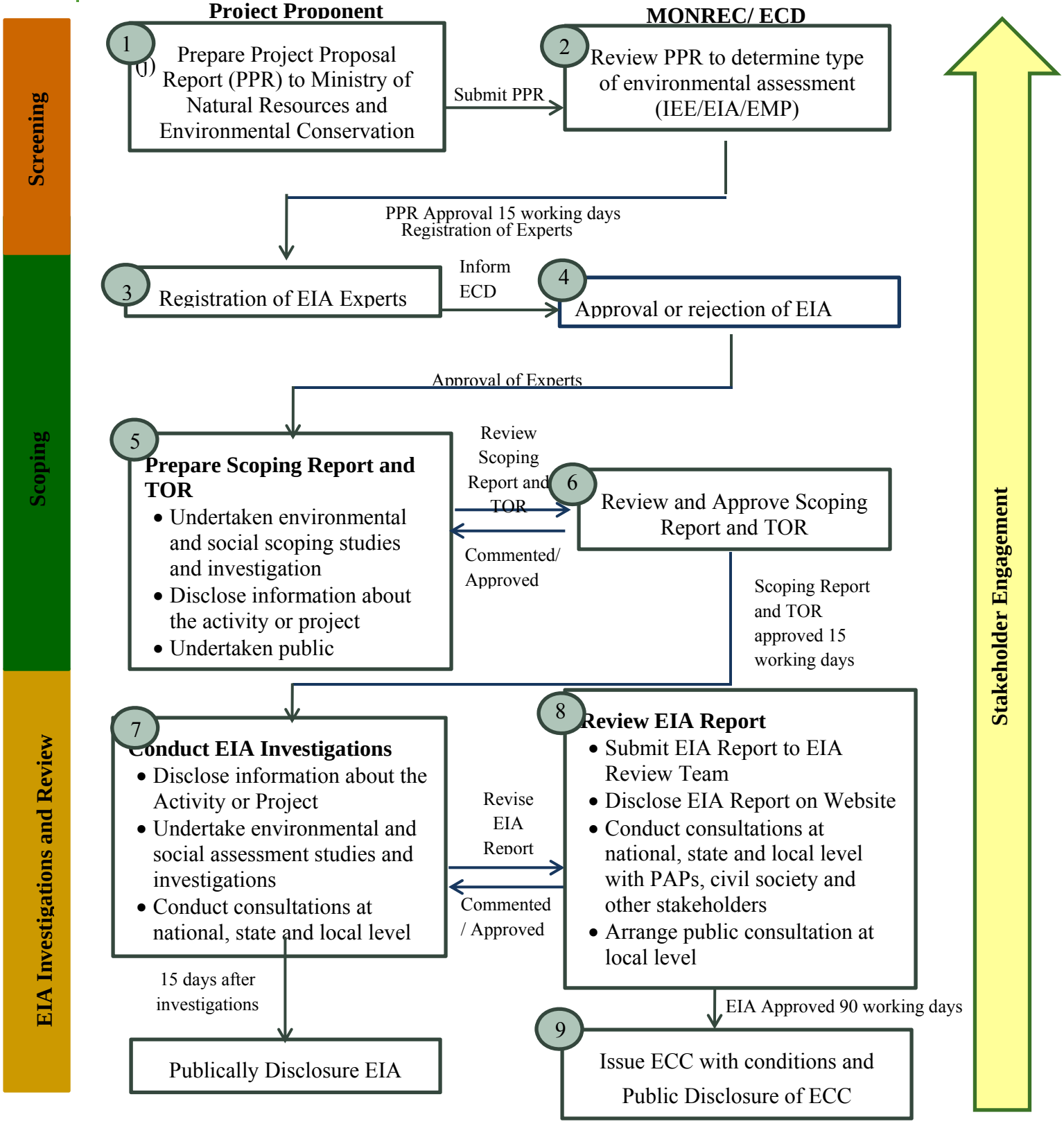
The Ministry may approve and reply on the environmental impact assessment report or environmental management plan with the approval of the Committee.

ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURES (2015)

(1) Outline of the Procedures

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

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



Abbreviation

ECC – Environmental Compliance Certificate
ECD – Environmental Conservation Department
EIA – Environmental Impact Assessment
EMP – Environmental Management Plan
IEE – Initial Environmental Examination
MONREC – Ministry of Natural Resource and Environmental Conservation
PAPs – Project Affected Persons
PPR – Project Proposal Report
TOR – Terms of Reference

The objective of these national guidelines is to provide the basis for regulation and control of noise and vibration, air emissions, liquid discharges from various sources. According to these guidelines, all projects subject to EIA procedure have to comply with and refer to applicable national guidelines/ standards or international standards adopted by the Ministry. In addition, a project proponent shall be responsible for the monitoring of their compliance with general and applicable industry- specific guidelines as specified in the EMP and ECC (Environmental Compliance Certificate).

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

Section 12:

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

Section 13:

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

PROTECTION OF ETHNIC MINORITIES RIGHTS (2015)

This law aims for every ethnicity to get equal citizen's rights of Union Constitution laws, living friendly together based on union peace. It prohibits every one not to interrupt the rights and opportunities of any ethnicity prescribed by this law without any strong reason.

This law aims for every ethnicity to get equal citizen's rights of Union Constitution laws, living friendly together based on union peace.

Section 22:

Everyone cannot interrupt the rights and opportunities of any ethnicity prescribed by this law without any strong reason.

So, the project proponent has the responsibility to consider the rights and opportunities of any ethnicity if any ethnicity is found to be affected by the proposed project.

THE CONSERVATION OF WATER RESOURCES AND RIVERS LAW (2006)

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

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

b) To smooth and safety waterways navigation along rivers and creeks;

c) To contribute to the development of State economy through improving water resources and river system;

d) To protect environmental impact.

FOREST LAW (1992)

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

THE WILD LIFE PROTECTION AND CONSERVATION OF LOCAL FLORA AND FAUNA LAW (1994)

The Director General shall, with the approval of the Minister:

a) Determine and declare endangered species of wild animal which are to be protected according to the following categories:
   i. Completely protected species of wild animals;
   ii. Normally protected species of wild animals;
   iii. Seasonally protected species of wild animals;
b) Determine and declare the endangered species of wild plants and their nature habitats thereof;
c) Lay down and carry out measures for the preservation of protected wildlife species;
d) Co-ordinate with the relevant department or organization if the wildlife which are to be determined for protection are under the administration of another Government department or Government organization.

THE PROTECTION AND PRESERVATION OF CULTURAL HERITAGE REGIONS LAW (1998)

The State Peace and Development Council Law enacted this law by Law No. 9/ 98 on the date of 10thSeptember, 1998. The Ministry of Culture may, with the approval of the Government Issue notification for the protection of cultural heritage areas are categorized as following kinds of zones/region:

a) Ancient monumental zone;
b) Ancient site zone.

Objectives:

a) To implement the protection and preservation policy with respect to perpetuation of cultural heritage that has existed for many years;
b) To protect and preserve the cultural heritage regions and the cultural heritage therein so as not to deteriorate due to natural disaster or man-made destruction;
c) To uplift hereditary pride and to cause dynamism of patriotic spirit of citizens by protecting and preserving the cultural heritage regions;
d) To promote public awareness and will as to the high value of the protection and preservation of the cultural heritage regions;
e) To protect the cultural heritage regions from destruction;
f) To carry out protection and preservation of the cultural heritage regions in conformity with the International Convention approved by the State.

It is also stated in the "Determining of Cultural Heritage Region" that the Ministry of Culture may carry out for the acquisition of any land within the cultural heritage region, if necessary:

"If the land is under the administration of any government department or government organization, coordinating in advance, with the relevant government department or government organization".

NATURAL DISASTER PREVENTION LAW (2013)

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

The objectives of this Law are as follows:

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

Section 6, article 16:

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

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

e) Performing other duties assigned by this law in respect of the preventive measures.

MYANMAR INVESTMENT LAW (2016)

40. Investment includes the followings:

a) Enterprise;
b) moveable property, immovable property and related property rights, cash, pledges, mortgages and liens, machinery, equipment, spare-parts, and related tools;
c) shares, stocks, and debentures of a company;
d) intellectual property rights in accordance with applicable laws, including technical know-how, inventions, industrial designs, and trademarks;
e) claims to money and to any performance under contract having a financial value;
f) rights under contracts, including turnkey, construction, management, production or revenue-sharing contracts; and
g) assignable rights granted by relevant laws or contract including the rights of exploration, prospecting and extraction of natural resources;

41. The following investments shall be stipulated as prohibited investment:

a) business/ investment activities which may bring or cause the hazardous or poisonous wastes into the Union;
b) business/ investment activities which may bring technologies, medicines, flora and fauna and instruments which are still being tested abroad or which have not been obtained approvals for use, planting and cultivation except the investments which made for the purpose of research and development;
c) business/ investment activities which may affect the traditional culture and customs of the racial groups within the Union;
d) business/ investment activities which may affect the public health
e) business/ investment activities which may cause significant damage to the natural environment and ecosystem; and
f) business/ investment activities which manufacture goods or provide services that are prohibited in accordance with applicable laws.

42. The following investment activities shall be stipulated as restricted investment:

a) Investment activities allowed to carry out by Government only;
b) Investment activities restricted to foreign investors;
c) Investment activities allowed only in form of joint venture with a citizen owned entity or a citizen of Myanmar; and
d) Investment activities permitted with the recommendation of the relevant ministries.

50. (b) Foreign investor may lease land or building up to an initial period of 50 years commencing on the date of receipt of the permit or endorsement from the Commission either from the Government or governmental organizations or from private land or building owners.

(c) After the expiry of the term permitted under sub-section (b), a consecutive period of 10 years and a further consecutive period of 10 years extension to the initial period of lease land or building may be obtained with the approval of the Commission.

(f) The Commission shall, for the purpose of the development of the entire Union with the approval of Pyidaungsu Hluttaw submitted through the Government, grant a longer period for the rights to lease land or building and the rights to use land under this Law, to investors who invest in least developed and remote region.

65. The Investor -

(f) shall not make any significant alteration of topography or elevation of the land on which he is entitled to lease or has rights to use, without the approval of the Commission;

(g) shall in relation to the investment business, abide by applicable laws, rules, procedures and best standards practiced internationally so as not to cause damage, pollution, loss to the natural and social environment and not to cause damage to cultural heritage;

(q) The investments which need to obtain prior approval under the environmental conservation law and the procedures, shall take permit or endorsement of Commission before undertaking the assessment. Such Investments which obtained permit or endorsement, shall report environmental and social impact assessment to the Commission along the period in which the activities of the investments.

75. (a) With respect to the income tax exemption, the Commission will issue a notification with the approval of the Union Government to designate as Zone (1), the regions that are least-developed, and as Zone (2), the regions that are moderately developed, and as Zone (3), the regions that are adequately developed, and income tax exemption may be granted to investment businesses in Zone (1) for a period of 7 consecutive years including the year of commencement of the business, investment businesses in Zone (2) for a period of 5consecutive years including the year of commencement the business, and investment businesses in Zone (3) for a period of 3 consecutive years including the year of commencement of the business.

MYANMAR HOTEL AND TOURISM LAW (1993)

In Section (3) in this law stated as the following;

a) 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.

In Section 8 in this Law stated the requirements for a License to operate a hotel as follow;

1) License issued by the township municipal concerned if it is a lodging-house.
2) Registered in accordance with the Myanmar Company Act if it is a limited company or joint-venture.

Certificate of the standard of health hygiene for the hotel or lodging-house by the department concern.

NATIONAL LAND USE POLICY (2016)

a) To promote sustainable land use management and protection of cultural heritage areas, environment, and natural resources for the interest of all people in the country;

b) To strengthen land tenure security for the livelihoods improvement and food security of all people in both urban and rural areas of the country;

c) To recognize and protect customary land tenure rights and procedures of the ethnic nationalities;

d) To develop transparent, fair, affordable and independent dispute resolution mechanisms in accordance with rule of law;

e) To promote people centered development in land resources and accountable land use administration in order to support the equitable economic development of the country;

f) To develop a National Land Law in order to implement the above objectives of National Land Use Policy.

LAND ACQUISITION ACT (1894)

This British era act is still effective at present due to the lack of new legislation relevant to land acquisition. The Act stipulates that the government could acquire a land, if it was deemed to be in the interest of the public. Religious lands such as pagodas, stupas, shrines, and cemeteries were not subject for acquisition.

THE UNDERGROUND WATER ACT (1930)

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

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

Environmental Quality Standards

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

a) suitable surface water quality standards in the usage in rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs and other inland water sources of the public;
b) Water quality standards for coastal and estuarine areas;
c) Underground water quality standards;
d) Atmospheric quality standards;

e) Noise and vibration standards;
f) Emissions standards;
g) Effluent standards;
h) Solid wastes standards;
i) Other environmental quality standards stipulated by the Union Government.

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

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

DEVELOPMENT COMMITTEE LAW (1993)

Food Safety Responsibilities:

a) Provision of health certificate to food stall
b) Recommendation for licensing of food stall
c) Medical examination of food handlers
d) Training on food safety
e) Food hygiene & food safety of food manufacturer & food stalls
f) Granting permission for slaughter house and sale of meat.

SOCIAL SECURITY LAW (2012)

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

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

NATIONAL FOOD LAW (1997)

Food Safety Responsibilities:

a) Recommendation on imported and exported food
b) Post market surveillance (risk assessment)

c) HACCO along with general practice for food inspectors and manufactures
d) Food safety training for restaurants, street, vendors, etc.
e) Laboratory training on basic food analysis.

LABOR ORGANIZATION LAW (2011)

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

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

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

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

THE EMPLOYMENT AND SKILL DEVELOPMENT LAW (2013)

Employee Skill Development and Doing Training Program

14. The employer shall carry out the training program in accord with the work requirement in line with the policy of the skill development team to develop the skill relating to the employment for the workers who are proposed to appoint and working at present.

15. The Employer:

(a) shall carry out the training for each work or compounding the work individually or group – wise by opening on – job training, training systematically at worksite, sending outside training and training by using information technology system, for arranging the training program to enhance the employment skill of the workers;
(b) Appointing the youths of 16 years as apprentice, shall arrange the training for technology relating to the employment systematically in accord with the regulations prescribed by the skill development team.

The project proponent shall make training plans and programs for skill development of the workers and staff in accordance with the above-mentioned section 14 and 15 of the Employment and Skill Development Law.

THE LEAVE AND HOLIDAY ACT, 1951 (LAW AMENDED JULY, 2014)

Aim/ Objective:

- To allow worker for leave and holiday allowances, religious or social activities with earn allowance, and benefits for Health allowances.

- Concerned workers: Daily wage workers/ temporary workers/ permanent workers.

Casual Leave (6) days:

- Casual leave of 6 days with wages is to be provided
- Casual leave can be taken a maximum of 3 days at a time except in special cases
- Casual leave cannot be joined with any other leave
- Leave will be cancelled if it has not been used within a year

Earned leave (10) days:

- For continuous services of 12 months and above, 10 days of 'earned leave' shall be entitled
- If the service day is not 24 days 1-day deduction from earned Leave is made-
- Can be accumulated for up to 3 years

Medical Leave (30) days:

- Workers are entitled to 30 days of medical leave with full pay if 6 months service has been completed
- If 6 months service has not been completed, 'leave without pay' can be granted for medical needs
- Medical leave can be joined with Earned Leave
- If not taken within a year, medical leave is void or cancelled.

Maternity leave:

- Workers requiring it are entitled to 6 weeks maternity leave before confinement and at least (8) weeks after confinement
- Can be entitled jointly with medical leave

Public Holidays (21) days:

- Workers can enjoy time off with full pay.
- If work is given on a public holiday, twice the rate of regular wages is required.

Penalty for violation:

- Individuals violating this law may be sentenced to up to 2 years of imprisonment.

The project proponent shall comply with the Leave and Holiday Act (1951) for the benefits of workers prescribed under this law.

THE MINIMUM WAGE LAW (2013)

The Duties of the Employer

12. The employer:

(a) shall not pay wage to the worker less than the minimum wage stipulated under this Law;
(b) may pay more than the minimum wage stipulated under this Law;

(c) shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law;
(d) shall pay the minimum wage to the workers working in the commercial, production and services business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker;
(e) In paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. Such payment shall be for any personal use and benefit of the worker and his family and the value shall also be considerable and fair.

13. The employer:

(a) Shall inform the workers the rates of minimum wages relating to the business among the rates of minimum wage stipulated under this Law and advertise it at the workplace to enable to be seen by the relevant workers;
(b) Shall prepare and maintain the lists, schedules, documents and wages of the workers correctly;
(c) Shall report the lists, schedules and documents prepared and maintained under subsection (b) to the relevant department in accord with the stipulations;
(d) Shall accept the inspection when summoned by the inspection officer. Moreover, he shall produce the said lists and documents upon asking to submit;

The project proponent shall pay the minimum wage to the workers by obeying the section 12 and 13 stipulated under this Law.

PUBLIC HEALTH LAW (1972)

Chapter 2: Protection of Public Health

Though present in any existing laws, the Government should advise, inspect, monitor, amend or prohibit the following health issues in order to improve the health of the people and to prevent from being harmful to their health,

(1) Issues related with the environmental health
(a) Storage and disposal of litter and waste in the environment where people are residing
(b) Setting and drinking water to meet the international standards and protection for the public
(c) Prevention of pollution in the surrounding atmosphere of the residential area due to emission, odor, dusts, noise and radiation.
(d) To assist for the cleanliness and healthiness of urban and rural areas, constructing of housing and also for establishing clean and healthy dwelling areas.
(2) Issues related with the Productions of Commercial Food by the public-
(a) Registration, canceling and re- registration of food manufacturing industry, factory and business centers,
(b) Making good hygiene of foods sold by the public

(c) Prevention of forgery of foods produced by the public, mixing the unqualified materials in the products and extraction of the original materials from the foods
(d) Making good hygiene of food manufacturing industry, factory and business centers
(e) Making good hygiene of the food- selling premises
(f) Prohibition of unhealthy workers with communicable diseases in the food production and selling places
(g) Confiscation and destruction of hazardous foods
(h) If it is necessary for checking foods, they should be sent to government laboratories for testing.
(i) Making the foods comply with the Nationals Standards from time to time

(3) Issues related with Domestic and Cosmetic Materials used by the public
(a) Registration, canceling and re- registration of household and cosmetic materials manufacturing industry, factory and business centers,
(b) Prohibition of manufacturing the household and cosmetic products if these are harmful, toxic, and presence of harmful radiations for the public,
(c) Destruction of already manufactured hazardous household and cosmetic products in an un-harmful way for the public,
(d) Collection and destruction of hazardous household and cosmetic products from the shops,
(e) Making the domestic and cosmetic products to comply with the nationals standards from time to time

(4) Issues related to communicable diseases
(a) In order to prevent the spread of communicable diseases, announcement of specific diseases should be made locally if needed
(b) Observation, setting the plan for immunization of the public, Immunization, elimination of pests and animals and other necessary works for prevention of communicable disease
(c) Issuing the notification as an emergency area (State, Division, District, Township, Ward, Village or specific place) if there is any situation of outbreak of infectious diseases which will cause jeopardy for the public or if there is an outbreak of communicable disease, necessary control measures has to be undertaken.

(5) Issues related to the Private Health Care Centers
(a) Setting up the necessary regulations for Private Health Care Centers,
(b) Registration, canceling and re- registration of Private Health Care Centers,

(6) Issues related to the medicines for public use
(a) Registration, canceling and re- registration for manufacturing of medicines for selling and distribution,
(b) To make sure that the medicines are un- harmful to the public and genuine, the sample of medicines and the production procedure have to be sent to the organizations formed by the Government
(c) Prohibition of advertisement of the quality of medicine more than what they deserve or advertisements with fake,
(d) Distribution of the imported medicines only after the quality test,

(e) In order to test the quality of the medicine, it should be tested in laboratories assigned by the Government

Chapter 3: Duties and Obligations of the Organizations

5. the organizations formed under this law, or person assigned by these organizations, government departments assigned by this law and the Organizations under the Government, has given empowerment to make inspection and instructions at anytime in the factory, industry, working centers, shops, premises, buildings and places for the issues related with the health of the environment, foods, household and cosmetic materials for public use, communicable diseases, private health care centers and medicines.

The project proponent shall prevent the pollution in the surrounding atmosphere of the residential area due to emission, odor, dusts, noise and radiation and avoid storage and disposal of litter and waste in the environment where people are residing as per section of the public Health Law.

1.2 : APPLICATION OF INTERNATIONAL GUIDELINES

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

IFC GUIDELINES FOR TOURISM AND HOSPITALITY DEVELOPMENT (2007)

The EHS Guidelines for Tourism and Hospitality Development contain information relevant to tourism and hospitality facilities, including business and city hotels, resorts, eco-lodges, and other accommodation and catering facilities.

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

The World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). The EHS Guidelines contain the performance levels and measures that are normally acceptable to IFC and that are generally considered to be achievable in new facilities at reasonable costs by existing technology. The General EHS Guideline contains information on crosscutting Environmental, Health, and Safety issues potentially applicable to all industry sectors. It should be used together with the relevant industry sector guideline(s). When host country (Myanmar) regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent.

IFC GUIDELINES ON WATER AND SANITATION, (2007)

The EHS Guidelines for Water and Sanitation include information relevant to the operation and maintenance of potable water treatment and distribution systems, and collection of sewage in

centralized systems (such as piped sewer collection networks) or decentralized systems (such as septic tanks subsequently serviced by pump trucks) and treatment of collected sewage at centralized facilities.

IFC GUIDELINES ON WASTE MANAGEMENT FACILITIES (2007)

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

ENVIRONMENTAL AND SOCIAL EXPERTS

TEAM LEADER

MOH MOH KHAING (Ms)

Moh Moh Khaing is a Consultant who holds Transitional Consultant Certificate No 0072, described expertises are Biodiversity and Ecology and Marine Biology and Microbiology. She has Master of Research Degree in Microbiology and Master of Science Degree in Marine Science, University of Pathein, Myanmar, at 2013 and 2012. She has more than 4 years of consulting experience in Environmental and Social Impact Assessment field, which include Planning and Identifying, Coordinating, Ecology and Habitats, Physical and Biological Monitoring, Socio-economic Monitoring, Data Analysis and Technical Report Writing. She also has an experience as Research Fellow in Conservation field.

TEAM MEMBERS

JAINT YADANAR (Ms)

Jaint Yadanar is an Associate Consultant, who holds Transitional Consultant Certificate No 0098, described expertises are Biodiversity and Ecology and Socio-economy. She has Bachelor Degree in Forestry from the University of Forestry in 2013. She has experiences on environmental site surveys and also socio-economic surveys. Another experience is to cooperate with clients and to conduct stakeholder engagement and public consultation meeting.

AUNG MYINT MYAT (Mr)

Aung Myint Myat is an Associate Consultant, who holds Transitional Consultant Certificate No 0099, described expertises is Forestry. He has Bachelor Degree in Forestry from the University of Forestry in 2014. He has three years experiences on environmental site surveys and also socio-economic surveys. Another experience is to cooperate with clients and to conduct stakeholder engagement and public consultation meeting.

INNA LAZAREVA (Ms)

Inna Lazareva is an Associate Consultant, who holds Transitional Consultant Certificate No 0096. She has received B.A and M.A in Burmese and Chinese Philology from University of St. Petersburg (Russia) and MLitt degree by research (Burmese) at the University of Oxford. She had worked with communities and on social issues at different organizations in Myanmar including UNDP and Myanmar Centre for Responsible Business. Her experience of working on social issues includes labor, health and safety, resettlement and covers such sector as oil and gas, ICT, tourism. She has worked on projects in hydropower and tourism sectors for E Guard.

AYE NYEIN THU (Ms)

Aye Nyein Thu is a Project Associate, who received her Bachelor Degree in Forestry from the University of Forestry in 2015. She has two years experiences on environmental site survey and socio-economic surveys. Another experience is to cooperate with clients and to conduct stakeholder's engagement and public consultations.

KHAING MAY SOE THAUNG (Ms)

Khaing May Soe Thaung is a Project Assistant, who received her Bachelor Degree in Forestry from the University of Forestry in 2015. She has one-year experiences on environmental site survey and socio-economic surveys. Another experience is to cooperate with clients and to conduct stakeholder's engagement and public consultations.

NAING ZAW WIN (Mr)

Naing Zaw Win is a Project Assistant, who received his Bachelor Degree in Forestry from the University of Forestry in 2015. He has one-year experiences on environmental site survey and socio-economic surveys. Another experience is to cooperate with clients and to conduct stakeholder's engagement and public consultations.

SHWE YA MIN BO (Ms)

Shwe Ya Min Bo is a Project Assistant, who received her Bachelor Degree in Forestry from the University of Forestry in 2016. She has one-year experiences on environmental site survey and socio-economic surveys. Another experience is to cooperate with clients and to conduct stakeholder's engagement and public consultations.

AUNG MOE OO (Mr)

Aung Moe Oo is a Project Assistant, who received his Bachelor Degree in Chemical Engineering from Technological University in 2016. He has experiences on environmental site survey and socio-economic surveys. Another experience is to cooperate with clients and to conduct stakeholder's engagement and public consultations.

CHAPTER 2: PROJECT DESCRIPTION AND ALTERNATIVE SELECTION

2.1: PROJECT DESCRIPTION

INTRODUCTION

This chapter described the information of proposed Eco Tourism Resort development which include the objective of the proposal, investment plan, project site, project facilities, project infrastructure, employment statement.

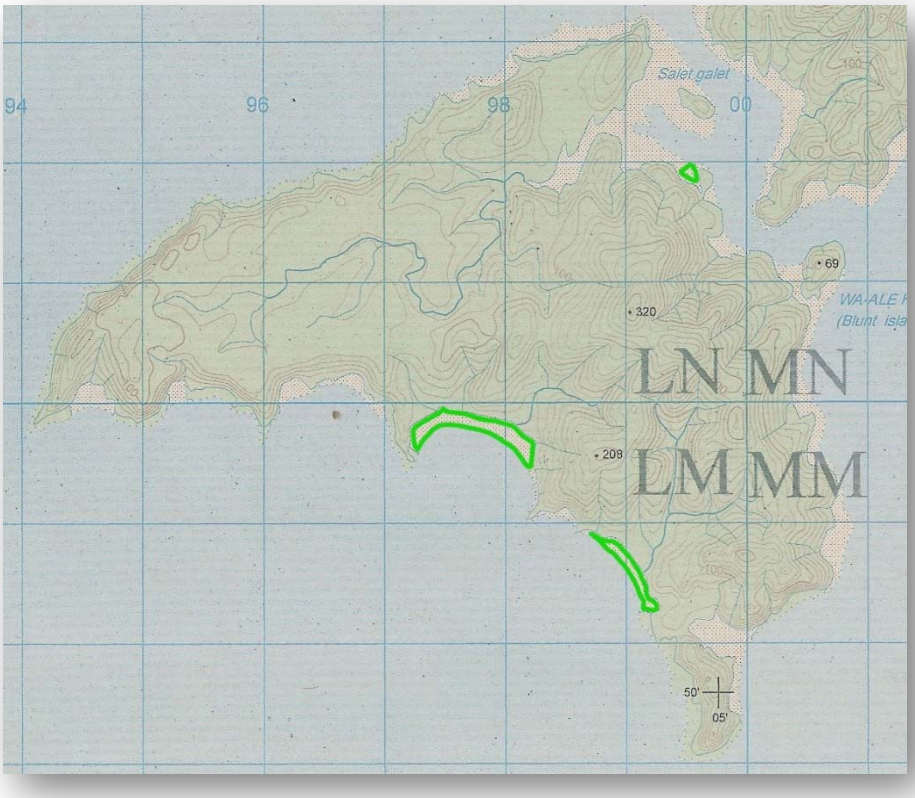
OVERVIEW

This proposed project is undertaken by Benchmade Asia Myanmar Ltd which is 100% foreign investment. The proposed project is located at Wa Ale island, North Latitude 10’ 51.1321’and East Latitude 98’03.774’, Lampi Island Marine National Park, Bokpyin Township, Kawthaung District, Tanintharyi Region. Wa Ale is part of the Myeik archipelago which located in southern Myanmar. It is 60 Nautical miles far away from Kawthaung, 45 minutes from Kawthaung and 45 minutes boat rides to Wa Ale from new port. Wa Ale is adjacent to Lampi island, one of the largest island in the archipelago. The area of Wa ale Kyun is (3,934) acres. The proposed project will be used in (3) areas of Wa Ale island. The areas (1) is (158,822 sq.m) 39.25 acres, the area (2) is (217,328 sq.m) 53.70 acres and the area (3) is (29,122 sq.m) 7.20 acres. A total area of the proposed development is about 100.15 acres, rented from Forest Department under the Ministry of Environmental Conservation and Forestry (MOECAF), herein Ministry of Natural Resources and Environmental Conservation (MONREC). The type of Land is National Park Land. The lease rate of the proposed project operation will be for initial period of (50) years extendable twice at 10 years, at a time.

2.2: PROPOSED PROJECT DEVELOPMENT

The Eco resort hotel development will be implemented with Build, Operate and Transfer system (BOT) for 3 areas. The construction period will be from October 2015 to March 2019.The Eco resort hotel will implement in 3 areas in Wa Ale island.

The Area No. (1) will be in a higher-end luxury Eco Villas which includes 30 high-end 1-4-bedroom bungalows or Eco villas facing the seas, restaurants, generator, solar powered electricity (to the extent possible without affecting the beauty of the scenery) and Kubota Waste Management System.Area No. (2) will be in a higher-end Luxury Eco Villas which includes 30 Eco Villas facing the sea, structure for a restaurant and kitchen as well as reception areas and staff housing, spa, generator, solar powered electricity (to the extent possible without affecting the beauty of the scenery) and Kubota Waste Management System. The area No. (3) will be in a higher-end hotel which includes 10 room lodges or Eco villas facing the sea, restaurant, generator, solar powered electricity (to the extent possible without affecting the beauty of the scenery) and Kubota Waste Management System.


Salet galet
94
96
98
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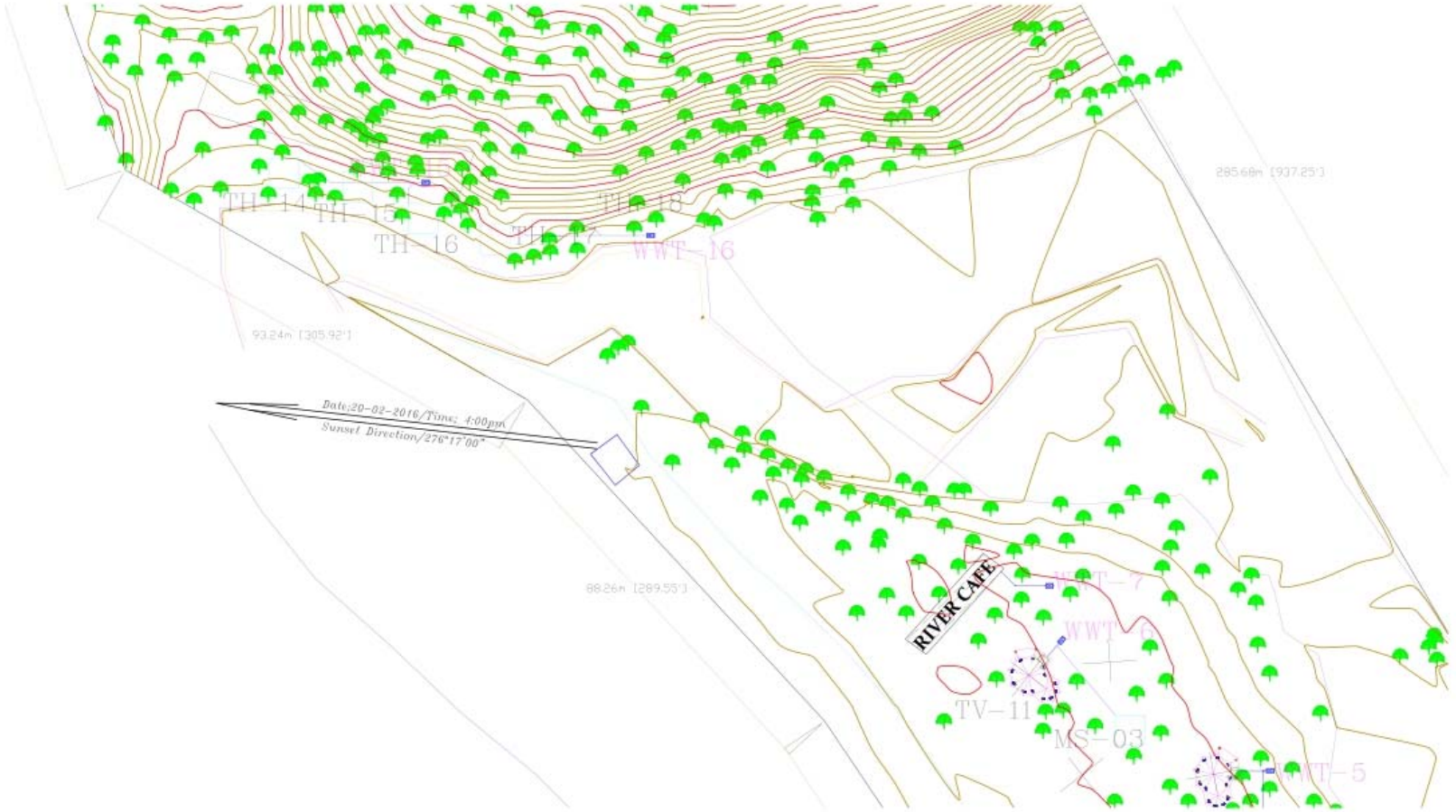
69
320
208
LN MN
LM MM
50'
05'


Area 2, Tree house and Gym
5 unit of Tree-house
WWT-1 (KZ5)
WWT-2 (KZ5)
Gym
WWT = Waster Water Treatment
KZ5 = Kubota Tank Model
RIVER CAFE


TH-14
TH-15
TH-16
TH-18
WWT-16
285.68m [937.25']
93.24m [305.92']
Date:20-02-2016/Time: 4:00pm
Sunset Direction/276°17'00"
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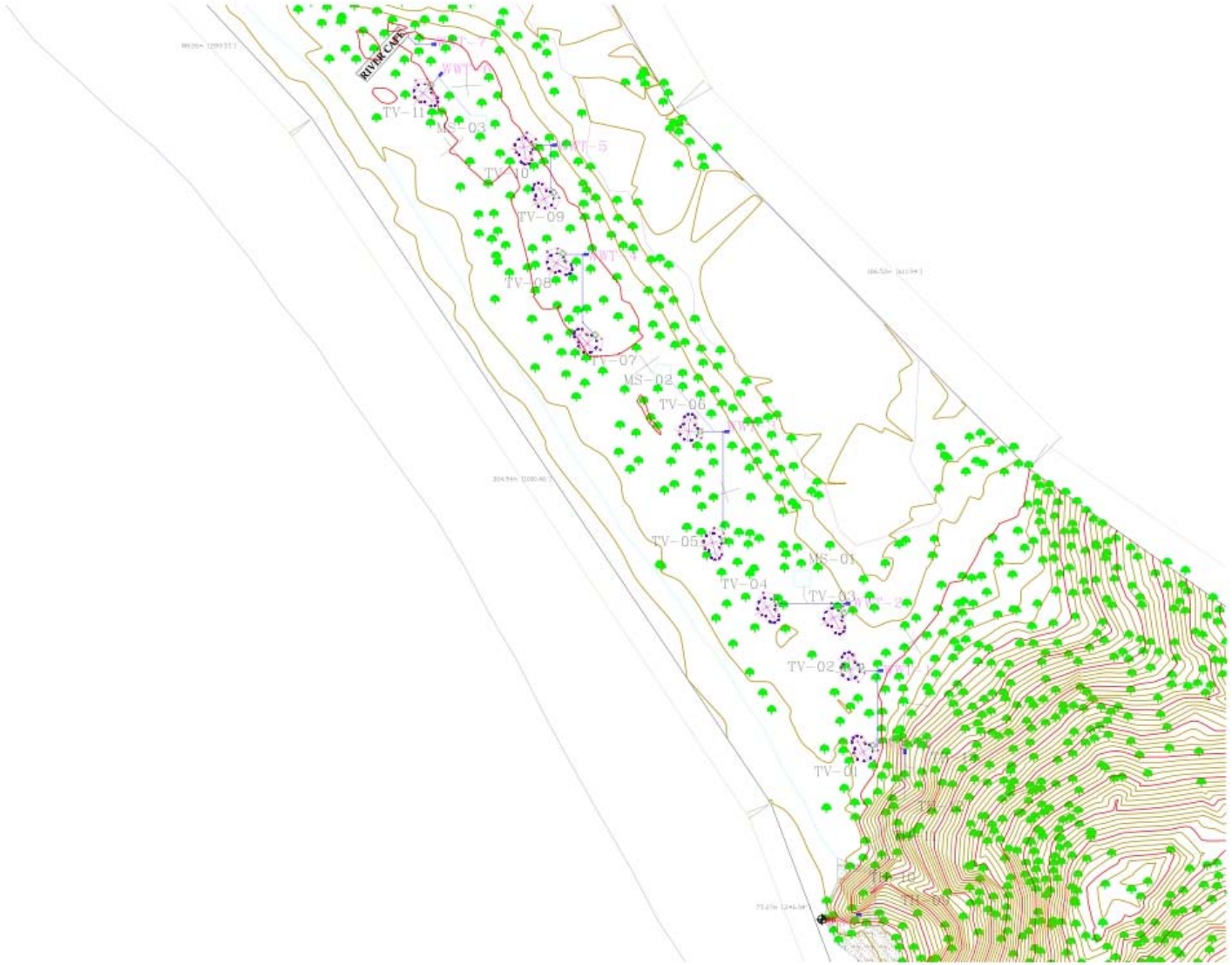
RIVER CAFE
WWT-7
WWT-6
TV-11
MS-03
WWT-5


RIVER CAFE
TV-11
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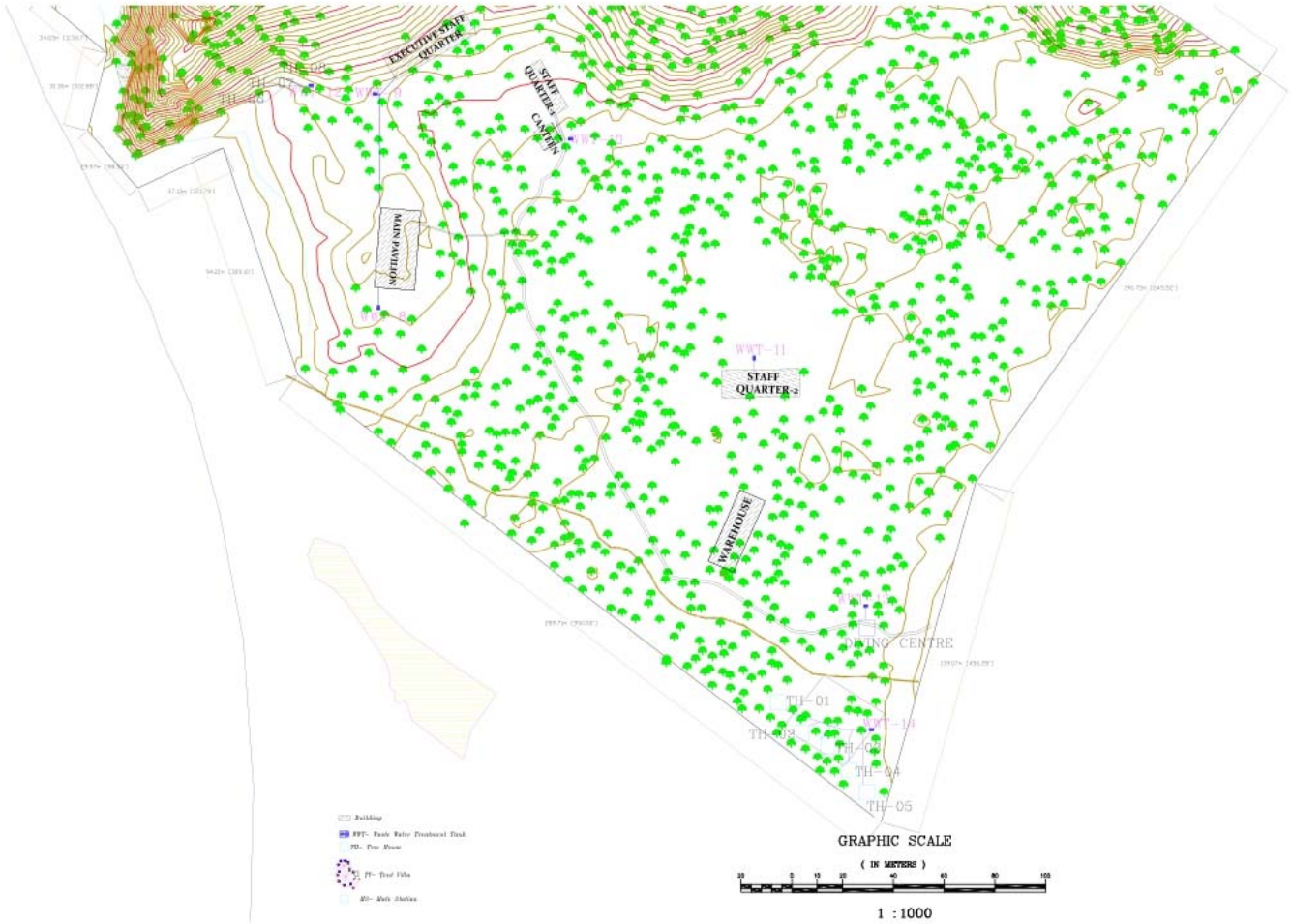


Figure 2.1: Proposed Project Location

2.3: BUILDING CONSTRUCTION:

The construction process will maintain a safe working environment during construction and afterwards. It will have limited use of machinery and no heavy machinery on the island. Most wood used in construction will be reclaimed and there will be very little cement used during the building process. All villas will be built on platforms to ensure very little disturbance of the ground cover. All efforts will be made to disturb the natural environment on the island and as stated earlier, no trees with a diameter over 15 cm will be cut.

Accommodation in the resorts will include tents as well as wooden villas, both of which will be constructed in an environmentally friendly manner. The tents will be placed on platforms of recycled timber raised 1 to 2 meters off the ground, in order to not disturb the flora that exists on the sites presently. BAM will establish hiking/ biking trails, as well as a canopy walk that will both showcase the beauty of the island and ensure minimal impact and responsible tourism.

Toilets will be environmentally efficient, BAM will be used Kubota Waste Management System. BAM will not have large laundry facilities on the island, only emergency washers using environmentally safe detergents. Most laundry will be sent to Kawthaung for processing. No dry-cleaning services will be available. Design of the villas allow for air-conditioning only in the sleeping areas of the villas and will use new DC technology for energy efficiency.

2.4: ENERGY

Wa Ale island is off grid with no power from the mainland, therefore, as an alternative energy source, BAM will install solar electricity energy and generators. The solar farms will plant in designated areas. Although fully depends on the solar energy for the energy need is a certain goal for Wa Ale resort but while solar energy could not able to support the energy needs, BAM will continuously look for the alternative ways which are more clean, green and efficient. If the solar energy source fall short, the propane generators which is a cleaner alternative to petrol or diesel generators will support.

WATER:

There are several areas where we will be water efficient and responsible on Wa Ale Kyune.

- No drilling of deep water wells
- Rain water capture near villas
- Sea water swimming pool
- Kubota Waste Management System

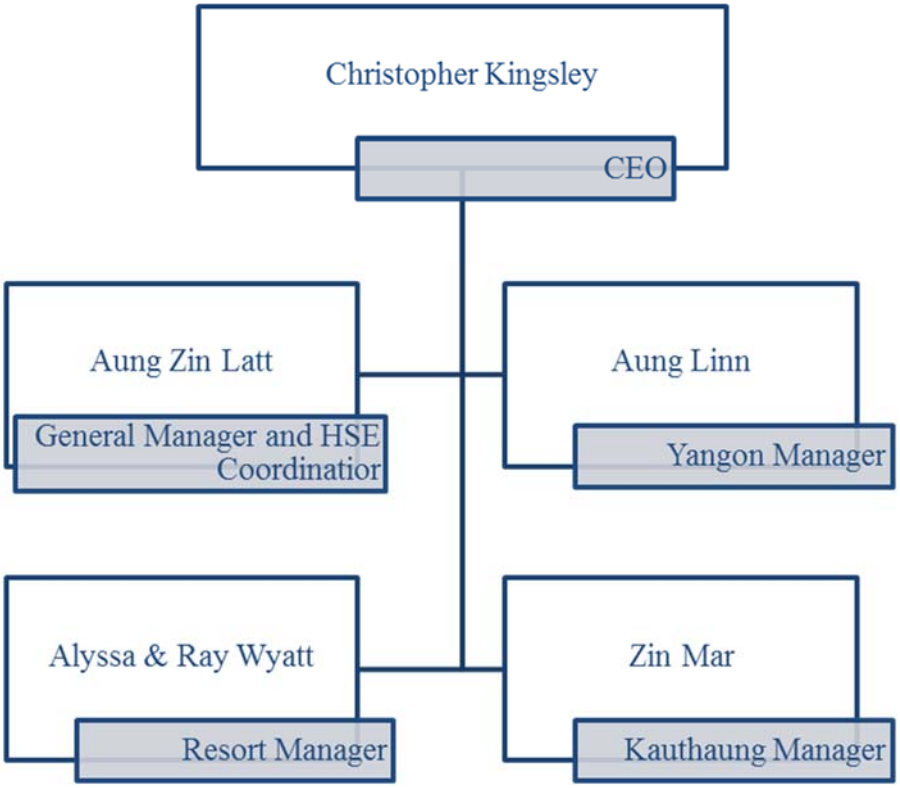
The water usage from island resources will be very limited due to the policies that will be implemented above. Drilling deep into the island will harm its long-term water sources but capturing river and rain water through cisterns and large capture areas is the most environmentally friendly path.

2.5: PROJECT PROPONENT DESCRIPTION

Benchmade Asia Myanmar Limited is 100% foreign owned limited which has already received the permission from Myanmar Investment Commission to establish the Eco resort at Wa Ale Island. The proposed project duration will be 42 months. The detailed information of project proponent description is shown below:

List of Shareholders and Directors of Benchmade Asia Myanmar Limited					
Sr. No	**Name**	**Citizenship/NRC No./ Passport No.**	**Designation**	**Address**	**Shareholding %**
1	Mr. Christopher Wright Kingsley	PP 488854235	Director	# 14, Markpeace Road, Singapore	100%
2	Mrs. Farina Wong Kingsley	PP 214928971	Director	# 3435, Regetta Blvd, Richmond, California 94804, U.S. A	

ORGANIZATION CHART OF BENCHMADE ASIA MYANMAR LTD



MANPOWER REQUIREMENT

List of persons required for the proposed eco resort hotel project.

No	**Type of Personnel**	**No. of Persons required for each 12 months**									
Foreign Experts and Technicians Required		**Year- 1**	**Year- 2**	**Year-3**	**Year- 4**	**Year-5**	**Year- 6**	**Year-7**	**Year- 8**	**Year -9**	**Year-10**
1	General Manager	1	1	1	1	1	1	1	1	1	1
2	Head of Recreation	2	2	2	2	2	2	2	2	2	2
3	Chef	2	2	2	2	2	2	2	2	2	2
	Sub Total	5	5	5	5	5	5	5	5	5	5
LOCAL PERSONNEL REQUIRED											
1	General Manager	1	1	1	1	1	1	1	1	1	1
2	Asst. General Manager	2	2	2	2	2	2	2	2	2	2
3	Accounting Manager	1	1	1	1	1	1	1	1	1	1
4	HR Manager	1	1	1	1	1	1	1	1	1	1
5	Office Manager	2	2	2	2	2	2	2	2	2	2
6	Boat Staff	6	8	8	8	8	8	8	8	8	8
7	Office Staff	10	12	15	18	20	20	20	20	20	20
	Sub Total	23	27	30	33	35	35	35	35	35	35
8	Housekeeping Manager	2	2	2	2	2	2	2	2	2	2
9	Food & Beverage Manager	2	2	2	2	2	2	2	2	2	2
10	Maintenance Manager	2	2	2	2	2	2	2	2	2	2
11	Doctor	1	1	1	1	1	1	1	1	1	1
12	House Keeping Staff	15	17	20	22	25	25	25	25	25	25
13	Chef	6	8	8	10	12	12	12	12	12	12
14	Waiters & Cook	20	23	25	30	35	35	35	35	35	35

15	Maintenance Staff	8	8	10	10	10	10	10	10	10	10
16	Warehouse Staff	5	5	6	8	8	8	8	8	8	8
17	Sub Total	61	68	76	87	97	97	97	97	97	97
18	Boat Captain	4	4	4	4	4	4	4	4	4	4
19	Yatch Staff	4	4	5	5	5	5	5	5	5	5
20	Sub Total	8	8	9	9	9	9	9	9	5	9
Local Persons Required		92	103	115	129	141	141	141	141	141	141
Total		97	108	120	139	146	146	146	146	146	146

2.6: RESOURCE CONSUMPTION

There may only low usage in energy consumption and water consumption by the proposed project because this Eco resort will implement as environmental friendly system. For the annual electricity requirement, will use generators and solar electricity. Annual water requirement being on island will be relying on artesian wells. Wa Ale Resort will minimize power consumption through fixture choices, policies, and guest awareness. Solar and other renewable resources will be used as much as possible. Generators will provide auxiliary and backup power. Power will be provided by a mix of solar energy and generators. Design includes extremely energy efficient fixtures. Operations plans will minimize power usage. Air Conditioning will be used in limited areas and to achieve limited temperature levels. Recreational vehicles will use solar power when possible.

Wa Ale implementation estimates that 1 MW will be needed to operate the planned hotels. It is taking an environmentally friendly and efficient plan to use solar power to the extent possible without adversely affecting the aesthetics of the islands. It is estimated that it will be able to establish solar power to provide 80% of the needs. The rest of the required electricity will be met by diesel generator solutions, which will be operated from enclosed containers that will house the generator, controller, and fuel tank for both security and to extend the life of the equipment.

BAM will install the Kubota Waste Management System throughout the project. There will be no chemicals used or waste emitted into the ocean or the forest. Natural water reservoirs will be created at forks of local streams and planned in such a way as to not cause flooding or alter the eco-system. Using this method, it can maximize use of captured rain-water. Near the sites presently, a significant amount of water is being flushed into the ocean and causing erosion. There will endeavor to work against this erosion problem. The planned water usage on Area 4 will be 31m^3 per day, again much of this from the rain water capture system.

CHAPTER 3: PROJECT ALTERNATIVE

This section considers the selected alternative to 'no project alternative'. There were no other alternatives site locations considered for the project because all three locations for the project site had been identified by the Department of Forestry and permit had been given to the project proponent to develop this pre-selected resort location sites.

3.1: ALTERNATIVE 1: NO ACTION ALTERNATIVE

The following positive impacts are anticipated by choosing this alternative:

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

In the meantime, the following negative impacts are anticipated:

- In the absence of government security patrol due to the isolated location of the island, illegal consumption of resources will continue in the absence of any project-related security measures (e.g. on-going illegal hunting)
- Slow down of ecotourism development in Tanintharyi – loss of the opportunity to develop an international standard eco-resort which can set a good example (as the first eco-resort in Myeik Archipelago) for the other projects in the area
- Spillover positive effect on other small businesses (in the resort's potential supply chain and in the same location) through setting good practices in environmental and social management
- Job opportunity (need for up to 146 local personnel)

3.2: ALTERNATIVE 2: PROJECT WA ALE ECO-RESORT IN PRE-SELECTED LOCATION

The project proponent, Benchmade Asia Myanmar Ltd, had already received a permission from Myanmar Investment Commission to establish the Eco resort hotel at Lampi Marine National Park. The Eco resort hotel development will be implemented with Build, Operate and Transfer system (BOT) for 3 areas. The construction period will be from October 2015 to March 2019.

The proposed Wa Ale resort is designed as an environmentally minimal-impact self-sufficient project which pays attention to the natural setting of the island in its architectural design, meets its energy needs with renewable energy sources and uses environmentally sensitive materials and sustainable construction techniques, and has a sustainable approach to water, wastewater and sewage. Thus, it is expected to bring positive impacts and to the development of tourism in Myeik Archipelago while at

the same time having negligible impact on land, natural resources and biodiversity of the surrounding environment. Below is the description of the proposed project in pre-selected location. Below is the detailed description of the physical and biological as well as social conditions of the surrounding environment which help to assess the potential environmental and social risks of the proposed project.

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

SETTTING THE STUDY AREA

Considering both environmental and social impacts of the proposed project's nature and location, the EIA study area for it was roughly set within 2 km radius of the center of the proposed project area. Other environmental and social features located further away from the centrecenter of the project have also been described where relevant to the EIA.

OBJECTIVES AND METHODOLOGY

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

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

4.1: PHYSICAL ENVIRONMENT

The proposed project is located on Wa Ale island is a conservation area which is one of the constitutent islands of Lampi Marine National Park (designated in 1996) of the larger Myeik Archipelago.

4.1.1 LAND USE

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

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 E Guard, Environmental Quality Team and deployed at two sampling stations, Station (1)- 10°50'24.94"N, 98° 4'39.38"E and Station (2)- 10°52'26.40"N, 98° 4'34.10"E. Air quality sampling stations were deployed in the vicinity of Wa Ale island from 24-25, December 2016 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).

OBJECTIVES

The objective of the assessment is:

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

Figure 4 .1 Air Quality and Noise Quality Monitoring Location

METHODOLOGY

Air Quality Sampling Instrument

The air quality sampling survey used the Grimm and Aeroqual Monitoring Instruments.

Grimm (Environmental Dust Monitor) Operating Principle

The particle size analyser /dust-monitor Model 180 described in this text is a stationary unit (19" rack mounted), used for the continuous measurement of particles in the air (aerosols). These particles can be reported in various modes. However, these measurements are determined as Environmental mass as µg/m3. These measurements are reported for the various size distribution channels.

All units of the 180 series use light-scattering technology for single-particle counts, whereby a semiconductor-laser serves as the light-source. The scattered signal from the particle passing through the laser beam and is collected at approximately 90° by a mirror and transferred to a recipient-diode. The signal of the diode passes, after a corresponding reinforcement, a multi-channel size classifier. A pulse height analyser then classifies the signal transmitted in each channel. These counts can be

displayed and are also stored in the data storage card and may be transferred via the RS 232 for further analysis. Without data storage card, the instrument has an internal memory size of 80 Kbyte.

The ambient-air, to be analysed, is drawn into the unit via an internal volume-controlled pump at a rate of 1.2 litres /minute. The sample passes through the measuring cell, past the laser diode detector and is collected onto a filter. The pump also generates the necessary clean sheath air, which is filtered and passes through the sheath air regulator back in to optical chamber. This is to ensure that no dust contamination comes in contact with the laser-optic assembly. This particle free airflow is also used for the reference-zero tests during the auto-calibration.

Aeroqual (Portable Environmental Monitor) Operating Principle

Prior to operation the sensor must be warmed up to burn off any contaminants. When the monitor is first switched on it will warm up for 3 minutes. The reading will then flash for the next 7 minutes to indicate that the sensor is still in the warm up phase. It is recommended that the monitor is kept in Stand By mode when not being used to keep the sensor heated and prevent the build-up of contaminants. If the sensor is new (or unused for long periods) it can take up to 24 hours for the message "sensor warming up" (or "sensor failure" in older models) to disappear. Should the message remain after this time, a genuine sensor failure may have occurred. See the trouble-shooting guide.

For Ozone Sensor Heads: 24 hours is a conservative time for an ozone sensor to burn off contaminants and achieve its stated performance specification. In most instances, this will be achieved well within 24hrs. The warm up period can be reduced by subjecting the sensor to elevated ozone levels for a short period. For example, 0.1 ppm of ozone for 5 minutes typically reduces the warm up time to <30 minutes.

"Sensor aging"–This indicates that the sensor has reached the end of its usable life and the sensor head should be replaced as soon as possible. The measurement readings can no longer be relied upon to be within specification.

(i) Sampling time

The measurement was conducted 24hr continuously.

(ii) Outdoor air parameters to be measured

Outdoor air sampling survey mainly focused on the US EPA Criteria air pollutants which can affect the human health and environment.

1) **Particulates:** *PM_{10}, $PM_{2.5}$*

2) **Gases:** *NO_2, SO_2, CO, CO_2, O_3*

3) **Meteorology**: *Temperature, Relative Humidity,* which can have the influence on both local and regional air quality.

Air quality (gas) sampled data at the sampling sites

Air station- 1, 24 hrs (continuous)

Latitude - 10°50'24.94"N, **Longitude -** 98° 4'39.38"E, **Elev 2 ft**

Figure 4. 2 Air quality and Nosie quality monitoring at Wa Ale island, Air station- 1, 24 hrs (continuous)

Table 4.1: Nitrogen Dioxide (NO_2), Air Station-1, 1 hr (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result (µg/m^3)	NEQ (Emission) Guidelines
25. Dec.2016	Start Time: 8:00 End Time: 9:00	NO_2 (µg/m^3)	42.76 (µg/m^3)	200 µg/m^3
Remark-				

Table 4.2: Sulphur Dioxide (SO_2), Air Station-1, 10 min (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result (µg/m^3)	NEQ (Emission) Guidelines
25.Dec.2016	Start Time: 9:10 End Time: 9:20	SO_2 (µg/m^3)	128.14(µg/m^3)	200 µg/m^3
Remark-				

Table 4.3: Carbon Monoxide (CO), Air Station-1, 8 hr (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result(µg/m^3)	NEQ (Emission) Guidelines

24/25. Dec.2016	Start Time: 23:00 End Time: 7:00	CO (µg/m^3)	107.11 (µg/m^3)	499.6 (µg/m^3)
Remark-				

Table 4.4: Carbon Dioxide (CO_2), Air Station-1, 8 hr (continuous), Wa Ale island

Date	Time	Substance (ppm)	Result (ppm)	NEQ (Emission) Guidelines
24/25. Dec.2016	Start Time: 23:00 End Time: 7:00	CO_2 (ppm)	941.87 ppm	9000 (ppm)
Remark-				

Table 4.5: Particulate Matter (PM_{10}), Air Station-1, 24hr (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result (µg/m$^{3)}$	NEQ (Emission) Guidelines
24/25. Dec.2016	Start Time: 23:00 End Time: 23:00	PM_{10} (µg/m^3)	25.76 (µg/m^3)	50 (µg/m^3)
Remark-				

Table 4.6: Particulate Matter ($PM_{2.5}$), Air Station-1, 24 hr (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result (µg/m$^{3)}$	NEQ (Emission) Guidelines
24/25. Dec.2016	Start Time: 23:00 End Time: 23:00	$PM_{2.5}$ (µg/m^3)	15.52 (µg/m^3)	25 µg/m^3
Remark-				

Table 4.7: Relative Humidity (RH), Air Station-1, 24 hrs (continuous), Wa Ale island

Date	Time	Substance (%)	Result (%)	NEQ (Emission) Guidelines
24/25. Dec.2016	Start Time: 23:00 End Time: 23:00	RH (%)	78.53 (%)	-
Remark-				

Table 4.8: Temperature (TEMP), Air Station-1, 24 hrs (continuous), Wa Ale island

Date	Time	Substance (^{0}C)	Result (^{0}C)	NEQ (Emission) Guidelines
24/25. Dec.2016	Start Time: 23:00 End Time: 23:00	TEMP (^{0}C)	28 (^{0}C)	-
Remark-				

Table 4.9: Ozone (O_3), Air Station-1, 8 hrs (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result (µg/m^3)	NEQ (Emission) Guidelines
24/25. Dec.2016	Start Time: 8:00 End Time: 16:00	O_3	80	100
Remark-				

Air Station-2, 24 hrs (continuous)

Latitude - 10°52'26.40"N, Longitude - 98° 4'34.10"E, Elev 3ft

Figure 4.3 Air quality and Noise quality monitoring at Wa Ale island, Air Station- 2, 24 hrs continuous)

Table 4.10: Nitrogen Dioxide (NO_2), Air Station-2, 1 hr (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result (µg/m^3)	NEQ (Emission) Guidelines

26/26. Dec.2016	Start Time: 9:00 End Time: 10:00	NO_2 (µg/m^3)	39.48 (µg/m^3)	200 µg/m^3
Remark-				

Table 4.11: Sulphur Dioxide (SO_2), Air Station-2, 10 mins (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result (µg/m^3)	NEQ (Emission) Guidelines
26/26. Oct.2016	Start Time: 9:10 End Time: 9:20	SO_2 (µg/m^3)	0 (µg/m^3)	200 µg/m^3
Remark-				

Table 4.12: Carbon Monoxide (CO), Air Station-2, 8 hrs (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result(µg/m^3)	NEQ (Emission) Guidelines
26/26. Dec.2016	Start Time: 9:30 End Time: 17:30	CO (µg/m^3)	29.10 (µg/m^3)	499.6 (µg/m^3)
Remark-				

Table 4.13: Carbon Dioxide (CO_2), Air Station-2, 8 hrs (continuous), Wa Ale island

Date	Time	Substance (ppm)	Result (ppm)	NEQ (Emission) Guidelines
26/27. Dec.2016	Start Time: 18:00 End Time: 2:00	CO_2 (ppm)	1032 (ppm)	9000 (ppm)
Remark-				

Table 4.14: Particulate Matter (PM_{10}), Air Station-2, 24 hrs (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result (µg/m^3)	NEQ (Emission) Guidelines
26/27. Dec.2016	Start Time: 9:00 End Time: 9:00	PM_{10} (µg/m^3)	32.9 (µg/m^3)	50 µg/m^3
Remark-				

Table 4.15: Particulate Matter ($PM_{2.5}$), Air Station-2, 24 hrs (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result (µg/m^3)	NEQ (Emission) Guidelines
26/27. Dec.2016	Start Time: 9:00 End Time: 9:00	$PM_{2.5}$ (µg/m^3)	16.3 (µg/m^3)	25 µg/m^3
Remark-				

Table 4.16: Relative Humidity (RH), Air Station-2, 24 hrs (continuous), Wa Ale island

Date	Time	Substance (%)	Result (%)	NEQ (Emission) Guidelines
26/27. Dec.2016	Start Time: 9:00 End Time: 9:00	RH (%)	84.04 (%)	-
Remark-				

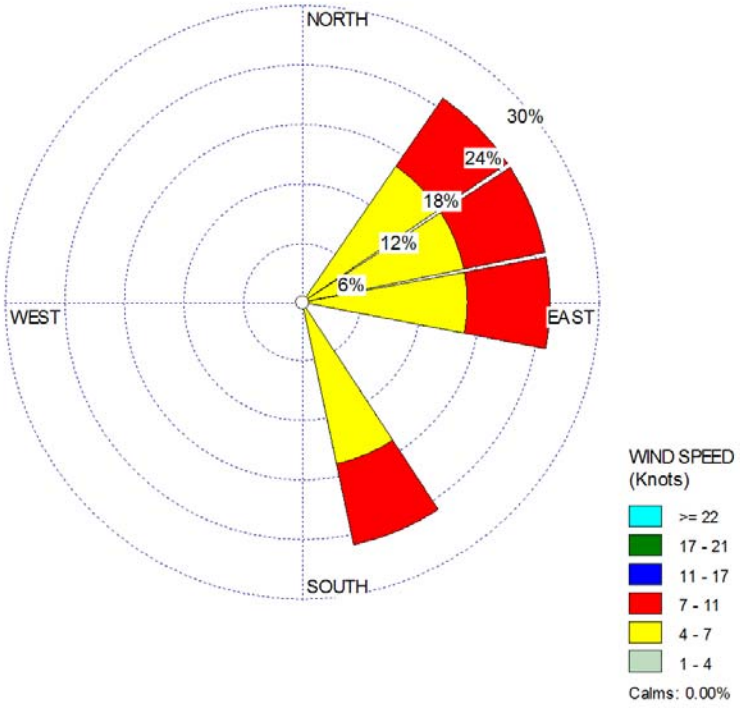
Table 4.17: Temperature (TEMP), Air Station-2, 24 hrs (continuous), Wa Ale island

Date	Time	Substance (^{0}C)	Result (^{0}C)	NEQ (Emission) Guidelines
26/27. Dec.2016	Start Time: 9:00 End Time: 9:00	TEMP (^{0}C)	28 (^{0}C)	-
Remark-				

Table 4.18: Ozone (O3), Air Station-2, 8 hrs (continuous), Wa Ale island

Date	Time	Substance (µg/m^3)	Result (µg/m^3)	NEQ (Emission) Guidelines
27/27. Dec.2016	Start Time: 1:00 End Time: 9:00	O_3	37.49	100
Remark-				

4.1.3 WIND DIRECTION


NORTH
30%
24%
18%
12%
6%
WEST
EAST
SOUTH
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 0.00%

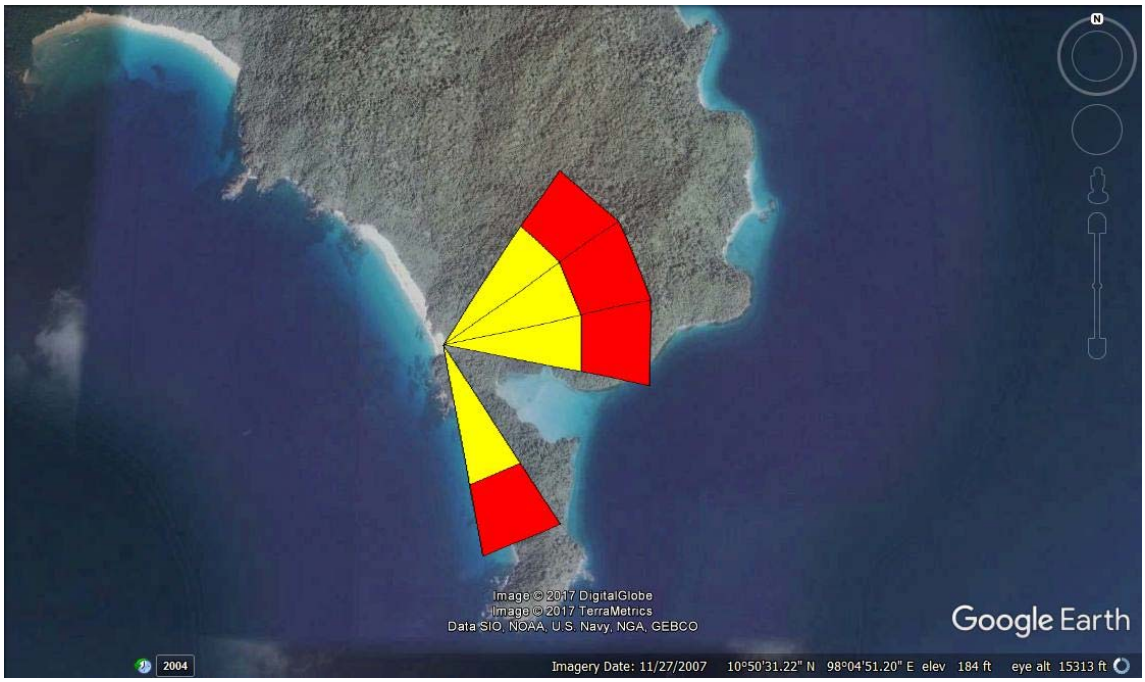


Image © 2017 DigitalGlobe
Image © 2017 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google Earth
2004
Imagery Date: 11/27/2007 10°50'31.22" N 98°04'51.20" E elev 184 ft eye alt 15313 ft

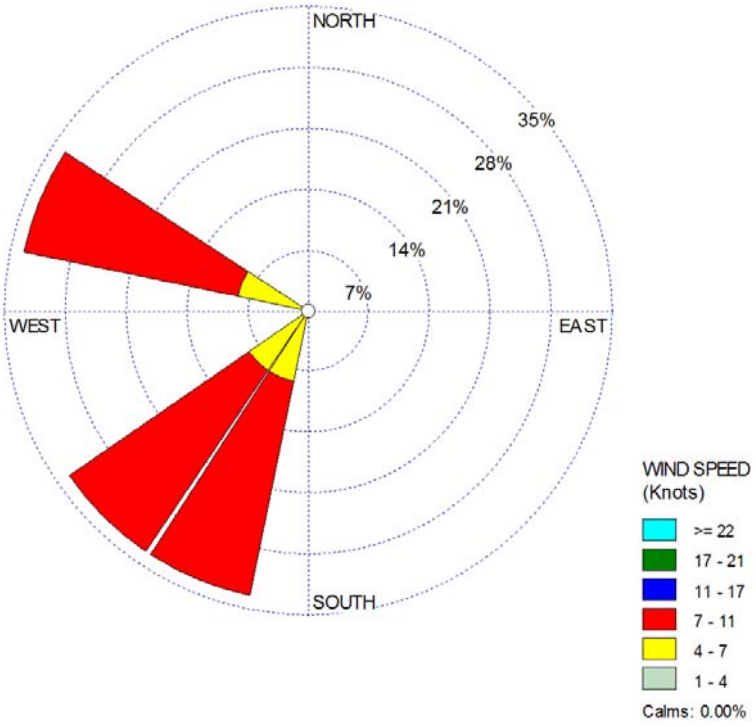


Figure 4. 4 :Wind direction during Pre-monsoon season, at 6:00 AM and 18:00 AM

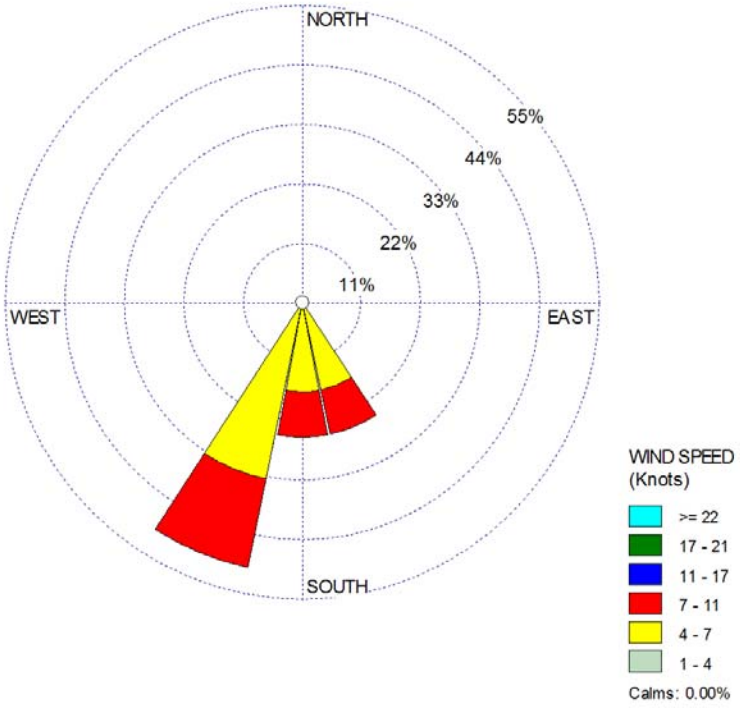

NORTH
55%
44%
33%
22%
11%
WEST
EAST
SOUTH
WIND SPEED
(Knots)
>= 22
17 - 21
11 - 17
7 - 11
4 - 7
1 - 4
Calms: 0.00%


Image © 2017 TerraMetrics
Image © 2017 DigitalGlobe
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google Earth
2004
Imagery Date: 11/27/2007 10°50'18.57" N 98°04'37.54" E elev 111 ft eye alt 15362 ft

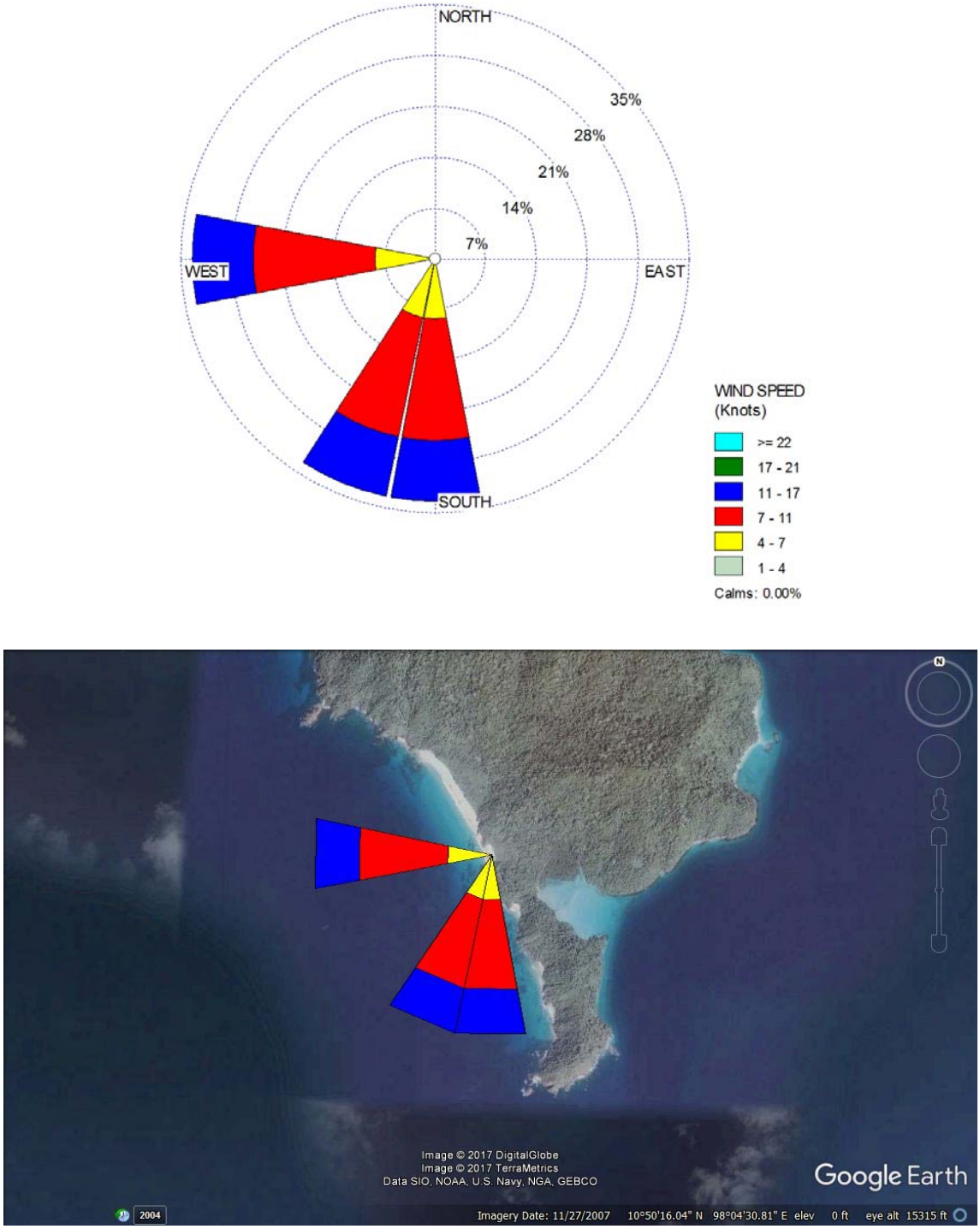
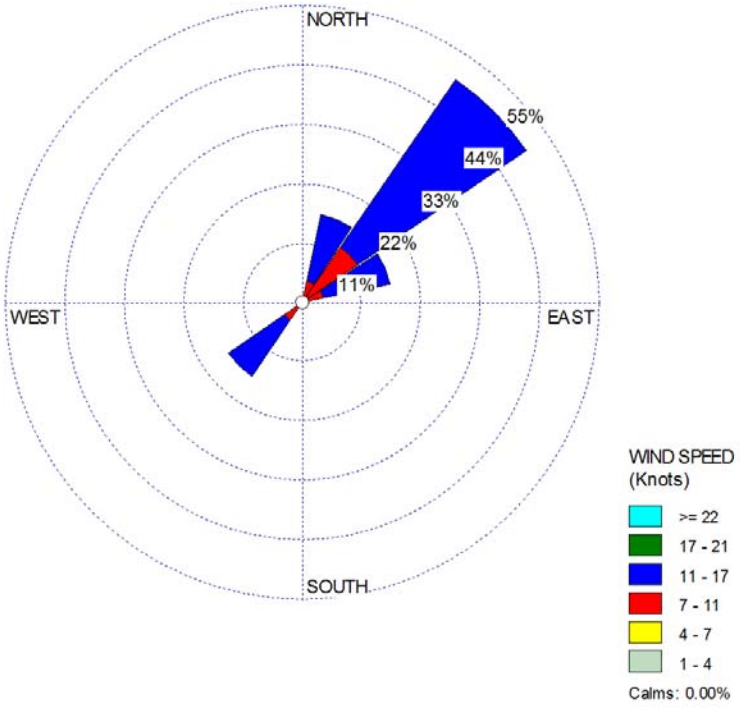


Figure 4 .5:Wind direction during Monsoon season, at 6:00 AM and 18:00 AM



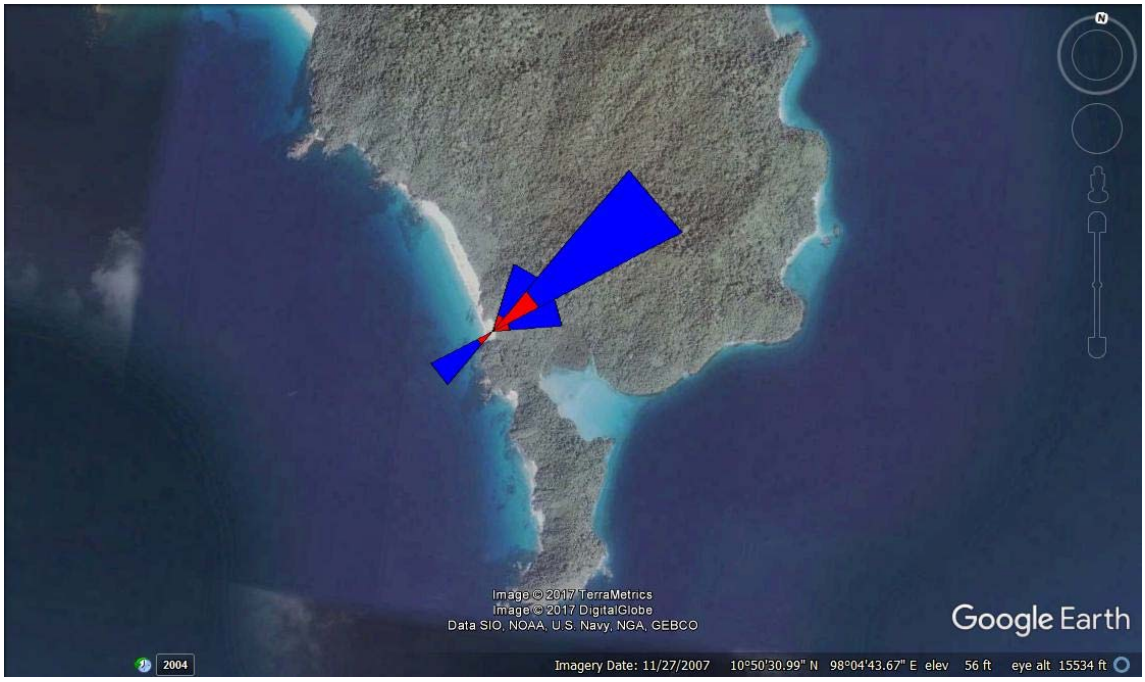


Figure 4 .6: Wind direction during Post-monsoon season, at 6:00 AM and 18:00 AM

4.1.4 NOSIE QUALITY

There will be significant noise due to the construction activities compared to the current condition but short term in period.

Sound becomes noise only when it becomes unwanted and if it becomes more than that it is referred to as "noise pollution". The problem has been viewed and analyzed from all the perspectives but the solution probably is not so easy to achieve since there is a lot of contradiction between legislation, guidance and documents. Resulting to noise pollution has many reasons such as construction being close to human habitats which prevent the noise from decaying before it reaches human ear.

The purpose of this project is to reveal not only the existing baseline noise quality but also to ascertain the noise quality being produced by the current project site.

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 E Guard, Environmental Quality Team and deployed at two sampling stations, Station (1)- 10°50'30.86"N, 98° 4'30.91"E and Station (2)- 10°52'26.40"N, 98° 4'34.10"E. Noise quality sampling stations were deployed in the vicinity of Wa Ale island from 24-27, December, 2016 to collect the current noise quality data.

Noise station- 1, 24 hrs (continuous), 24-25, December, 2016

Latitude - 10°50'30.86"N, **Longitude -** 98° 4'30.91"E, **Elev 2 ft**

Figure 4 .7: Outdoor noise quality monitoring at Noise station-1

The following table shows the existing average noise level of in project Area.

Table 4.19: Outdoor noise level measured at the Noise station-1

Area	Daytime Average Noise Level (dB)	Night-time Average Noise Level (dB)	NEQ Guideline
Wa Ale island- Point 1	53.05[a] (38[b]-73.6[c])	47.30[a] (39[b]-73.4[c])	55db

***Note:** [a] Average; [b] Min; [c] Max*

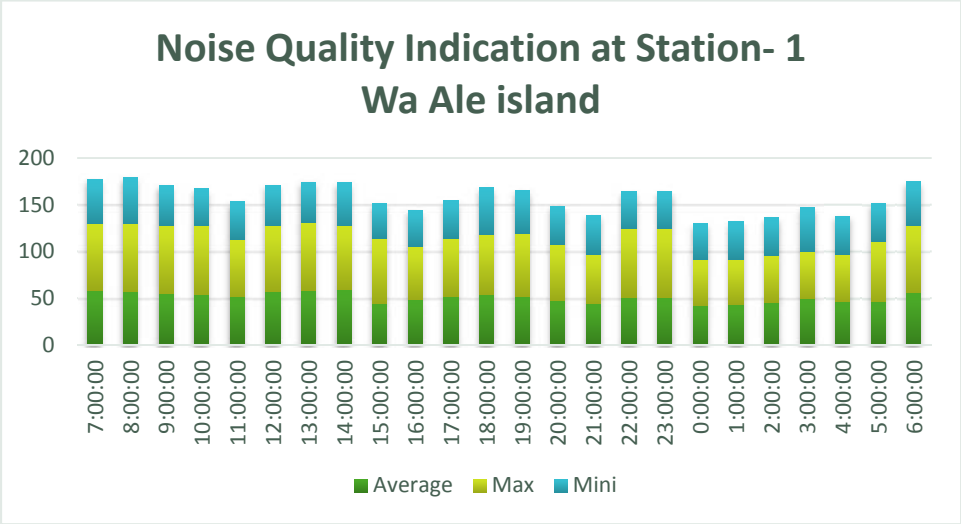


Figure 4. 8: Nosie quality indication at Noise station- 1

Table 4.20: Noise standard value of National Environmental Quality (Emission) Guidelines

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

Noise Station-2, 24 hrs (continuous), 26-27, December, 2016

Latitude - 10°52'26.40"N, Longitude - 98° 4'34.10"E, Elev 3ft

Figure 4. 9: Outdoor noise quality monitoring at Noise station- 2

The following table shows the existing average noise level of in project Area.

Table 4.21: Outdoor noise level measured at the Noise station-2

Area	Daytime Average Noise Level (dB)	Night-time Average Noise Level (dB)	NEQ Guideline
Wa Ale island- Point 2	57.13[a] (46.8[b]-75.4[c])	56.87[a] (47.7[b]-73.8[c])	55db

***Note:** [a] Average; [b] Min; [c] Max*

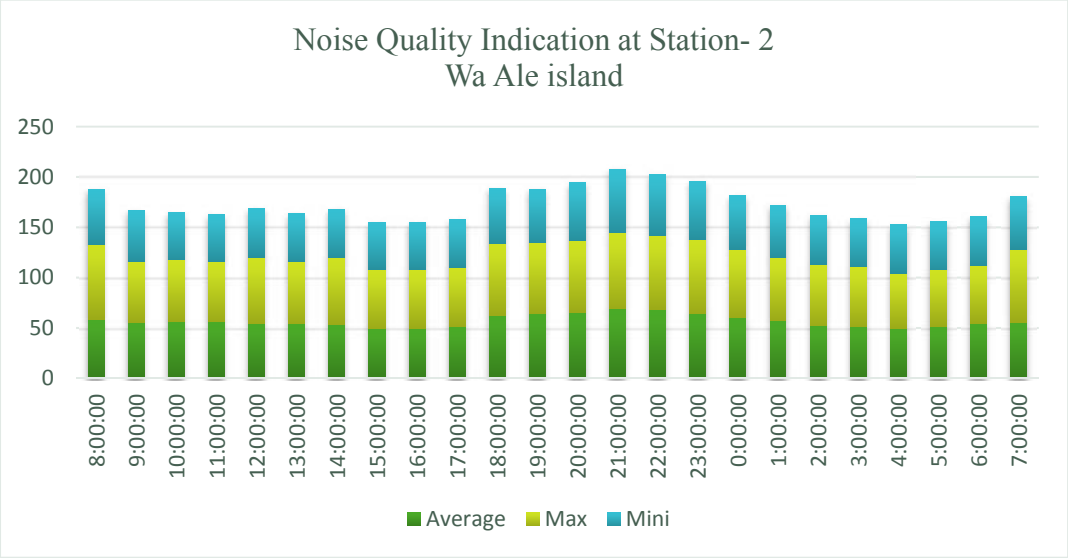


Figure 4 .10: Nosie quality indication at Noise station- 1

Table 4.22: Noise standard value of National Environmental Quality (Emission) Guidelines

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

The monitoring results show that ***the background level in the vicinity of project site was acceptable complying with the standard level of EQG by Environmental Conservation department (ECD).***

According to Environmental Quality Guideline, noise impacts should not exceed the levels presented below, or result in a maximum increase in background levels of 3dBA at the nearest receptor location off-site.

4.1.5 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.

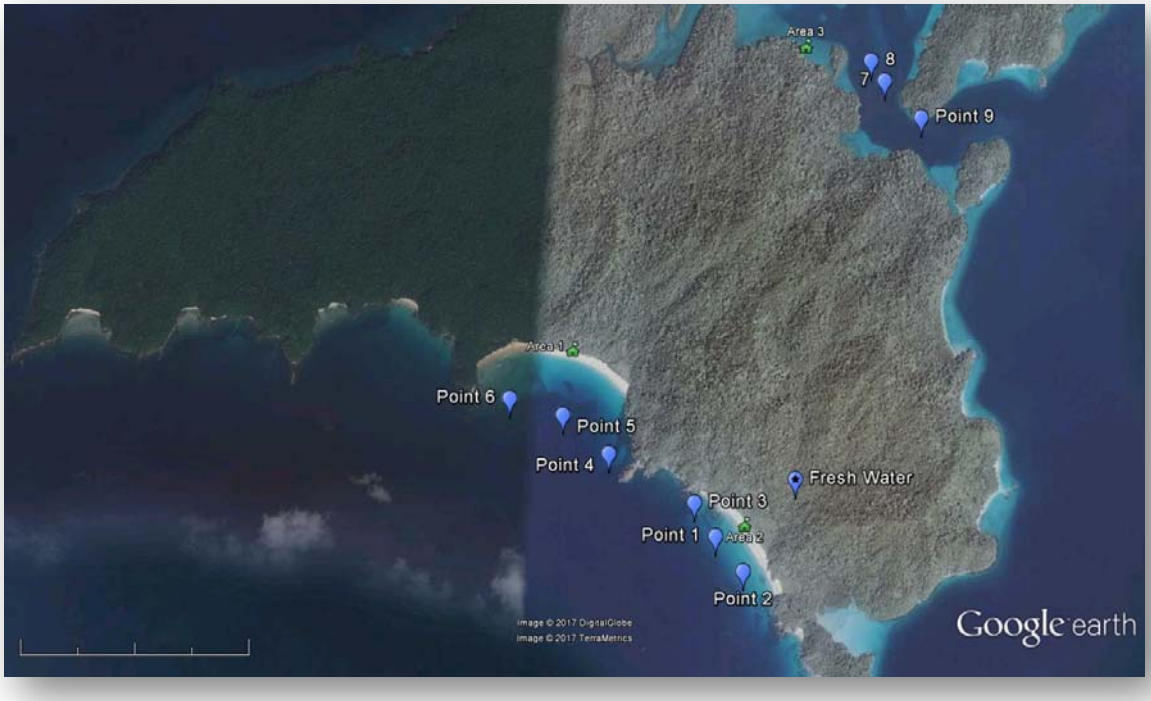


Figure 4.11: The Water Sample (Fresh and Marine) collected locations

FRESH WATER

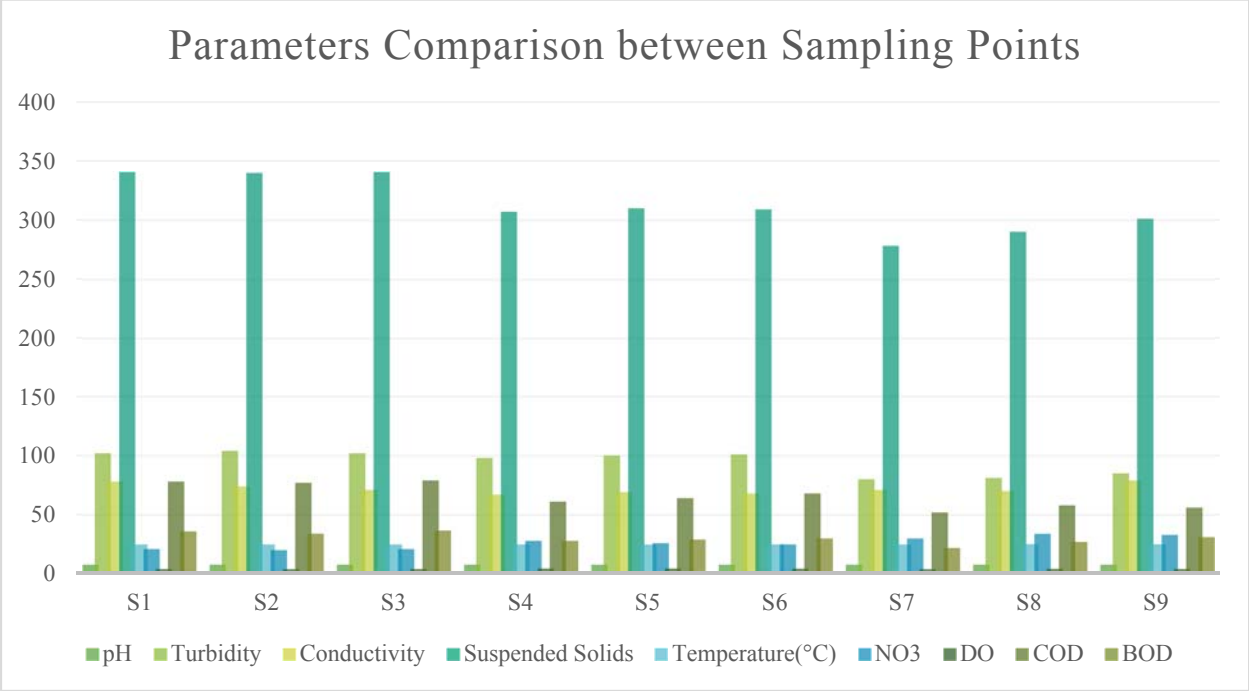
Spring water is the available source for the proposed project. According to the observation, there are enough spring water sources for the development. The fresh water sample was taking at Latitude 10.847252 N and Longitude 98.076221 E.

Figure 4. 12: Fresh water sources in Wa Ale island.

Parameters	Lab results	WHO Guideline
pH	7.2	6.5-8.5
Color (True)	8 TCU	15 TCU
Turbidity	1 NTU	5NTU
Total Hardness	91 mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)	31 mg/l as $CaCO_3$	200 mg/l
Iron	0.0 mg/l	0.3 mg/l
Chloride (as CL)	mg/l	250 mg/l
Sulphate (as SO4)	mg/l	200 mg/l
Total Solids	mg/l	1500 mg/l
Suspended Solids	312 mg/l	
Dissolved Solids	mg/l	1000 mg/l
Manganese	0.00 mg/l	0.05 mg/l
Chlorine (CL)	0.0 mg/l	0.2 mg/l
Temperature(°C)	25.1 °C	
Fluoride (F)	mg/l	1.5 mg/l
Lead (as Pb)	mg/l	0.01 mg/l
Arsenic (As)	mg/l	0.01 mg/l
Nitrate(NO_3)	mg/l	50 mg/l
Cyanide (CN)	mg/l	0.07 mg/l
Zinc (Zn)	mg/l	3 mg/l
Copper (Cu)	mg/l	2 mg/l
Phosphate	mg/l	5 mg/l

MARINE WATER

Marine water samples were collected at 9 sampling stations, the collected water samples were transported to ISO TECH Laboratory and SGS Laboratory to analysis.



Parameters	S1	S2	S3	S4	S5	S6	S7	S8	S9
pH	8.1	8.2	8	8.2	8.2	8.2	8	8	8.1
Salinity	32.2	32.1	32.2	32.4	32.4	32.4	32.5	32.6	32.5
Turbidity	102	104	102	98	100	101	80	81	85
Conductivity	78	74	71	67	69	68	71	70	79
Suspended Solids	341	340	341	307	310	309	278	290	301
Temperature(°C)	25	25	25	24.9	24.8	25	25	25.2	25.1
NO_3	21	20	21	28	26	25	30	34	33
DO	4.2	4.1	4.2	4.9	4.7	4.5	4	4.3	4.2
COD	78	77	79	61	64	68	52	58	56
BOD	36	34	37	28	29	30	22	27	31

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.

4.1.6 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).

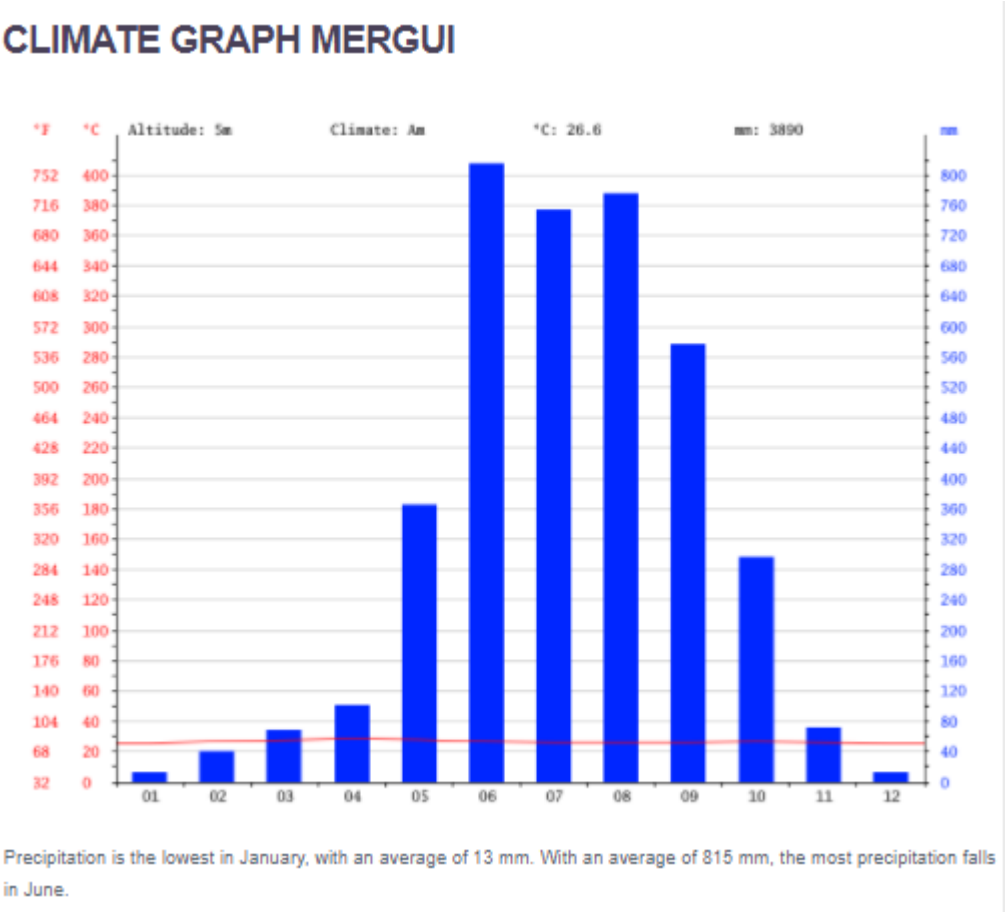


Figure 4. 13: Average Monthly Temperature and Rainfall Chart of Mergui, Myanmar (1982 – 2012) (Sources: https://en.climate-data.org/location/326/).

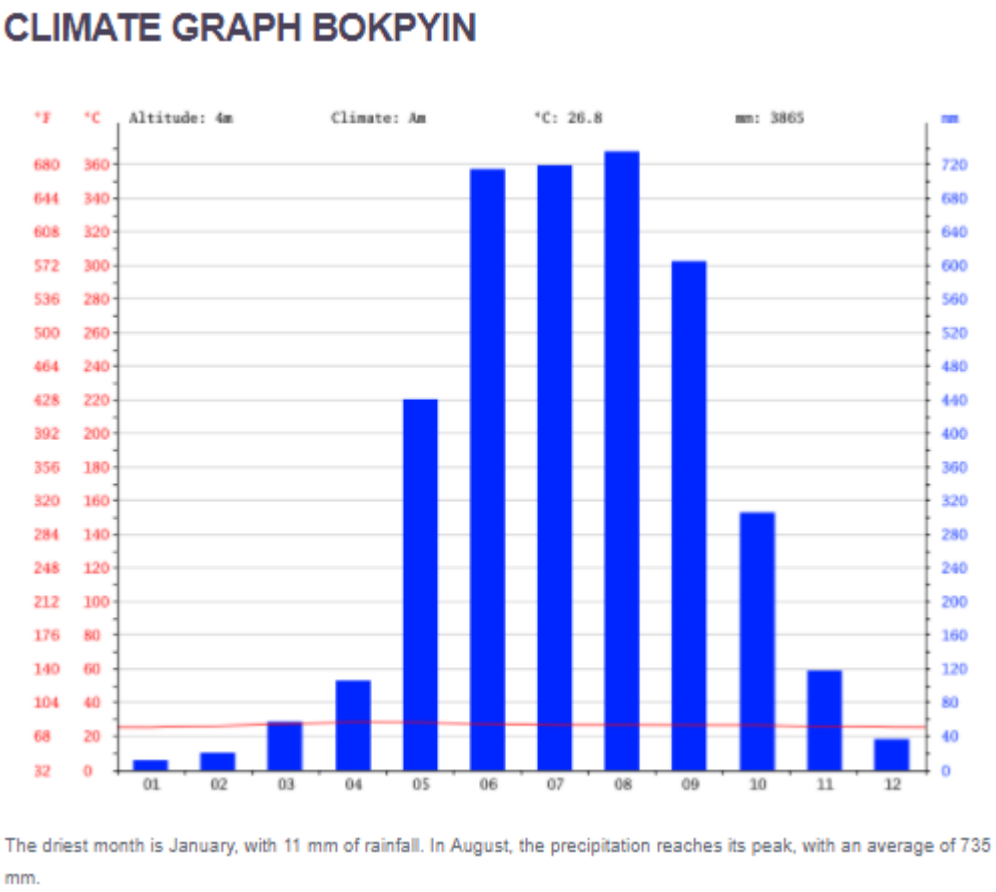


Figure 4 .14: Average Monthly Temperature and Rainfall Chart of Bokpyin, Myanmar (1982 – 2012) (Sources: https://en.climate-data.org/location/993669/).

CYCLONES

Myanmar's Rakhine Region, Ayeyarwady Region, Yangon Region, Mon State and Tanintharyi Region are considered as vulnerable areas to cyclones which occur from April to December (with severe cyclones occurring during the pre-monsoon period of April-May and post-monsoon period of October-December). While comparing the three major coastlines Rakhine, Ayeyarwady and Tanintharyi, Tanintharyi region had least major cyclone hit. Out of the annual ten tropical storms in the Bay of Bengal, almost five become severe cyclones of which 90 percent crossed the Rakhine coast, 7 percent the Ayeyarwady delta coast and the remaining 3 percent crossed the Tanintharyi and Mon coasts. According to the 1947-2008 data of cyclone landfall on Myanmar coast, the highest probability is at Sittwe, Kyauk Phyu and followed by Maundaw and decreasing south towards the Ayeyarwady delta. 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.

CLIMATE CHANGE

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

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

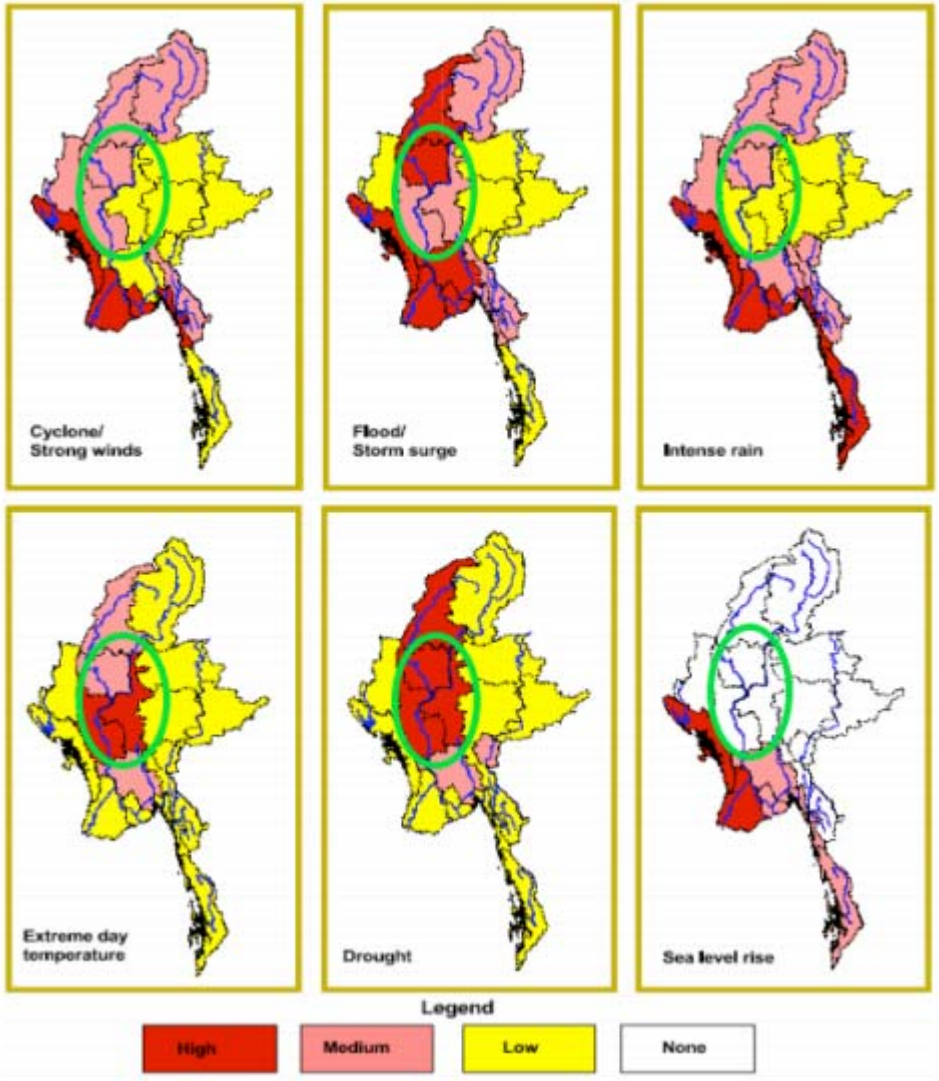


Figure 4 .15: Distribution of Projected Climate Change-related Disaster Risks (UNDP 2011)

4.1.7 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.

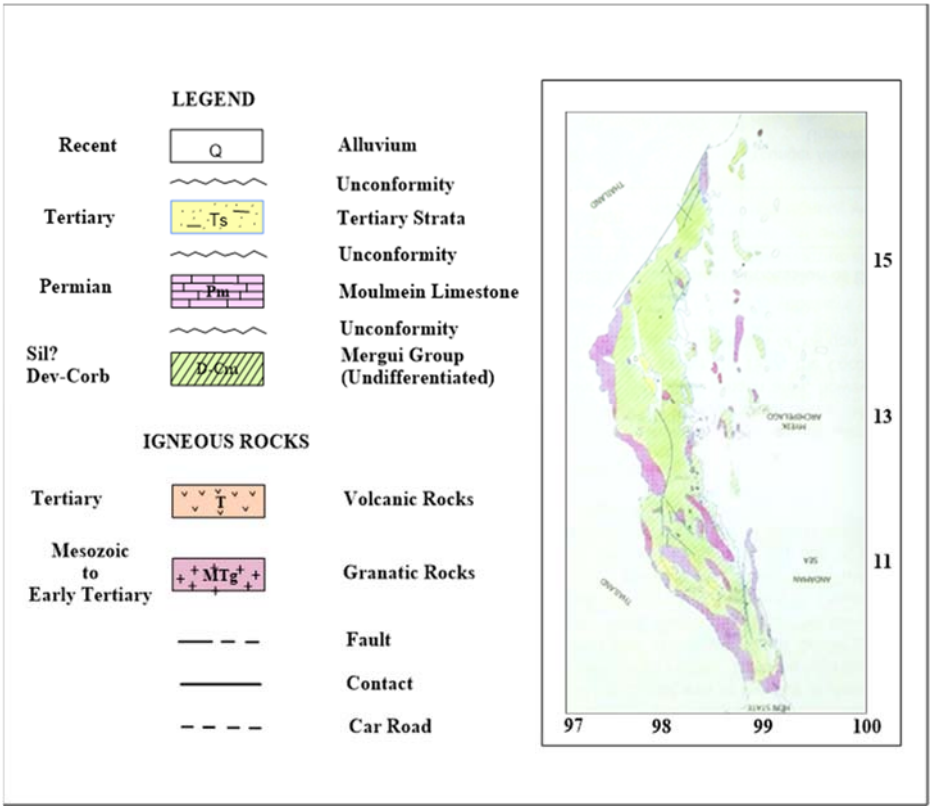


Figure 4 .16: Geological Map of the project Site

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).

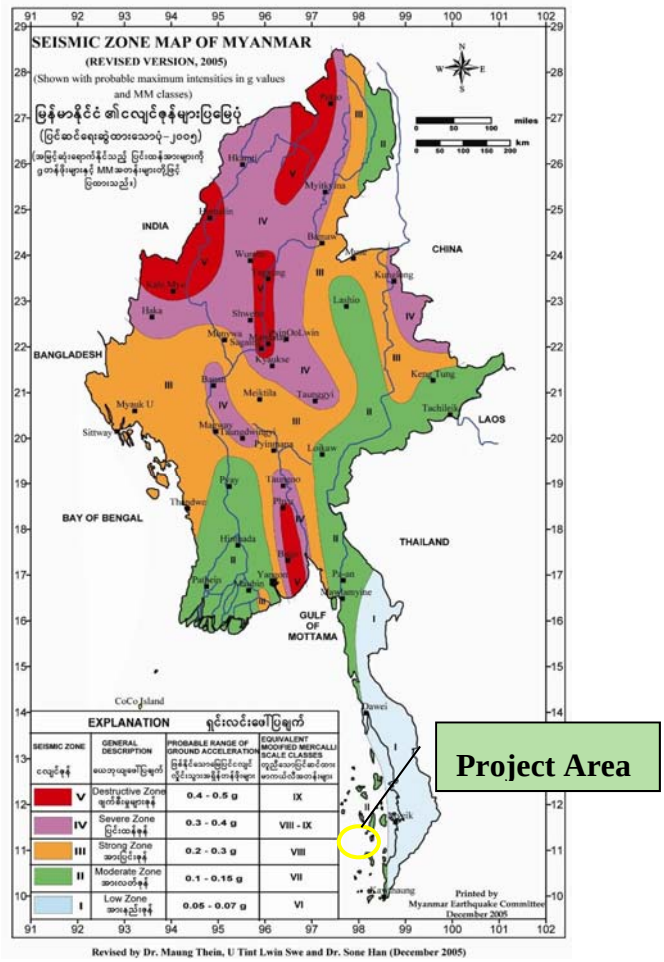


Figure 4 .17: Seismic Zone Map of Myanmar (Revised by Dr. Maung Thein, U Thint Lwin Swe and Dr. Sone Han (December 2005)).

4.2: BIOLOGICAL ENVIRONMENT

4.2.1 BIODIVERSITY

The biodiversity survey was conducted by the E Guard for the Environmental Impact Assessment (EIA) of Wa Ale Eco- Tourism Resort Project in Taninthayi Region. Wa Ale island is located at Kawthaung district, Taninthayi region. **Fauna and flora** survey was carried out, within and around the Wa Ale island in dry season (December 23rd - 27th, 2016).

The baseline study includedboth terrestrial and aquatic **fauna** with the focus on the major groups are vertebrates (birds, reptiles, lizards, fishes and amphibians) and invertebrates (butterflies, dragonflies, damselflies and many kinds of insects). The study involved especially visual observation.

According to the survey results, in the area surrounding the study sites, about two mammal species of *Macaca fascicularis* (also known as long-tailed macaque orcrab-eating macaque and *Macaca leonine* (also known as northern pig-tailed macaque) were observed.

The bird survey identified about 27 species of Avian Fauna belonging to 7 orders and 15 families were recorded with different population abundance and different bird species categorized as insectivores, omnivores, carnivores, nectarivore species and fruit-eating species. During the survey period, eight reptilian species were also recorded at the study site. Five *Chelonia mydas* Green Sea Turtle's nests were also observed between N 10°50.809' E 098° 04.348' E 85m and N 10°50.640' E 098° 04.463' E 18m in this study site. Surrounding the study site, about 51 species of aquatic fauna belonging to 14 orders and 34 families were recorded with different population abundance and of different categorized aquatic species. Biodiversity survey team observed that there are about 24 species of butterflies belonging to 7 families, 7 species of dragonflies and damselflies belonging to two families, libellulidae and coenagrionidae in the areasurrounding the project.

As for flora, the baseline study and specimen collection of flora was carried out in and around the Island and project site area. Assessment of the diversity of flora groups such as trees, small trees, shrubs, herbs, climbers, fern and epiphyte was conducted. Plant species diversity totalled 50 species representing 49 genera of 36 families were listed in the project site area.

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As for flora, the baseline study and specimen collection of flora was carried out in and around the Island and project site area. The project was conducted for the aAssessment of the diversity of flora groups such as trees, small trees, shrubs, herbs, climbers, fern and epiphyte was conducted. to predict the impacts and biotic ecology. The identification of the possible impact of the project recommended mitigation measures for all negative impacts identified. Plant species diversity total 50 species representing 49 genera of 36 families were listed in the project site area.

METHODOLOGY OF THE STUDY

SURVEY ITEM

Survey items for fauna and flora survey are as follows;

1. Biodiversity and Ecosystem

SURVEY AREA

The survey area was in Wa Ale Island and around the territorial waters near the Island in Taninthayi Region. Specimen collection of fauna and flora is carried out in and around the project sites and are also investigated that between 500 meters and 1000 meters from the project area.

SURVEY PERIOD

Flora and fauna survey was conducted cold season. The survey duration is as shown in Table.

Table 4. 23 Survey Periods for Fauna and Flora Survey

Season	**Period**
Cold season	December 23rd - 27th, 2016

FIELD SURVEY METHOD (FAUNA & FLORA)

FAUNA

(i) Field observation

Primary data collection was conducted by through direct observation, interviews, individual/target group consultation. This method was applied for collecting information about such as- common

resident faunas (mammals, birds, reptiles, amphibians, fish species, various kinds of insect include butterfly, dragonfly and damselfly etc.) and floras (existing flora data such as tree and small tree, shrub, herb and climber, terrestrial and aquatic grasses, herb and bamboo) in the project area; biological resources (listing of plantation and presence of wild animals). All collected specimens were scale photographed, morphometric characters were recorded and preserved in suitable containers with appropriate concentration of formalin for taxonomical identification and further study. The butterfly and dragonfly were photographed soon after the collection and measurements were also taken to the Department of Zoology, University of Yangon for key characteristics. The identified species were translated to scientific name with assistance of the senior researcher at Department of Zoology, University of Yangon.

Locations for observation (the list is below) were selected randomly near the project sites. The aids used for field observation were relevant topographic maps, compass, basic field survey equipment including the Global Positioning System (GPS) to assess the spatial location (latitude and longitude) of each survey point, digital camera, binoculars and reference books.

Not only depending on the kind of animal, signs and tracks of live animals but also depending on the study site and project, fauna is assessed using the point count method, line transects, mark and recapture).

Having interviewed the fishermen near the study site, the information of some fauna and flora was gatherered. Afterwards, collected specimens were measured and preserved and taxonomically identified within survey area by using field guide and photographic records and recorded in the species lists

Point count method, Line transects, Capture and Mark

Surveys and Investigations are conducted for Environmental Impact Assessment (EIA). The aids for field surveys are relevant topographic map, compass, and basic filed survey equipments including the Global Positioning System (GPS) to assess the spatial location (latitude and longitude) of each survey point, digital camera, binoculars and referenced books. Whenever necessary, not only depending on the kind of animal, sign and tracks of live animal but also depending on the study site and project are assessed using the point count method, line transects, capture and mark. Having interviewed with fishermen of nearly study site, the information of some fauna and flora are gathered and identified. After wards, collected specimens will be measured and preserved and txonomically identified within survey area by using field guide and photographic records were made as a complete species list.

(ii) Natural and Physical Environment Anlysis

As far as it is concerning about Habitat Evaluation System (HES), Environmental Impact Assessment (EIA) technically exmained few habitat types. Biodiversity survey group observed within short period to collect the data of fauna. Our term identified as to observe their fur and feathers, dens, nests, trails and burrows for not seen face to face species. Biodiversity group investigated base on the conditions of survey areas to use scans and spot observation method.

The survey team learnt that the fudamental assumption underlying HES is that the persence or absence, abundance, and diversity of animal population in habitat or community are determined by basic biotic and abiotic factors that can be readily quantified. The carrying capacity of a habitat for a given species or groups of spcies is coorelated with basic chemical, physical, and biotic characteristics of the habitats.

(iii) **Topography:** Topographical data of land cover and vegetation will be obtained through field survey and pictured with the help of GPS and related equipments and software. Some of these data will be collected visually from field survey.

(iv) **Biological Condition:** Fauna and flora occuring in the vicinity of around the Wa Ale island are visually surveyed and recorded with the help of scaled photographs. They will be identified taxonomically by using appropriate references.

(v) Terrestrial and Aquatic Fauna Survey

The base line study and specimen collection of terrestrial and aquatic fauna, especially as major groups of vertebrate and invertebrate are observed. They are carried out in and around Wa Ale island, Eco Resort Project Area. Habitat preferences, relative abundances and diversity assessment were examined. Diversity of fauna species were presented in tabulated forms. Possible impacts (negative and positive impacts) were investigated and mitigation measures were proposed. Collected specimens were checked with the IUCN Red list and CITE appendices.

FLORA

METHOD

The floristic data collection was conducted by the following methods in the study Area.

SAMPLE PLOTTING

The Global positioning system was used to mark the coordinates of the sample plots. In order to obtain essential data for predicting of species composition in the forest and vegetation types, 5 x 5 and 10 x 10-meter quadrants, were set up and tree species in the plot were collected and density, relative density, frequency, relative frequency of each species were also calculated. The species identification was carried out by using key to the families of flowering plants and appropriate literature.

RANDOM TRANSECTING

To get representative checklists of the tree species and plant collection was also carried out by random transect lines along the seashore and between one plot and another wherever possible. Materials used for recording are measuring tape for sample plotting and transecting, digital camera for recording and GPS.

DATA ANALYSIS

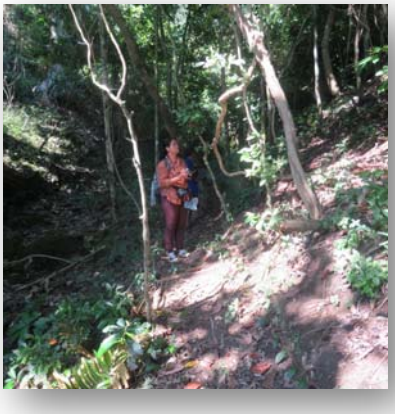
After field survey, data entry was carried out in excel work sheet. For identification of threaten species, it is conducted matching with IUCN red list version 2016.3.

QUANTITATIVE STRUCTURES OF SPECIES

1. Population density; the density of a species is the numerical representation of its individuals in a unit area. The density of a species refers to the adequacy of its different requirements and the availability of space.
2. The frequency of a species is expressed as the percentage occurrence of its individuals in a number of observations.
   According to Santra, (1999), the density and frequency index is determined by the following formula.

$$\text{Relative Density (R.D)} = \frac{\text{No. of individual species}}{\text{Total no. of all individual Species}} \times 100$$

$$\text{Relative Frequency (R.F)} = \frac{\text{No. of occurrences of the species}}{\text{Total no. of all occurrences Species}} \times 100$$



4.2.2 RESULTS

CLASSIFICATION OF TERRESTRIAL FAUNA AND FLORA

- **Fauna**
- **Vertebrate**
- **Mammals**

MAMMALS

Surrounding of the Island, about two mammal species as *Macaca fascicularis* Long-Tailed Macaque/ Crab-Eating Macaque and *Macaca leonine* Northern Pig-Tailed Macaque were observed. *Macaca fascicularis* Long-Tailed Macaque/ Crab-Eating Macaque was recorded with the population abundantly. It is a medium-build macaque with long tail (as long as the body). Grey to reddish – brown, paler underneath. The crab-eating macaque lives in a wide variety of habitats, including primary lowland rainforests, disturbed and secondary rainforests, shrub-land, and riverine and coastal forests and mangrove. The crab-eating macaque has the third-largest range of any primate species, behind only humans and *Rhesus macaques*. The IUCN Red List categorizes the species as Least Concern, and CITES lists them as Appendix II. A recent review of their populations suggests a need for better monitoring of populations due to increased wild trade and rising levels of human-macaque conflict, which are reducing overall population levels despite the species being widely distributed. *Macaca leonine* Northern Pig-Tailed Macaque was also recorded in this area according to report by the native people (Table.2, Plate.1).

Table 2. Mammal species recorded Wa Ale Island, Eco Resort Construction Project Area during the survey period

Sr.	Order/Family	Species	Common Name	IUCN Red List Status	Type of evidence
I	Primates				
1	Cercopithecidae	*Macaca fascicularis*	Long-Tailed Macaque/ Crab-Eating Macaque	LC	Observed
2	Cercopithecidae	*Macaca leonina*	Northern Pig-Tailed Macaque	VU	Interviewed

LC- Least Concern, VU – Vulnerable, No. of Species – 1, No. of Order – 1, No. of Family – 1

BIRDS

According to the survey results, surrounding of the study site, about 27 species of Avian Fauna belonging to 7 orders and 15 families were recorded with different population abundance and different categorize bird species as insectivores, omnivores and carnivorous (Table.3, Plate. 2). Not only bird species but also the nests with eggs near the study site are found as various habitat types.

The most commonly observed all year-round resident birds include, beneficial insectivorous species like Lesser Rasket-Tailed Drongo *Dicrurus remifer, Collacalia fuciphaga* Edible-Nest Swiftlet and *Eurystomus orientalis* Dollar Bird as the insectivorous group are identified in this survey. According to survey results, insectivorous species are quite effective in reducing insect pest populations. Some species also can serve as an indicator or trigger organism, indicating possible environmental trouble, as declines in their relatively abundant numbers may precede other more obvious effects of environmental stress.

During the bird survey, Scarlet-Backed Flowerpecker *Dicaeum cruentatum*, *Pbilentoma velatum* Maroon-Breasted Philentoma, Large-Billed Crow *Corvus macrorhynchos*, *Chloropsis cyanopogon* Lesser Green Leafbird, *Hypsipetes mcclellandii* Mountain Bulbul are also recorded as omnivores and common resident birds.

The carnivorous species are recorded by Black Kite (*Milvus migrans*), Brahminy Kite (*Haliastur indus indus*), White-Bellied Sea Eagle (*Haliaeetus leucogaster*), *Butastur indicus* Grey-Faced Buzzard, Black-Capped Kingfisher (*Halcyon pileata*), *Aredeola baccbus* Chinese Pond Heron, Purple Heron (*Ardea purpure*), Great Blue Heron *Ardea herodias* and Greater Coucal (*Centropus sinensis*) in bird survey. Brahminy Kite (*Haliastur indus indus*) is found very abundantly at surrounding of the study site.

Thick-Billed Green Pigeon *Treron curvirostra*, *Aceros corrugatus* Wrinkled Hornbill, *Treron vernans* Pink-Necked Green Pigeon and Pied Imperial Pigeon *Ducula bicolor* are found in this study site as fruit-eating species. Pied Imperial Pigeon *Ducula bicolor* is a relatively large, pied species of pigeon. It is found in forest, woodland, mangrove, plantations. It is mainly found on small islands and in coastal regions.

Aethopyga siparaja Crimson Sunbird, *Nectarinia calcostetba* Copper-Throated Sunbird, *Nectarinia zeylonica* Purple-Pumped Sunbird, *Aethopyga ignicauda* Fire-Tailed Sunbird, *Nectatinia asiatica* Purple Sunbird and *Nectatinia jugularis* Olive-Backed Sunbird are identified as nectarivore species.

Table 4.24 Bird species recorded during the survey period in Wa Ale Island, Eco Resort Construction Project Area

Sr.	Order/Family	Scientific Name	Common Name	IUCN Red List Status
I	**Passeriformes**			
1	Dicaeidae	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker	LC
2	Dicruridae	*Dicrurus remifer*	Lesser Rasket-Tailed Drongo	LC
3	Tephrodornithidae	*Pbilentoma velatum*	Maroon-Breasted Philentoma	NT

Sr.	Order/Family	Scientific Name	Common Name	IUCN Red List Status
4	Chloropseidae	*Chloropsis cyanopogon*	Lesser Green Leafbird	NT
5	Covidae	*Corvus macrorhynchos*	Large-Billed Crow	LC
6	Pycnonotidae	*Hypsipetes mcclellandii*	Mountain Bulbul	LC
7	Columbidae	*Treron curvirostra*	Thick-Billed Green Pigeon	LC
8	Columbidae	*Ducula bicolor*	Pied Imperial Pigeon	LC
9	Columbidae	*Treron vernans*	Pink-Necked Green Pigeon	LC
10	Nectariniidae	*Aethopyga siparaja*	Crimson Sunbird	LC
11	Nectariniidae	*Nectarinia calcostetba*	Copper-Throated Sunbird	LC
12	Nectariniidae	*Nectarinia zeylonica*	Purple-Pumped Sunbird	LC
13	Nectariniidae	*Aethopyga ignicauda*	Fire-Tailed Sunbird	LC
14	Nectariniidae	*Nectatinia asiatica*	Purple Sunbird	LC
15	Nectariniidae	*Nectatinia jugularis*	Olive-Backed Sunbird	LC
II	**Coraciiformes**			
16	Coracidae	*Eurystomus orientalis*	Dollar Bird	LC
III	**Bucerotiformes**			
17	Bucerotidae	*Aceros corrugatus*	Wrinkled Hornbill	NT
IV	**Apodiformes**			
18	Apodidae	*Collacalia fuciphaga*	Edible-Nest Swiftlet	LC
V	**Accipitriformes**			
19	Accipitridae	*Milvus migrans*	Black Kite	LC
20	Accipitridae	*Haliastur indus indus*	Brahminy Kite	LC
21	Accipitridae	*Haliaeetus leucogaster*	White-Bellied Sea Eagle	LC
22	Accipitridae	*Butastur indicus*	Grey-Faced Buzzard	LC

Sr.	Order/Family	Scientific Name	Common Name	IUCN Red List Status
23	Halcyonidae	*Halcyon pileate*	Black-Capped Kingfisher	LC
VI	**Pelecaniformes**			
24	Ardeidae	*Ardea purpurea*	Purple Heron	LC
25	Ardeidae	*Ardea Herodias*	Great Blue Heron	LC
26	Ardeidae	*Aredeola baccbus*	Chinese Pond Heron	LC
VII	**Cuculiformes**			
27	Centropodidae	*Centropus sinensis*	Greater Coucal	LC

**Note: LC- Least Concern, NT-Near Threatened, No. of species-27, No. of Order-7, No. of Family-15*

According to the survey results, the following different categorize of bird species are followed:

Table 4. Different categorize of bird species from Wa Ale Island, Eco Resort Construction Project Area

Sr.	Types of bird species	Number of Species
1.	Insectivorous species	3
2.	Omnivores species	5
3.	Carnivorous species	9
4.	Fruit-eating species	4
	Nectarivore species	6
Total		27

Sr. No.	Location	GPS Points	Elevation
1.	**Site 1**	N 10°50.809’ E 098° 04.348’	Elevation- 85 m
2.		N 10°51.030’ E 098° 04.014’	Elevation- 89 m
3.		N 10°51.253’ E 098° 03.962’	Elevation- 3 m
4.		N 10°51.399’ E 098° 03.651’	Elevation- 2 m
5.		N 10°51.401’ E 098° 03.603’	Elevation- 2 m
6.		N 10°51.388’ E 098° 03.504’	Elevation- 19 m

7.		N 10°51.379’ E 098° 03.477’	Elevation- 18 m
8.	**Site 2**	N 10°50.717’ E 098° 04.444’	Elevation- 11 m
9.		N 10°50.640’ E 098° 04.463’	Elevation- 18 m
10.		N 10°50.745’ E 098° 04.418’	Elevation- 3 m
11.		N 10°50.788’ E 098° 04.392’	Elevation- 8 m
12.		N 10°50.788’ E 098° 04.385’	Elevation- 11 m
13.		N 10°50.809’ E 098° 04.349’	Elevation- 10 m
14.		N 10°51.379’ E 098° 03.474’	Elevation- 40 m

Table 4.25: Avian fauna species occurrence of various types of habitats in Wa Ale Island, Eco Resort Construction Project Area

Sr. No.	Scientific Name	Common Name	Points												
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	*Dicaeum cruentatum*	Scarlet-Backed Flowerpecker				√		√		√				√		√
2	*Dicrurus remifer*	Lesser Rasket-Tailed Drongo		√			√						√			
3	*Pbilentoma velatum*	Maroon-Breasted Philentoma				√			√						√	
4	*Chloropsis cyanopogon*	Lesser Green Leafbird				√			√			√				√
5	*Corvus macrorhynchos*	Large-Billed Crow		√			√					√				
6	*Hypsipetes mcclellandii*	Mountain Bulbul					√					√				
7	*Treron curvirostra*	Thick-Billed Green Pigeon	√				√				√					
8	*Ducula bicolor*	Pied Imperial Pigeon	√			√						√				
9	*Treron vernans*	Pink-Necked Green Pigeon	√		√			√				√		√		
10	*Aethopyga siparaja*	Crimson Sunbird		√		√		√			√	√				
11	*Nectarinia calcostetba*	Copper-Throated Sunbird		√		√					√		√			√
12	*Nectarinia zeylonica*	Purple-Pumped Sunbird	√			√		√		√						√
13	*Aethopyga ignicauda*	Fire-Tailed Sunbird				√								√		
14	*Nectatinia asiatica*	Purple Sunbird	√		√	√	√									√
15	*Nectatinia jugularis*	Olive-Backed Sunbird			√			√				√				
16	*Eurystomus orientalis*	Dollar Bird				√										
17	*Aceros corrugatus*	Wrinkled Hornbill		√								√				

Sr. No.	Scientific Name	Common Name	Points													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
18	*Collacalia fuciphaga*	Edible-Nest Swiftlet	√	√	√		√	√	√				√	√		√
19	*Milvus migrans*	Black Kite		√		√				√			√			
20	*Haliastur indus indus*	Brahminy Kite	√		√				√			√			√	√
21	*Haliaeetus leucogaster*	White-Bellied Sea Eagle			√					√	√					
22	*Butastur indicus*	Grey-Faced Buzzard				√								√		
23	*Halcyon pileata*	Black-Capped Kingfisher											√			√
24	*Ardea purpurea*	Purple Heron		√										√	√	√
25	*Ardea herodias*	Great Blue Heron										√				√
26	*Aredeola baccbus*	Chinese Pond Heron								√				√		
27	*Centropus sinensis*	Greater Coucal						√								
Total species			**7**	**8**	**6**	**12**	**6**	**7**	**4**	**5**	**4**	**9**	**5**	**7**	**3**	**10**

REPTILIAN

During survey period, eight reptilian species was recorded at the study site. These are *Python reticulates* Reticulated Python, *Chrysopelea ornata* Ornate Flying Snake were observed in this study site. As interviewed survey, Russell's viper (*Daboia russelii siamensis*), Banded Krait (*Bungarus fasciatus*), Chequered keelback water snake (*Xenochrophis piscator*) were recorded. According to interview records, there were caught accidentally some snakes both poisonous and non-poisonous snakes in this area according to report by the native people. *Python reticulatus* reticulated python is a species of python found in Southeast Asia. They are the world's longest snakes and longest reptiles and among the three heaviest snakes. Like all pythons, they are nonvenomous constrictors and normally not considered dangerous to humans. Although large specimens are powerful enough to kill an adult human, attacks are only occasionally reported. *Chrysopelea ornata* Ornate Flying Snake was excellent climbers, being able move across even the smallest of branches and even straight up trees with few branches by using the edges of rough bark. They are mildly venomous, but the venom is not considered to be dangerous to humans. It is intended to assist in subduing fast moving, arboreal prey. *C. ornata* takes small arboreal prey, such as lizards, bats and small rodents. Two lizard species, *Calotes emma alticristatus* Northern Forest Crested Lizard and *Mabuya longicaudata* Long-tailed Sun Skink are also observed in this survey (Table.6, Plate 3). *Calotes emma alticristatus recorded that the* terrestrial and arboreal; diurnal; inhabits various forest habitats including dry deciduous, coastal, and moist evergreen. Insectivorous; feeds on termites, grasshoppers, ants, cockroaches, beetles, diverse species of moths and low flying butterflies and soil-living insects and their larvae.

In survey period, *Chelonia mydas* Green Sea Turtle's nests were observed about five nests between N 10°50.809' E 098° 04.348' E 85m and N 10°50.640' E 098° 04.463' E 18m in this study site. Like other sea turtles, green sea turtles migrate long distances between feeding grounds and hatching beaches. Many islands worldwide are known as Turtle Island due to green sea turtles nesting on their beaches. Females crawl out on beaches, dig nests and lay eggs during the night. Later, hatchlings emerge and scramble into the water. Those that reach maturity may live to eighty years in the wild. The diet of green turtles' changes with age. Juveniles are carnivorous, but as they mature they become omnivorous. The young eat fish eggs, mollusks, jellyfish, small invertebrates, worms, sponges, algae, and crustaceans (Table.6, Plate 4).

Table 4.26: Reptile species recorded during the survey period in Project Area

Sr.	Order/Family	Scientific Name	Common Name	IUCN RedList Status	Type of evidence
I	**Squamata**				
1	Pythonidae	*Python reticulatus*	Reticulated Python	NE	Observed
2	Colubridae	*Chrysopelea ornata*	Ornate Flying Snake	Not known to be endangered	Observed

3	Colubridae	*Xenochrophis piscator*	Chequered keelback water snake	LC	Interviewed
4	Elapidae	*Bungarus fasciatus*	Banded Krait	LC	Interviewed
5	Viperidae	*Daboia russelii siamensis*	Russell's viper	LC	Interviewed
6	Agamidae	*Calotes emma alticristatus*	Northern Forest Crested Lizard	NE	Observed
7	Scincidae	*Mabuya longicaudata*	Long-tailed Sun Skink	LC	Observed
II	**Testudines**				
8	Cheloniidae	*Chelonia mydas*	Green Sea Turtle	EN	Observed
9		*Dermochelys coriacea*	Leatherback Turtle	CR	Observed

LC- Least Concern, NE- Not evaluated, EN- Endangered, No. of species- 8, No. of Family- 7, No. of Orde-2.

AQUATIC FAUNA (FISH AND CRAB)

Surrounding of the study site, about 51 species of Aquatic Fauna belonging to 14 orders and 34 families were recorded with different population abundance and different categorize aquatic species (Table. 7, Plate 5). During survey period, not only fish species but also the marine decapod crustacea species are found through out the the sand bank in the study site.

Table 4.27 Fish species recorded during the survey period in Project Area

Sr. No.	Order	Family	Scientific Name	Common Name	Type of evidence
	Fish				
1	Tetradontiformes	Diodontidae	*Diodon hystrix*	Spotted porcupine fish	Observed
2	Tetradontiformes	Monacanthidae	*Alutera monoceros*	Unicorn leatherjacket	Observed
3	Sepiida	Sepiidae	*Sepia aculeata*	Needle cuttle fish	Observed
4	Sepiida	Sepiidae	*Sepia pharaonis*	Pharaoh cuttle fish	Observed
5	Teuthida	Loliginidae	*Loligo devauceli*	Squid	Observed
6	Siluriformes	Plotosidae	*Plotosus canius*	Gray catfish	Observed
7	Siluriformes	Bagridae	*Nemapteryx caelatus*	Engraved catfish	Observed

Sr. No.	Order	Family	Scientific Name	Common Name	Type of evidence
8	Siluriformes	Clariidae	*Clarias gariepinus*	African catfish	Observed
9	Perciformes	Carangidae	*Carangoides ferdau*	Blue trerally	Observed
10	Perciformes	Sphyraenidae	*Sphyraena barracuda*	Great barracuda	Observed
11	Perciformes	Scombridae	*Scomberomorus guttatus*	Indo Pacific king mackerel	Observed
12	Perciformes	Scombridae	*Rastrelliger brachysoma*	Short mackerel	Observed
13	Perciformes	Scombridae	*Rastrelliger kanagurta*	India mackerel	Observed
14	Perciformes	Carangidae	*Decapterus* maruadsi	Japanese scad	Observed
15	Perciformes	Carangidae	*Selaroides leptolepis*	Yellowstripe scad	Observed
16	Perciformes	Serranidae	*Cephalopholis boenak*	Chocolate hind	Observed
17	Perciformes	Serranidae	*Epinephelus faveatus*	Barred- chest grouper	Observed
18	Perciformes	Lethrinidae	*Lethrinus ornatus*	Ornate Emperor	Observed
19	Perciformes	Terapontidae	*Terapon theraps*	Largescaled therapon	Observed
20	Perciformes	Lutjanidae	*Lutjanus vitta*	Brownstripe red snapper	Observed
21	Perciformes	Sciaenidae	*Johnius belangerii*	Belanger's croaker	Observed
22	Perciformes	Leiognathidae	*Leiognathus equulus*	Ponylfish	Observed
23	Perciformes	Scombridae	*Scomberomorus commerson*	Spanish mackerel	Observed
24	Perciformes	Trichiuidae	*Lepturacanthus savala*	Savalani hairtail	Observed
25	Perciformes	Carangidae	*Seriolina spe:*	Songoro amberjack	Observed
26	Perciformes	Carangidae	*Parastromateus niger*	Black pomfret	Observed

Sr. No.	Order	Family	Scientific Name	Common Name	Type of evidence
27	Perciformes	Sciaenidae	*Pennahia anea*	Grey fish croaker	Observed
28	Perciformes	Nemipteridae	*Scolopsis bimaculatus*	Thumbprint monocle bream	Observed
29	Perciformes	Nemipteridae	*Nemipterus peronei*	Notchedfin thread fin bream	Observed
30	Perciformes	Caesionidae	*Dipterygonotus balteatus*	Mottled fusilier	Observed
31	Perciformes	Drepaneidae	*Drepane punctata*	Spotted sickle fish	Observed
32	Perciformes	Siganidae	*Siganus javus*	Streaked spinefact	Observed
33	Clupeiformes	Clupeidae	*Tenualosa Ilisha*	Hilsa shad	Observed
34	Clupeiformes	Clupeidae	*Dussumieria acuta*	Rainbow sardine	Observed
35	Pleuronectiformes	Paralichthyidae	*Pseudorhombus arsius*	Largetooth flounder	Observed
36	Pleuronectiformes	Psettadidae	*Psettodes erumei*	Indian spiny turbot	Observed
37	Anguilliformes	Anguillidae	*Anguilla bengalensis*	Mottled eel	Observed
38	Anguilliformes	Muraenesocidae	*Muraenesox bagio*	Pike eel	Observed
39	Squaliformes	Squalidae	*Squalus acanthias*	Dog fish	Observed
40	Rajiformes	Dasyatidae	*Pastinachus sephen*	Cowtail stingray	Observed
41	Mugiiformes	Mugiidae	*Mugil cephalus*	Flathead mullet	Observed
42	Beloniformes	Belonidae	*Tylosurus crocodilus*	Hound needle fish	Observed
43	Clupeiformes	Clupeidae	*Dussumieria acuta*	Rainbow sardine	Observed
44	Clupeiformes	Clupeidae	*Tenualosa toli*	Toli shad	Observed
45	Decapoda	Portunidae	*Portunus sp:*		Observed
46	Decapoda	Portunidae	*Portunus sanquinolentus*	Redspot swimming crab	Observed
47	Decapoda	Portunidae	*Portunus pelagicus*	Blue-swimming crab	Observed
48	Decapoda	Portunidae	*Charybdis natatar*	Ridged swimming crab	Observed

Sr. No.	Order	Family	Scientific Name	Common Name	Type of evidence
49	Decapoda	Portunidae	*Charybdis sp:*	-	Observed
50	Decapoda	Portunidae	*Charybdis feriata*	Coral crab	Observed
51	Decapoda	Raninidae	*Ranina ranina*	Spanner crab	Observed

No. of species – 51, No. of Order – 14, No. of Family – 34

CORALS

According to the analysis data from MAAS (2009) and Cherry Aung PhD thesis (2009), there are 20 families, a total of 518 corals species are recorded in Myanmar. Among them 49% are recorded in Tanintharyi region.

INVERTEBRATE

Invertebrates such as butterflies, dragonfly and damselfly species are found as few number in the nearby the Wa Ale Island Resort Construction Project, Taninthayi Region.

BUTTERFLY

Butterflies are important as one of the external agents of the Entomophily. These insects visit one flower after another gathering pollen and nector certainly have an important role in play of the process of pollination.

The relationship between butterfly and plants plays an important role in an ecosystem. Flowering plants need butterfly species for pollination and the butterflies require suitable plant species to serve as their host plants to complete their life cycle. Flowering plants are also sources of food for the adult butterfly species as they ecological specialization of butterflies by cross-pollinating the plants.

Biodiversity survey group are observed that there are about 24 species of Butterfly as well as male and female belonging to 7 families in surrounding of the project area (Table.8, Plate 6). These are *Papilio polytes* Common Mormon, *Papilio demoleus* Common Lime, *Catopsilia pomona* Common Emigrant, *Eurema brigitta* Small Grass Yellow, *Euploea doubledayi* Striped Black Crow, *Euploea klugii* Blue King Crow, *Euploea core* Common Crow, *Euploea modesta, Danaus genutia* Striped Tiger, *Danaus Limniace* Blue Tiger, *Cupha erymanthis* Rustic, *Cirrochroa tyche* Common Yeoman, *Phalantha alcippe* Small Leopard, *Tanaecia flora* Blue Count, *Junonia iphita* Chocolate pansy or chocolate soldier, *Vindula erota* Common Cruiser, *Lebadea martha* The Knight *Ypthima similis* Common Four-ring Butterfly, *Chilades pandava* Plains cupid, *Drupadia ravindra* Common Posy, *Neomyrina nivea* White Imperial Butterfly, *Arhopala ammonides* Little Cerulean Oakblue, *Potanthus* sp. Darts, and *Potanthus* sp. Darts.

Table 4. 28: Butterfly species recorded during the survey period in Project Area

Sr.	Order/Family	Scientific Name	Common Name	Abundance status
I	**Lepidoptera**			
1	Papilionidae	*Papilio polytes*	Common Mormon	Common
2	Papilionidae	*Papilio demoleus*	Common Lime	Common
3	Pieridae	*Catopsilia pomona*	Common Emigrant	Common
4	Pieridae	*Eurema brigitta*	Small Grass Yellow	Common
5	Danaidae	*Euploea doubledayi*	Striped Black Crow	Common
6	Danaidae	*Euploea klugii*	Blue King Crow	Common
7	Danaidae	*Euploea core*	Common Crow	Common
8	Danaidae	*Euploea modesta*	-	Common
9	Danaidae	*Danaus genutia*	Striped Tiger	Common
10	Danaidae	*Danaus Limniace*	Blue Tiger	
11	Nymphalidae	*Cupha erymanthis*	Rustic	
12	Nymphalidae	*Cirrochroa tyche*	Common Yeoman	
13	Nymphalidae	*Phalantha alcippe*	Small Leopard	
14	Nymphalidae	*Tanaecia flora*	Blue Count	
15	Nymphalidae	*Junonia iphita*	chocolate pansy or chocolate soldier,	
16	Nymphalidae	*Vindula erota*	Common Cruiser	
17	Nymphalidae	*Lebadea martha*	The Knight	
18	Satyridae	*Ypthima similis*	Common Four-ring Butterfly	
19	Lycaenidae	*Chilades pandava*	Plains cupid	
20	Lycaenidae	*Drupadia ravindra*	Common Posy	
21	Lycaenidae	*Neomyrina nivea*	White Imperial Butterfly	
22	Lycaenidae	*Arhopala ammonides*	Little Cerulean Oakblue	
23	Hesperiidae	*Potanthus* sp.	Darts	
24	Hesperiidae	*Potanthus* sp.	Darts	

No. of species – 24, No. of Order – 1, No. of Family – 7

DRAGONFLY

Dragonflies are valuable as indicators of aquatic and terrestrial ecosystem health and also play a vital role as prey and predator to maintain the balance of tropic levels of food chain. The prey of the adults consists mostly of the harmful insects of crops, orchards and forests and thus has a regulatory impact on the agro-forestry.

Their aquatic larvae constitute a natural biological control over mosquito larvae and thus help to control several epidemic diseases like malaria, dengue, filaria etc. Adult odonates feed on mosquitoes, black flies and other blood-sucking flies and act as an important bio-control agent of these harmful insects. Odonates were thus increasingly recognized due to the direct role of predators in ecosystem and their value in indicators of water quality.

Biodiversity survey group investigated that the surrounding of the Eco Resort Construction Project Area. The survey team observed within short period to collect the data of fauna, about 7 species of Dragonfly and Damselfly belonging to two families as Libellulidae and Coenagrionidae (Table. 9, Plate 7).

Table 4.29: Dragonfly species recorded during the survey period in Project Area

Sr.	Order/Family	Species	Common Name	Abundance status
I	**Odonata (Dragonfly)**			
1	Libellulidae	*Orthetrum pruinosum*	Crimson-tailed Marsh Hawk	Very Common
2	Libellulidae	*Orthetrum sabina*	Green Marsh Hawk	Common
3	Libellulidae	*Neurothemis fulvia*	Fulvous Forest Skimmer	Common
4	Libellulidae	*Diplacodes trivialis* (Male)	Ground Skimmer	Very Common
5	Libellulidae	*Diplacodes trivialis* (Female)	Ground Skimmer	Very Common
II	**Odonata (Damselfly)**			
6	Coenagrionidae	*Pseudagrion microcephalum*	Blue Grass Dartlet	Common
7	Coenagrionidae	*Ischnura verticalis*	Eastern Forktail	Common

No. of species – 7, No. of Order – 1, No. of Family – 2

SPECIES DIVERSITY OF TERRESTRIAL AND AQUATIC FAUNA FROM WA ALE ECO-TOURISM PROJECT AREA

According to the survey record, especially some of these data collected visually from field survey within short period to collect the data of fauna. So, these areas are assessed as a high diversity of terrestrial and aquatic fauna representing five different groups such as vertebrate

(Mammal, Bird, Reptile, Fish) and Invertebrate (Butterfly, Dragonfly and Damselfly). There are total of 118 fauna species recorded in and around the Resort Construction Project Area. The list of fauna is mentioned as follows:

Table 4.30: Species Occurrence of Terrestrial and Aquatic Fauna from Wa Ale Island Eco Resort Construction Project

Vertebrate								Invertebrate			
Mammal		Bird		Reptilian		Fish		Butterfly		Dragonfly/Damselfly	
No. family	No. species	No. family	No. species	No. family	No. species	No. family	No. species	No. family	No. species	No. family	No. species
1	1	15	27	5	8	34	51	7	24	2	7
Total species number – 118											

OVERVIEW OF FLORA

FLORISTIC COMPOSITION

The total number of tree species collected in 11 representative sample plots in study area is 28 species belonging to 28 genera.

RELATIVE DENSITY OF TREE SPECIES

Among the sample plots species density per study site was varied and the highest density was observed *Eugenia oblata, Thespesiapopulnea, Barringtoniaasiatica, Guettardaspeciosa, Sonneratiacaseolaris*, *Calophyllum inophyllum and Cycas rumphii*. The result shows that these seven species are abundant in this area.

Table 4.31: Relative density of tree species

No.	Scientific Name	Density (D)	Relative Density (R. D. %)
1	*Aegiceras floridum*	0.5	2.48
2	*Barringtonia asiatica*	1.45	7.21
3	*Calamus longisetus*	0.72	3.58
4	*Calophyllumino phylum*	1.09	5.42
5	*Caryotamitis.*	0.54	2.68
6	*Casuarina equisetifolia*	0.72	3.58
7	*Cordia subcordata*	0.36	1.79
8	*Cycas rumphii*	0.81	4.03
9	*Dillenia parviflora*	0.18	0.89

No.	Scientific Name	Density (D)	Relative Density (R. D. %)
10	*Diospyrosmollis*	0.72	3.58
11	*Eugenia oblata*Roxb.	1.63	8.11
12	*Garcinia heterandra*Wall	0.36	1.79
13	*Guettardaspeciosa* L.	1.45	7.21
14	*Heritieralittoralis*Dryand.	0.72	3.58
15	*Hernandiaovigera* L.	0.54	2.68
16	*Ixoraarborea*Roxb.	0.27	1.34
17	*Licualamerguensis*Becc.	0.45	2.23
18	*Lumnitzeralittorea*(Jack) Voigt.	0.72	3.58
19	*Phoebe lanceolata* (Nees) Nees	0.36	1.79
20	*Premnaintegrifolia*L.	0.72	3.58
21	*Rapaneayunnanensis*	0.36	1.79
22	*Rhizophoramucronata*Lam.	0.72	3.58
23	*Sonneratiacaseolaris*(L.) Endl.	1.09	5.42
24	*Sophoratomentosa* L.	0.72	3.58
25	*Terminalia catappa* L.	0.72	3.58
26	*Thespesiapopulnea* (L.) Sol. ex Correa (1)	1.63	8.11
27	*Vaticaodorata* (Griff.) Sym.	0.36	1.79
28	*Vitexpubescens (*Vahl)	0.18	0.89

RELATIVE FREQUENCY OF TREE SPECIES

Relative frequency is the frequency of one species compared to the total frequency of all the species. According to the results *Eugenia oblate,* is high relative frequency value (6%) followed by, *Barringtoniaasiatica, Guettarda speciose, Thespesiapopulnea,* are (5%) respectively, *Casuarina equisetifolia, Cycasrumphii*, *Premnaintegrifolia* are equally. Therefore, these species occur everywhere in the study area. The lower frequency of some species, such as *Vitexpubescens, Dilleniaparviflora,* and *Phoebe lanceolata*, species in lower position in table is demarcated as rare species in study area.

Table 4.32: Relative frequency of tree species

No.	Scientific Name	Frequency (F)	Relative Frequency (R. F. %)
1	*Aegicerasfloridum*Roemer &Schultes	0.36	3.63
2	*Barringtoniaasiatica* (L.) Kurz	0.54	5.45
3	*Calamuslongisetus*Griff.	0.27	2.72
4	*Calophylluminophyllum*L.	0.36	3.63
5	*Caryotamitis*Lour.	0.27	2.72
6	*Casuarina equisetifolia*	0.45	4.54
7	*Cordia subcordata*	0.36	3.63
8	*Cycasrumphii*	0.45	4.54
9	*Dillenia parviflora*	0.18	1.81
10	*Diospyro smollis*	0.36	3.63
11	*Eugenia oblata*	0.63	6.36
12	*Garcinia heterandra*	0.36	3.63
13	*Guettar daspeciosa*	0.54	5.45
14	*Heritiera littoralis*	0.36	3.63
15	*Hernan diaovigera*	0.36	3.63
16	*Ixoraar borea*	0.27	2.72
17	*Licua lamerguensis*	0.36	3.63
18	*Lumnitzera littorea*	0.27	2.72
19	*Phoebe lanceolata*	0.18	1.81
20	*Premnainte grifolia*	0.45	4.54
21	*Rapanea yunnanensis*	0.27	2.72
22	*Rhizophora mucronata*	0.27	2.72
23	*Sonneratia caseolaris*	0.27	2.72
24	*Sophorato mentosa*	0.27	2.72
25	*Terminalia catappa*	0.36	3.63
26	*Thespesia populnea*	0.54	5.45
27	*Vatica odorata*	0.36	3.63

No.	Scientific Name	Frequency (F)	Relative Frequency (R. F. %)
28	*Vitex pubescens*	0.18	1.81

Table 4.33: Vegetation type in the study area

No.	Sample Quadrant	Vegetation type	Latitude/Longitude	Altitude	Dominant species
1	Q1	Moist Evergreen Forest	N 10°51.399' E 098° 03.651'	2m	*Eugenia oblata, Thespesia populnea, Barringtonia asiatica, Guettarda speciosa, Sonneratia caseolaris, Calophyllumino phylum* and *Cycas rumphii*
2	Q2	Moist Evergreen Forest	N 10°51.401' E 098° 03.603'	2m	
3	Q3	Moist Evergreen Forest	N 10°50.754' E 098° 04.418'	3m	
4	Q4	Moist Evergreen Forest	N 10°50.777' E 098° 04.342'	6m	
5	Q5	Moist Evergreen Forest	N 10°50.788' E 098° 04.385'	11m	
6	Q6	Moist Evergreen Forest	N 10°50.809' E 098° 04.349'	10m	
7	Q7	Moist Evergreen Forest	N 10°51.379' E 098° 03.471'	40m	
8	Q8	Moist Evergreen Forest	N 10°51.388' E 098° 03.504'	19m	
9	Q9	Moist Evergreen Forest	N 10°51.379' E 098° 03.477'	18m	
10	Q10	Moist Evergreen Forest	N 10°50.347' E 098° 04.870'	26m	
11	Q11	Moist Evergreen Forest	N 10°52.446' E 098° 04.744'	215m	

Table 4.34: Species Inventory List

No.	Genus	Species	Common Name	Family Name	IUCN status	Habit
1	*Aegiceras*	*Floridum*	Not known	Primulaceae	NT	T
2	*Asplenium*	*nidus L.*	Bird's net fern	Aspleniaceae	Nil	F

No.	Genus	Species	Common Name	Family Name	IUCN status	Habit
3	*Barringtonia*	*Asiatica*	Kyi-gyi	Lecythidaceae	LC	T
4	*Bulbophyllum*	*Reclusum*	Not known	Orchidaceae	Nil	E
5	*Calamus*	*Longisetus*	Kyein	Arecaceae	Nil	ST
6	*Calophyllum*	*inophyllum*	Pon-nyet	Hypericaceae	LC	T
7	*Caryota*	*mitis*	Min-baw	Arecaceae	Nil	T
8	*Casuarina*	*equisetifolia*	Pinle-kabwe	Casuarinaceae	Nil	T
9	*Chromolaena*	*Odorata*	Bizat	Asteraceae	Nil	S
10	*Clerodendrum*	*Inerme*	Pinle-kyauk-pan	Verbenaceae	Nil	S
11	*Clerodendrum*	*macrosiphon*	Ngayan-padu	Verbenaceae	Nil	S
12	*Cordia*	*subcordata*	Thanat	Boraginaceae	LC	ST
13	*Crinum*	*Asiaticum*	Koyan-gyi	Amaryllidaceae	Nil	H
14	*Cycas*	*Rumphii*	Mondaing	Cycadaceae	NT	ST
15	*Cyperus*	*Laxus*	Not known	Cyperaceae	Nil	H
16	*Dicliptera*	*Reptans*	Not known	Acanthaceae	Nil	H
17	*Dillenia*	*Parviflora*	Zinbyun	Dilleniaceae	Nil	T
18	*Diospyros*	*Mollis*	Te	Ebenaceae	Nil	ST
19	*Eugenia*	*Oblate*	Thabye-sat-chi	Myrtaceae	Nil	T
20	*Flagellaria.*	*Indica*	Myauk-kyein	Flagellariaceae	Nil	CL
21	*Garcinia*	*heterandra*	Taw-mingut	Hypericaceae	Nil	T
22	*Glochidion*	*sp.*	Not known	Euphorbiaceae	Nil	S
23	*Guettarda*	*Speciosa*	Not known	Rubiaceae	Nil	ST
24	*Heritiera*	*Littoralis*	Pinle-kanazo	Sterculiaceae	LC	T
25	*Hernandia*	*Ovigera*	Not known	Hernandiaceae	Nil	T
26	*Hoya*	*Carnosa*	Not known	Asclepiadaceae	Nil	CL
27	*Ipomoea*	*pes-caprae*	Pinle-kazun	Convolvulaceae	Nil	CL

No.	Genus	Species	Common Name	Family Name	IUCN status	Habit
28	*Ixora*	*Arborea*	Ponna-yeik	Rubiaceae	Nil	ST
29	*Kyllinga*	*melanosperma*	Thone-daunt-myet	Cyperaceae	Nil	H
30	*Lasia*	*Spinosa*	Zayit	Araceae	Nil	H
31	*Leea*	*Aequata*	Naga-mauk	Leeaceae	Nil	S
32	*Licuala*	*merguensis*	Salu	Arecaceae	Nil	ST
33	*Lumnitzera*	*Littorea*	Not known	Combretaceae	LC	T
34	*Lythophyte*	*Lythophyte*	Not known	Araceae	Nil	E
35	*Mikania*	*micrantha*	Not known	Asteraceae	Nil	CL
36	*Morinda*	*angustifolia*	Tawyeyo	Rubiaceae	Nil	ST
37	*Phoebe*	*lanceolata*	Seik-nan	Lauraceae	Nil	T
38	*Potho*	*sp.*	Not known	Araceae	Nil	E
39	*Premna*	*integrifolia*	Kywe-thwe	Verbenaceae	Nil	T
40	*Rapanea*	*yunnanensis*	Not known	Myrsinaceae	Nil	T
41	*Rhizophora*	*mucronata*	Byu-chidauk	Rhizophoraceae	LC	T
42	*Scaevola*	*Taccada*	Pinle-tan	Goodeniaceae	Nil	S
43	*Scoparia*	*Dulcis*	Dana-thuka	Scrophulariaceae	Nil	H
44	*Sonneratia*	*caseolaris*	Lamu	Lythraceae	LC	T
45	*Sophora*	*tomentosa*	Thinbaw-magyi	Fabaceae	Nil	ST
46	*Terminalia*	*catappa*	Banda	Combretaceae	Nil	T
47	*Thespesia*	*populnea*	Sabu-bani	Malvaceae	Nil	ST
48	*Tridax*	*procumbens*	Hmwezok-ne-gya	Asteraceae	Nil	H
49	*Vatica*	*odorata*	Kayin-kyaung-che	Dipterocarpaceae	Nil	T
50	*Vitex*	*pubescens*	Kyetyo	Verbenaceae	Nil	T

CURRENT ENVIRONMENTAL ASPECTS

According to the recorded data, water birds and terrestrial birds, plenty of butterflies and some species of insects between 500 Meter and 1000 Meter surrounding the project area are discovered.

IUCN AND CITES APPENDICES

In study sites were recorded no fauna species under the IUCN RedList and CITES appendices were recorded in this project area at the survey time. According to BirdLife International (2012 & 2013), Pbilentoma velatum Maroon-Breasted Philentoma, Chloropsis cyanopogon Lesser Green Leafbird, Aceros corrugatus Wrinkled Hornbill are recorded that the concern as the Near Threatened (NT) in bird survey results. Near Threatened (NT) and Least Concern (LC) mean without include threatened species. So, these are negligible status. As *Chelonia mydas* Green Sea Turtle, it was listed as Endangered (EN) by the IUCN and CITES and is protected from exploitation in most countries.

4.3: SOCIO-ECONOMIC COMPONENTS

SOCIAL AND CULTURAL RESOURCES

DEMOGRAPHIC STRUCTURE

TOPOGRAPHY

Bote Pyinn Township is located between Latitude 10° 19' and 10° 55' and between Longitude 98° 34' and 98° 56'. Total area is described in the following table.

No.	Township	Town	Area (sq miles)	Town	Area (sq miles)
1.	Bote Pyinn	1058.96	1058.96	-	-
2.		Pyi Gyi Mandaing	818.41	-	-
3.		Kara Thuri	626.71	-	-
	Total		2504.08		

BOUNDARY

Bote Pyinn Township is bordered by Thailand to the East, Kawt Thaung township to the South, Andaman sea and Tanintharyi Township to the North.

SOCIAL ENVIRONMENT

Various ethnic groups are living in Bote Pyinn Township are as follow.

No.	Ethnic	Population				Township Population	Percentage of Township Population
		Bote Pyinn	Mandaing	Kara Thuri	Total		
1.	Kachin	1	-	-	1		0.002
2.	Kayah	-	-	-	-		-
3.	Kayin	738	3033	59	3830		6.203
4.	Chin	6	-	-	6		0.010
5.	Mon	994	702	45	1741		2.820
6.	Burma	23658	7163	11566	51387		81.6
7.	Yakhine	111	-	25	136		0.22
8.	Shan	743	887	7	1637		2.65
9.	Salone	250	-	-	250		0.405
10.	Others	-	1120	2641	3761		6.09
Total		35501	12905	13343	61749	61749	100%

EDUCATIONAL STATUS

Educational information of Bote Pyinn Township as follow.

(a) Universities/ Collages

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

(b) Basic Education

(i) High schools

No.	School	Location	Area (Acres)	No. of Teachers	No. of Student	Ratio of Teacher and Students
1.	High school – Bote Pyinn	Shwe Bone Thar Quarter	5.35	48	1298	1: 27.04
2.	High school – Kara Thuri	No (1) Quarter	6.17	25	389	1: 16.56
3.	High school – Pyi Gyi Mandaing	East Lay Nyar Quarter	9.26	26	758	1: 29.15
4.	High school – South Dagon	Htaung Matt Quarter	7.02	32	925	1: 28.9
Total			27.8	131	3370	1: 25.72

(ii) Middle Schools

No.	Township	No. of Schools	No. of Teachers	No. of Students	Ratio of Teacher and Students
1.	Bote Pyinn	7	127	3317	1: 26.11
2.	Kara Thuri	8	3	1850	1: 22.29
3.	Pyi Gyi Mandaing	5	77	2164	1: 31.83
Total		20	287	7331	1: 25.54

(iii) Primary Schools

No.	Township	No. of Schools	No. of Teachers	No. of Students	Ratio of Teacher and Students
1.	Bote Pyinn	42	225	5112	1: 22.72
2.	Pyi Gyi Mandaing	24	118	3769	1: 32
3.	Kara Thuri	14	64	1161	1: 18

Total	80	407	1042	1: 24.67

(c) Illiterate

No.	School	No. of Teachers	No. of Students	Ratio
1.	Dahmma Rakhita Monastery	12	365	1: 30.42
2.	Man Aung Monastery	4	113	1: 28.25
3.	Sarsana Rakhita Rama Monastery	2	32	1:16.00
4.	Shwe Sarsana Monastery	2	66	1:33.00
5.	Yadana Man Aung Monastery	-	-	-
6.	Sarsana Aung Myay Monastery	5	120	1:24.00
	Total	25	627	1:25.08

(d) Health Status

Information of Health of Bote Pyinn are as follow.

(i) Hospitals

No.	Hospitals	Public/ Private	No. of Bed
1.	Bote Pyinn Hospital	Public	
2.	Kaya Thuri Cottage Hospital	Public	
3.	Pyi Gyi Mandaing	Public	
4.	18/100 Military Hospital	Public	
5.	South Dagon General Hospital	Private	

(ii) Clinics

No.	Clinic	Public/ Private	Diseases
1.	Dr. Thuyane Tun	Private	General
2.	Dr. Nant Aye Moe Moe Aung	Private	General

(iii) Rural Health Department/ Sub-Department

No.	Rural Health Department	Rural Health Department	Note
1.	Chaung Kaphee Rural Department	Chaung Kaphee rural health sub-department	Delivery Nurse
		Yay Ngan rural health sub-department	Delivery Nurse

No.	Rural Health Department	Rural Health Department	Note
		Satain rural health sub-department	Delivery Nurse
		A Lal Man rural health sub-department	Delivery Nurse
		Ma Thay/ Kann Taw rural health sub-department	Delivery Nurse
		Kara Thuri rural health sub-department	Delivery Nurse
		Kan Maw Gyi rural health sub-department	Delivery Nurse Delivery Nurse
2.	Pyi Gyi Mandaing Cottage Hospital	Pyi Gyi Mandaing health sub-department	Delivery Nurse
		Taung Nge health sub-department	Delivery Nurse
		Shwe Gae Nyo health sub-department	Delivery Nurse
		Lay Nyar health sub-department	Delivery Nurse
		Yadana Pone health sub-department	Delivery Nurse
		Khae Chaung health sub-department	Delivery Nurse
3.	Bote Pyinn	Mother and Children health care center	Delivery Nurse (women health care nurse + Supervisor (1) + Supervisor (2))
		Malaria Attack Department	Malaria affected one person

Lampi Marine National Park (LMPN) covers an area of some 205 km^2 and is recognised as an IUCN Category II national park. There are four permanent human settlements in the park: Makyone Galet, War Kyunn, Ko Phawt and Sittat Galet) are situated in Lampi Island MNP core area and Nyaung Wee - in the proposed buffer zone. Only Makyone Galet is an officially recognised village. Sitta Galet settlement (located on Wa Ale Island, the same location as Wa Ale resort) is still not recognised as an official settlement. Until 2008 Sitta Galet, Ko Phawt and Nyaung Wee were only temporary camps and War Kyunn was a private work camp. Since 1996 when the area of LMPN was officially opened to tourism and business, LMNP saw

several flows of migration and the population started growing rapidly[1], as illustrated in the table below:

Table 4.35: Household Trend in Lampi Island[2]

Sr.	Survey Year (Source)	1995 (FD)	2008 (BANCA)	Annual growth	2010 (OIKOS)	Annual growth	2015 (OIKOS)
1.	Makyone Galet	55	88	3	191	51	196
2.	War kyun	172	243	5	255	6	271
3.	Ko Phawt	NE	8		30	11	25
4.	Sitta Galet	NE	9		26	9	42
5.	Nyawung Wee	Only boats	27		62	18	89
Total		**227**	**375**		**564**		

The Park has some 598 households living in five villages – four in the Park and a fifth located in a proposed buffer zone. Makyone Galet with 196 households is the main settlement, and only officially recognized village in the Park. Others villages include: Ko Phawt with 25 households; Sitta Galet with 42 households; War Kyun with 271 households (148 in the dry-season); and, Nyaung Wee in the proposed buffer zone with 89 households.

The majority population is Bamar. The Salone (Moken), an Austronesian people of the Mergui Archipelago called 'sea nomads', make up around 100 households in the villages of Makyone Galet, Nyaung Wee and Ko Phawt. They face particular hardship. Moken intermarriage with Bamar is also common.

Main livelihood activities include fishing and related services, trading (including retail), farming, logging and hunting. A considerable percentage of households within the Park survive through subsistence livelihood.

Social problems include alcoholism, drug abuse and, due to marginal returns from fishing, loosing boats and marine knowledge.

A growth of opportunity seekers on fishing vessels from the mainland resulted in a decline in fishing catches. Illegal activities such as dynamite and dragnet fishing, commercial fishing, over-harvesting of marine resources (sea cucumber, sea shells, turtle eggs), illegal hunting (of mousedeer, civets, monkeys, wild-pig), logging and the growth of plantation crops (rubber, mango, betel-nut, cashew) occur within the Park's boundaries.[3]

Protected areas (1995, 2008, 2010) + ecotourism plan (LMNP-GMP 2014 & Istituto Oikos surveys 2015 (2015)).

Ecotourism plan 2015

CHAPTER 5: IMPACT ASSESSMENT AND MITIGATION MEASURES

IMPACT AND RISK ASSESSMENT METHODOLOGY

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.

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.

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.

WATER QUALITY

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

The samples were analyzed for the following parameters:

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

The proposed parameters are estimated and there may have variation.

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;

- PM_{10}, PM $_{2.5}$
- Nitrogen Dioxide (NO_2)
- Carbon monoxide (CO)
- Carbon Dioxide (CO_2)
- Sulphur Dioxide (SO_2)
- Wind Direction
- Wind Speed
- Relative Humidity
- Temperature

NOISE

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

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 5.1: 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 taken into account relevant legislative or policy standards or guidelines.

Table 5. 2 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 taken into account the sensitivity of the receiving environment and the magnitude of change. Table (6.3) below provides an indication of how significance has been determined, although it should be noted that this is meant to be a general approach and has not been treated as a strict matrix.

Table 5.3: 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 takes into account mitigation and therefore "residual" impacts have been determined, which can be defined as any impact that would remain following the implementation of proposed mitigation measures.

DEVELOPMENT PHASES

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

Construction impacts are temporary, short-term impacts that occur during the construction phase only. This will include impacts resulting from construction of the 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.

5.3: IDENTIFICATION OF POTENTIAL SIGNIFICANT IMPACTS

Impacts	Likely Impacted environment			Impact Types								Receptors' sensitivity	Magnitude of impact	Impact Assessment	Potential Mitigation Reference	Residual Impact
				Duration		Positive		Negative								
	Terrestrial	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant	Irreversible	Cumulative					
Construction Phase Impact																
Change access rights and usage	☑		☑	☑				☑		☑		High	Medium	Moderate	5.8.1	Minor
Site Clearance	☑		☑		☑			☑				High	Low	Moderate	5.8.1	Minor
Material storage	☑	☑	☑		☑			☑				Medium	Low	Minor	5.8.1	Negligible
Sewage disposal	☑	☑	☑		☑			☑			☑	High	Medium	Moderate	5.8.1	Minor
Solid waste production	☑	☑	☑		☑			☑			☑	High	Medium	Moderate	5.8.1	Minor
Noise pollution	☑	☑	☑		☑			☑				Medium	Medium	Moderate	5.8.1	Minor
Light pollution	☑	☑	☑		☑				☑			Medium	Medium	Moderate	5.8.1	Minor
Air pollution	☑		☑		☑				☑			Medium	Low	Minor	5.8.1	Negligible
Diesel and oil spills	☑	☑			☑				☑		☑	Medium	Low	Minor	5.8.1	Negligible
Anchoring		☑			☑				☑		☑	Medium	Low	Minor	5.8.1	Negligible

Impacts	Likely Impacted environment			Impact Types								Receptors' sensitivity	Magnitude of impact	Impact Assessment	Potential Mitigation Reference	Residual Impact
				Duration		Positive		Negative								
	Terrestrial	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant	Irreversible	Cumulative					
Transportation and Navigation		☑	☑		☑				☑		☑	Low	Medium	Minor	5.8.1	Negligible
Employment			☑		☑	☑						Medium	Medium	Moderate	5.9	-
Operation Phase																
Resource consumption	☑		☑	☑				☑		☑		High	Medium	Moderate	5.8.2	Minor
Change access rights and usage	☑	☑	☑	☑				☑		☑		Medium	Medium	Moderate	5.8.2	Minor
Sewage disposal	☑	☑	☑	☑				☑			☑	High	Medium	Moderate	5.8.2	Minor
Generate Solid waste and disposal	☑	☑	☑	☑				☑			☑	High	Medium	Moderate	5.8.2	Minor
Light pollution	☑	☑	☑		☑			☑				Medium	Medium	Moderate	5.8.2	Minor
Nosie	☑	☑	☑	☑				☑				Medium	Low	Minor	5.8.2	Minor
Misuse of marine resources		☑			☑			☑			☑	High	Medium	Moderate	5.8.2	Minor
Diesel and oil spills	☑	☑			☑				☑			High	Low	Moderate	5.8.2	Minor
Population increase	☑		☑		☑				☑			Medium	Low	Minor	5.8.2	Minor

Impacts	Likely Impacted environment			Impact Types								Receptors' sensitivity	Magnitude of impact	Impact Assessment	Potential Mitigation Reference	Residual Impact
				Duration		Positive		Negative		Irreversible	Cumulative					
	Terrestrial	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant							
GHG emission increase	☑			☑					☑		☑	Medium	Low	Minor	5.8.2	Negligible
Anchoring		☑			☑				☑		☑	Medium	Low	Minor	5.8.2	Negligible
Transportation and Navigation		☑	☑		☑				☑		☑	Low	Medium	Minor	5.8.2	Negligible
less illegal trading	☑	☑	☑	☑		☑						High	High	Major	5.8.2	-
Employment			☑	☑		☑						Medium	High	Moderate	5.9	-
Decommissioning Phase																
Air pollution	☑		☑		☑				☑			Medium	Medium	Moderate	5.8.3	Minor
Noise	☑		☑		☑			☑				Medium	Medium	Moderate	5.8.3	Minor
Solid waste production and disposal	☑	☑	☑		☑			☑				Low	High	Moderate	5.8.3	Minor
Replantation	☑		☑	☑		☑						High	Low	Moderate	5.8.3	Minor
Transportation and Navigation		☑	☑		☑				☑		☑	Low	Medium	Minor	5.8.3	Negligible

Impacts	Likely Impacted environment			Impact Types								Receptors' sensitivity	Magnitude of impact	Impact Assessment	Potential Mitigation Reference	Residual Impact
				Duration		Positive		Negative		Irreversible	Cumulative					
	Terrestrial	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant							
Anchoring		☑			☑				☑		☑	Medium	Low	Minor	5.8.3	Negligible
Employment			☑		☑	☑						Medium	Medium	Moderate	5.9	-

5.4 : IDENTIFICATION AND ASSESSMENT OF POTENTIAL SIGNIFICANT IMPACTS

POTENTIAL SIGNIFICANT IMPACTS

5.4.1 CONSTRUCTION PHASE IMPACTS

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

CHANGE ACCESS RIGHTS AND USAGE

The construction of the resort will involve the buildings and other infrastructures. This will result in a loss of the options for alternative land use and thus represents an irreversible commitment of land resources.

SITE CLEARANCE

The current vegetation on the island is dominant with trees and shrubs. According to the construction processes, it will maintain a safe working environment during construction and afterwards. Most wood used in construction will be reclaimed and there will be very little cement used during the building process. All villas will be built on platforms to ensure very little disturbance of the ground cover. All efforts will be made to disturb the natural environment on the island and as stated earlier, no trees with a diameter over 15 cm will be cut. This requires to work around the trees and not through them. Therefore, there will not be significant impacts on the island's biodiversity because of site clearance activities.

LIGHT POLLUTION

If the construction process will carry out during the night and light from the labor camp there will disturbance to the islands' biodiversity. The occurrence of lighting is periodic and short-term.

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 residents 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.

NOISE POLLUTION

The use of heavy equipment during site clearance and road construction works will inevitably generate noise, which may create a nuisance for nearby residents and 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 on breeding season of islands' biodiversity, it could be significant impact on them. And also, the development area is near the turtle nesting area, it can negatively be impacted on them.

MATERIAL STORAGE

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

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

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.

SEWAGE DISPOSAL

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

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.

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. The anchoring of the boat may cause the damage to the benthic environment but these occurrences represent short-term and insignificant impact on the environment due to the frequency of shipping movement.

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.

5.4.2 OPERATION PHASE IMPACT

RESOURCE CONSUMPTION

The resort intends to install its own water supply and electricity. The spring water sources are available for the proposed development. The channelization of spring water will be impacted on the daily habitat of terrestrial biodiversity. The resort will install solar farms which is environmental friendly and generator, this implies the production of noise, vibrations, and storage of diesel fuel and the related disturbances and nuisances as well as the threat of hydrocarbon spills the ground.

CHANGE ACCESS RIGHTS AND USAGE

The Wa Ale island is inhibited area and not commercially used. During the operation period, there will increase in population and changed in land use as a result of the development. This will impact on both islands' biodiversity and socio-economic uses of the local people in both positive and negative ways. During the construction period, if it is take place at breeding area of the turtle, it can disturb their nature. And also, Lampi island is not only distinct as National Marine Park but also the movement of Moken people (Salone). Their living condition may affect by the construction activities.

SEWAGE AND WASTEWATER DISPOSAL

The proposed development is located at the natural rich environment, without the proper sewage and wastewater disposing system, it may significantly impact on the natural environment. If the wastewater from shower, toilet and kitchen directly discharged to the natural environment especially on the marine environment will directly cause the deterioration on water quality and it can impact on the aquatic biodiversity such as toxic algal blooming.

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.

POPULATION INCREASE

During the operation period of the development, population growth is the definite reason, it can impact as misuse in natural resources, changes in access rights, cultural distortion on local residence and **Salone** people.

LIGHT POLLUTION

Although Wa Ale island itself is inhibited island, its located in biodiversity rich area and a lot of turtle nesting area were recorded during the survey. 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, especially on the turtle during their nesting season.

NOISE

During the operation period, noise index will increase due to the 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 turtles and mammals.

GHG EMISSION INCREASE

The proposed development has a plan to install solar power farm that will provide 80% of the electricity needs. The rest of required electricity will supply by diesel generator, which will be operated from enclosed containers that will house the generator, controller and fuel tank for both security and to extend the life of the equipment. The Wa Ale development estimates that 1 MW per day will be needed to operate the planned hotels. Thus, the total amount of GHG emissions can be calculated as follows:

Electricity GHG emission						
	kWh/day	MWh/d	CO_2 Metric ton	CO_2 Kilo ton for 1 day	For one year Kilo ton	
Electricity	1000	1	1.023	0.001023	0.373395	CO_2 Kt emission

According to the European Bank for Reconstruction and Development (EBRD) Green House Gas assessment methodology, CO_2 emissions could be categorized as five which are:

- Negligible (no GHG assessment necessary)
- Low (< 20 kt/y CO_2-equivalent per year. See GN 6 for relative importance of different GHGs and their CO_2-equivalence (CO_2-e))
- Medium-Low (20 – 100 kt CO_2-e /y)
- Medium-High (100 kt – 1 Mt CO_2-e /y)
- High (>1 Mt CO_2-e /y)

Thus, the proposed project can be categorized as low emission group (< 20 kt CO_2-e /y) the EMISSION FOR ONE YEAR WOULD BE APPROXIMATELY 0.37 KT CO_2-E /Y.

LESS ILLEGAL TRADING

Wa Ale 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 impact of the development, the population growth on the island may reduce the occurrence of these activities.

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 reefs.

MISUSE OF MARINE RESOURCES

One of the practice that will be offered by the resort is SCUBA diving and snorkeling. 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.

EMPLOYMENT

Wa Ale's activities will help to develop and sustain employment in a relatively remote and economic poor area as well as add economic diversity with regard to income opportunities. Wa Ale will directly employ over 120 individuals at its hotels and affiliated restaurants and indirectly more than 300 during construction, with a very high percentage of the workforce being Myanmar nationals. Wa Ale will use local labor as far as possible offering opportunities in construction, administrative and management roles, and encourage the development of local subcontractors.

SOCIO-ECONOMIC

Because of the proposed development is located in inhibited island, there may have no significant impacts on socio-economic. Although there will not have directly impacted on the local residence due to the development, population increasing and change in access rights may be indirectly impacted on the local community. The detailed social impact assessment are described in Chapter 5.6.

5.4.3 DECOMMISSIONING PHASE IMPACT

AIR POLLUTION

During the decommissioning phase, it is anticipated that a certain amount of airborne particulates (dust) will be generated due to demolition activities. The situation will get worse during the dry season. The occurrence of dust will be a short-term, during the demolition activity only.

NOISE

According to the construction procedures, most wood used in construction will be reclaimed and there will be very little cement used during the building process. Because of that the demolition activities will not generate noise, which will create nuisance to the neighboring residents and communities and also the impact will be short-term and is considered a non-significant threat to nearby residents and communities.

SOLID WASTE PRODUCTION AND DISPOSAL

Solid waste generates during the demolition phase will include, scrap wood and metals, hazardous solid waste contaminated soils encountered on site due to previous land use activities during the operation phase. Also, small amount of machinery maintenance materials such as oily rags and used oil filters, and used oil as well as oil spill cleanup materials from oil and fuel spills. These kinds of wastes, if not properly disposed of, will cause negative impacts on the site and surrounding environment. These kinds of wastes are planned to properly dispose of at Kawthaung Township Development Committee waste disposal sites, which may cause short-term impacts only.

REPLANTATION

Replanting of trees will be carried out to enhance the ecology and appearance of the site after demolition process. In addition to enhancing the aesthetic appeal of the project site, replanting provides the means for partially restoring the site's natural elements and ecological habitats. It is therefore a significant mitigation activity with a positive impact. The replantation plan should seek to avoid the use of non-native and potentially invasive species. It should include low-maintenance local species and the types of trees and shrubs used for feeding by local bird species.

TRANSPORTATION AND ANCHORING

There will be transportation of the solid waste that generates during the demolition phase to disposal site via cargo boats. While transporting these solid wastes, they need to cover up completely and safely. While anchoring the cargo boats it can damage to the benthic environment and it should avoid anchoring on the coral reefs and seagrass beds.

POSITIVE OR NEGATIVE

Construction Phase

Negative impacts

- Loss of land use options
- Site Clearance- loss of terrestrial habitat & biodiversity
- Materials stockpiling & storage – coastal contamination
- Construction solid waste & disposal- land contamination
- Dusting – air quality degradation
- Lighting- disturbance to the islands' biodiversity
- Sewage & litter – public health & contamination
- Construction works water demand – supply shortage
- Coastal excavation and construction works – marine habitat loss
- Sourcing rock, beach fill & sand – indirect impacts
- Construction works material stockpiling- coastal contamination

- Fuel & chemicals storage & spillage- land and coastal contamination
- Equipment & vehicle maintenance – soil contamination
- Shipping movement and anchoring- marine and benthic environment disturbance
- Impact on cultural heritage-cultural exchange

Positive Impacts

- Employment – socio-economic benefit
- Replanting & landscaping – habitat recreation

Operation Phase

Negative impacts

- Water demand – supply shortage
- Energy demand – fossil fuel combustion/emission of greenhouse gases
- Sewage collection & disposal- land and water contamination
- Solid waste management & disposal- land and coastal contamination
- Misuse of reef resources – poor SCUBA/snorkeling practices
- Mosquito fogging
- Impact on culture, cultural heritage-cultural exchange

Positive impacts

- Employment & staff training – socio-economic benefit
- 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

Decommissioning Phase

Negative impacts

- Materials stockpiling & storage – coastal contamination
- Construction solid waste & disposal
- Dusting – air quality degradation
- Sewage & litter – public health & contamination

- Fuel & chemicals storage & spillage
- Equipment & vehicle maintenance – soil contamination
- Impacts on cultural heritage, culture
- Unemployment- loss permanent employment

Positive Impacts

- Employment – temporary employment
- Replantation

5.5: MAGNITUDE

The impact magnitude during the construction periods and decommissioning periods are typically significant but in short term period. However, accommodation in the resorts will include tents as well as wooden villas, both of which will be constructed in an environmentally friendly manner. The tents will be placed on platforms of recycled timber raised 1 to 2 meters off the ground, in order to not disturb the flora that exists on the sites presently. These platforms will be assembled in Yangon and shipped to the island.

The proposed development is implement as in BOT system. 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 low in intensity.

The impact magnitude of operation period is typically in long term and some activities are significant and some are not such as water resource and energy demand would be significantly impacted on the both biological and physical environment such as supply water shortage, fossil fuel combustion and greenhouse gas emission. Improper installation and maintenance of waste management will significantly be impacted in long term period. Misusing of marine resources acquainted with water sport activity, such as SCUBA diving and snorkeling activities, unless marine resources are properly managed there will be long term impact on marine biodiversity such as damage to coral reef habitats.

5.6: DURATION

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

5.7: REVERSIBILITY

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

5.8: POTENTIAL MITIGATION MEASURES

5.8.1 CONSTRUCTION PHASE IMPACTS

According to the Wa Ale construction plans, there will have limited use of machinery and no heavy machinery on the island. Most wood used in construction will be reclaimed and there will be very little cement used during the building process. All villas will be built on platforms to ensure very little disturbance of the ground cover. All efforts will be made to disturb the natural environment on the island and as stated earlier, no trees with a diameter over 15cm will be cut. Accommodation in the resorts will include tents as well as wooden villas, both of which will be constructed in an environmentally friendly manner. The tents will be placed on platforms of recycled timber raised 1 to 2 meters off the ground, in order to not disturb the flora that exists on the sites presently.

There are several areas where we will be water efficient and responsible on Wa Ale island.

- No drilling of deep water wells
- Rain water capture
- Kubota Waste Management System

The water usage from island resources will be very limited due to the policies that will be implemented above.

Impact mitigation here seeks to retain and restore as much of the original and natural forested condition of the site:

5.8.1.1 SITE CLEARANCE

- 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.

5.8.1.2 AIR POLLUTION

- Exposed ground should be regularly wetted in a manner that effectively keeps down the dust.
- Stockpiles of fine materials should be wetted or covered up during windy conditions.
- Workers on the site should be issued with dust masks during dry and windy conditions.

5.8.1.3 NOISE POLLUTION

- Construction activities that will generate disturbing sounds should be restricted to normal working hours.

- Workers operating equipment that generates noise should be equipped with noise protection gear.
- Workers operating equipment generating noise levels greater than 80 dBA continuously for 8 hours or more should use earmuffs.
- Construction and decommissioning should avoid breeding season of both terrestrial and marine biodiversity.

5.8.1.4 LIGHT POLLUTION

- 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.

5.8.1.5 CHANGES IN ACCESS RIGHTS AND USAGE

- Observed and recorded the turtle nesting area and do not disturb their natural habitat and behaviors.
- Solely not to disturb the movement and activities of Salone people

5.8.1.6 TRANSPORTATION AND ANCHORING

- 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 comstruction workers.

5.8.1.7 MATERIALS STORAGE

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

5.8.1.8 CONSTRUCTION WASTE DISPOSAL

- 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.

5.8.1.9 SEWAGE

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

5.8.1.10 LITTER MANAGEMENT

- The trash bin should be provided in sufficient numbers and place at the exposed area and easy to access for the disposal of lunch and drink boxes, so as to prevent littering of the site.
- Arrangements should be made for the regular collection of litter and for its disposal.

5.8.2 OPERATION PHASE IMPACT

Wa Ale Kyune is off grid with no power from the mainland. Although fully depends on the solar energy for the energy need is a certain goal for Wa Ale resort but while solar energy could not able to support the energy needs, BAM will continuously look for the alternative ways which are more clean, green and efficient. Benchmade Asia Myanmar Ltd will plant solar farms at designated areas. While the solar energy source fall short for the requirements, there will be installment of propone generators which is cleaner alternative to petrol or diesel generators.

For the freshwater source, there are several areas where will be water efficient and responsible on Wa Ale island. According to the resources conservation plan there will no drilling of deep water wells, rain water capture near villas and use Kubota Waste Management System. The water usage from island resources will be very limited due to the policies that will be implemented above.

5.8.2.1 EMPLOYMENT

- Assuming that the proposed development would potentially offer employment for approximately 210 persons.
- This would represent a positive long-term impact.

5.8.2.2 RESOURCE CONSUMPTION

- Provide adequate water storage facilities to ensure adequate supplies for the development.
- 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

5.8.2.3 SEWAGE AND WASTEWATER DISPOSAL

- Kubota waste management system will install in this development. Kubota has well known reputation in production of waste and wastewater treatment plant in globally. Kubota sewage treatment system is not just a septic tank but a wastewater treatment system.
- The tank features various functions such as anaerobic, aerobic, sedimentation and disinfection.
- The treatment of wastewater is as same quality as a centralized sewage system. **BOD removal ratio > 90%, effluent BOD < 20mg/l**. **The system can treat any type of wastewater including kitchen, toilet, and laundry and bathrom sewage**.
- Proper solid waste receptacles and storage containers should be provided in sufficient numbers, particularly for the disposal of lunch and drink boxes, so as to prevent littering of the site.

5.8.2.4 SOLID WASTE PRODUCTION AND DISPOSAL

- Use the proper and systematic waste management
- Sort the type of waste, practice reuse, recycle, renew system
- Apply pits that covered with concrete or linen to avoid the ground water contamination before transport to Kautthaung Township Development Committee Dumping site.

5.8.2.5 LIGHT POLLUTION

- All the activities on the beach should close out at night time
- Avoid the lighting on the beach during the nesting season of Turtle
- All the light should switch off during the night time except for the emergency light

5.8.2.6 NOISE POLLUTION

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

5.8.2.7 CHANGES IN ACCESS RIGHTS AND USAGE

- Observed and recorded the turtle nesting area and do not disturb their natural habitat and behaviors.
- Solely avoid the movement of Salone people and do not disturb their activities

5.8.2.8 MISUSE OF MARINE RESOURCES

- 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.

5.8.3 DECOMMISSIONING PHASE IMPACTS

5.8.3.1 AIR POLLUTION

- Fenced the site for safety and security reasons
- Personal Protective Equipment (PPE) such as dust masks shall be provided where dust levels are high.
- Burning of waste materials shall not be allowed and the best decommissioning practices should be applied.

5.8.3.2 NOISE POLLUTION

- Installation of control devices such as mufflers to all decommissioning equipment to help minimize noise generated.
- Decommissioning workers must be provided with personal protective equipment (PPE), e.g. earmuffs.

5.8.3.3 SOLID WASTE PRODUCTION AND DISPOSAL

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

5.8.3.4 REPLANTATION

- Replantation should also use native flowering plants to provide habitat and host plants for butterflies.
- Install Greenbelt plantation procedure.

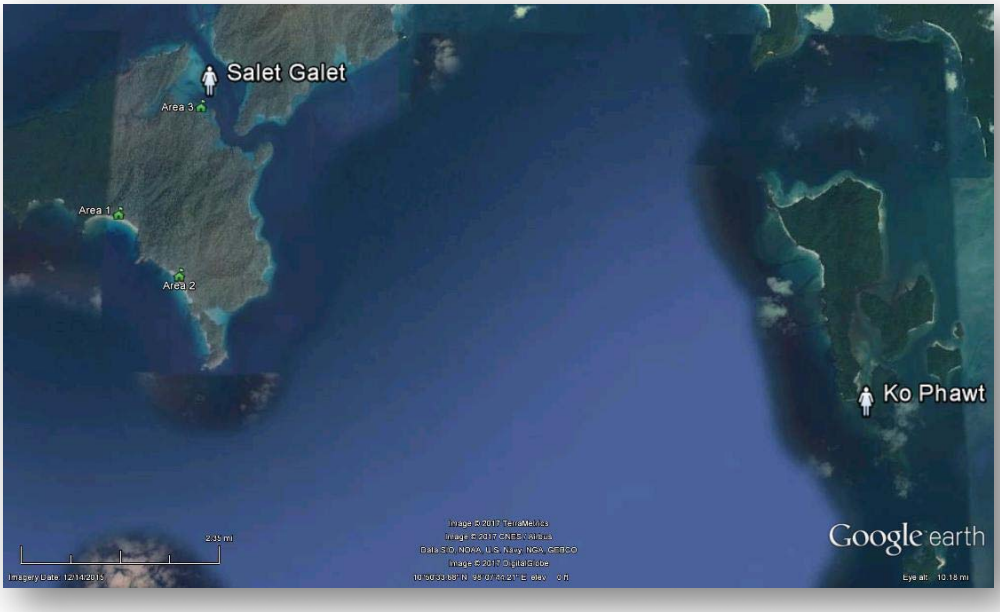
5.9: SOCIAL IMPACT ASSESSMENT AND MITIGATION

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

5.9.1 DESCRIPTION OF THE STUDY

For the purpose of the social impact assessment we included 3 villages in the Project Area: Sitta Galet, Ko Phawt, and Makyone Galet. Sitta galet is located on the same island as the project site - on Wa Ale Island, on the north coast of the Island in a passage between the War Ale and Lampi Islands facing Lampi Island in the north. The other two villages are located at a distance of 16.57 km and 28.79 km from the project site 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 10% sampling size for each village using Random Sampling. The language of survey was Burmese. 8 team members of E Guard conducted the survey at 25 December 2016 in Sitta Galet settlement where the villagers from Ma Kyone Galet and Ko Phawt were invited to come for survey.

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 questionnaire can be found in the Appendix VI.



MAP: Surveyed Villages and Project Location

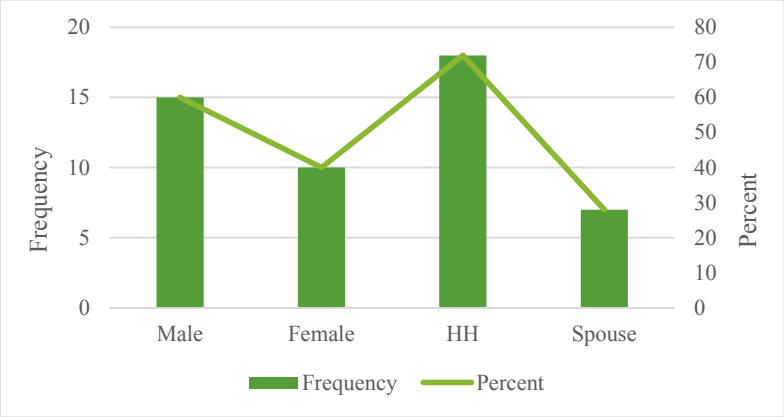
Figure 5. 1 Socio-economic Survey

5.9.2 INFRASTRUCTURE AND SERVICES: TRANSPORT INFRASTRUCTURE & PUBLIC UTILITIES

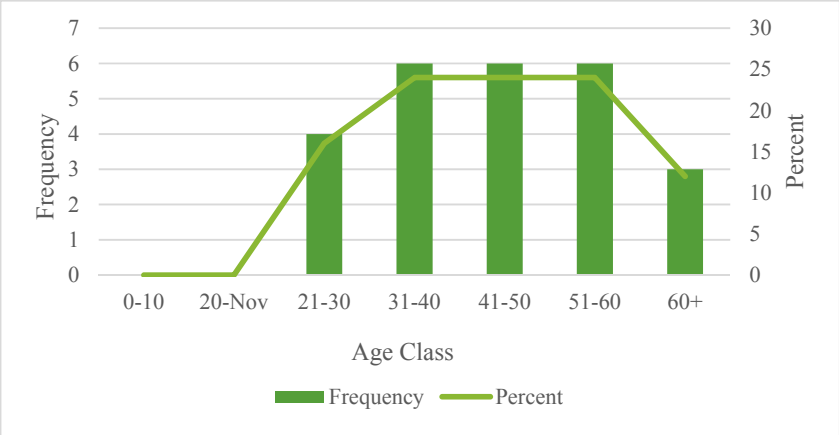
The project site on Wa Ale Island can be reached by private motorized boat from Aung Ba (approximately 6 hours boat drive). During the rainy season travelling in and around the park

5.9.3 SOCIOECONOMIC COMPONENT

For socio-economic baseline survey 10 people (9 female, 1 male) (which is more than 20% of the total number of) from Sitta Galet were surveyed, 1 female as a head of household otherwise all male are HH and female are the spouses of HHs; 5 people (all male) from Ko Phawt which is 10% of 25 households, all heads of household; 11 respondents (2 female, 9 male) from Ma Kyone Galet (which is 6% of the total number of households there 196, 2 female respondents head of households, otherwise the rest are male heads of household, and if female then the spouse of heads of households) as shown in the following figure.



All respondents identified themselves as Burmese ethnically except one woman from Sitta Galet, she identified herself as Salone ethnicity. The age distribution of the surveyed respondents is 28-67 years (see also in the following figure). Most of the surveyed respondents are at the age of over 45 years with many experiences and knowledge about their living environment. And then, there are also the 4 respondents from 21-30 age class and 6 respondents from 31-40 age class.



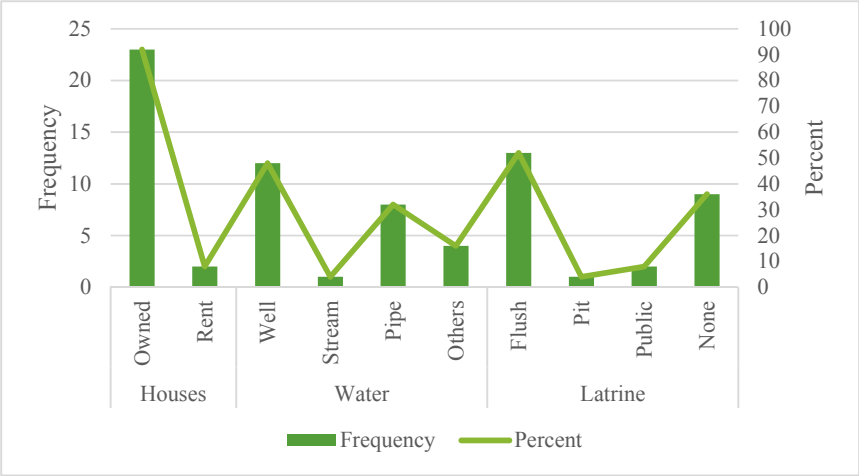
(a) Livelihood. Living conditions

For house ownerships and structures, most of respondents live in self-owned houses and 2 respondents live in rented houses. The houses have been constructed with CGI sheet and thatch for roof, wood for wall, wood and concrete for floor and thatch for ceiling.

For water, most of respondents get water for drinking and domestic usages mostly from wells and community pipes (12 and 8 respondents out of 25) and 1 respondent get water from stream whereas the others from the rest (4 respondents) catch water from the rain. Most respondents did not express concerns about the **quality of water** (20 out of 25) and were more concerned by quantity of water while still most of the surveyed were positive ((8 concerned to 17 non-concerned) and reported that it depends on season (20 out of 25).

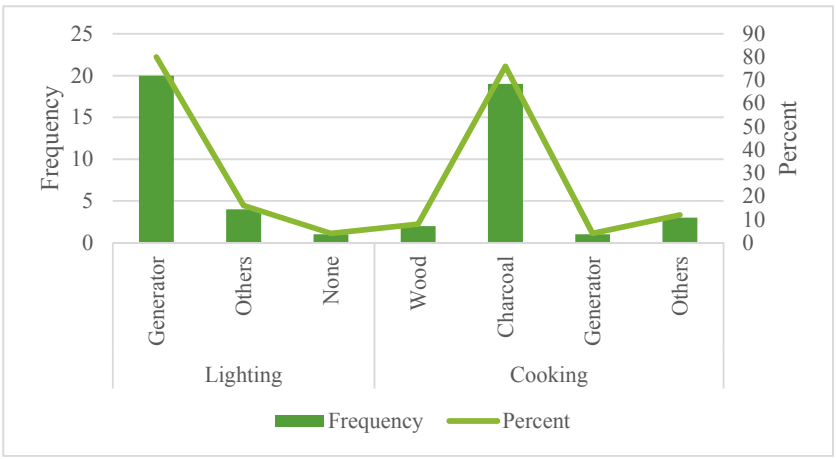
For latrine, half of the respondents (most of which are from Ma Kyone Galet – 9 out of 13), use flash latrine, whereas most of Sitta Galet respondents reported not having latrines at all (5

out of 9 of those who have no latrines). And then, 1 respondent uses pit latrine and 2 respondent uses public latrine as shown in the following figure.



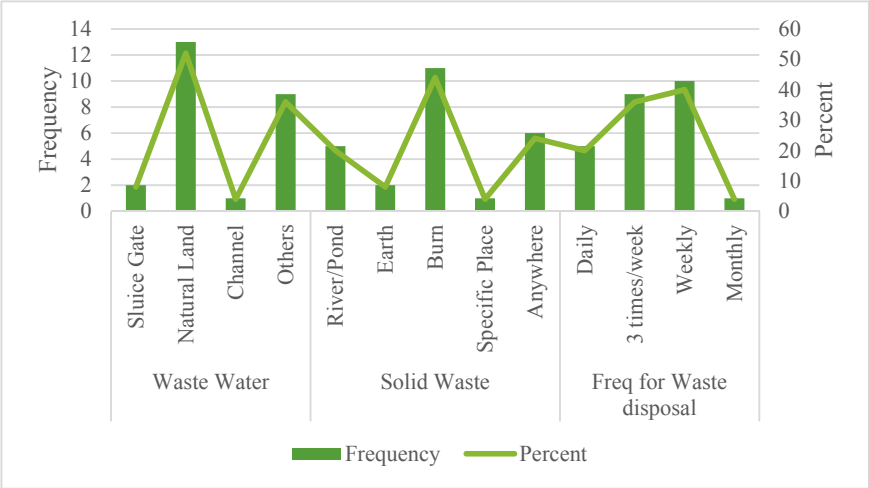
For lighting, Access to electricity is still limited and the government electricity grid line is not available to theses villages at this moment. For most of the families, generators serve as a source of electricity (20 respondents out of 25) and the rest 4 respondents use electricity from battery and kerosene. But, the only one respondent had not used any source for electricity.

For cooking, the charcoal and wood instead of electricity are used by the 19 respondents and 2 respondents, respectively. And then, there is also 1 respondent who uses generator for both lighting and cooking. But, the 3 respondents use the other such as kerosene and battery as shown in the following figure.



For Wastewater, it is drained to the natural land (13 out of 17 who specified the drainage type) by most of respondents, other answers being draining to a designated sluice gate (2

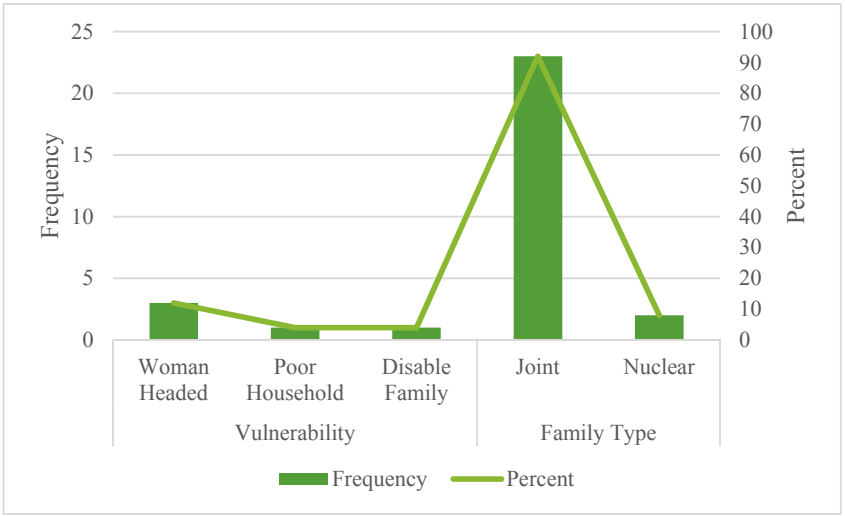
respondents) and to lake/pond/channel (1 respondent)[4]. The other 9 respondents have not noticed and cannot answered where their wastewater is drained.



For solid waste and frequency for waste disposal, the waste management is lacking. Garbage is disposed predominantly by burning (11, or 44%) and dumping into rivers (5, or 20%), other ways of disposal include bury into earth (2, or 8%), dumping in a specified location (1, or 4%) and the rest 6 respondents disposed their garbage to non-specific place with the frequency of weekly or three times a week (see also the above figure).

(b) Religion, family life and household characteristics and social organization

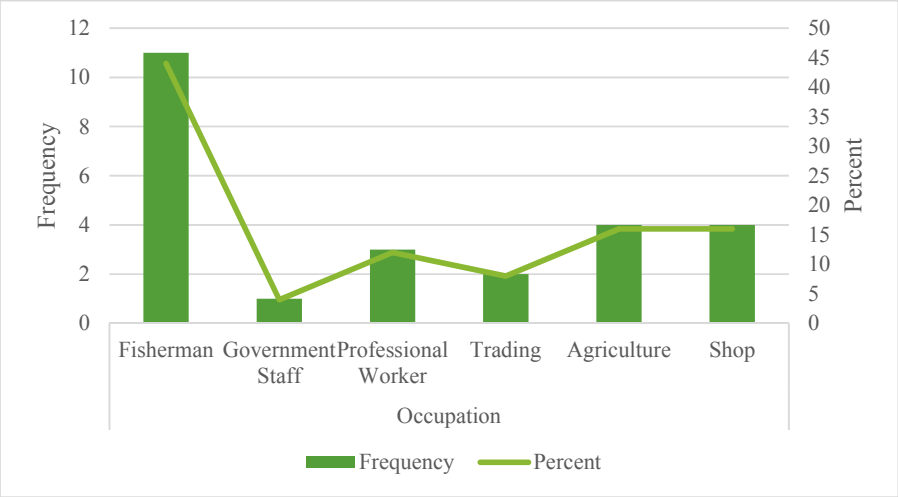
For religion and family structure, most number of families (24 households) are Buddhist and one household worships the salon tradition. The family structure of the majority of the families (23 out of 25) is a joint type of family meaning parents and their children living together with their relatives. The 2 respondents have the nuclear type family which means the respondents live together with their own family including children (see also the figure).



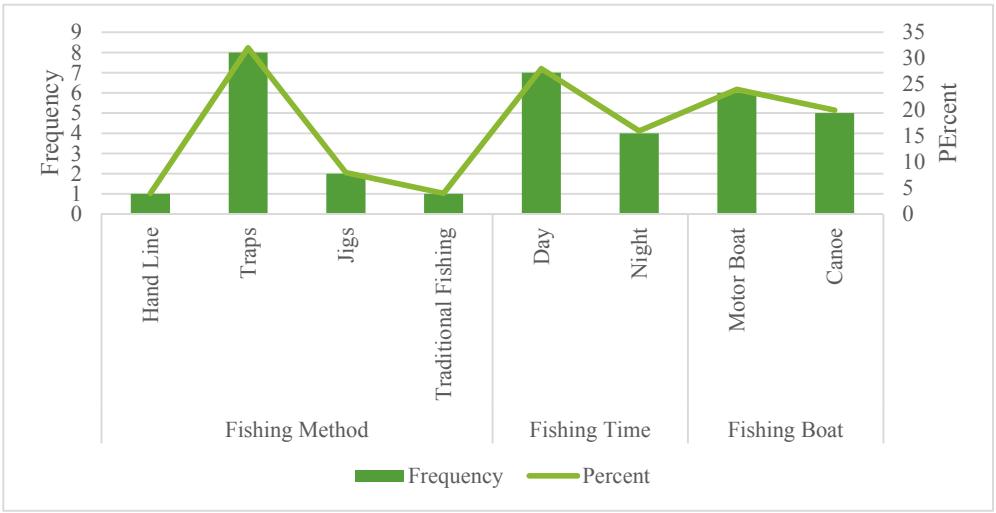
Vulnerable households: respondents self-reported three households have women as HHs in Sitta and Ma Kyone Galets (may be based on the gender and relationship to HH data), one poor household in ma Kyone galet, and one family with a disabled member in Sitta Galet.

(c) Occupations

Main occupations are fisherman and agriculture as can be seen in figure below: 44% of respondents are fisherman and half of them happen to come from Sitta Galet (4 out of 8) and from Ko Phawt as shown in the followed figure.

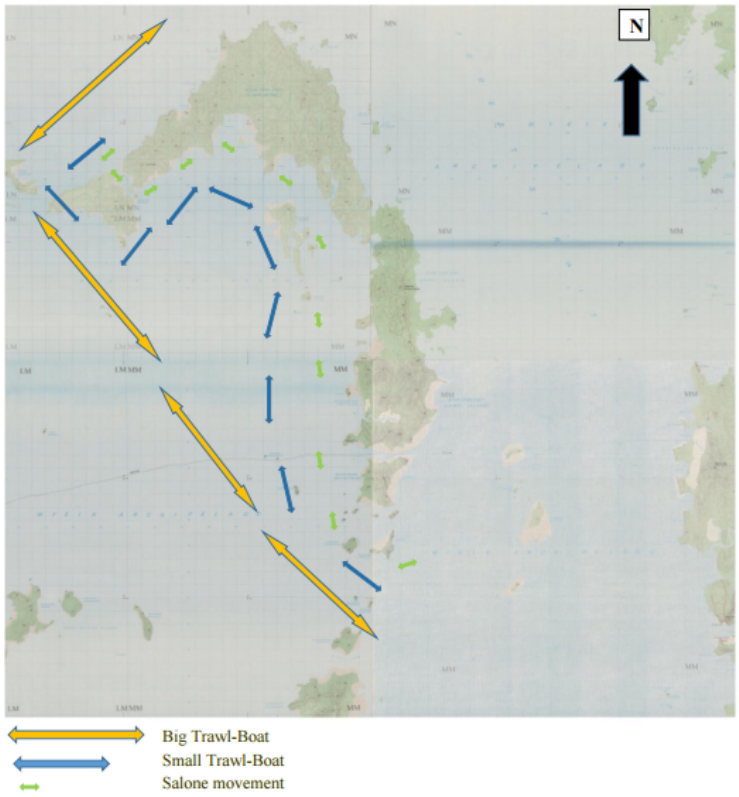


The surveyed respondents do not engage in livestock raising, they are predominantly fishing community. The main fishing product is squid which can be fished all year round. The most common fishing method was reported to be trapping and they go out fishing either solo or duo on motorised boats at night or during the day as shown in the following figure.



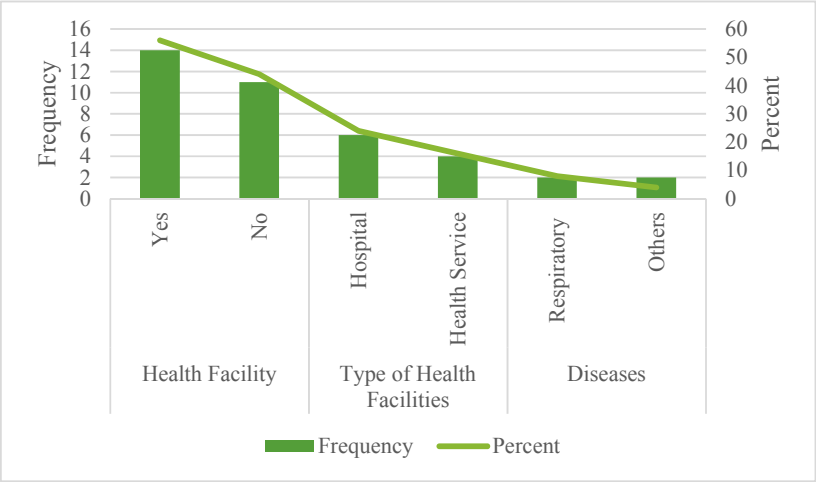
The catch is sold in their village, and some of the respondents sell their catch to large-scale commercial producers. The map below shows the roughly observed fishing boat and Salone (Moken) movement around the Wa Ale Island.

The observed fishing boat and Salone movement around the Wa Ale Island



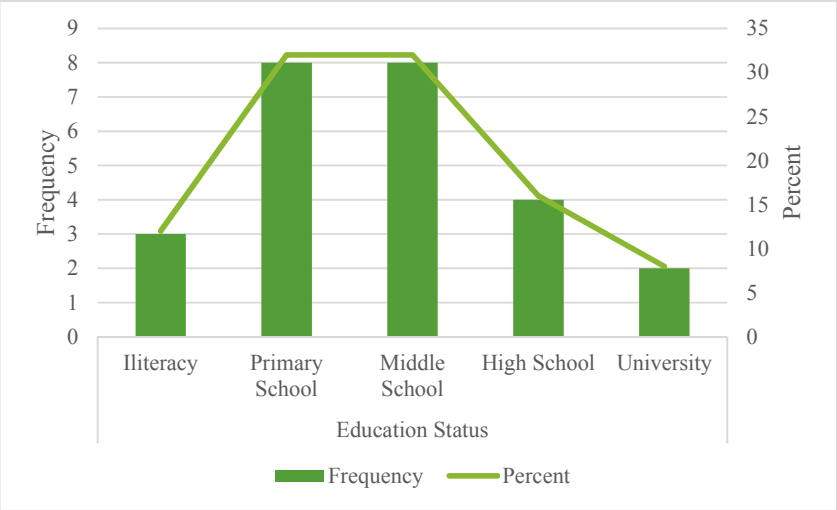
(d) Health facilities

The health facilities are lacking. Most of the surveyed respondents who responded (14 out of 25) reported having medical facility in their village, and most of them (14 out of 25) go there in case of illness. Mixed opinions of villagers from the same settlement revealed that some villagers seemed to have little awareness of medical facility availability in their village. They named hospital as a type of health facility they go to. The most common disease occurred in these villages are respiratory diseases (See also in the following figure).



(e) Education

The level of education is low. Most respondents, or 16 people or 64% of the surveyed 25 people, have primary or middle education, all illiterate respondents (3, or 12%) come from Sitta Galet, and all respondents with a university degree (only 2, or 8%) – from Makyone Galet settlement as shown in the following figure.

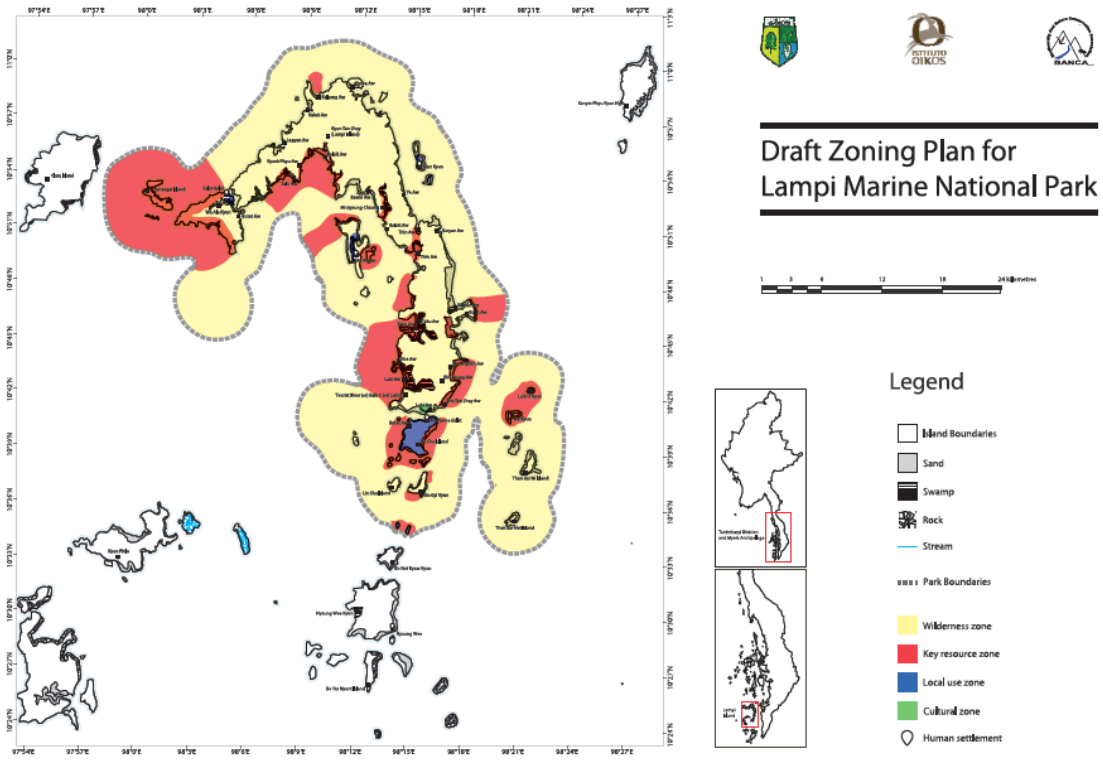


Makyone Galet is the oldest settlement, while Ko Phawt and Sittat Galet are temporary fishing camps established after 2007primary schools are present in Makyone Galet (but Salone children don't attend) and War Kyunn. But the others three settlements, Ko Phawt, Sittat Galet and Nyaung Wee, have no schools (2010).

5.9.4 CULTURAL HERITAGE AND NATURAL RESOURCES

Unique cultural feature of the Lampi Island Marine National Park is presence of the ethnic group of Malay Stock – the Moken people (how they call themselves) or the Salone people (the way they are called in Myanmar). They are also romantically called sea gypsies'. They have been moving from one island to another living by fishing and staying during the rainy season on shore in their houses built very close to the seashore line. They had unique beliefs related to sea, abilities to stay underwater for long time, myths and legends about sea (well recorded by the anthropologist Jact Ivan off year). They went out fishing in their special canoes. Later they changed their livelihoods to more sedentary way of life. They were moved Myanmar Government to Bo Chun Island and formed a settlement later joined by migratory Bamar population mixing with them. This is now Ma Kyone settlement. They were and will be attracting visitors who are interested in learning about their unique culture which presents challenges for the future: how to preserve their culture and

For the Salone people Lampi is considered as one of their mother-islands where they have a cemetery and spirit poles. On the zoning map developed by MOECAF, Instituto Oikos, BANCA the green color indicates the place of the Moken settlement as a cultural zone. Limits of use for the cultural zone can also be seen below:



Zone Activities Matrix		
ACTIVITIES GUIDE	**STATUS**	**LIMITS OF USE**
Boating	☑	
Research	☑*	Research must be approved by Salone committee.
Eco-tourism	Permit	Access regulated by special permits and only in the presence of a Salone guide registered by the park.
Limited fishing	☑*	LOU for legal fishing will be defined jointly with DOF during the first-year of implementation of the management plan as prescribed in the action plan.
Limited collecting	☑*	
Aquaculture	X	
Agriculture and livestock breeding	X	
Limited logging	X	
Human settlements	X	
Legend	**☑- Activity allowed, ☑*- Restrictions apply, Permit- Official permit from government department needed, X- Activities prohibited**	

IMPACT ON COMMUNITY AND OCCUPATIONAL HEALTH AND SAFETY

SOURCE OF IMPACT

This section provides an analysis of the potential impacts which may directly affect the health and safety of the community within the Project Area during construction and operation.

CONSTRUCTION

The construction of Wa Ale Resort is expected to take approximately 3.5 years for all three areas and rely primarily on local labour (see Impacts on Livelihood section below).

The construction of the resort is not likely to result in influx of migrant workers at the project site, because it is expected that during construction, Wa Ale Resort will indirectly employ more than 150 individuals among local labour as far as possible offering opportunities in construction, administrative, and management roles. The resort is also expected to encourage the development of local subcontractors.

Due to relative remoteness of the two of the three construction sites to the nearest sitta galet settlement of 42 households and intention to work with local labour and minimum influx of migrants it is less likely cause socio-economic changers, conflicts of social unrests in the local community of Sitta Galet.

A minor increase in traffic is expected on waterways but the chances of collisions with other vehicles are minor and this is unlikely to affect the community or fisherman due to much open space available in Lampi Marine National Park. The Wa Ale resort construction also plans to utilise or recycle materials from the island to minimize the need to source and bring material from elsewhere.

Waste disposal, sewage and wastewater discharge from the Project may lead to potential contamination of soil, surface water and ground water if managed improperly, and this may further affect the health of community and workforce. Refer to sections 5.4.1 for environmental impacts of wastewater discharge.

OPERATION

The expected number of guests that the resort has capacity to accommodate in 30 eco-lodge at area one and 18 eco-lodge at area two, approximately 70-100 guests. Together with the resort staff it will add up to about 200 people living on the island at the same time.

There is expected to be an increase in traffic within the local area during operation of the resort as motorised boats will be carrying guests to the island and around the island and to other islands

Due to increased population on the island, there is a possibility of more interaction with the communities and here is the possibility that a vehicle-related collision or other such incident could occur which may constitute significant impact if a member of the local community or workforce were to be injured.

Waste disposal, sewage and wastewater discharge from the Project may lead to potential contamination of soil, surface water and ground water if managed improperly, and this may

further affect the health of community and workforce. First of all, waste production will be limited. If not recycled on site, the waste is expected to be collected and transported by boat to Kawthaung. The project also plans to utilize the eco-friendly Kubota Waste Management system all premises of the resort to treat wastewater and sewage. Refer to sections 5.4.1 for environmental impacts of wastewater discharge.

EXISTING/IN PLACE CONTROLS

As part of the project design, the best practices in ecological tourism in waste management and water treatment will be utilized to minimize impacts such as regular water testing in accordance with global best practices. For controls related to waste disposal and sewage and wastewater discharges, these have been discussed at length in Sections 5.4.1.

Significance of Impacts on Community and occupational health and safety

Impact	Community and occupational health and safety				
Type	**Direct**	Indirect	Induced	Cumulative	
Duration	Temporary	Short term	**Long term**	**Permanent**	
Extent	**Local**	Regional	International		
Scale	Affect workforce and local community in Project area				
Frequency	Irreversible.				
Magnitude	Positive	Negligible	**Small**	Medium	Large
Receptor/Resource Sensitivity	**Low**	Medium	High		
Significance	**Negligible**	Minor	Moderate	Major	
	The combination of a Low Resource Sensitivity and Small Impact Magnitude will result in an overall negligible impact.				

ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING

In order to effectively mitigate the potential impacts on the health and safety of the workers and the community, the following mitigation measures will be introduced:

- Timings of the resort's boat movements must synchronize with other boats and make sure not disrupt fishery grounds – communities must be consulted and speed limits must be fixed.
- All construction equipment should be placed at a distance from the village settlements (Sitta Galet).
- All the workers should have pre-employment medical check-ups and establish that only healthy were employed at site.
- Health conditions of the communities, especially living close to the resort's location (Sitta Galet settlement's residents) must be checked and monitored regularly to keep record of

the changes in the health status. If there are changes to the health status or spread of decease recorded, required actions must be taken in collaboration with heath department.

- Additional controls related to waste disposal and sewage and wastewater discharges are discussed in Sections 5.4.1.
- It is also recommended to consult communities and NGOs active in the area before implementing planned activities.

SIGNIFICANCE OF RESIDUAL IMPACTS

Based on the assumption that Benchmade Asia Myanmar will be able to control and mitigate the impacts arising from its project activities, the impacts on the health and safety of the community and the workforce are likely to be **Minor**.

IMPACT ON LIVELIHOOD OF THE COMMUNITY

SOURCE OF IMPACT

CONSTRUCTION

Upon build-out and stabilization, Wa Ale Resort is expected to directly employ over 100 individuals.

During construction, it is supposed to indirectly employ **more than 150 individuals**. This workforce will be more likely sourced from local communities thus adding economic diversity of income opportunities, which are currently primarily limited to fishing along with minor trading activities.

The project will not result in the loss of any community's land and crops as the land acquired for the project belonged to the Department of Forestry which gave the permission to use this land for construction of the resort.

OPERATION

Wa Ale will use local labour as far as possible offering opportunities not only in construction but also in administrative, and management roles, and we will encourage the development of local subcontractors.

Currently the locals are heavily reliant on the fishing industry. The Wa Ale Resort development will also provide additional economic and technological opportunities to the fishing industry by becoming a captive market to buy food products for the Wa Ale Resort restaurant. In addition, more opportunities may also be provided to this local industry, such as access to additional power sources (e.g. charging batteries) and greater connectivity to the mainland, which will enhance communication and trade. The project also aims to hire and train local knowledgeable people to be tour and walk guides for the guests of the resort, promote selling artisan crafts to the guests.

EXISTING/IN PLACE CONTROLS

The project will prefer local labour. Training of local builders on assembly of tents and villas will be led by US-trained experts. In addition, all workers will undergo proper professional training for their respective trades before reporting for duty. General workers will have the

chance to advance to skilled workers through on-site and off-field training when they have achieved the necessary basic skill set.

Within the Wa Ale resort's senior management team, several individuals will be appointed to direct management training workshops to enhance the skills and internationalize the expertise of local team members.

Subject to the outstanding performance of Wa Ale Resort, annual performance bonuses will be declared and paid out to each employee before the Myanmar New Year (Water Festival).

SIGNIFICANCE OF IMPACTS ON LIVELIHOOD PROFILE OF THE COMMUNITY

In the absence of adequate mitigation measures, the significance of the impacts on the livelihood profile of the local community is likely to be **Positive**.

Impact	Change in Livelihood			
Type	**Direct**	Indirect	Induced	Cumulative
Duration	Temporary	Short term	**Long term**	**Permanent**
Extent	**Local**	Regional	International	
Scale	Generation of direct and indirect economic opportunities for the local community. The Project is likely to require 150 skilled workers in the construction and operation phases who are going to undergo training.			
Frequency	Through the life of the project.			
Magnitude	**Positive**	Negligible	Small	Medium	Large
Receptor/Resource Sensitivity	**Low**	Medium	High	
Significance	Negligible	Minor	Moderate	Major

ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING

So as to maximize the benefits in terms of economic opportunity generation, the following additional measures are recommended:

- preference to the vulnerable groups (families with women as head of households, families with a disabled member);
- consultation with communities and Instituto Oikos and other NGOs active in the area before implementing planned activities;
- consider seasonal character of the work at the resort to support the employees during off-peak season (rainy season);

SIGNIFICANCE OF RESIDUAL IMPACTS

The potential impacts from the project on the livelihood profile of the community are expected to be **Positive**.

IMPACT ON TRANSPORT AND INFRASTRUCTURE SERVICES

SOURCE OF IMPACT

CONSTRUCTION

The impacts on the transport and infrastructure services in the construction phase of the Project are likely to be the impacts due to the construction of the work camp and transportation of labour, equipment, materials and waste. Due to eco-friendly (energy-saving and waste-reducing) approaches of the project proponent, the impact at the construction stage are expected to be minor. Increase in traffic within the local area is also expected to be minor. It is understood that the project at this stage will be using private boats already operating in the area of the Lampi National Marine Park. Even a slight increase in traffic may result in vehicle-related collision or other incidents which may constitute significant impact if a member of the local community, fisherman, or the workforce were to be hurt.

Refer to Sections 5.4.1 for management issues related to waste disposal and discharge of sewage and wastewater.

OPERATION

To reach the Wa Ale Resort site guests and non-resident staff members will be ferried by boat. An increase in traffic may result in vehicle-related collision or other incidents which may constitute significant impact if a member of the local community, fisherman, or the workforce were to be hurt.

Building roads and use heavy machinery to make some parts of the island more accessible for guests of the resort may cause disruption to the natural environment and community livelihoods if carried out unannounced and with no appropriate safety measures. No cars or trucks will be used on the island and no paved roads will be built on the island so there will be no heavy machinery brought to the island for the works.

EXISTING/IN PLACE CONTROLS

While piers might be added to facilitate boat access, pathways on the islands will remain natural and no paving is planned. The resort developer plans to construct suspended pathways for water and other systems wherever possible. New forest trails will be constructed according to the highest conservation standards and utilizing natural materials re-used from the island.

SIGNIFICANCE OF IMPACTS

The significance of the impacts on transportation and infrastructure services are likely to be **Negligible.**

ASSESSMENT OF IMPACTS ON INFRASTRUCTURE AND TRANSPORTATION SERVICES

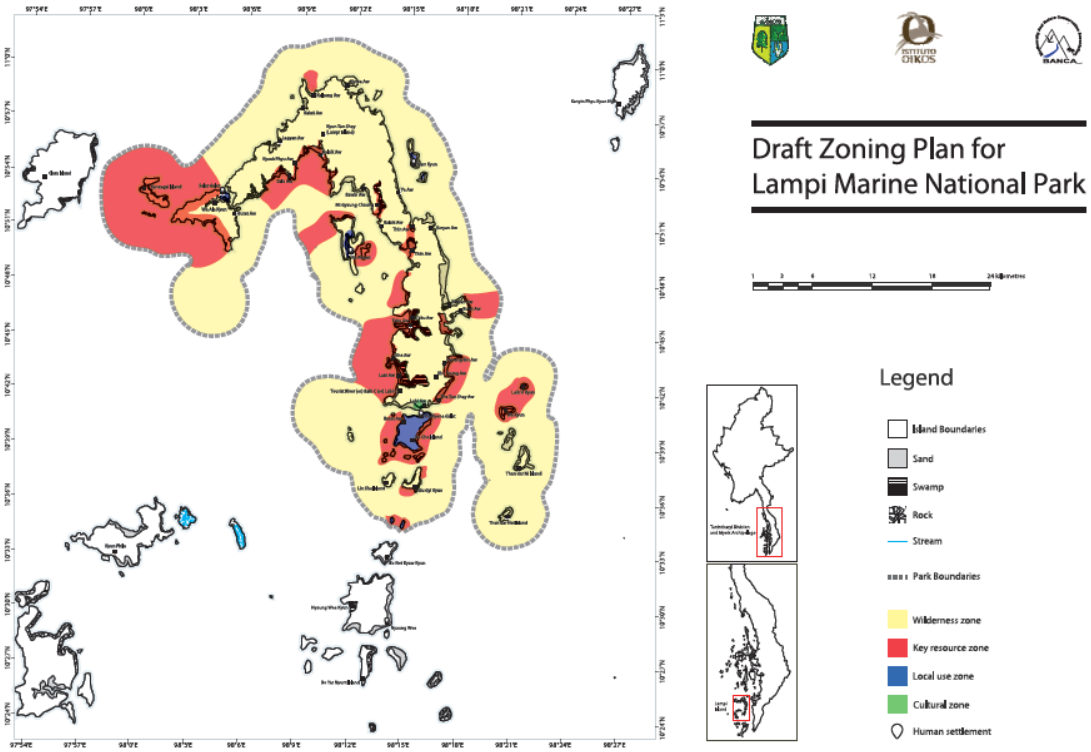
Impact	Impacts on Infrastructure and Transportation Services			
Type	**Direct**	Indirect	Induced	Cumulative
Duration	Temporary	Short term	**Long term**	Permanent

Extent	**Local**	Regional		International	
Scale	Impact on infrastructure and transportation services due to increased traffic on waterways.				
Frequency	Through the life of the project.				
Magnitude	Positive	**Negligible**	Small	Medium	Large
Receptor/Resource Sensitivity	**Low**	Medium		High	
Significance	**Negligible**	Minor	Moderate	Major	

ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING

Since the significance of impact is considered to be negligible and the project has existing control measures, below are a few additional mitigation measures which are also recommended to implement during the construction and operation of the Wa Ale resort project:

- in movements around the Lampi Island Marine National Park mind the maps of fisherman's movements and coordinate with communities to avoid collisions of vessels and disruption of fishing activities;
- during planning the project activities and planning refer to the zoning map of the Lampi Island Marine National Park below (refer to Lampi Marine National Park's General Management Plan 2014-2018);



- coordinate and inform local communities in sitta galet and other settlements (if the activities may disrupt their livelihood) before implementing any infrastructural activities;
- consultation with NGOs active in the area of the park such as Instituto Oikos, BANCA and others before implementing planned activities;

ASSESSMENT OF IMPACTS ON CULTURAL HERITAGE, CULTURE

SOURCE OF IMPACT

During the operation of the Wa Ale resort interaction with local communities during walking tours, visits to villages in Ma Kyone Galet may lead to direct physical impacts to the cultural heritage resources which may exist in the area such as the Moken people and other communities' cemeteries, the Moken people's spirit poles etc. These resources may also be impacted by accidental events caused by the project's activities such as fire and explosions.

EXISTING/ IN PLACE CONTROLS

Project facilities /main activities will be located away from the sensitive cultural heritage resources on Bo Chun Island. No known monuments, cemeteries, spirit poles or other cultural heritage are located within the proposed project site.

Wa Ale ecotourism project plans "Engage with the local community as business partners and beneficiaries of the positive impacts of the project. We believe there can be a *cultural exchange*

Where upon the local community is bettered by some sustainable enterprises and the project is bettered by the local knowledge and cultural exchange".

SIGNIFICANCE OF IMPACTS

The significance of the impacts on the cultural heritage is considered to be **Minor** or **Moderate**

ASSESSMENT OF IMPACTS ON CULTURAL HERITAGE

Impact	Impact on Cultural Heritage			
Type	Direct	**Indirect**	Induced	Cumulative
Duration	Temporary	Short term	Long term	**Permanent**
Extent	**Local**	**Regional**	International	
Scale	The community of Moken People in the cultural zone and elsewhere where they live and places of their cultural heritage			
Frequency	Through the life of the project.			
Magnitude	Positive	Negligible	**Small**	**Medium**	Large
Receptor/Resource Sensitivity	Low	**Medium**	High	
Significance	Negligible	**Minor**	**Moderate**	Major

ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING

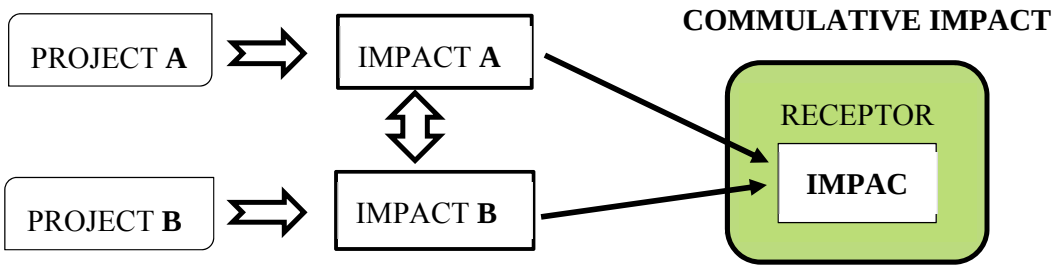
In order to minimize the impacts on the cultural heritage in the area, the following mitigation measures are recommended.

- The Project will meet the international best practice for the documentation and protection of the cultural heritage and in case of chance finds;
- The project will consult the Moken (Salone) representatives and NGOs active in the area of the park and others to assist in identification and protection cultural heritage sites on Wa Ale and other islands of the Lampi Island Marine National Park before implementing planned activities;
- The Project will follow the international best practice for the documentation and protection of the cultural heritage and in case of chance finds;
- All unplanned removals of nonreplicable cultural heritage need to be undertaken in consultation with the affected communities and in line with the regulatory requirements for the same;
- The Project will ensure that the local communities continue to access cultural heritage with no disruption, and if required, substitute access routes will be provided.
- The project will ensure that the resort staff is trained to act with cultural awareness and sensitivity to beliefs and faith of the local community, if any. This should be done in accordance with a properly developed protocol or Standard Operating Procedures (SOP). The resort guests also need to be educated and instructed in advance on how act polite and respectful in their cultural exchanges with local communities and in places of cultural heritage.

5.10. CUMULATIVE IMPACT ASSESSMENT

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

Risks and impacts will be analyzed in the context of the project's area of influence. This area of influence encompasses area potentially impacted by cumulative impacts from further planned development of the project. any existing project or condition, and other project related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken, and areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location" (IFC, 2006).



Impacts directly and indirectly associated with Wa Ale Eco-Tourism project are discussed in the previous chapter. This section deals with cumulative effects of the project and other associated impacts in relation to development are described. During the impact assessment, evaluation of potential cumulative impacts plays an integral part.

Cumulative impacts can be defined as successive and combined impacts of the one or more projects upon the society, economy and the environment. Such impacts may occur due to the accumulation and interaction of other developments, being developed within the same area or over a similar time frame of operation to the project being assessed. Development activities such as Wa Ale Eco Tourism project 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 Wa Ale Eco Tourism 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 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.

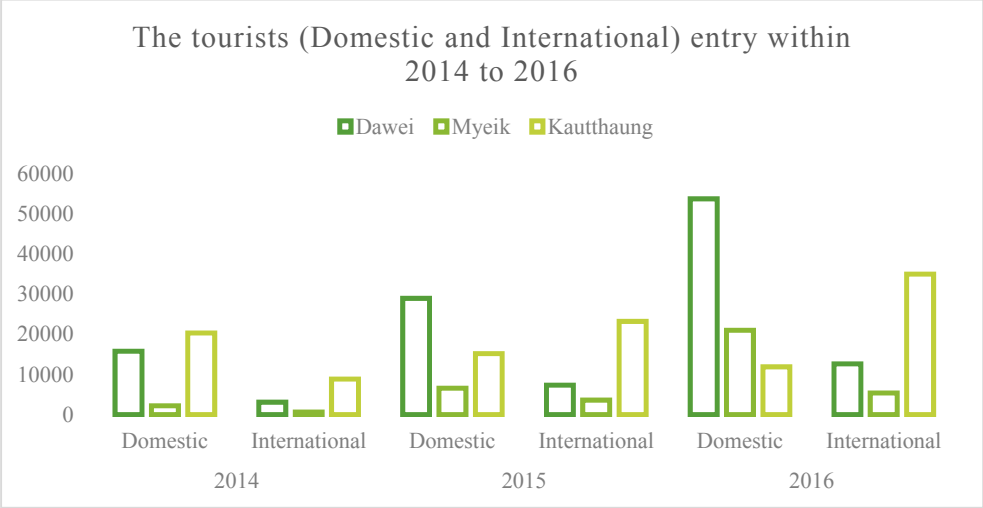


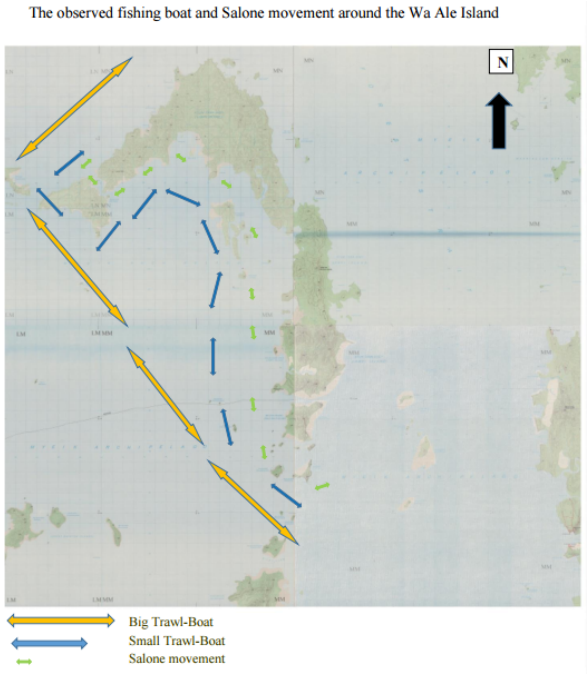
Figure 5. 2 The visitor entries between 2014-2016 (Source: MOHT Tourism Development Plan, Tanintharyi).

According to the Ministry of Hotels and Tourism, Tanintahryi Region, there are a total of eight islands that approved by MIC in Tanintharyi region.

Figure 5. 3 The MIC approved proposed hotel and resort project (Source: MOHT Tourism Development Plan, Tanintharyi)

Although, the visitor entries to Kautthaung Township is increased steadily, there is no active commercially developed tourism activities around the 2 miles vicinity of proposed development areas. There are one fishing village (Salet Galet) was observed around the 2 miles vicinity of the proposed development areas.

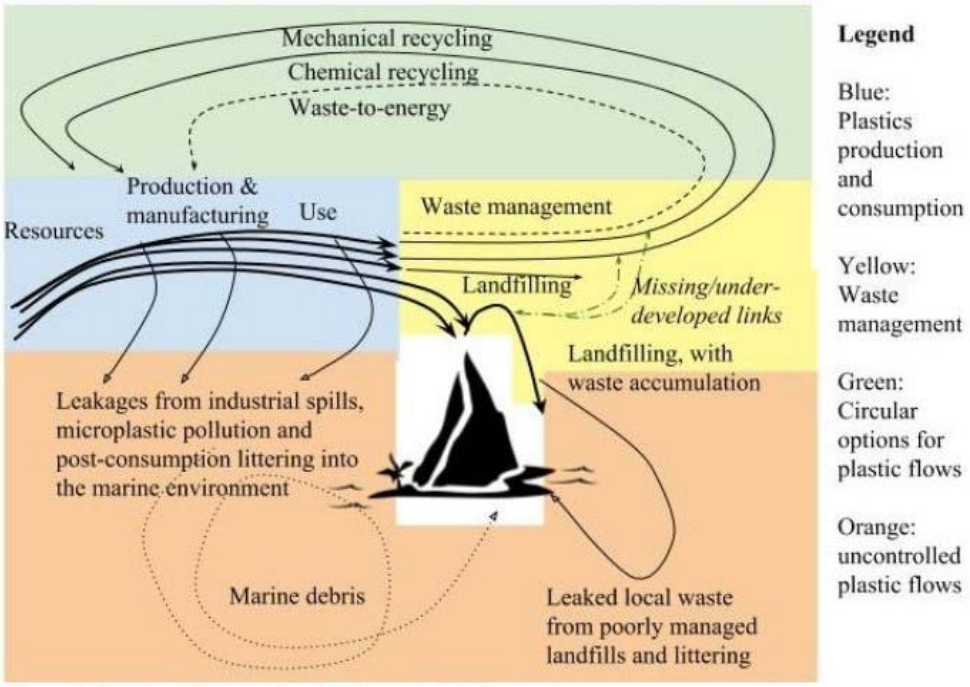
Figure 5.4:2 Miles vicinity area from the proposed project



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.



**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.

- 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 5.5: Marine Litter (debris) observed at Wa Ale 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 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 Benchmade Asia Myanmar Ltd is organized with the following sections:

1) Environmental Management Plan
2) Environmental Monitoring Plan
3) Occupational Health and Safety Plan
4) Emergency Response Plan
5) Oil Spill Response Plan
6) Waste Management plan
7) Corporate Social Responsibility Plan
8) Biodiversity Management Plan
9) Cultural exchange control plan

OBJECTIVES OF ENVIRONMENTAL MANAGEMENT PLAN

The objectives of Environmental Management Plan are:

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

RESPONSIBILITIES OF THE EMP

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

- Benchmade Asia Myanmar Ltd
- Environmental Conservation Department
- Third-party Environmental Consultant Firm

BENCHMADE ASIA MYANMAR LTD

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

The team is consisted of the following personnel:

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

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

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

HSE COORDINATOR

HSE Coordinator is responsible and accountable for ensuring the following:

- Observe HSE regulations, wears all required safety equipment, encourages safe working practices, corrects obvious hazards immediately or reports them to the General Manager. Development of HSE culture among all workers, during construction, operation and decommissioning phases.
- Regular site visit and reporting during construction, operation and decommissioning works to check whether the objectives of EMP are being followed.
- Manage safety and health in construction, operation and decommissioning operations.
- Keep full records of environmental management activities and present to annual independent third-party environment audit.
- Assess the risk in performing various steps of processes such as construction, operation and decommissioning with appropriate safety measures;
- Undertake regular safety and health inspections and audits onsite.
- Ensure equipment to be regularly checked and properly maintained;
- Provide necessary information and instructions, as well as providing and arranging training to the workers and supervising them to follow safety rules and safe working procedures strictly.

HSE ASSISTANTS

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

Development and training according to the HSE plan.

BIODIVERSITY MANAGEMENT OFFICER

Biodiversity Officer is responsible and accountable for ensuring the following:

- Provide accurate and relevant environmental advice on native vegetation and biodiversity preservation.
- Assist with the interpretation and implementation of the Permitted Clearing of Native Vegetation Biodiversity Assessment Guidelines

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

ENVIRONMENTAL CONSERVATION DEPARTMENT

EIA review consists of two stages:

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

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

The Environmental Management Responsibilities of ECD is to:

- conduct periodic site visits for projects with adverse environmental impacts
- conduct supervision missions for detailed review for projects with significant adverse environmental impacts
- review the periodic environmental monitoring reports submitted to ensure that adverse impacts are mitigated as planned and as agreed.
- EIA report review committee will lead by EIA Review Coordinator from ECD and the review committee members will comprise of technical and professional experts and are responsible for evaluating the information in the EIA report on the following:
    - Project description, activities and alternatives
    - Environmental setting of the project
    - Impacts of the project
    - Significance of the impacts
    - Cumulative impacts
    - Significance of residual impacts
    - EMP is reasonable to manage and monitor residual effects
    - Issues raised by the public and proposed solutions to those issues are identified. and
    - Use of accepted scientific principles and practices during data gathering and interpreting

THIRD-PARTY ENVIRONMENTAL CONSULTANT FIRM

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

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

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

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

Table 6. 1 Environmental Management Plan

Issues	Location	Mitigation Measures	Time Frame	Residual impacts	Responsible Person	Supervised /Approved by
Construction Phase: This phase that corresponds to any event, process, or activity that occurs during the construction of the project.						
Appointment of HSE Coordinator/ HSE Assistant			(2) yrs		HR Dpt of BAM.	Managing Director
Appointment of Biodiversity Officer			(2) yrs		HR Dpt	Managing Director
Water quality	All Construction site	The following mitigation measures should be taken: ✓ Contaminate water shall be reduced by avoiding earthwork in rainy season, and the proper wastewater drainage system shall be provided ✓ Temporary toilet should be provided for labors ✓ 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 the construction period	Minor	Construction Company	HSE Coordinator
Soil Erosion and Landslide	All Construction site	✓ To the greatest extent possible, phase site clearance so as to minimize the area of exposed soil at any given time. ✓ Re-cover exposed soils with grass and other appropriate species as soon as possible. ✓ Temporarily bund exposed soil and redirect flows from heavy runoff areas that threaten to erode or result in substantial surface runoff to adjacent marine waters.	Throughout Construction period	Minor	Construction Company	HSE Coordinator

		✓ Monitor areas of exposed soil during periods of heavy rainfall throughout the construction phase of the project				
Air quality	All Construction site	✓ Cover or control equipment should be used such as spraying water, bag house in the material handling process. ✓ All machineries and equipment shall have effective engines and exhaust systems so as to maintain exhaust emissions within permissible limit. ✓ Open burning of waste materials shall not be allowed.	Throughout Construction period	Minor	Construction Company	HSE Coordinator
Noise	All Construction site	✓ Construction work should be completed in as short a period by assigning qualified engineers and supervisors. ✓ Construction works should also be confined to daytime hours. ✓ Noise control devices should be applied such as temporary noise barriers. ✓ For generator, noise enclosure should be built.	Throughout Construction period	Minor	Construction Company	HSE Coordinator
Solid waste disposal	All Construction site	To reduce and control of these waste disposal, ✓ Construction activities should be conducted with the use of appropriate health and safety procedures in accordance with the regulatory requirements. ✓ Some types of the waste should be land filling, some be reused and some be recycled. ✓ Vegetation and combustible waste must not be burned on the site.	Throughout Construction period	Minor	Construction Company	HSE Coordinator, Biodiversity Officer

		✓ 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. ✓ 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.				
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 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	Throughout Construction period	Moderate	Construction Company and resort Biodiversity Officer	HSE Coordinator, Biodiversity Officer
Occupational health and safety	All construction site	For management of occupational health and safety, ✓ The representative of project proponent should a health and safety management plan for the construction workers based on the EMP.	Throughout Construction perioc	Minor	Construction Company	HSE Coordinator

		✓ 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. ✓ For the safety of construction staff, adequate safety measures including availability of first-aid facilities are implemented on the project site.				
Marine biodiversity	All construction site	✓ 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 guests and for hotel staff.	Throughout Construction period	Minor	Construction Company and resort Biodiversity Officer	HSE Coordinator, Biodiversity Officer
Operation/ Service Phase: The main project activities of services and maintenance are, total 70 Eco-Villas services for guests, restaurants, bar, meeting, travel and communication.						

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 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.	Throughout Operation period	Minor	Resort Manager and proponent	HSE Coordinator
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.	Throughout Operation period	Minor	Resort Manager and proponent	HSE Coordinator
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	Throughout Operation period	Minor	Resort Manager and proponent	HSE Coordinator, Biodiversity Officer

		➢ Collect marine litters that accumulate at the island, once per year and transport to Kautthaung Township Development Committee Dumping site. ➢ Apply pits that covered with concrete or linen to avoid the ground water contamination before transport to Kautthaung Towhship Development Committee Dumping site.				
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	Throughout Operation period	Minor	Resort Manager and proponent	HSE Coordinator
Human	All the proposed operation area	To prevent and reduce of occupational health and safety, ✓ 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. ✓ 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	Throughout Operation period	Minor	Resort Manager and proponent	HSE Coordinator

Biodiversity	All the proposed operation area	✓ Project proponent should alert not to hunt in order to avoid wildlife extinction. ✓ Tree plantations should be formed in the verdant area after the construction period. It can also increase the ability of absorbing and storage of water and also protect the biodiversity. ✓ Native and endemic plants should use in replantation ✓ 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	Biodiversity Officer and proponent	HSE Coordinator, Biodiversity Officer
Marine Environment	All the proposed operation area	✓ Installation of boat mooring buoys at the sitefor 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 ✓ Mark and record the turtle nesting areas and their nesting seasons ✓ Make sure there is no disruption during the turtle nesting and their breeding season ✓ Light out during the night except for emergency light	Throughout Operation period	Minor	Biodiversity Officer and proponent	HSE Coordinator, Biodiversity Officer
Decommissioning Phase: After 50 years later, this is the final phase of the project and it will be in relation to the condition as stated in the investment contract. 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. ✓ Burning of waste materials shall not be allowed and the best decommissioning practices should be applied.	Throughout Decommissioning period	Minor	Decommissioning Company	HSE Coordinator
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	Decommissioning Company	
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	Decommissioning Company	HSE Coordinator
Solid waste production and disposal	All the decommissioning site	✓ Avoid, minimize, reuse and recycle wastes generated at the project site. ✓ To reduce and control of solid waste disposal, demolition activities should be conducted with the use of appropriate health and safety procedures in accordance with the regulatory requirements.	Throughout Decommissioning period	Minor	Decommissioning Company	HSE Coordinator

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	Decommissioning Company	HSE Coordinator
Biodiversity	All the site	To prevent impact on wildlife sanctuary during decommissioning phase, ✓ 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	Throughout Decommissioning period	Minor	Decommissioning Company and resort biodiversity Officer	HSE Coordinator

6.1: ENVIRONMENTAL MONITORING PLAN

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

6.1.1 MONITORING PARAMETERS

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

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

Operation Phase: To determine the impacts that might arise from the operation of hotel and office complex activities

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

6.1.2 ENVIRONMENTAL MONITORING REPORTS

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

Table 6 .2 Environmental Monitoring Plan

No.	Environmental Concerns	Parameters	Location	Frequency	Responsible Party	Remarks
Construction Phase						
1.	Air quality	PM_{10}, $PM_{2.5}$, CO, CO_2, NO_2, SO_2	2 points- Area (1) and Area (2)	Once	HSE/Third Party	

Table 6 .2 Environmental Monitoring Plan						
No.	**Environmental Concerns**	**Parameters**	**Location**	**Frequency**	**Responsible Party**	**Remarks**
2.	Noise Level	Noise Level dBA	2 points- Area (1) and Area (2)	Once	HSE/Third Party	
3.	Water quality	pH, Color (True), Turbidity, Total Hardness, Calcium, Iron, Chloride, Sulphate, Total Solids, Suspended Solids, Chlorine	1 point	Once	HSE/Third Party	
4.	Sewage and wastewater	Regular Maintenance	Septic tank	Throughout construction period	HSE	
5.	Solid waste disposal	Waste Management plan	Proposed dump site	Throughout construction period	HSE	
Operation Phase						
1.	Air quality	PM_{10}, $PM_{2.5}$, CO, CO_2, NO_2, SO_2	2 points- Area (1) and Area (2)	2 times- Dry season and wet season	Proponent	During operation phase, the environmental monitoring plan should be revised per year if it is necessary
2.	Noise Level	Noise Level dBA	2 points- Area (1) and Area (2)	One time	Proponent	
3.	Water quality	Fresh water- pH, Color (True), Turbidity, Total Hardness, Calcium, Iron, Chloride, Sulphate, Total Solids, Suspended Solids, Chlorine Marine water- pH, Salinity, Turbidity, Conductivity, Suspended Solids,	Freshwater- 1 point Treated water- 1 point Marine Water- 3 points- Area (1,2,3)	Yearly	Proponent	

Table 6 .2 Environmental Monitoring Plan

No.	Environmental Concerns	Parameters	Location	Frequency	Responsible Party	Remarks
		Temperature(°C), NO_3, PO_4, DO, COD, BOD, Oil and grease				
4.	Occupational Health and Safety	Visual check and weekly inspection	kitchen, guest rooms and employee hostels	Weekly	HSE	
5.	Sewage and wastewater	Regular Maintenance	Kubota Tanks	Yearly	Kubota/Proponent	
6.	Solid waste disposal	Waste management Plan	Dumping site	Weekly	HSE	
7.	Marine Litters	Waste Management Plan	Dumping site	Once per year	Proponent	
Decommissioning Phase						
1.	Air quality	PM_{10}, $PM_{2.5}$, CO, CO_2, NO_2, SO_2	2 points- Area (1) and Area (2)	Once	HSE/Contractor	
2.	Noise Level	Noise Level dBA	2 points- Area (1) and Area (2)	Once	HSE/Contractor	
3.	Water quality	pH, Color (True), Turbidity, Total Hardness, Calcium, Iron, Chloride, Sulphate, Total Solids, Suspended Solids, Chlorine	1 point	Once	HSE/Contractor	
4.	Sewage and wastewater	Regular Maintenance	Septic tank	Throughout decommissioning period	HSE/Contractor	
5.	Solid waste disposal	Waste Management plan	Proposed dump site	Throughout decommissioning period	HSE/Contractor	

Table 6 .3 Budget allocation for Environmental Monitoring Plan						
Sr., No.	**Monitoring items**	**Responsible person**	**Annual Estimated budget (USD) (provisional)**	**Frequency**	**Remark**	
Construction phase						
1.	Air quality	Contractor	1,200	Once	Only field measurement is included.	
2.	Noise Level		600			
3.	Water quality		1,500			
4.	Sewage and wastewater		1,000			
5.	Solid waste disposal		500			
		Sub-Total	**4,800**			
Operation phase						
1.	Air quality	Operator	1,200	Two times per 3 years	Field Measurement Two times per 3 years	
2.	Noise Level		600			
3.	Water quality		1,500	Twice per year (Once in Dry Season, Once in Wet Season)	Field Measurement and Lab Analysis for Fresh water and treated water. Twice per year (Dry season and wet season)	
4.	Sewage and wastewater		1,000			
5.	Marine Water		1,000	Two times per 3 years (Once in Dry Season, Once in Wet Season	Field Measurement and Lab Analysis for Marine Water. Twice per 3 years (Dry season and wet season)	
6.	Solid waste disposal		1,000	Twice per year	Follow up according to the EMP	
		Sub-Total	**6,300**			
Decommissioning phase						
1.	Air quality	Contractor	1,200	Once		

Table 6 .3 Budget allocation for Environmental Monitoring Plan					
Sr., No.	**Monitoring items**	**Responsible person**	**Annual Estimated budget (USD) (provisional)**	**Frequency**	**Remark**
2.	Noise Level		600		Only field measurement is included.
3.	Water quality		1,500		
4.	Sewage and wastewater		1,000		
5.	Solid waste disposal		500		
		Sub-Total	**4,800**		
		Total	**15,900**		

6.2: BIODIVERSITY MANAGEMENT PLAN

Wa Ale island is located within the National Marine Park (Lampi island). According to the literature, the biodiversity index is high in Lampi island. The habitat of Lampi island is evergreen forest 22%, mangrove forest 2%, dune and beach forest 1%, marine habitat 75%. There are 195 trees species, 19 mammal species, 228 bird species, 29 reptile and amphibian species, 370 marine flora species and 165 marine fauna species are recorded (Source: FD, OIKOS, BANCA, Project completion report).

According to the biodiversity field survey conducted by E Guard's biodiversity survey team, a total of 28 tree species, 7 species of dragonfly, 24 species of butterfly, 51 species of aquatic fauna, 8 species of reptile, 27 species of bird and 2 species of mammal were recorded at Wa Ale island. Among them, *Macaca leonine* (Northern Pig-tailed Macaque), *Pbilentoma velatum* (Maroon-breasted *Philentoma*, *Chloropsis cyanopogon* (Lesser Green Leafbird), *Aceros corrugatus* (Wrinkled Hornbill), *Phthon reticulatus* (Reticulated Python), *Calotes emma alticristatu*s (Northern Forest Crested Lizard), *Chelonia mydas* (Green Sea Turtle), *Dermochelys coriacea* (Leatherback Sea Turtle), *Cyacas rumphii* (Mondaing) were recorded as IUCN Red List species. The Environmental Management Plan, Biodiversity Management Plan and Biodiversity Management Plan for IUCN Redlist Species are shown in below.

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**	**Turtle**	**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
Change access rights and resource usage			☑									☑			☑		Medium	Low	Minor
Shipping movement						☑		☑	☑			☑			☑		Medium	Low	Minor
Diesel and oil spills			☑							☑		☑			☑		Medium	Low	Minor

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**	**Turtle**	**Coral**	**Fish**	**Mammals**	**Benthic Fauna**	**Long Term**	**Short Term**	**Significant**	**Not Significant**	**Significant**	**Not Significant**			
Sewage disposal		☑	☑	☑						☑		☑			☑		High	Low	Moderate
Solid waste production		☑	☑	☑						☑		☑			☑		High	Medium	Moderate
Anchoring							☑			☑		☑				☑	Medium	Low	Minor
Operation Phase																			
Resource consumption		☑	☑	☑							☑				☑		Medium	Medium	Moderate
Chang access rights and usage		☑	☑									☑				☑	Medium	Low	Minor
Sewage disposal		☑	☑			☑	☑	☑	☑		☑				☑		High	Medium	Moderate
Solid waste production and disposal		☑	☑			☑	☑	☑	☑		☑				☑		High	Medium	Moderate

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**	**Turtle**	**Coral**	**Fish**	**Mammals**	**Benthic Fauna**	**Long Term**	**Short Term**	**Significant**	**Not Significant**	**Significant**	**Not Significant**			
Population increase		☑	☑	☑							☑					☑	Medium	Low	Minor
Light pollution	☑		☑			☑			☑			☑			☑		High	Low	Moderate
Nosie	☑		☑			☑			☑		☑					☑	High	Low	Moderate
Replantation	☑	☑	☑	☑	☑						☑		☑				High	Low	Moderate
Less illegal trading		☑	☑	☑		☑	☑				☑		☑				High	Medium	Moderate
Diesel and oil spills						☑	☑	☑	☑		☑					☑	Medium	Low	Moderate
Anchoring							☑			☑		☑				☑	Medium	Low	Minor
Shipping movement						☑		☑	☑			☑					Medium	Low	Minor
Decommissioning Phase																			

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**	**Turtle**	**Coral**	**Fish**	**Mammals**	**Benthic Fauna**	**Long Term**	**Short Term**	**Significant**	**Not Significant**	**Significant**	**Not Significant**			
Site Clearance												☑			☑		High	Medium	Moderate
Air pollution												☑			☑		Medium	Low	Minor
Noise												☑			☑		Medium	Medium	Moderate
Solid waste production		☑	☑		☑							☑			☑		Medium	Medium	Moderate
Replantation	☑	☑	☑	☑	☑							☑	☑				High	Medium	Moderate
Shipping movement						☑		☑	☑			☑				☑	Medium	Low	Minor

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 Park Warden) • not to discharge any kind of waste • to inform any kind of irregularities (such as dead birds and animals) to responsible officer (Park Warden from wildlife and nature conservation division of 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	Minor	HSE Team, Biodiversity officer	Distribution of "DOs" and "DONTs" pamphlets and thorough explanation to all new visitors and employees. Daily monitor and control. Renew yearly.	**5000**

Sr.	Activity	Residual Impacts	Responsibility	Timing	Estimated Budget (USD)
	• tend to quite as much as possible during hiking and trekking activities • 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 in Lampi Marine Park 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	HSE Team/ Mountain Top Hotel	Regular contacts and cooperation with nearby communities and local authorities. Renew yearly	**50000**

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				
				Total	**55,000**

Scientific Name	Common Name	IUCN Status
Macaca leonine	Northern Pig-Tailed Macaque	VU
Pbilentoma velatum	Maroon-Breasted Philentoma	NT
Chloropsis cyanopogon	Lesser Green Leafbird	NT
Aceros corrugatus	Wrinkled Hornbill	NT
Python reticulatus	Reticulated Python	NE
Calotes emma alticristatus	Northern Forest Crested Lizard	NE
Chelonia mydas	Green Sea Turtle	EN
Dermochelys coriacea	Leatherback Sea Turtle	CR
Cycas rumphii	Mondaing	NT

6.2.1 MAMMALS

MACACA LEONINA (NORTHERN PIG-TAILED MACAQUE)

IUCN Status – Vulnerable

Description - The **northern pig-tailed macaque** (*Macaca leonina*) is a species of primate in the family Cercopithecidae. It is found in Bangladesh, Cambodia, China, India, Laos, Myanmar, Thailand, and Vietnam. Traditionally, it has been considered a subspecies of southern pig-tailed macaque.

Taxonomy

Kingdom	**Phylum**	**Class**	**Order**	**Family**
Animalia	Chordata	Mammalia	Primates	Cercopithecidae

Habitat - This is a predominantly terrestrial animal, although it readily climbs and forages in the canopy. It is diurnal and frugivorous. It occupies tropical evergreen and semi-evergreen

forest, tropical wet evergreen forest, tropical moist deciduous forest, coastal forest, swamp forest, low elevation pine forests (in Lao PDR and China) and montane forest, including degraded forests. In China the species occupies elevations between 50-2,000 m (Molur *et al.* 2003; Choudhury 2003). In Lao PDR and Viet Nam the species is associated with lowlands, usually below 500 m. Its generation time is 10-12 years (Molur *et al.* 2003). According to secondary information and recent records, populations in Myanmar live between 190-400 m (S. Htun pers. comm.).

Activity	Responsible person	Timing
✓ Locate and documented their nesting area ✓ Counted and recorded the biomass ✓ Documented their breeding season ✓ Awareness raising, Dos and Don'ts to both employee and guests ✓ Do not disturb their daily habitat ✓ Do not contact with them ✓ Do not feed the exotic food ✓ Avoid the capturing the photo with flash mode on ✓ Reduce the noise level as much as possible during their breeding season ✓ Not to discharge any kind of waste ✓ to inform any kind of irregularities (such as dead birds and animals) to authorities ✓ Not to hunt or catch any wildlife ✓ 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 ✓ Post the picture and brief description of their habitat at the guest rooms ✓ To be fully compliance with Protection of Wildlife and Conservation of Natural Areas Law (1994) and Rules (2002)	Biodiversity Management Officer	Throughout the construction period, operation period and decommissioning period

6.2.2 BIRDS

PHILENTOMA VELATA (MAROON-BREASTED PHILENTOMA)

IUCN Status – Near Threathened

Description - The **maroon-breasted philentoma** (*Philentoma velata*) is a bird species. Long placed in the flycatcher family (Muscicapidae) when these were used as a "wastebin taxon", they are now tentatively assigned to the Tephrodornithidae pending detailed study. It is found in Brunei, Indonesia, Malaysia, Myanmar, Singapore, and Thailand. Its natural habitats are subtropical or tropical moist lowland forests and subtropical or tropical swamps. It is threatened by habitat loss.

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Aves	Passeriformes	Vangidae

Habitat - It inhabits broadleaf evergreen lowland and lower montane primary and secondary forest, as well as mixed deciduous forest, transitional forest and established ALBIZIA plantations. It occurs up to 800 m in Java, 1,500 m elsewhere and 1,650 m in the Kelabit Highlands, northern Borneo. It feeds in pairs or small family groups in the middle and upper canopy, gleaning insects and sallying after them on short flights. It breeds in **March-June**.

CHLOROPSIS CYANOPOGON (LESSER GREEN LEAFBIRD)

IUCN Status – Near Threathened

Description - The **lesser green leafbird** (*Chloropsis cyanopogon*) is a species of bird in the Chloropseidae family. It is found in Brunei, Indonesia, Malaysia, Myanmar, Singapore, and Thailand. Its natural habitat is subtropical or tropical moist lowland forests. It is threatened by habitat loss.

Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Aves	Passeriformes	Chloropseidae

Habitat - Canopy and high edge of lowland evergreen forest, including peat-swamp forest, mature and regenerating secondary forest, also fruiting trees and shrubs in clearings and high shade cover of plantations. It occurs up to 700 m in most of its range but occasionally to 1,100 m in Malaysia. Birds in breeding condition have been recorded in **February-August**.

RHABDOTORRHINUS CORRUGATUS (WRINKLED HORNBILL)

IUCN Status – Near Threatened

Description - The wrinkled hornbill or Sunda wrinkled hornbill (Rhabdotorrhinus corrugatus) is a medium-large hornbill which is found in forest in the Thai-Malay Peninsula, Sumatra and Borneo.

Taxonomy

Kingdom	**Phylum**	**Class**	**Order**	**Family**
Animalia	Chordata	Aves	Bucerotiformes	Bucerotidae

Habitat - This species occurs in primary evergreen and swamp forests, up to 1,000 m asl. It can persist in selectively logged forest if primary forests are adjacent, but it does not occur in secondary forest.

Activity	Responsible person	Timing
✓ Locate and documented their nesting area ✓ Documented their breeding season and migration season ✓ Awareness raising, Dos and Don'ts to both employee and guests ✓ Do not disturb their daily habitat ✓ Reduce the noise level as much as possible during their breeding season and during the hiking or trekking activities ✓ Maintain the forest as much as possible to attain the more nesting area ✓ Not to discharge any kind of waste ✓ To inform any kind of irregularities (such as dead birds and animals) to authorities ✓ 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 ✓ Post the picture and brief description of their habitat at the guest rooms ✓ To be fully compliance with Protection of Wildlife and Conservation of Natural Areas Law (1994) and Rules (2002)	Biodiversity Management Officer	Throughout the construction period, operation period and decommissioning period

6.2.3 MARINE TURTLE

CHELONIA MYDAS (GREEN TURTLE)

IUCN Status – Endangered

Description - Its appearance is that of a typical sea turtle. *C. mydas* has a dorsoventrally flattened body, a beaked head at the end of a short neck, and paddle-like arms well-adapted for swimming. Adult green turtles grow to 1.5 metres (5 ft) long. The average weight of mature individuals is 68–190 kg (150–419 lb) and the average carapace length is 78–112 cm (31–44 in). Exceptional specimens can weigh 315 kg (694 lb) or even more, with the largest known *C. mydas* having weighed 395 kg (871 lb) and measured 153 cm (60 in) in carapace length

Anatomically, a few characteristics distinguish the green turtle from the other members of its family. Unlike the closely related hawksbill turtle, the green turtle's snout is very short and its beak is unhooked. The neck cannot be pulled into the shell. The sheath of the turtle's upper

jaw possesses a denticulated edge, while its lower jaw has stronger, serrated, more defined denticulation. The dorsal surface of the turtle's head has a single pair of prefrontal scales. Its carapace is composed of five central scutes flanked by four pairs of lateral scutes. Underneath, the green turtle has four pairs of inframarginal scutes covering the area between the turtle's plastron and its shell. Mature *C. mydas* front appendages have only a single claw (as opposed to the hawksbill's two), although a second claw is sometimes prominent in young specimens.

The carapace of the turtle has various color patterns that change over time. Hatchlings of *Chelonia mydas*, like those of other marine turtles, have mostly black carapaces and light-colored plastrons. Carapaces of juveniles turn dark brown to olive, while those of mature adults are either entirely brown, spotted, or marbled with variegated rays. Underneath, the turtle's plastron is hued yellow. *C. mydas* limbs are dark-colored and lined with yellow, and are usually marked with a large dark brown spot in the center of each appendage.

Taxonomy

Kingdom	**Phylum**	**Class**	**Order**	**Family**
Animalia	Chordata	Reptilia	Testudines	Cheloniidae

Habitat - Green sea turtles move across three habitat types, depending on their life stage. They lay eggs on beaches. Mature turtles spend most of their time in shallow, coastal waters with lush seagrass beds. Adults frequent inshore bays, lagoons and shoals with lush seagrass meadows. Entire generations often migrate between one pair of feeding and nesting areas. Within their geographical range, the green sea turtles generally stay near continental and island coastlines. Near the coastlines, the green sea turtles live within shallow bays and protected shores. In these protected shores and bays, the green sea turtle habitats include coral reefs, salt marshes, and nearshore seagrass beds. The coral reefs provide red, brown, and green algae for their diet and gives protection from predators and rough storms within the ocean. The salt marshes and seagrass beds contain seaweed and grass vegetation, allowing ample habitat for the sea turtles. The breeding season occurs in late spring and early summer.

DERMOCHELYS CORIACEA (LEATHERBACK)

IUCN Status – Vulnerable

Description - The **leatherback sea turtle** (*Dermochelys coriacea*), sometimes called the **lute turtle** or **leathery turtle** or simply the **luth**, is the largest of all living turtles and is the fourth-heaviest modern reptile behind three crocodilians. It is the only living species in the genus ***Dermochelys*** and family **Dermochelyidae**. It can easily be differentiated from other modern sea turtles by its lack of a bony shell, hence the name. Instead, its carapace is covered by skin and oily flesh. *Dermochelys* is the only extant genus of the family Dermochelyidae.

Taxonomy

Kingdom	**Phylum**	**Class**	**Order**	**Family**
Animalia	Chordata	Reptilia	Testudines	Dermochelyidae

Habitat - Leatherback turtles can be found primarily in the open ocean. Leatherbacks follow their jellyfish prey throughout the day, resulting in turtles "preferring" deeper water in the daytime, and shallower water at night (when the jellyfish rise up the water column). This hunting strategy often places turtles in very frigid waters. One individual was found actively hunting in waters that had a surface temperature of 0.4 °C. (32.72 °F). Leatherback turtles are known to pursue prey deeper than 1000 m — beyond the physiological limits of all other diving tetrapods except for beaked whales and sperm whales. Their favored breeding beaches are mainland sites facing deep water, and they seem to avoid those sites protected by coral reefs. Nesting can occur year round, but most nesting occurs from October to March with a peak in late December-early January.

Figure 6. 1 The recorded and documented Turtle nesting area

Activity	Responsible person	Timing
✓ Locate and documented their nesting area ✓ Documented their nesting and breeding season ✓ Awareness raising, Dos and Don'ts to both employee and guests ✓ Reduce the noise level as much as possible during their nesting and breeding season ✓ All light need to off during their nesting season at nesting area ✓ Protect the nesting area and eggs from other animals and human ✓ Do not disturb the nest and protect to remain the same condition as much as possible ✓ Collect the plastic bottles, bags and other wastes at and near the nesting area and their traits to the nest ✓ Not to discharge any kind of waste ✓ To inform any kind of irregularities (such as dead and hurt turtle) to authorities ✓ Not to hunt or catch any wildlife including their eggs and offspring ✓ Not to purchase any kind of wildlife and products related to wildlife ✓ Post the picture and brief description of their habitat at the guest rooms ✓ To be fully compliance with Protection of Wildlife and Conservation of Natural Areas Law (1994) and Rules (2002)	Biodiversity Management Officer	Throughout the construction period, operation period and decommissioning period

6.2.4 FLORA

CYCAS RUMPHII

IUCN Status – Near Threatened

Description - The cycad is a small tree, growing to about 10 m (33 ft) in height, with a trunk diameter of up to 40 cm (16 in). The bark is grey and distinctively fissured into rectangular, or diamond-shaped, segments. The leaves grow from the crown – bright green, glossy, palm-like fronds, 1.5–2.5 m (4.9–8.2 ft) long, with 150–200 leaflets on each frond. The spiny petiole is 35–60 cm (14–24 in) long. The male plant's strobilus, or cone, is oblong-ellipsoidal, 30–60 cm (12–24 in) long, orange in colour and foetid in odour. The female's megasporophylls are about 30 cm long, fleshy, brown and densely hairy, with the fertile area about 35 mm (1.4 in) wide. The seeds are 45 mm long and 30 mm wide, ripening from green to an orange- or reddish-brown colour.

Taxonomy

Kingdom	Phylum	Class	Order	Family
Plantae	Tracheophyta	Cycadopsida	Cycadales	Cycadaceae

Habitat - The cycad’s range is centered on the Maluku Islands, extending northwards to Sulawesi, eastwards to New Guinea, and westwards to Java and southern Borneo. It also occurs on Christmas Island, an Australian territory in the Indian Ocean 300 km (190 mi) south of Java, and is cultivated in Fiji and Vanuatu. It is largely a species of tropical closed forest or woodland on calcareous soils in coastal habitats. It is often found on stabilized dunes formed of coralline sand and limestone.

Activity	Responsible person	Timing
✓ Locate and documented their distribution along the island ✓ Awareness raising, Dos and Don'ts to both employee and guests ✓ Make sure to give the information and recognize their character to construction workers and all employee ✓ Avoid to cut down ✓ Collect the cycad's pup and replanting ✓ Post the picture and brief description of their habitat at the guest rooms ✓ To be fully compliance with Protection of Wildlife and Conservation of Natural Areas Law (1994) and Rules (2002)	Biodiversity Management Officer	Throughout the construction period, operation period and decommissioning period

6.3: CULTURAL EXCHANGE CONTROL PLAN

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:

(Reference: http://www.myanmartourism.org/index.php/tourist-information/dos-don-ts;

http://www.dosanddontsfortourists.com/)

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.
- 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

Useful references:

- WB OP 4.0 on Indigenous Peoples https://policies.worldbank.org/sites/ppf3/PPFDocuments/090224b0822f89d5.pdf
- Policy on Indigenous Peoples (ADB) https://www.adb.org/documents/policy-indigenous-peoples
- The international standards applied: IFC performance standard 7 on Indigenous Peoples (http://www.ifc.org/wps/wcm/connect/115482804a0255db96fbffd1a5d13d27/PS_English_2012_Full-Document.pdf?MOD=AJPERES)

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.

General Recommendations

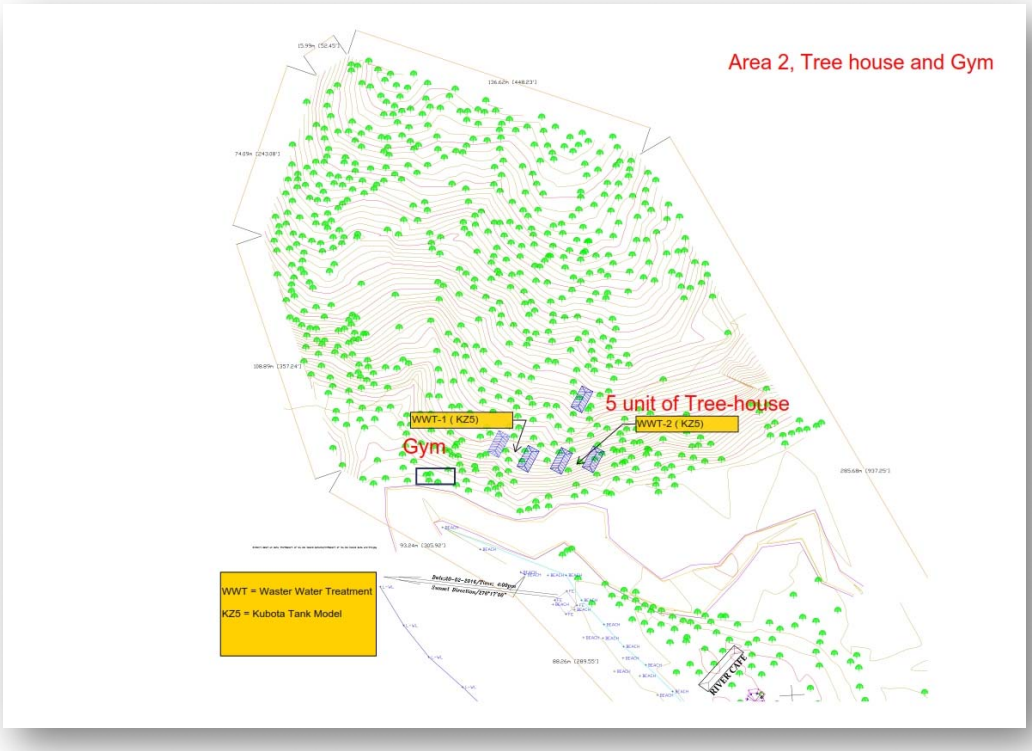
Resources and Standards: IFC, ADB, WB

Consult local NGOs, community leaders, local tour guides

6.4: WASTE MANAGEMENT PLAN

6.4.1 WASTEWATER AND SEWAGE

Kubota waste management system will install in waste management system of Wa Ale Eco-Tourism project. Kubota began its business by manufacturing and selling cast metal products. Since then, they have offered various products contributing to improving human lives and society. Kubota has well known reputation in production of waste and wastewater treatment plant in globally.



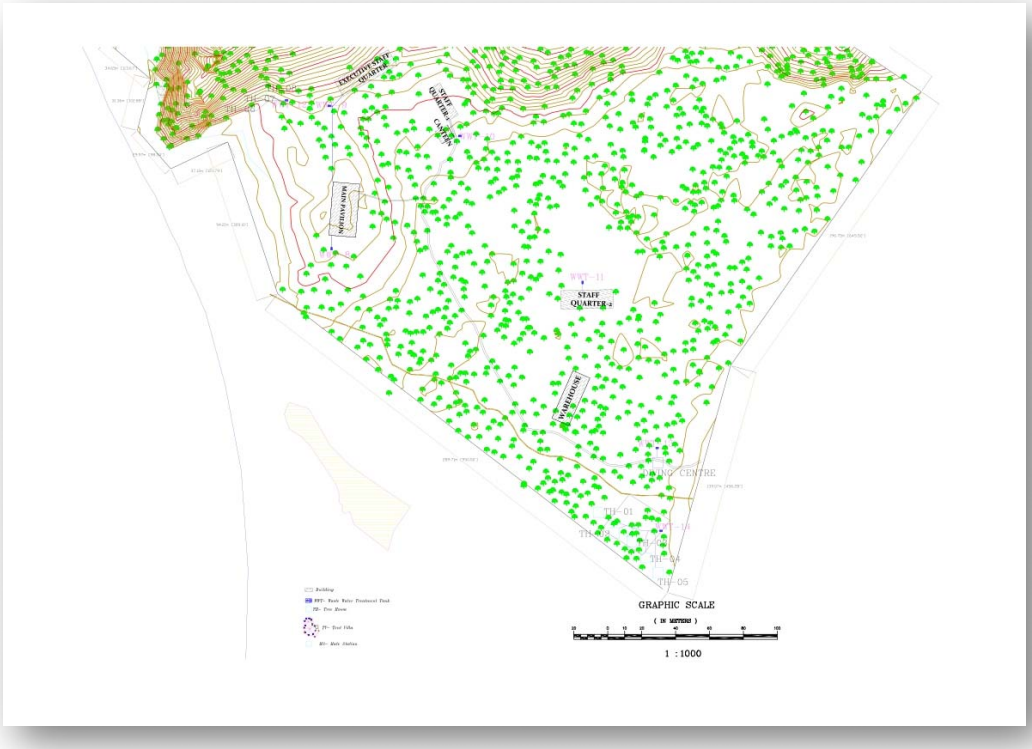
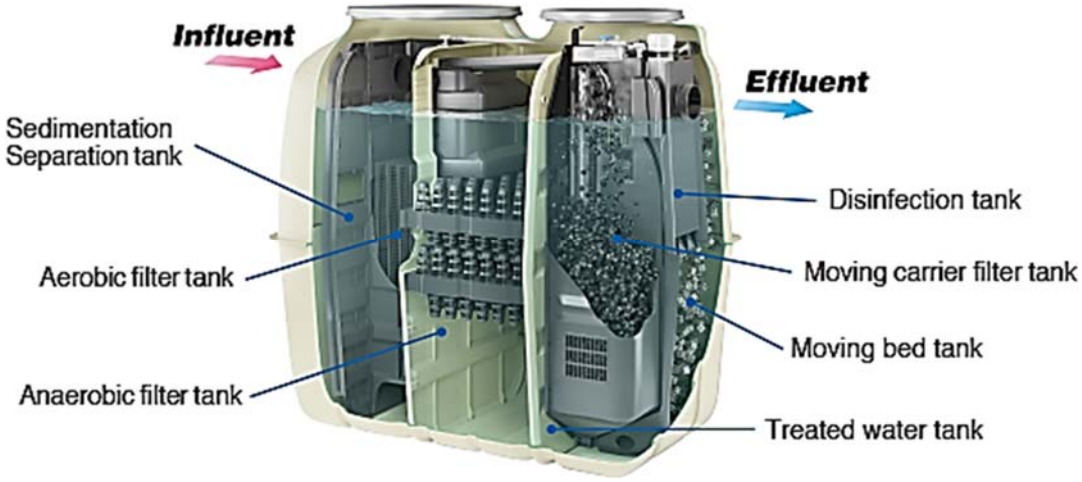
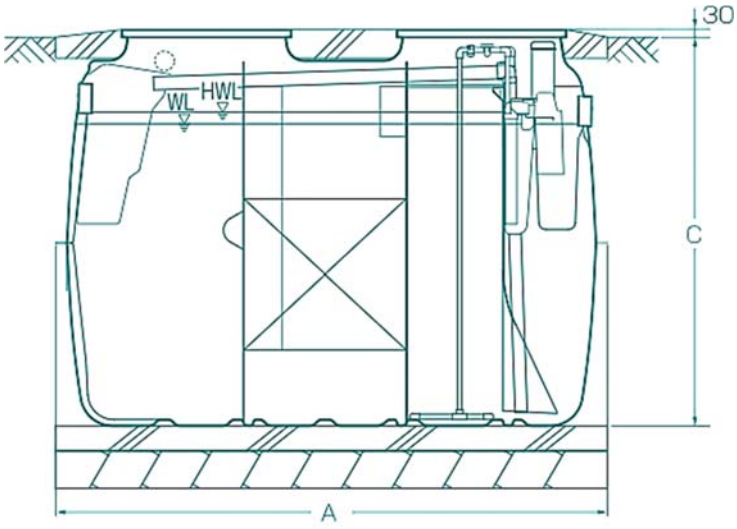
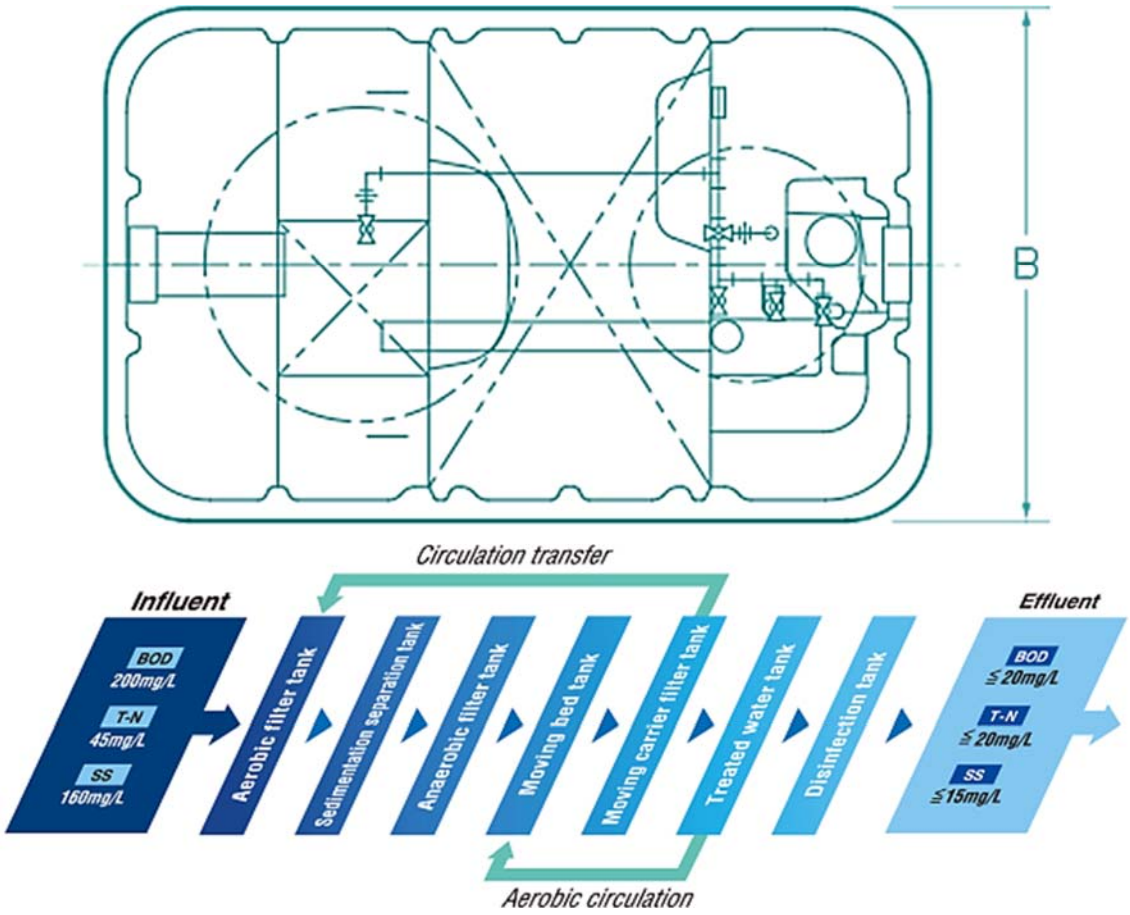


Figure 6.2 The locations of Kubota installment

Among the type of waste management facilities, KZ type (moving bed carrier filter process) will be installed in this project. The KZ type is one more step in space-saving installation. The tank itself is the smallest design in the world. It can be built without having to choose a place, and even with a small excavation space, it will be labour-saving and make construction quicker. All-in-one air-piping unit blower without timer.






B
Circulation transfer
Influent
BOD
200mg/L
T-N
45mg/L
SS
160mg/L
Aerobic filter tank
Sedimentation separation tank
Anaerobic filter tank
Moving bed tank
Moving carrier filter tank
Treated water tank
Disinfection tank
Effluent
BOD
≦20mg/L
T-N
≦20mg/L
SS
≦15mg/L
Aerobic circulation

Specifications (inf. BOD 200 mg/L)

Model		KZ-5	KZ-7	KZ-10
Flow rate (m^3/day)		1.0	1.4	2.0
Dimensions (mm)	Length A	1,580	2,120	2,790
	Width B	980	980	1,200
	Height C	1,525	1,525	1,550
	Influent pipe E	270	270	300
	Effluent pipe F	320	320	350
Manhole number	Φ450	1	3	2
	Φ600	1	-	1
Inf.eff.pipe dia. (mm)		Φ100		
Air pipe dia. (mm)		Φ13		
Capacity (m^3)	Aerobic filter tank	0.105	0.146	0.208
	Sedimentation separation tank	0.432	0.605	0.650
	Anaerobic filter tank	0.520	0.738	1.053
	Moving bed tank	0.205	0.285	0.432
	Moving carrier filter tank	0.067	0.094	0.130
	Treated water tank	0.054	0.072	0.525
	Disinfection tank	0.015	0.015	0.021
	Total capacity	1.406	1.955	3.219
Blower air flow rate (L/min)		60	80	120

Kubota sewage treatment system is not just a septic tank but a wastewater treatment system. The tank features various functions such as anaerobic, aerobic, sedimentation and disinfection. The treatment of wastewater is as same quality as a centralized sewage system. **BOD removal ratio > 90%, effluent BOD < 20mg/l**. However unlike a centralized sewage system, Johkasou can save customers up to 80% of costs and construction time required. Kubota FRP Johkasou can be customizable to cater for any undividual requirements and installed in a short time frame. Higher quality than regular RC type tanks.

Johkasou uses standardized high quality FRP materials in construction. Kubota FRP Johkasou is low cost and easy to maintain. This advanced technology not only increases the treatment efficiencies (better performance) but also makes it easy to maintain. The system can be operated

by automatic control panel, it is not necessary to arrange a resident operator. **The system can treat any type of wastewater including kitchen, toilet, and laundry and bathrom sewage**.

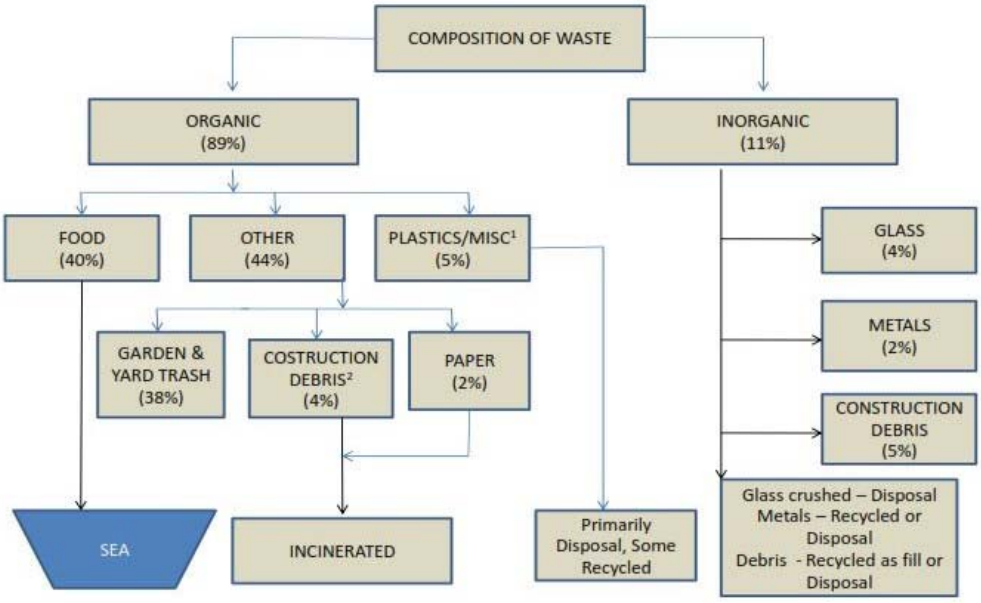
TRASH WASTE

According to the Wa Ale eco-resort management plan, the trash waste will be transported to the mainland on a weekly basis via the cargo boats. On the island, there will be a recycle plastic grinder which will take all plastic waste and reduce them into pellets. These pellets will be used in construction or will be transported back to the mainland.

The Wa Ale management tend to buy as much as produce and food from local sources in order to reduce packaging and thus trash consumption. Moreover, to reduce the plastic waste there will not allow the plastic water bottles on the island and will not use at the hotel.

6.4.2 WASTE MINIMIZATION

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.



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. 4 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 wrapping or bags, composite wrappers	Hotel's different departments
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

Table 6 .5 Waste minimization practices

OFFICES	HOUSE KEEPING	FOOD AND BEVERAGE	ECO PURCHASING GUIDELINES FOR ENERGY EFFICIENT EQUIPMENT
Use a centrally-placed or electronic bulletin board for messages instead of making multiple copies memos. Shred office paper and use it to package Reuse envelopes and folders for routing in house, mail and correspondence. Make double sided copies when possible. Use electronic mail for correspondence when possible. Non-toxic inks, unbleached and chlorine-free papers, nontoxic, biodegradable correction fluid shipments.	Select vendors who take back reusable containers, pallets and other waste packaging. Request that manufacturers package products in returnable and/or reusable boxes and crates. Use refillable bath soap, shampoo, hair rinse and hand lotion dispensers for guest rooms to eliminate soap pieces and plastic bottles. Refinish and reupholster damaged and dated Furniture. Use clothes hangers left by guests for employee uniforms or return to the dry cleaners and recycle plastic garment bags.	Use only reusable dishes and flatware in restaurants and employee cafeteria. Use filters in deep fryers to extend the life of cooking oil. Request fruits, vegetables and meats to be packaged in reusable crates, or recyclable boxes. Use glass or plastic coasters to reduce cocktail napkin waste. Use dry, concentrated dishwasher chemicals in dispensers to reduce chemical spills and waste.	Purchase A/C equipment sized for the area of use. Install heat recovery units on large A/C systems to preheat water Install lighting controls (timers or occupancy sensors) to turn off lights in unoccupied areas such as storage-rooms, employee rest rooms, walk-in coolers, etc. Use photovoltaic lighting systems for lighting advertising signs, walkways, plants, trees, decorative water fountains and remote outdoor areas. Use dishwashing machines that use final rinse water for the prewash of the next load of dishes. Use copy and fax machines which have power down/stand-by features that operate when machines are idle.

6.5: EMERGENCY RESPONSE PLAN

6.5.1 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.

6.5.2 NATURAL HAZARD RESPONSE PLAN

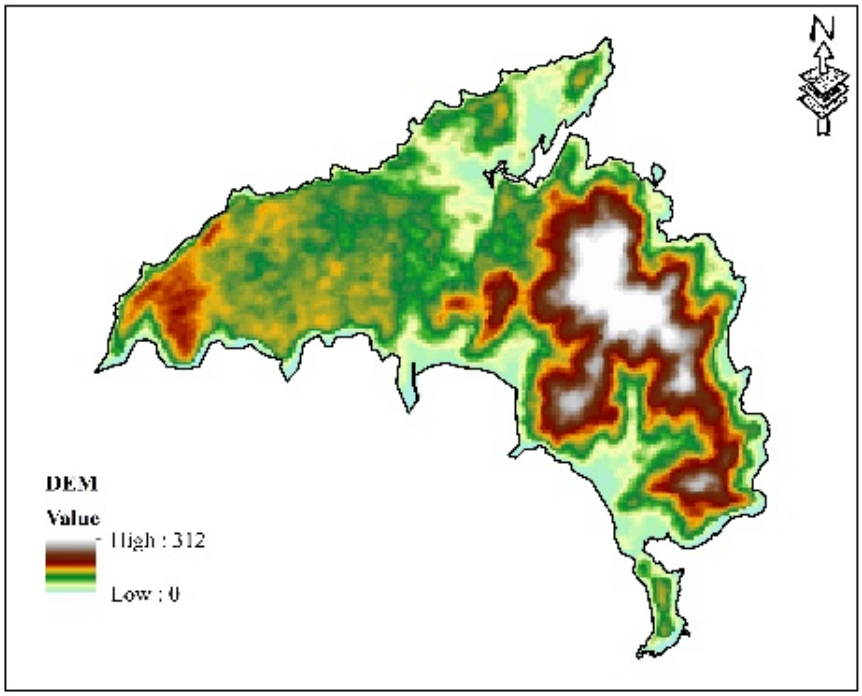


Figure 6. 1: Wa Ale island Topography, High- sea level above

- 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.

6.6: OIL SPILL RESPONSE PLAN

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

6.6.1 OIL SPILL RESPONSE CRITERIA

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

6.6.2 STEPS FOR OIL SPILL RESPONSE

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

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

6.7: OCCUPATIONAL HEALTH AND SAFETY PLAN

This document is intended to assist emergency response plan for construction and operation phases of Wa Ale Eco-Resort Management. An emergency situation is defined as unforeseen event that has a potential to cause environmental damage such as earthquake, landslide, soil

erosion, water pollution, oil spillage or accidents such as disrupt or shutdown of operations and physical equipment damage or environment.

In order to effectively manage, such incidents the following process should be considered.

- Planning and preparing of an emergency
- Organizing a response to the emergency
- Recovery from an emergency

The following steps will be necessary for developing an emergency plan:

- Establish a management team. There should be a competent leader for developing a response plan.
- Identify hazards, probability and assess potential impacts for BAM activities
- List an inventory of emergencies occurred:
- Existing facilities
- Area adjacent to the facility
- The community close by

Develop training programs and assign the team leader to be responsible for managing the emergency training program. The training plan should include the following:

Training may include use of fire extinguishers, evacuation drills, disaster exercises, first aid and CPR.

Training matrix should be prepared to meet the following requirements:

- Who will do the training
- Who is to be trained
- What training is required for all employees
- What training is required for specialist employees
- What training is required for contractors and their employees
- What orientation is required for visitors
- Training for the nearby communities
- How to evaluate training and re-training interval
- The method of storing and location of training records

Effective communications are essential for reporting emergencies to first response teams, employees, neighborhood and the community. An Emergency Response Organization Chart should be prepared for effective communication especially during the crisis.

In order to alert the people about the crisis an alarm system or other forms of communications should be used to reliably alert residents, visitors and workers to an emergency. There should be a dedicated muster point and all employees should know that they should assembly at the muster point when the alarm is sounded.

For the fire protection plan Benchmade Asia Myanmar Ltd was already planned for both beach such as fire protection plan for Turtle Beach and fire protection plan for Honeymoon Beach.

6.8: INITIATIVES UNDER CSR (CORPORATE SOCIAL RESPONSIBILITY) PROGRAMME

In addition to activities which mitigate the negative impacts of the project described above (such as future employment opportunities for local people, Benchmark Asia Myanmar Limited (BAM) is planning more activities and initiative as part of its CSR programme.

BAM has already funded several environmental and CSR projects which benefited the economy of the place through development of eco-tourism and other initiatives. BAM will continue to contribute financial and knowledge resources towards environmental protection and economic development through the Lampi Foundation which will be funded by the donation of 20% of the eco-resort's profits and 2% of all room revenue (check www.lampifoundation.com for more information on BAM's CSR activities in the Lampi Marine National Park). The EIA assessment has shown that waste disposal issues, poor access to education and poor health facilities are the aspects of life which needs most attention in the communities. In planning specific activities, it is crucial to consult communities as well as NGOs which has worked with communities and know the history and development issues in the area. Below is the outline of a few ongoing and planned CSR activities of Wa Ale Eco-resort/BAM such as turtle conservation, coral restoration and livelihood support activities.

6.8.1 TURTLE CONSERVATION

The Lampi Foundation has financed a turtle conservation program, saving over 1500 sea turtles previously threatened by human raiding. It has been a successful initiative through both the simple hatcher, policing of the beaches by residents of nearby villages and educational meetings to all neighboring fishing villages. This was led by the Wildlife Conservation Society (WCS), MOECAF and the Lampi Foundation. Lampi Foundation will continue to engage experts and work closely with MOECAF in ensuring the continued nesting of all sea turtle nesting sites.

6.8.2 CORAL RESTORATION

Due to dynamite fishing in the Myeik archipelago during the past ten years, much of the beautiful corals have been destroyed. The Lampi Foundation will support the Ministry of Resources and Environmental Conservation (MONREC) in their efforts to put an end to this type of fishing. We will also assist them in their efforts to restore the lost coral by means of an underwater replanting program.

This project has already granted money to the Wildlife Conservation Society (WCS) to assist in coral restoration. WCS will lend their expertise, together with that of MONREC to benefit the sustainable health of this important ecosystem, one which is relied on by not only the animals who live there but also the economic activities such as tourism and fishing that depend on a healthy reef and ocean environment to continue to thrive. Initial work on these ongoing challenges has suggested that the coral ecosystem has been badly damaged but can still be salvaged without excessive efforts if additional resources are provided to help ongoing efforts. To thrive again, the coral reef needs the dynamite fishing and trawling fishing to stop.

6.8.3 LIVELIHOOD SUPPORT

The Wa Ale eco-resort intends to grow more food that it can use, cleanup far more ocean debris than it can recycle, produce more energy than it can use, and protect and encourage the existing marine and land-animal life. Wa Ale is committed to working with local communities on their terms, so the specifics of cultural impacts can only truly be measured after further engagement with the local community. By way of providing, for example, solar cookers to communities after consulting them on their needs.

6.8.4 COOKING

In many rural communities that are not connected to an electricity grid, cooking is a time-consuming process with detrimental health effects from use of kerosene and exposure to coal. BAM, through the Lampi Foundation, would like to introduce solar cookers to the population on a trial basis, as they have been well-received in other undeveloped areas as ways to save money on fuel, save time, and improve health. For instance, for users of indoor kerosene stoves, health often improves quickly and noticeably in the form of the disappearance of a chronic cough. A second impact seen in other communities has been a marked increase in time available for women to use as they please because of the time saved through more efficient cooking methods. In many cases, this has led to women developing new alternative income streams for themselves and their families. After a careful introduction to selected villagers who express interest, BAM will assess their feedback. If they are satisfied and believe the solar cooker is a beneficial tool for their fellow villagers, then Wa Ale eco-resort will put a plan in action to provide these devices throughout the village.

6.8.5 PUBLIC HEALTH

Through the partner, Global Medical Volunteers, the Lampi Foundation has already helped the village clinic in Ma Kyone Galet with medicine. Wa Ale Resort will continue to supply the medical clinic for the residents of Ma Kyone Galet and/or Salet Galet villages. The Lampi Foundation also has plans to equip the clinic with standard general practice equipment as well as specialist eye equipment and basic surgical equipment. The clinic's focus will be on water-borne disease, eye disease, and trauma due to accidents.

6.8.6 SALONE (MOKEN) PEOPLE

During stakeholder meeting in Kawthaung (24.12.2016), project proponent also shared that BAM is making plan for physical and financial support for social projects such as schools and clinics for Salone people. The financial support may come from charging additional fees for visiting their communities for cultural experiences of the resort guests (reinvestment of eco-resort profits into social projects) and to be discussed with the communities and NGOs working with the communities in Ma Kyone Galet where most of Salone people live. The community representative from Ma Kyone Galet also suggested the proponent to provide non-cash assistance to teaching facilities to support more children going to school rather than following their parents to help in the sea.

Other livelihood support activities may include support for development of ancillary income-generating activities, such as selling consumable goods and artisan crafts to the eco-resort, and increased access to grants, donations and other types of financial assistance.

6.8.7 COOPERATE SOCILA RESPONSIBILITIES GENERAL RECOMMENDATIONS

In addition to GRM set up during construction, operation period other CSR recommendations include setting up:

- ✓ Operational grievance mechanism (for communities)
- ✓ Workforce grievance mechanism (for employees)
- ✓ Whistle blowing policy for staff which is consistent with UN Guiding Principles on Human rights and business
- ✓ Introduce the following policies which include the company policy objectives, applicability, commitments, responsibilities and review, monitoring and reporting and approved by the company's director and reviewed annually: Anti-Bribery & Corruption Policy, Corporate Social Responsibility Policy, Human Rights Statement and Policy, Health, Safety, & Environmental Policy, Environmental Policy, Community Investment Policy, Land Acquisition Policy.
- ✓ Disclose Environmental Impact Assessment (EIA) report on the company's website. This is now a requirement according to EIA Procedures: "Not later than fifteen (15) days after submission of the EIA Report to the Department, the Project Proponent shall disclose the EIA Report to civil society, PAPs, local communities and other concerned stakeholders: (i) by means of national media (i.e. newspapers); (ii) the website(s) of the Project or Project Proponent; (iii) at public meeting places (e.g. libraries, community halls); and (iv) at the offices of the Project Proponent." (article 65 EIA Procedures, Notification No. 616 / 2015, December 29, 2015)

During the life of the project Wa Ale eco-resort developer, BAM, commits to frequent and consistent engagement with local residents to seek feedback on how to better serve local needs and build on the social and environmental harmony in the local community. BAM has also dedicated ourselves to assisting local authorities and governmental officials in implementing useful social and environmental measures within the project, transferring technology and expertise to the local workforce.

In all CSR activities, it is important to engage communities to avoid potential conflicts or confrontation within communities, conflicts between visitors and local people through educating visitors about local customs and norms, training guides how to lead tours and exercise cultural sensitivity and manage cultural exchanges. Otherwise, poor employment and management practices can damage relations between the business and communities.

CHAPTER 7: PUBLIC CONSULTATION AND DISCLOSURE

According to the EIA procedure (Article 60 and 61) public consultation meeting has to be performed during the preparation of the scoping report and information about Benchmade Asia Myanmar Ltd have to be made available to stakeholders, so as to understand the project. Likewise, public disclosure has to be made during the final stage of the EIA report and to be included in the final EIA report.

PURPOSE OF PUBLIC CONSULTATION IN EIA PREPARATION

The purpose of the Public Consulting meeting is to organize, responsible persons and procedures to be applied for public engagement that is mandatory according to Myanmar Environmental Impact Assessment Procedure (2015).

During the development of EIA reports, the Project Proponent shall undertake the following consultation process:

- Timely disclosure of all relevant information about the proposed project and its likely adverse impacts
- Arrange consultation meetings at National, Regional, State, Township and Local levels depending on the category of the project,
- Consultations with the concerned government organizations

Stakeholders shall include the following:

- Institutions (Regional or Local Government Authorities, etc.)
- Organizations (INGOs, NGOs, CBOs, CSOs etc.)
- Individuals (Groups with special interests, academic, community, business community, media etc.)
- Project Affected Persons (PAPs) and Interested persons (politicians and religious leaders, etc.)

FIRST PUBLIC CONSULTATION MEETING

The first public consultation for Wa Ale Eco Resort project was held at Garden Hotel, Kauthaug Township and Sitta Galet Village, Tanintharyi Division. Invitation letters together with the notice of the meeting was sent to respective stakeholders one week in advance to the meetings. The public announcement for the public consultation was advertised in Myanma Alinn and Kyaymone Newspaper at 22/Dec/2016. In this public consultation meeting, explained about the outline of project activities, EIA Procedure, Potential impacts of the proposed project and answered to questions and having the comments from the stakeholders. Overview of first public consultation for Wa Ale Eco Resort projet as follow:

Overview of first public consultation for Wa Ale Eco Resort projet			
Project	Wa Ale Eco Resort Project		
Venue	Garden Hotel	**Region**	Thanintharyi

District	Kauthaung	**Township**	Kauthaung
Date	24/12/2016		
Time	From (8:30) AM to (12:00) AM		
Attendance List	Government-19 Persons **Public**-12 Persons **Non-Government Organization**- 24 Persons **Media**- 3 Persons **Private**- 8 Persons **Total**- 66 Persons		
Agenda	(i) Opening Cremony (ii) Greeting Speech by U Win Htun, Assistant Director from the Forest Department. (iii) Explanation about the process of Environmental Conservation Department by Daw Mai Asthar, Director from the Environmental Conservation Department. (iv) Explanation about the detailed information of the project by U Aung Zin Latt, General Manager from the Benchmade Asia Myanmar Ltd. (v) Presentation about the EIA Procedures by Daw Moh Moh Khaing, Consultant from the E Guard Environmental Services. (vi) Questions and Answers. (vii) Closing Ceremony.		

Main questions, comments and response of first public consultation

Q; U Tin Ko Ko Oo (OFI)- As for the Lampi Marine National Park which recognize as the Asean Heritage, what kind of impact will affect by the proposed project?

A; Daw Mai Astha (Director, Environmental Conservation Departmnt)- As we can compare with internationally which allow public exhibition and observation in national heritage for example Philippine. This purpose allows us to recognization the Myanmar heritage by internationally and not only to get foreign income and but also to conserve the natural environment of the island.

A; Daw Moh Moh Khaing (E Guard)- As you have seen, the potential impacts of proposed project were described in the presentation and we can more detaily described after the survey.

Q; U Tin Ko Ko Oo (OFI)- In the establishment of the project include both conserve the nature and support the local communities, I am afraid that the both intentions will not be able to fulfill.

A; Daw Mai Astha (Director, Environmental Conservation Department)- There are the natural environment in every region. Now E Guard will do the EIA and according to their report, we can analyze and recommentd the needs and follow up.

Q; U Kyaw Htin (Retired Person)- Why need to implement the resort project on the island which have many natural resources?

A; U Win Htun (Assistant Director)- This Eco resort project will give not only the economic advantages but also can conserve the biodiversity, plant and animals from the island. The project proponet will perform environmental friendly with the project and environment.

Q; U Htay Naing (Administrator, Shu Nge Bar Line Village Tract)- The local people do not know these projects. We did not know which government that are contracted with the project proponent. The half area of Ma Gyone Galet Village is in the ocean. There are so many business men in the village. The gardener is very worried about their land.

A; U Win Htun (Assistant Director, Forest Department)- There are 23 gardens on the islands. The Minister check them and perfrom and implement with laws. The implementation year of the department is 30 years and we will prepare systematically the rented lands.

A; Daw Moh Moh Khaing (E Guard)- That is the main reason to held the public conultaion at this place and time. Now we are disclosing the information of the proposed project and pontential impacts at Kauthaung and after that we will go to the Sitta Galet for next public consultation.

Q; U Htay Naing (Administrator, Shu Nge Bar Line Village Tract)- We are not very satisfied why do you choose Wa Ale Island to implement the Eco resort project.

A; U Win Naing (Staff Officer, Lampi Marine National Park)- We want to allow the public to observe the island and the other purpose is to conserve the island.

Q; U Zin Myo Aung (Kawthaung, Young Boys Network)- Do you do the information of the project in line with the procedure of the standard and procedures?

A; Daw Moh Moh Khaing (Consultant, E guard Environmental Services)- We will prepare the report in line with the description of the Myanmar Environmental Impact Assessmet (2015).

Q; Daw Su Myat New (Associate, Myanmar Centre for Responsible Business)- How do you survey on the island?

A; Daw Nyo Nyo Lwin (Biodiversity Team)- We will survey the plants, animal species, insects and bacteries on the island. We will also study how much species are endganered and how much impacts can affect on the biodiversity? We can get the references from the island for the students.

Q; U Nyunt Win (Administrator, Ma Gyone Galet Village)- How do you mange the waste?

A; U Aung Zin latt (General Manager, Benchmade Asia Myanmar Ltd)- We will burn the inorganic waste. We will use the waste water in agriculture.

Overview of first public consultation for Wa Ale Eco Resort projet			
Project	Wa Ale Eco Resort Project		
Venue	Sitta Galet Village	**Region**	Thanintharyi
District	Kauthaung	**Township**	Bokpyin
Date	25/12/2016		

Time	From (10:00) AM to (11:00) AM
Attendance List	Public-34 Persons Total- 34 Persons
Agenda	(i) Opening the ceremony (ii) Explanation about the project by U Aung Zin Latt (GM, Benchmade Myanmar Limited) (iii) Presentation about EIA Procedures by Daw Moh Moh Khaing (Consultant, E Guard Environmental Services Co., Ltd. (iv) Questions and Answers (v) Closing Ceremony

Main questions, comments and response of first public consultation

Q; U Nyunt Win (Ma Gyone Galat Village)- Sitta Galat Village is unofficial one. Whether the project owner has the plan to remove this village if it disturbed to the implementation of the Wa Ale Hotel Project or not? And I would like to have a promise from the project owner not to remove the village.

A; U Aung Zin Latt (GM, Benchmade Myanmar Limited)- We have the plan to show the culture of the Burmese fishermen who are living in Sitta Galat Village. And he told to the village head and villagers about their plan during the last visit of Turtle Expert to the village. Furthermore, the project owner gained many staff including help from Sitta Galat Village currently. The project owner who rents only 3 percentage of the land has no plan to remove the village. But it will depend on the Nature and Wildlife Conservation Division which occupies the whole land. The project owner has so many benefits for the existing village.

Q; U Sein Myint (Ma Gyone Galat Village)- Whether the project owner has the plan for the Sa Lone ethnicity or not. I want to suggest that the proponent should develop the plans for the original local people and should collect the comments of the leader of these people.

A; U Aung Zin Latt (GM, Bench Made Myanmar Limited)- I have already contacted U Htwe who is making the plans for Salon People for physical and financial support such as schools and clinics for those people. We also have the plan to show the culture of those people by paying fees to them during the operation phase of the resort. The proponent intended to use those fees in projects to develop and maintain the decreasing number of those people.

Q; U Ye Naing Tun (Ma Gyone Galat Village)- How the Saving Foundation will make works relating to the environmental conservation?

A; U Aung Zin Latt (GM, Bench Made Myanmar Limited)- The foundation will make works relating to the environmental conservation in cooperation with experts.

Q; U Sein Myint (Ma Gyone Galat Village)- There are students who need to help their parents for fishing. He suggested the proponent to provide teaching facilities so as to study without any worries of their parents. He said they need only such kind of help not cash like 1000 lakh or 2000 lakh.

A; U Aung Zin Latt (GM, Bench Made Myanmar Limited)- I would like to suggest that let the project owner know the difficulties of the villagers. The proponent will help if he can. The project owner has the plan to provide physical support for the villagers. But he cannot provide technicians.

Q; Villager (Sita Galat Village)- I would like to know the boats of the villagers can approach to the Wa Ale Island?

A; U Aung Zin Latt (GM, Bench Made Myanmar Limited- The boats of the villagers can do it.

Q; U Myo Shein (Ma Gyone Galat Village)- I would like to asked that to improve the followings for the local people while conserving the nature;

1) Livelihoods of the local people

2) Education

3) Ethics

4) Legal Compliance

I would like to request that enforce the laws and regulations for both local people and others. The villagers depend on fishing and hunting for their livelihoods because there is no substitute.

Q; (Sita Galat Village)- There will have no severe impacts for their village although it is the nearest one to the project area. I would like to request to give suggestions and guidelines for conservation of the environment of their village.

A; U Tin Aung Moe (Director, E Guard Environmental Services)- I want to suggest that to separate the garbage and dispose systematically and not to break the glass bottles along the beach of their village.

Q; U Than Lwin (Ma Gyone Galat Village)- The laws prescribed are affecting to the local people not the others committing the same faults. And I wish not to remove the Sitta Galat Village during the operation phase of the resort.

A; U Tin Aung Moe (Director, E Guard Environmental Services)- I want to suggest the villagers to report their situations and impacts to the Luttaw members who has the rights to change the laws and regulations.






SECOND PUBLIC CONSULTATION AND DISCLOSURE MEETING

The second public consultation and disclosure meeting for Wa Ale Eco Resort project was held at Kauthaung Hotel, Kauthaug Township and Sitta Galet Village, Bokpyin Township, Tanintharyi Division. Invitation letters together with the notice of the meeting was sent to respective stakeholders one week in advance to the meetings. The public announcement for the

public consultation was advertised in Myanma Alinn and Kyaymone Newspaper at 12/Oct/2017.

In this public consultation meeting, explained about the recorded Environmental Quality data, observed Biodiversity and Socio-economic data, impacts methodology, analysis, mitigation measures and management plans and answered to questions and having the comments from the stakeholders. Overview of second public consultation and disclosure meeting for Wa Ale Eco Resort projet as follow:

Overview of second public consultation and disclosure meeting for Wa Ale Eco Resort projet			
Project	Wa Ale Eco Resort Project		
Venue	Kauthaung Hotel	**Region**	Thanintharyi
District	Kauthaung	**Township**	Kauthaung
Date	16/10/2017		
Time	From (9:00) AM to (11:00) AM		
Attendance List	**Government Department**- 8 **Media**- 5 **Local People**- 6 **Company**- 20 **Hlutt Taw**- 5 **Total**- 44		
Agenda	(i) Opening Ceremony. (ii) Opening speech and explain project plan by Mr. Christopher Kingsley, CEO, and translated by U Aung Zin Latt, General Manager, Benchmade Asia Myanmar Co., Ltd (iii) Presentation of Environmental and Social Considerations in Project by Daw Moh Moh Khaing, Consultant, E Guard Environmental Services (iv) Recommendations and suggestions by Attendees. (v) Closing Remark by Mr. Christopher Kingsley, CEO and U Aung Zin Latt, General Manager, Benchmade Asia Myanmar Co., Ltd. (i) Closing Ceremony.		
Main questions, comments and response of second public consultation and disclosure meeting			
Q; U Khin Maung Htwe (Ma Kyone Ga Latt village)- How do you consider for the life improvement of Salon people than the exhibition? **A; U Aung Zin Latt (BAM)-** We did not observe salone movement near the project site. There are no Salone people near the project site. If any salone community ask for the support we are willing to help. We did not have lead plan for the this but if you ask us to help, we will make sure to help. For now, we opened dispensary for their health.			

Q; U Khin Maung Htwe (Ma Kyone Ga Latt village)- This question was not only intention to Wa Ale project proponent but also direct to all tourism investor.

Q; U Htay Naing (LuNge Bar Line village tract leader)- We have encountered with extinction of salone people. Now, there are 558 people of Salon in three villages of my area. Government donates to Salon but still need help. I would like to request to business owners to support their livelihood as much as you can.

A; U Aung Zin Latt (BAM, General Manager)- He said that we will supps much as we can and you can request anytime.

Q; Daw Moe Ei (Reporter, Dawei Watch)- I want to know the reviewing process of this EIA report and is there any reviewing team is already formed?

A; Daw Moh Moh Khaing (E Guard)- This is now the public consultation stage, we will listen the public comments and concern according to this report and project, after that we will add these comments to the report and submit it to ECD.

Q; Daw Moe Ei (Reporter, Dawei Watch)- Wa Ale islands is situated within Marine National Park, how do you get permit for the project in this conservation zone?

A; U Aung Zin Latt (BAM, General Manager)- We win the tander that established from Forest Department while compete with 15 other investors at April 5, 2014.

Q; Daw Moe Ei (Reporter, Dawei Watch)- I want to know about turtle conservation and how many species of turtle are there and how to conserve them?

A; U Aung Zin Latt (BAM, General Manager)- Fund for turtle conservation is from Benchmade Asia Myanmar Co., Ltd and technology and advice from turle expert from WCS Organization.

A; Daw Moh Moh Khaing (E Guard)- We have observed two types of turtle nest for now, one was green turtle and other was leatherback turtle. We have mentioned in Biodiversity Management Plan that continuously record and observe the turtle nest and conserve according to the plan and report annually.

Q; Daw Moe Ei (Reporter, Dawei Watch)- I want to know the area of Wa Ale island and how many acres will be used for this project? How is the construction work?

A; U Aung Zin Latt (BAM, General Manager)- Wa Ale island is 3,934 acres wide and the proposed project area is 100.15 acres. Construction phase will tale 42 months. What is your target market? How to differ your customer from nature lover and other tourists? How about the students who want to study the island?

A; U Zay Myo Lin (Project Manager)- The concept of the construction work is conservation, less impact to nature, the materials are used ones not new materials, our construction structure is temporary, easy to install and easy to decommission. We will not use concrete and do not use washing- machine and even if any plant is situated in the construction site, we don't cut the plant, we will avoid the plant. We can conserve nature in these ways.

A; U Aung Zin Latt (BAM, General Manager)- We are targeted to Eco tourism sector, we expect our customer will be nature lover who do not need to mention that how to conserve the nature and already know Dos and Don'ts and we already mentioned at our website that what we can offer and Dos and Don'ts. And also, the part of the CSR we will cooperate with the Universities and support the research works.

A; Daw Moh Moh Khaing (E Guard)- There are two types of tourism, one is soft tourim and one is hard tourism, the proposed project is hard tourism which is not for recreational ones that

have restriction that not suitable for who prefer recreations. Therefore, we expect that the tourists who wants to visit the resort might be love the nature and want to live in nature way. We also mentioned in Biodiversity management plan and Waste Management Plan that to give the proper orientation to the guests.

Q; U Thiha (Golden Key Voluntary Services)- There are many business companies and eco-resorts permitted in many islands of Thanintharyi area. How can you solve and manage the waste problem in the island? This is not only the responsibility of proponent or company but also the responsibility of the government.

A; U Aung Zin Latt (General Manager)- We will collect the organic waste which degraded to small size with bio-plastic bags, after collecting the waste, we transported to Kautthaung Towhship Development Committee Dumping site.

Daw Moh Moh Khaing (E Guard)- For the island resort project, of course the waste generate from the operation which is manageable with the systemetic waste management plan but the main challenge is the waste accumulation from marine litter because marine litters are hard to control and it comes from everywhere. For this we can only advised to collect the trash once a year.

Overview of second public consultation and disclosure meeting for Wa Ale Eco Resort projet			
Project	Wa Ale Eco Resort Project		
Venue	Sitta Galet Village	**Region**	Thanintharyi
District	Kauthaung	**Township**	Bokpyin
Date	17/10/2017		
Time	From (9:00) AM to (11:00) AM		
Attendance List	**Government Department-** 1 **Media-** 1 **Local People-** 48 **Company-** 5 **Total-** 55		
Agenda	(i) Opening Ceremony. (ii) Opening speech and explain project plan by U Aung Zin Latt, General Manager, Benchmade Asia Myanmar Co., Ltd (iii) Presentation of Environmental and Social Considerations in Project by Daw Moh Moh Khaing, Consultant, E Guard Environmental Services (iv) Recommendations and suggestions by Attendees. (v) Closing Remark by U Aung Zin Latt, General Manager, Benchmade Asia Myanmar Co., Ltd. (vi) Closing Ceremony.		
Main questions, comments and response of second public consultation and disclosure meeting			
Q; Sitta Galet Villager- Wa Ale Eco Resort have already support us both education and health sector. I want to get a suggestion from the profession that how to make clean and healthy environment for village?			

A; U Tin Aung Moe (Director, E Guard Environmental Services)- I want to suggest that to separate the garbage and dispose systematically and not to break the glass bottles along the beach of their village, cover up the sewage pit, make the good drainage system around the house. To make a clean and healthy villager, it is not for a person job, it's need a whole village corporation.

CHAPTER 8: CONCLUSION

The potential significant negative impacts of the Wa Ale Eco-tourism project, during the construction phase are as follow;

- Change access rights and usage
- Site Clearance
- Noise
- Material storage
- Sewage disposal
- Solid waste production
- Light pollution

The potential significant positive impacts of Wa Ale Eco-tourism project, during the construction phase are as follow;

- Employment

During the operation phase, significant negative impacts of Wa Ale Eco-tourism project are as follow;

- Resource consumption
- Change access rights and usage
- Sewage disposal
- Generate Solid waste and disposal
- Light pollution
- Misuse of marine resources
- Diesel and oil spills

During the operation phase, positive impacts of Wa Ale Eco-tourism project are as follow;

- 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

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.

During the construction period, most of the negative impacts can be reduce by following the above-mentioned mitigation measures, for example, the negative impact of light pollution can

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

During the operation period, the negative impacts can be reduced by following the previous mentioned mitigation measures. The impacts are concerned with resource consumption, change access rights and usage, sewage disposal, generate Solid waste and disposal, light pollution, misuse of marine resources, diesel and oil spills.

The positive impacts during operational period are employment opportunity for 210 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 and increase in the provision of public services with the introduction of municipal and medical services are the positive impacts due to the Wa Ale Eco-tourism project.

10.1 CUMULATIVE IMPACT ASSESSMENT

Development activities such as Wa Ale Eco Tourism project 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 Wa Ale Eco Tourism 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.

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. 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.

CHAPTER 9: RECOMMENDATION

Wa Ale Eco-tourism project is located in the Myanmar Marine National Park which has rich biodiversity and resourceful nature. Although the project nature itself is environmental friendly and all throughout the processes are less harmful to the nature, some actions and processes need to strictly follow the mitigation measures and plans.

Solid waste production and disposal is one of the difficult challenge to control in hotel and resort project type, especially on island ones. For this action, the project proponent has to implement proper waste management system and need to give proper awareness to the workers and employee to dispose the waste at the garbage can and dispose the collected waste at the designated waste disposal area. The proponent need to implement and follow up the waste management plan, environmental management plan and biodiversity management plan.

Although hospitality industry consumes a lot of energy and resources Wa Ale Eco-tourism project intend to persuade their environmental friendly goals. Although fully depends on the solar energy for the energy need is a certain goal for Wa Ale resort but while solar energy could not able to support the energy needs, BAM will continuously look for the alternative ways which are more clean, green and efficient. While the solar energy source fall short for the requirements, there will be installment of propone generators which is cleaner alternative to petrol or diesel generators.

For the freshwater source, there are several areas where will be water efficient and responsible on Wa Ale island. According to the resources conservation plan there will no drilling of deep water wells, rain water capture near villas. The water usage from island resources will be very limited due to the policies.

According to the data from field survey, there are 9 species recorded in IUCN red-list status. Project proponent have to follow biodiversity management plan to avoid harmful impact on them. Wa Ale island is recognized as rich biodiversity and its resourceful nature, but it is still need to study and explore more about its biodiversity status and habitat, especially in marine biodiversity. The project proponent should collaborate with universities, invite professionals to study the Wa Ale island and publish scientific journal or report about the island's biodiversity and habitats.

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 disclosed such reports to Project Affected Persons (PAPs) upon request.

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

Wa Ale management body have to fully implement Corporate Social Responsibility (CSR) Plan as an ethical obligation, so as to be regarded as 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.

Benchmade Asia Myanmar Ltd should have implement the systematic procedure to transfer the Wa Ale resort to government after the contract end.

Wa Ale Eco-tourism management body have to abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar.

This EIA report has identified environmental and social issues, which need to be investigated. in order to keep the impacts in an acceptable manner. Mitigation measures should be carried out in line with applicable guidelines, regulations and Good International Industry Practice (GIIP).

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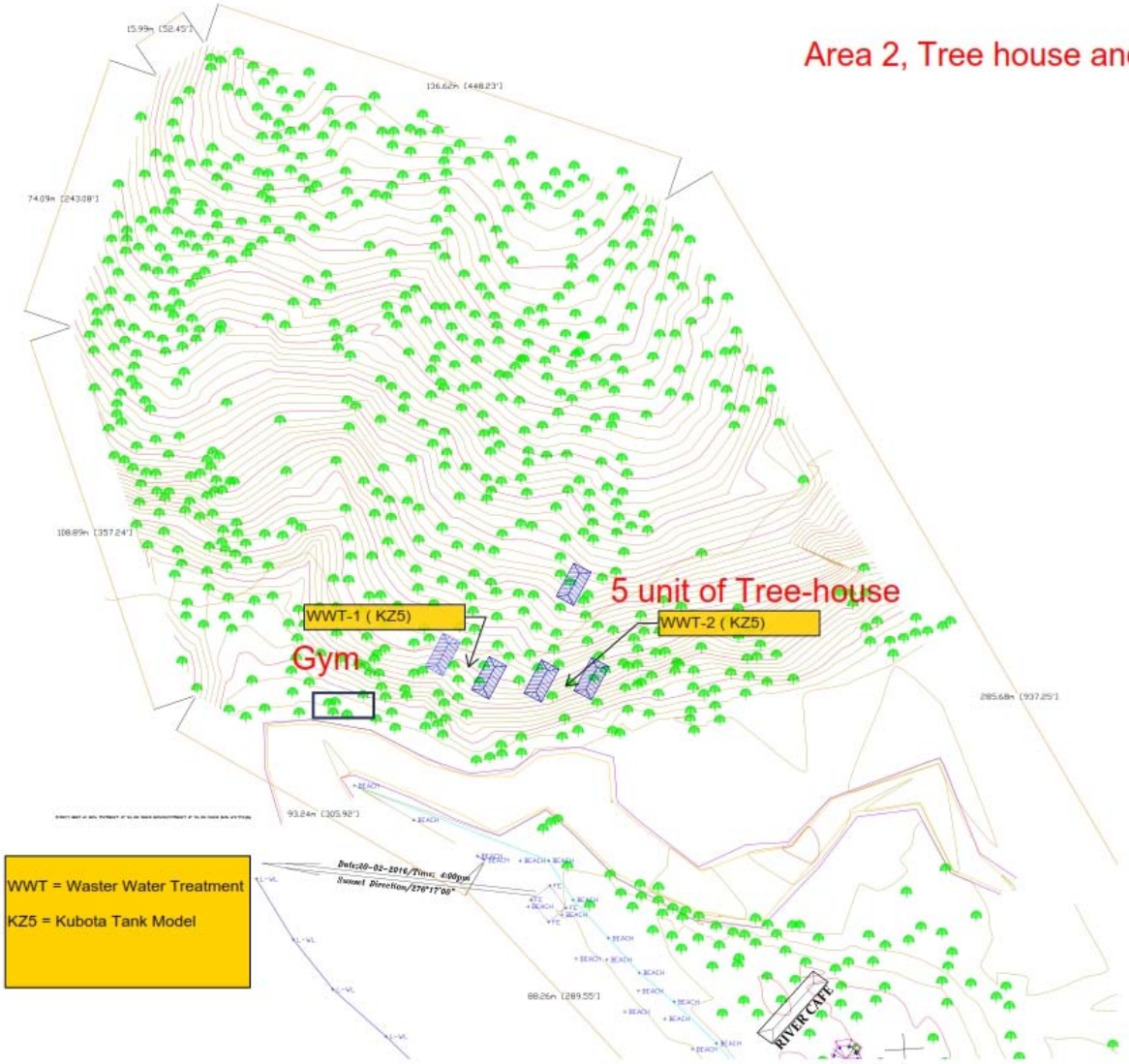
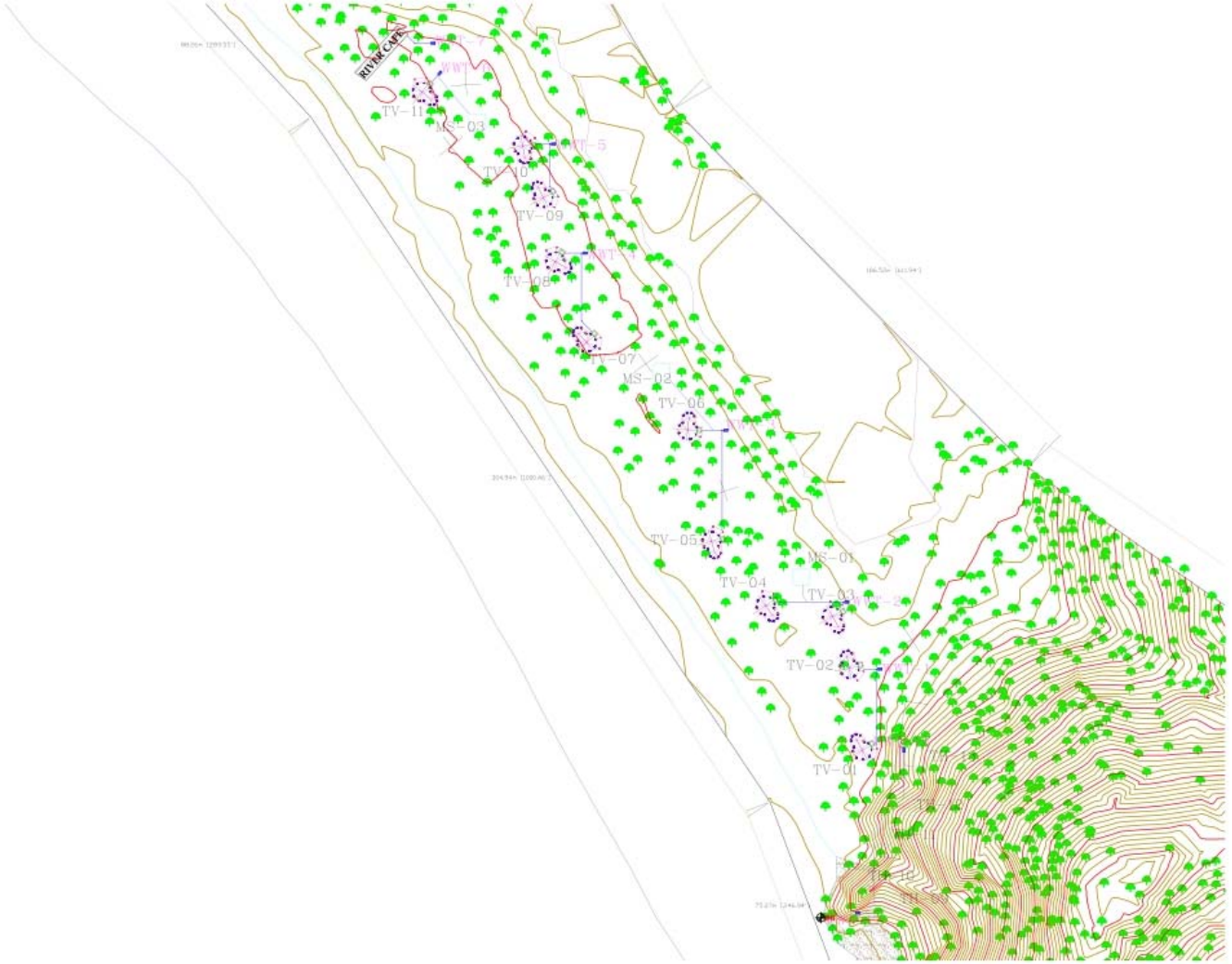
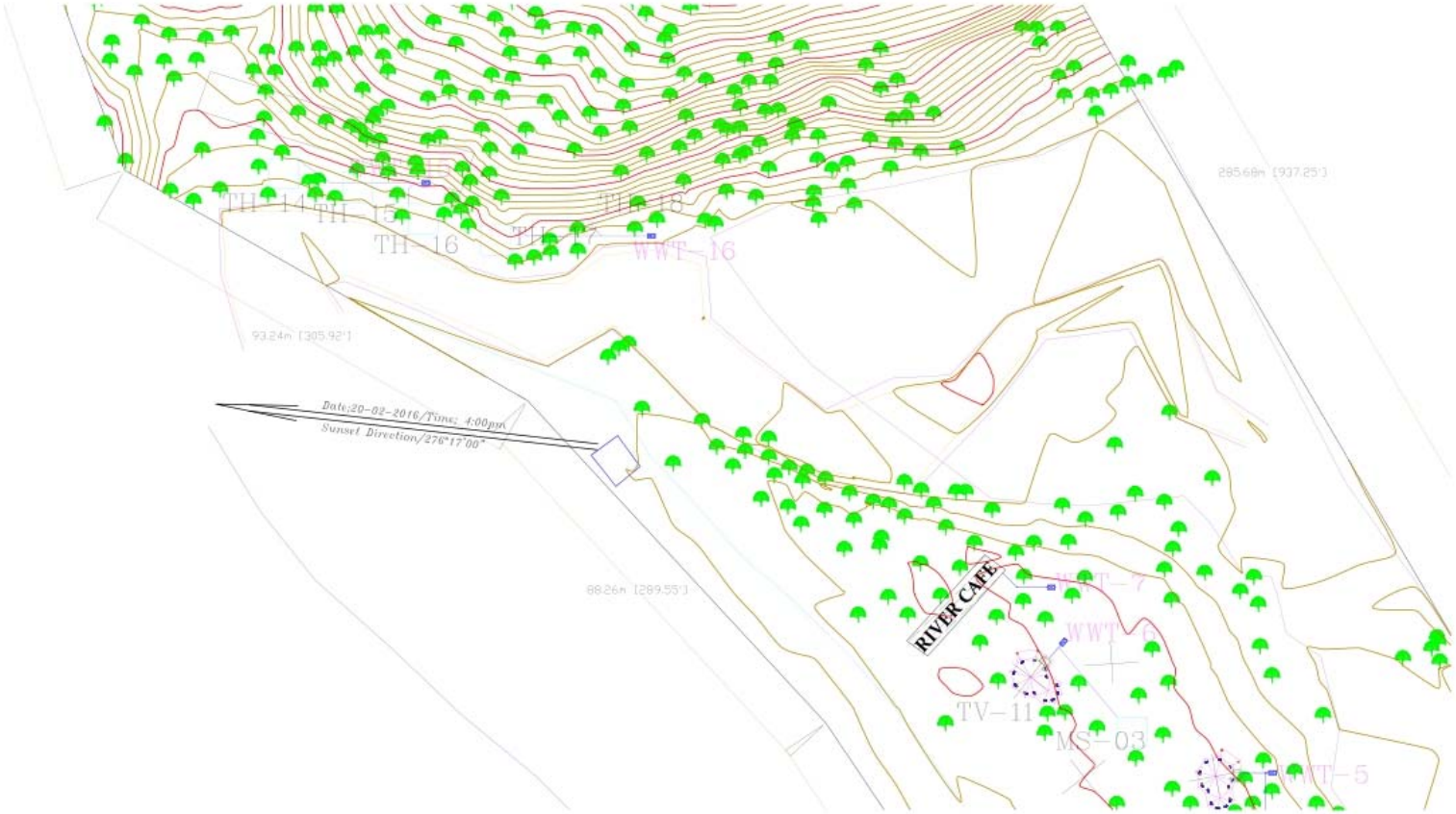
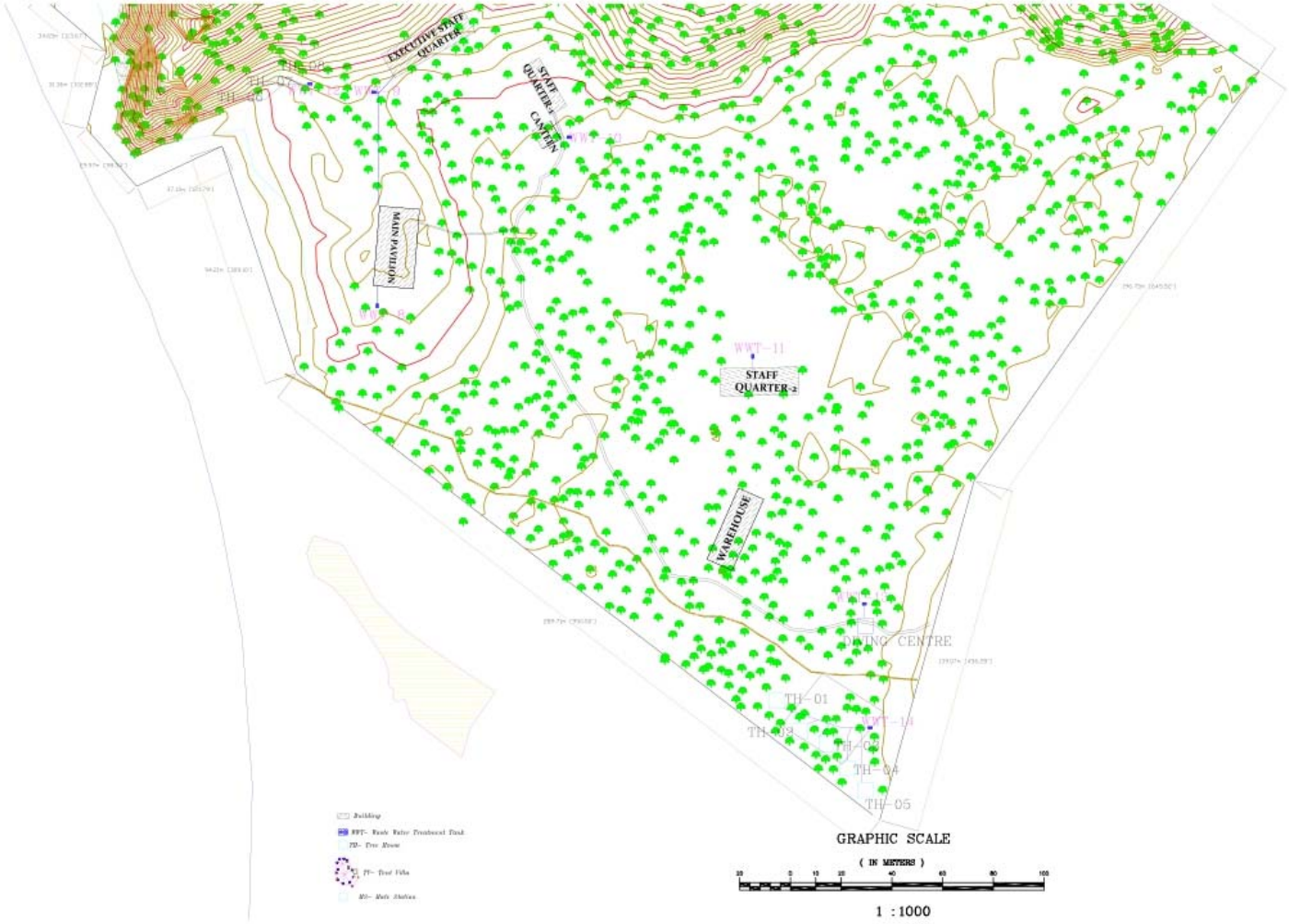
APPENDICES

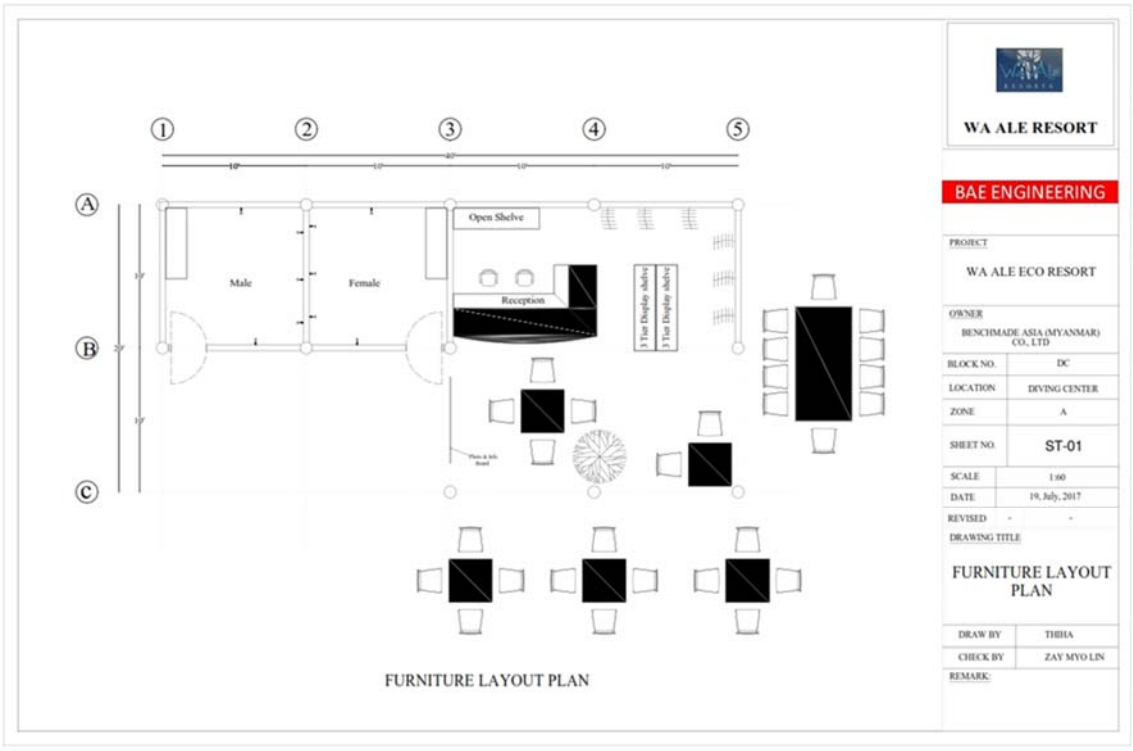
APPENDIX I: LAYOUT PLANS OF WA ALE ECO-TOURISM RESORT

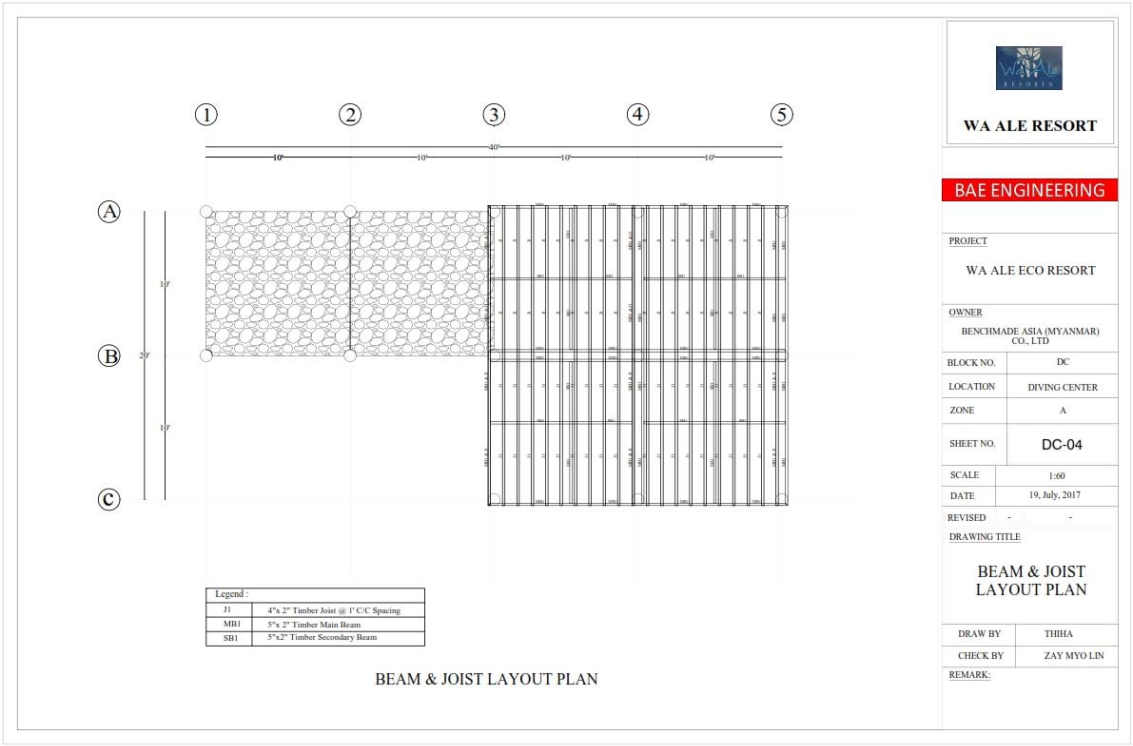

Area 2, Tree house and Gym
5 unit of Tree-house
WWT-1 (KZ5)
WWT-2 (KZ5)
Gym
WWT = Waster Water Treatment
KZ5 = Kubota Tank Model
RIVER CAFE


RIVER CAFE
TV-11
MS-03
TV-10
TV-09
TV-08
TV-07
MS-02
TV-06
TV-05
MS-01
TV-04
TV-03
TV-02
TV-01
TV-12


TH-16
WWT-16
285.68m (937.25')
93.24m (305.92')
Date:20-02-2016/Time: 4:00pm
Sunset Direction/276°17'00"
88.26m (289.55')
RIVER CAFE
WWT-7
WWT-6
TV-11
MS-03
WWT-5


EXECUTIVE STAFF QUARTER
STAFF QUARTER-1
CANTEEN
WORKSHOP
STAFF QUARTER-2
WAREHOUSE
DINING CENTRE
TH-01
TH-02
TH-03
TH-04
TH-05
WWT-11
WWT-12
GRAPHIC SCALE
(IN METERS)
1 : 1000


1
2
3
4
5
A
B
C
Male
Female
Open Shelve
Reception
3 Tier Display shelve
3 Tier Display shelve
FURNITURE LAYOUT PLAN
WA ALE RESORT
BAE ENGINEERING
PROJECT
WA ALE ECO RESORT
OWNER
BENCHMADE ASIA (MYANMAR) CO., LTD
BLOCK NO. DC
LOCATION DIVING CENTER
ZONE A
SHEET NO. ST-01
SCALE 1:60
DATE 19, July, 2017
REVISED - -
DRAWING TITLE
FURNITURE LAYOUT PLAN
DRAW BY THIHA
CHECK BY ZAY MYO LIN
REMARK:


1
2
3
4
5
A
B
C
Legend :
J1 4"x 2" Timber Joist @ 1' C/C Spacing
MB1 5"x 2" Timber Main Beam
SB1 5"x2" Timber Secondary Beam
BEAM & JOIST LAYOUT PLAN
WA ALE RESORT
BAE ENGINEERING
PROJECT
WA ALE ECO RESORT
OWNER
BENCHMADE ASIA (MYANMAR) CO., LTD
BLOCK NO. DC
LOCATION DIVING CENTER
ZONE A
SHEET NO. DC-04
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DATE 19, July, 2017
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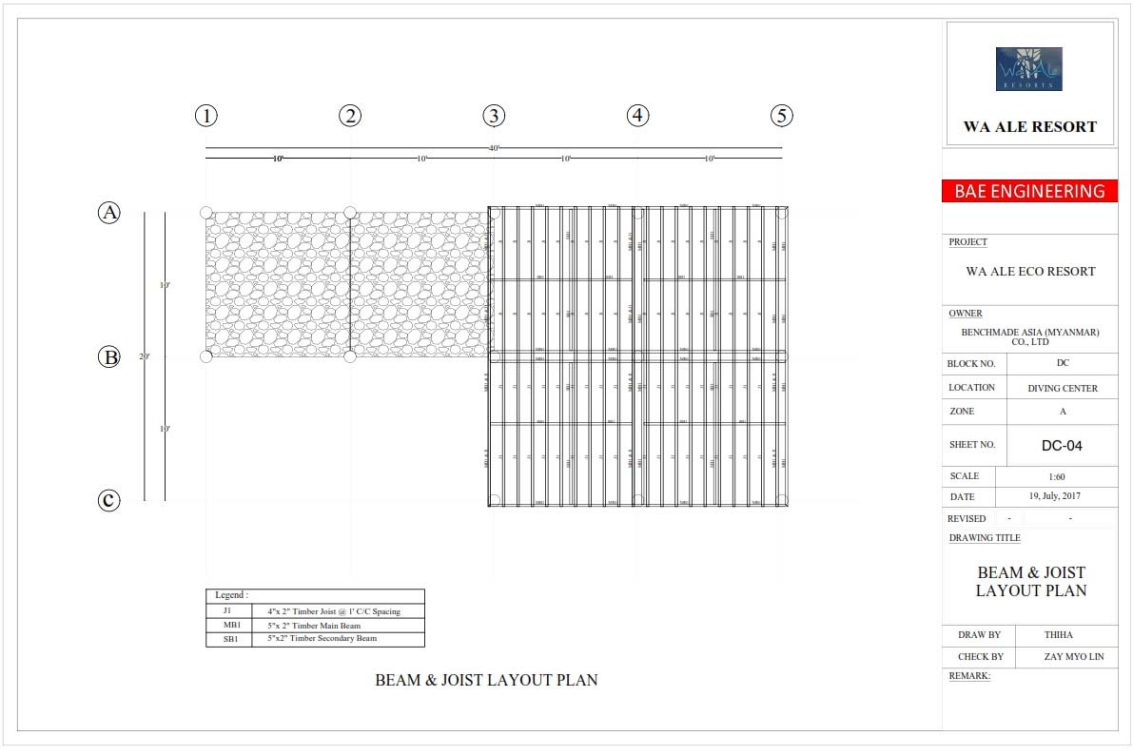
REMARK:


1
2
3
4
5
A
B
C
Legend :
J1 4"x 2" Timber Joist @ 1' C/C Spacing
MB1 5"x 2" Timber Main Beam
SB1 5"x2" Timber Secondary Beam
BEAM & JOIST LAYOUT PLAN
WA ALE RESORT
BAE ENGINEERING
PROJECT
WA ALE ECO RESORT
OWNER
BENCHMADE ASIA (MYANMAR) CO., LTD
BLOCK NO. DC
LOCATION DIVING CENTER
ZONE A
SHEET NO. DC-04
SCALE 1:60
DATE 19, July, 2017
REVISED - -
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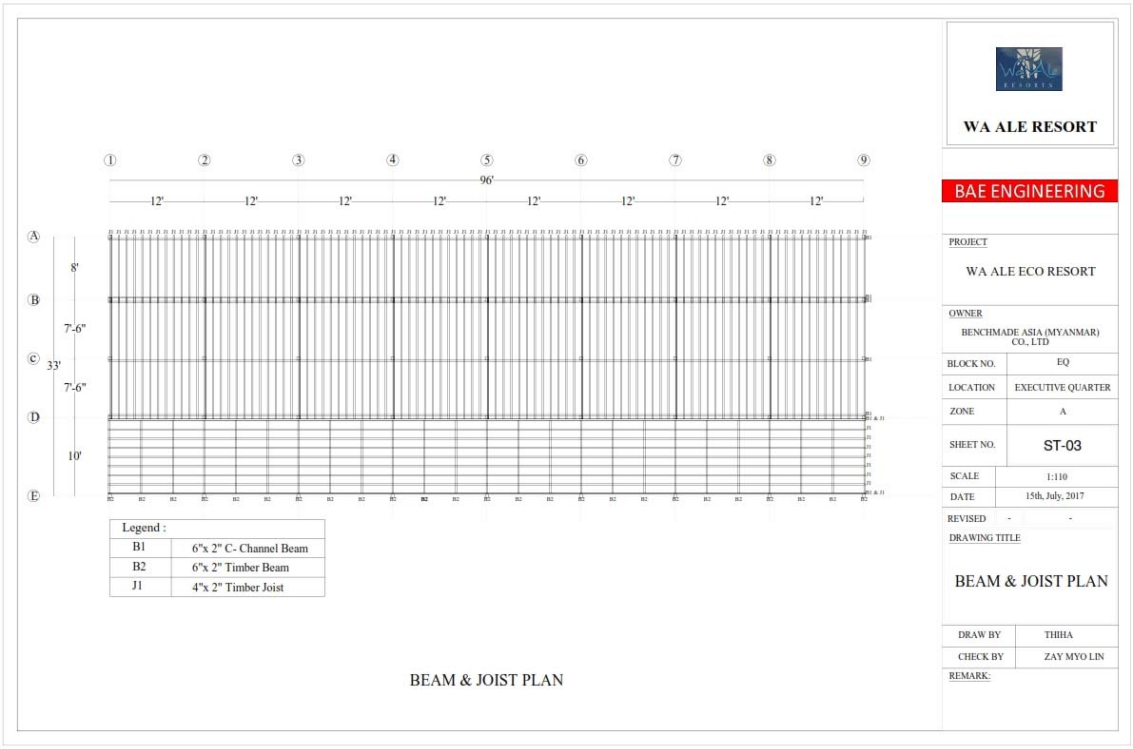
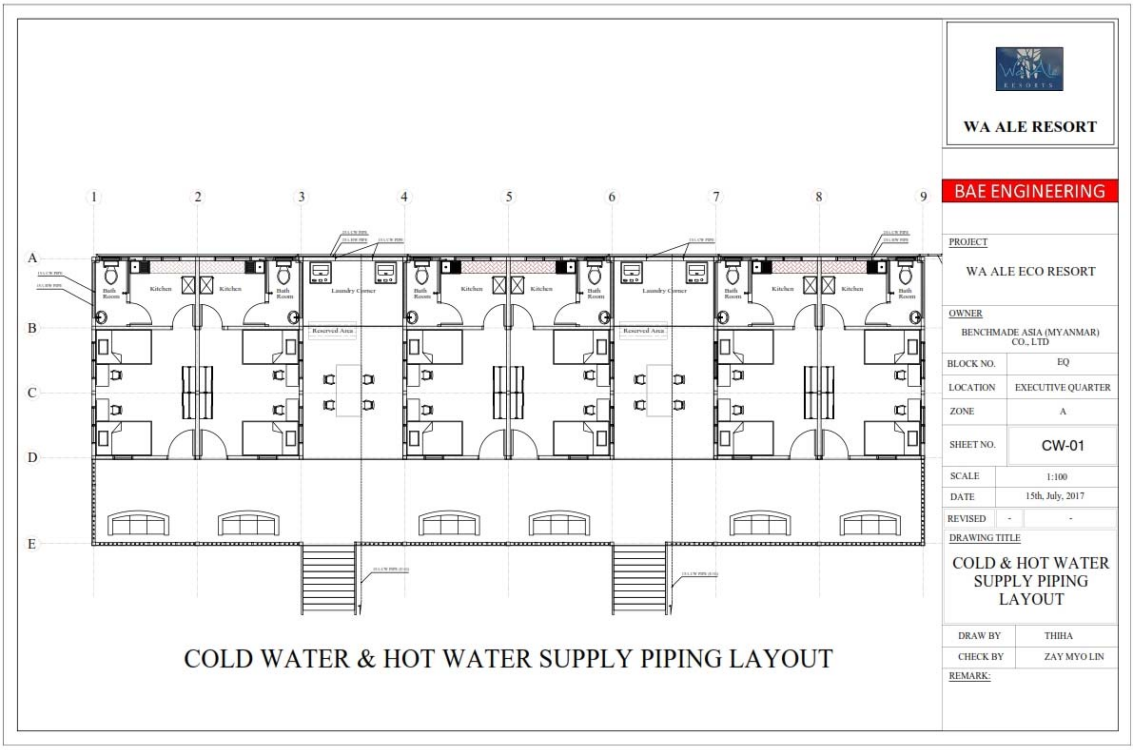
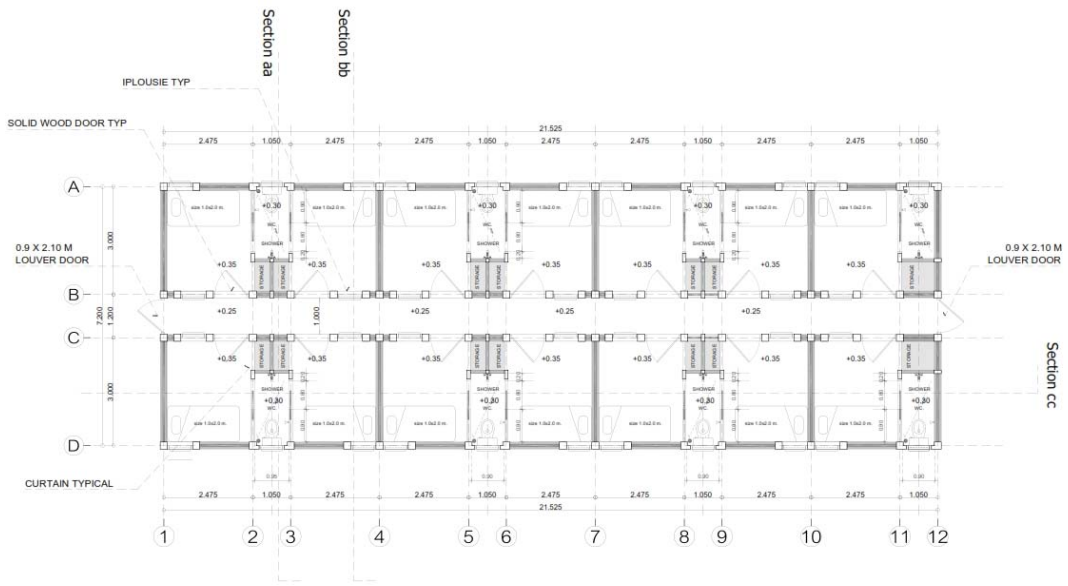

WA ALE RESORT
BAE ENGINEERING
PROJECT
WA ALE ECO RESORT
OWNER
BENCHMADE ASIA (MYANMAR) CO., LTD
BLOCK NO. EQ
LOCATION EXECUTIVE QUARTER
ZONE A
SHEET NO. ST-03
SCALE 1:110
DATE 15th, July, 2017
REVISED - -
DRAWING TITLE
BEAM & JOIST PLAN
DRAW BY THIHA
CHECK BY ZAY MYO LIN
REMARK:
96'
12'
8'
7'-6"
33'
10'
Legend :
B1 6"x 2" C- Channel Beam
B2 6"x 2" Timber Beam
J1 4"x 2" Timber Joist
BEAM & JOIST PLAN


WA ALE RESORT
BAE ENGINEERING
PROJECT
WA ALE ECO RESORT
OWNER
BENCHMADE ASIA (MYANMAR) CO., LTD
BLOCK NO. EQ
LOCATION EXECUTIVE QUARTER
ZONE A
SHEET NO. CW-01
SCALE 1:100
DATE 15th, July, 2017
REVISED - -
DRAWING TITLE
COLD & HOT WATER SUPPLY PIPING LAYOUT
DRAW BY THIHA
CHECK BY ZAY MYO LIN
REMARK:
Kitchen
Bath Room
Laundry Corner
Reserved Area
COLD WATER & HOT WATER SUPPLY PIPING LAYOUT



1/9

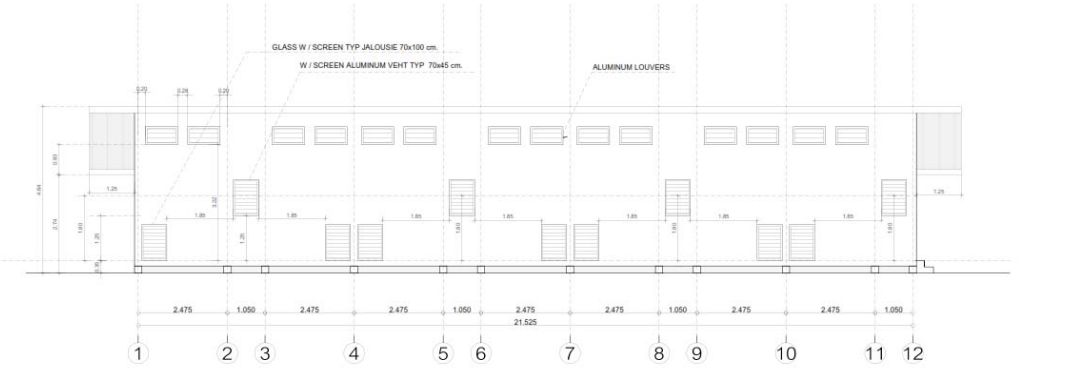
front view

STAFF QUARTERS

scale 1:75

STAFF QUARTERS

2/9

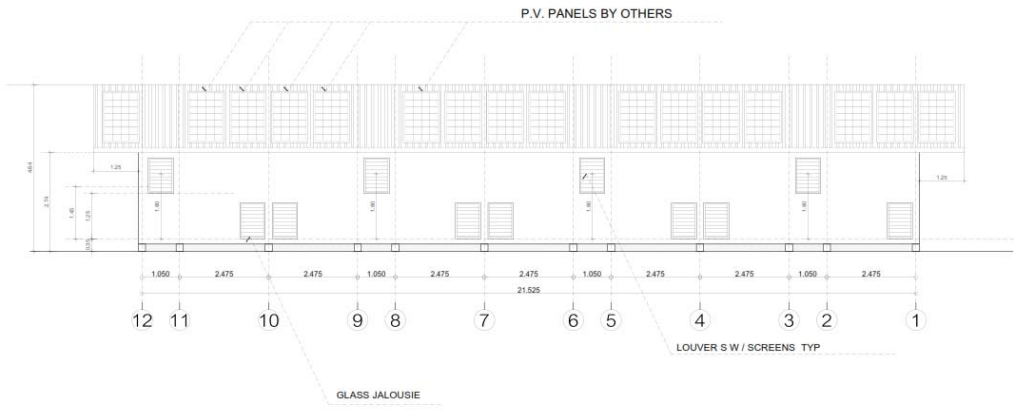


ELEVATION FRONT VIEW

scale 1:75

STAFF QUARTERS

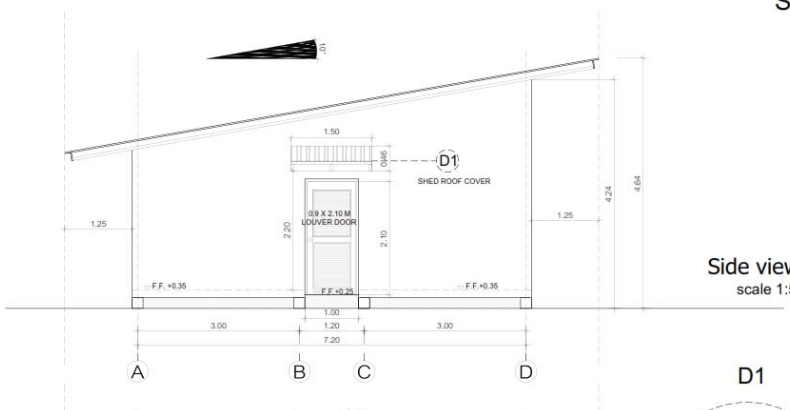
3
9



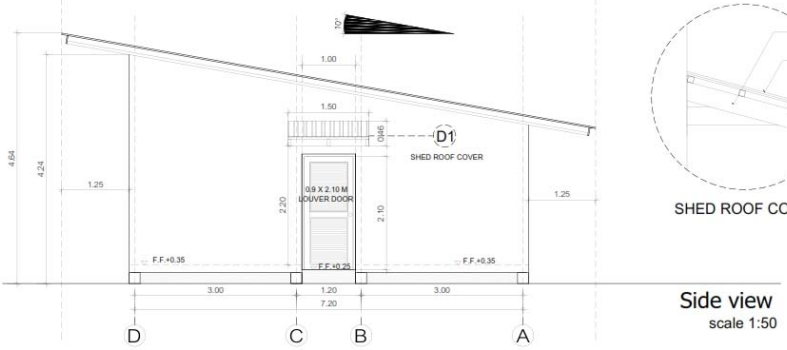
ELEVATION BACK VIEW
scale 1:75

STAFF QUARTERS

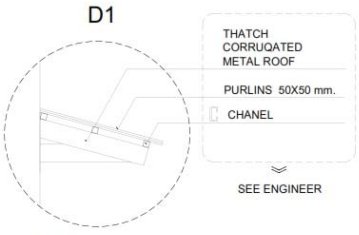
4
9

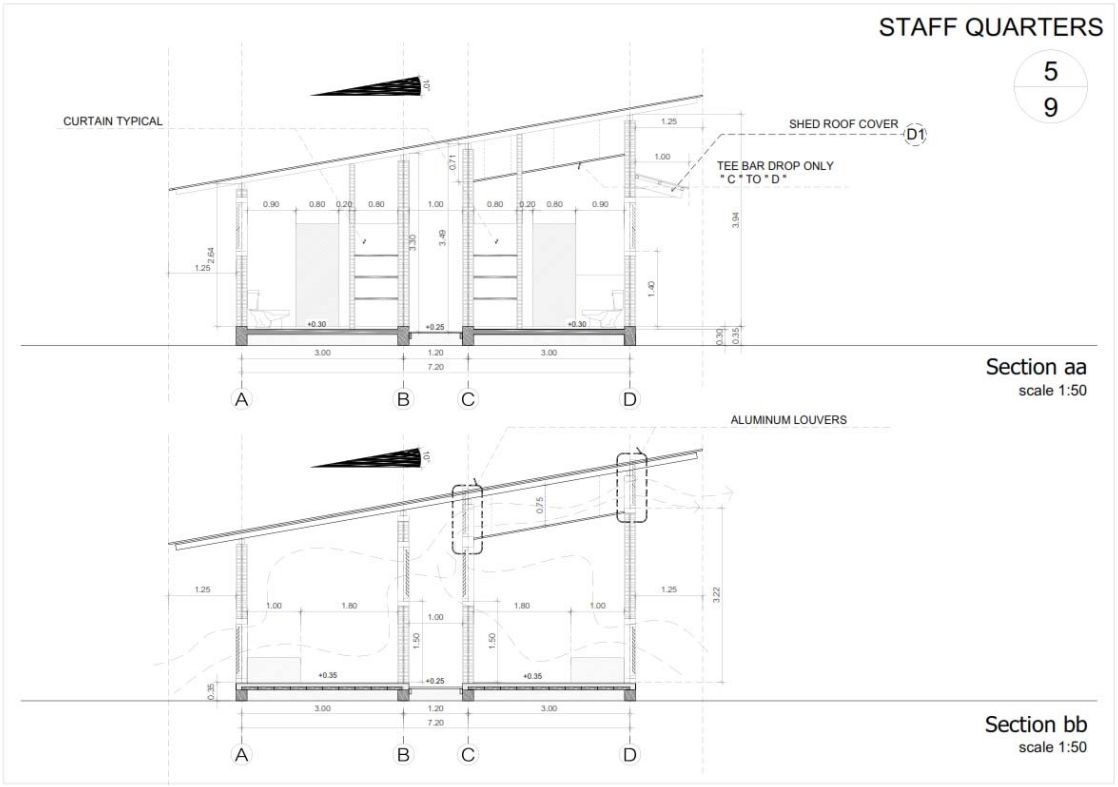


Side view
scale 1:50



Side view
scale 1:50




STAFF QUARTERS
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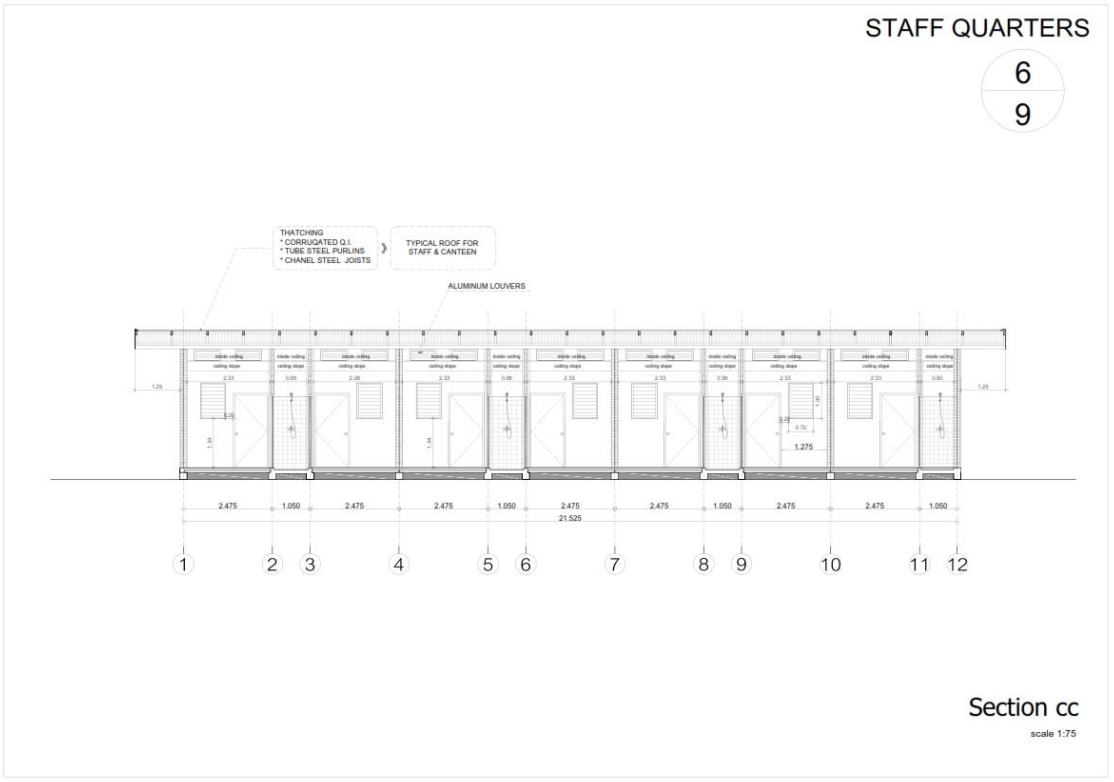
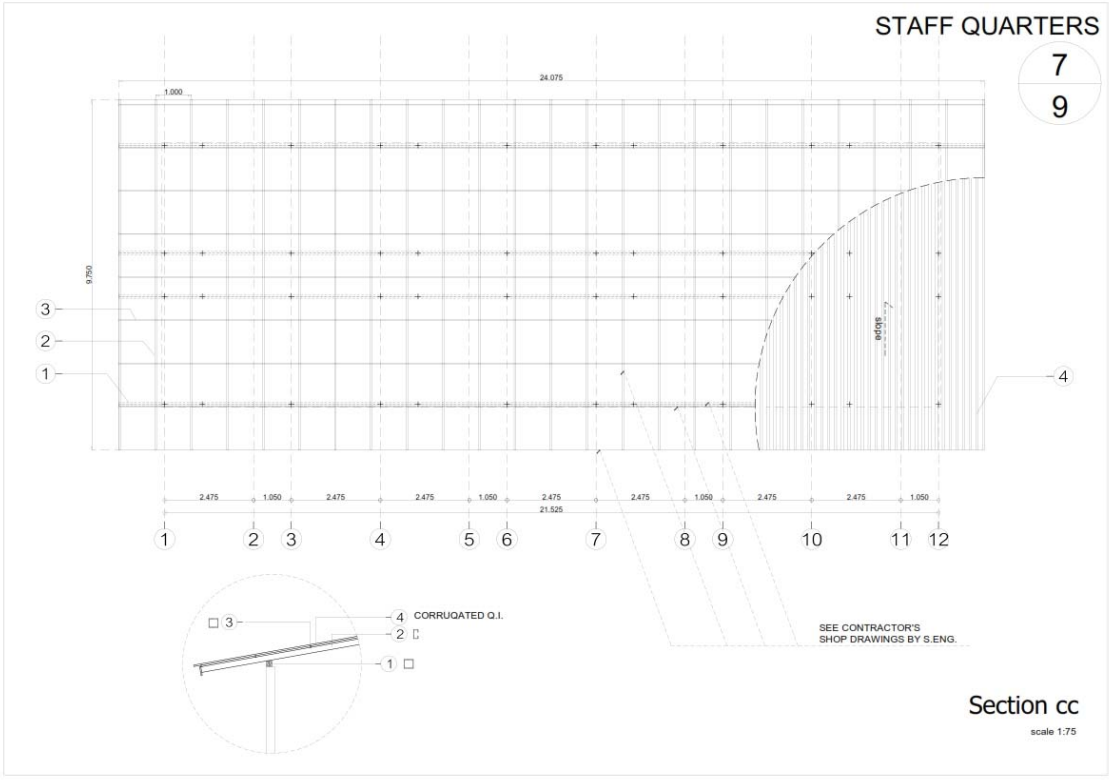
9
CURTAIN TYPICAL
SHED ROOF COVER
D1
TEE BAR DROP ONLY
" C " TO " D "
A
B
C
D
Section aa
scale 1:50
ALUMINUM LOUVERS
A
B
C
D
Section bb
scale 1:50


STAFF QUARTERS
6
9
THATCHING
* CORRUGATED G.I.
* TUBE STEEL PURLINS
* CHANEL STEEL JOISTS
TYPICAL ROOF FOR
STAFF & CANTEEN
ALUMINUM LOUVERS
1
2
3
4
5
6
7
8
9
10
11
12
Section cc
scale 1:75


STAFF QUARTERS
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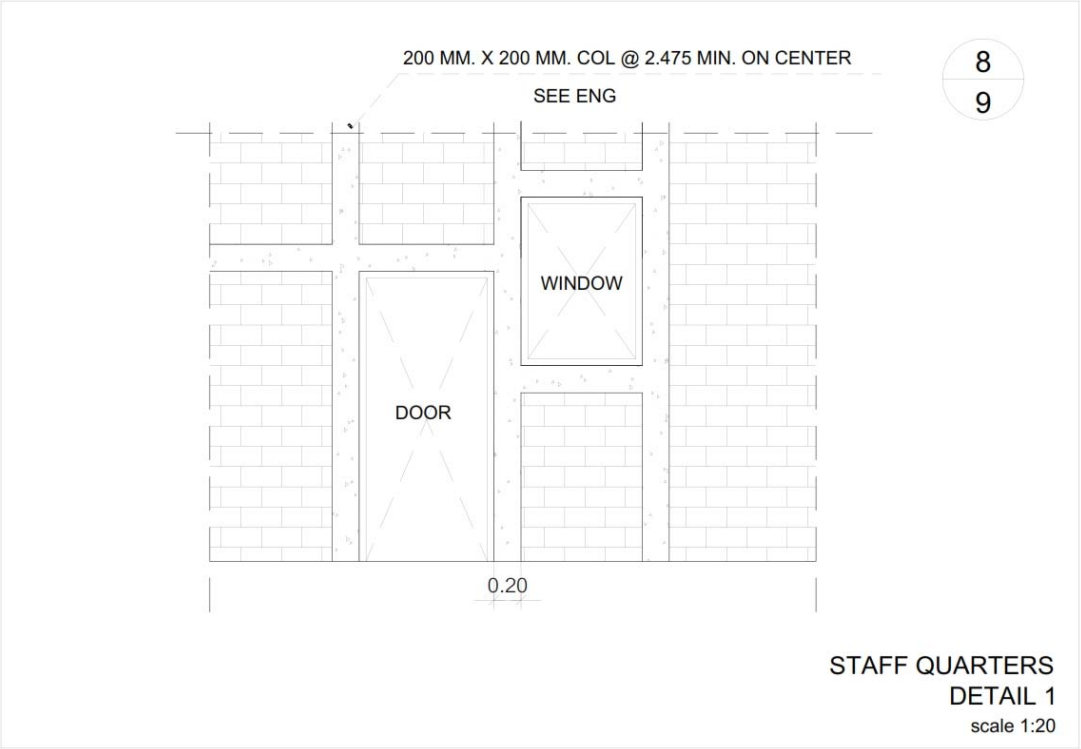
9
24.075
1.000
9.750
3
2
1
4
2.475
1.050
21.525
1
2
3
4
5
6
7
8
9
10
11
12
CORRUGATED Q.I.
SEE CONTRACTOR'S
SHOP DRAWINGS BY S.ENG.
Section cc
scale 1:75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STAFF QUARTERS
DETAIL 1
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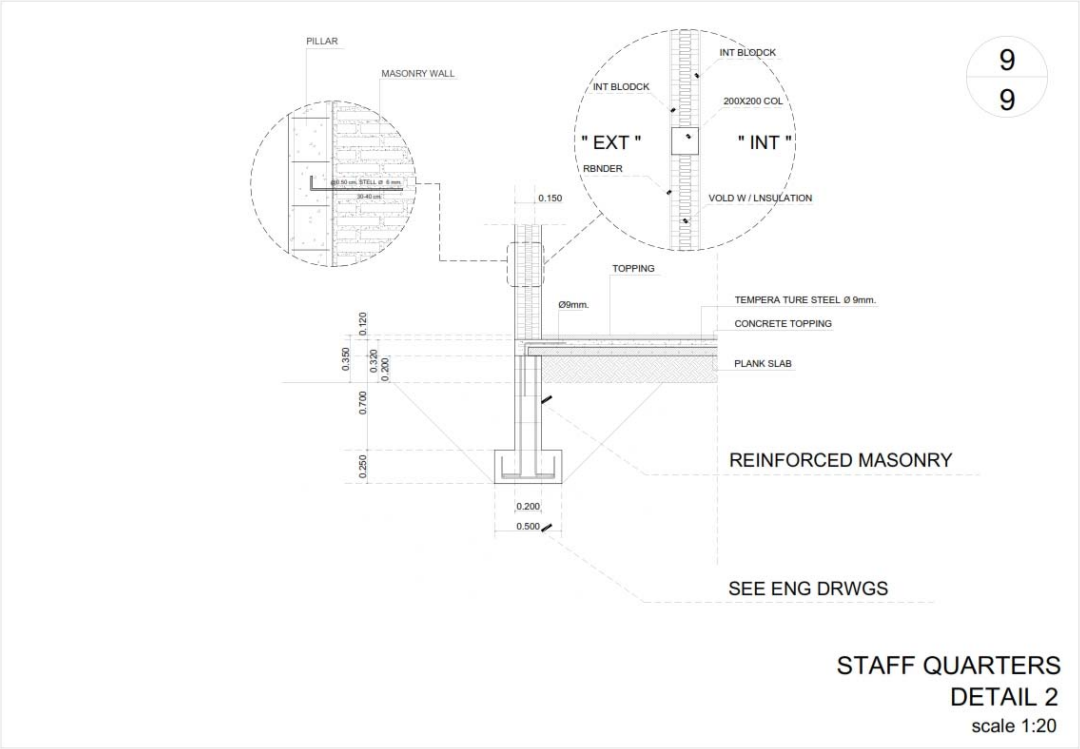
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PILLAR
MASONRY WALL
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INT BLODCK
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" INT "
RBNDER
VOLD W / LNSULATION
0.150
TOPPING
Ø9mm.
TEMPERA TURE STEEL Ø 9mm.
CONCRETE TOPPING
PLANK SLAB
0.120
0.350
0.320
0.200
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REINFORCED MASONRY
0.200
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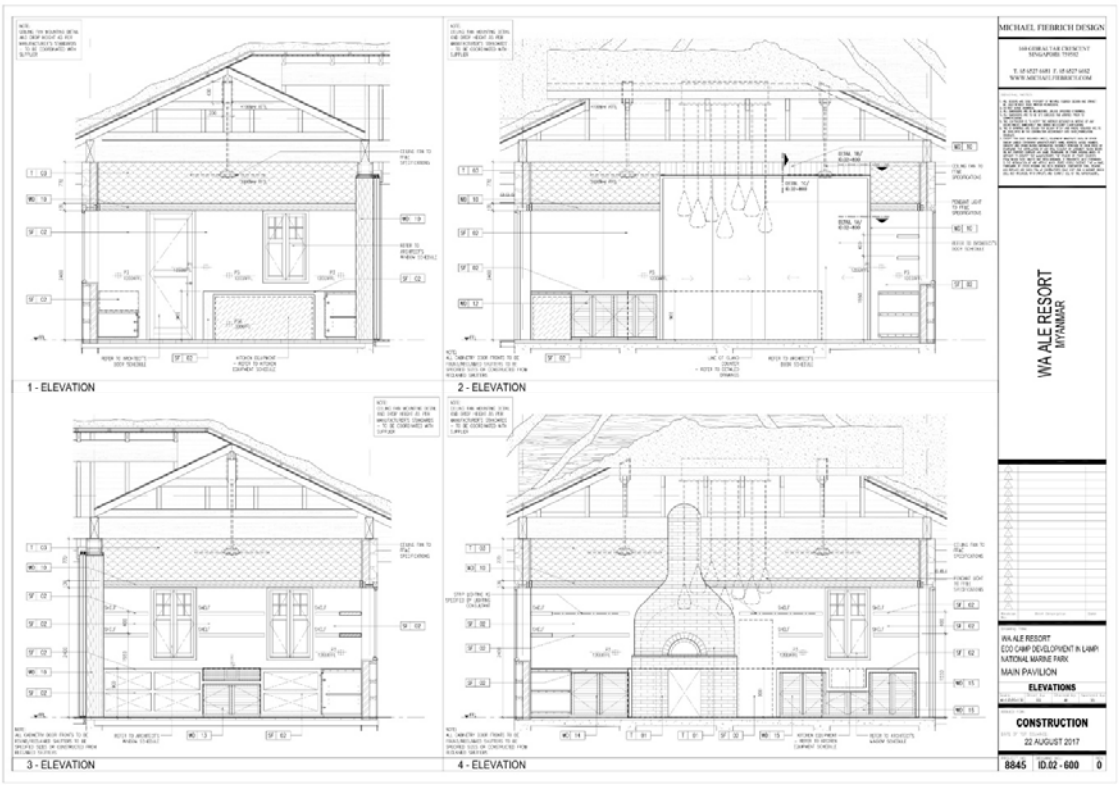
STAFF QUARTERS
DETAIL 2
scale 1:20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2 - ELEVATION
3 - ELEVATION
4 - ELEVATION
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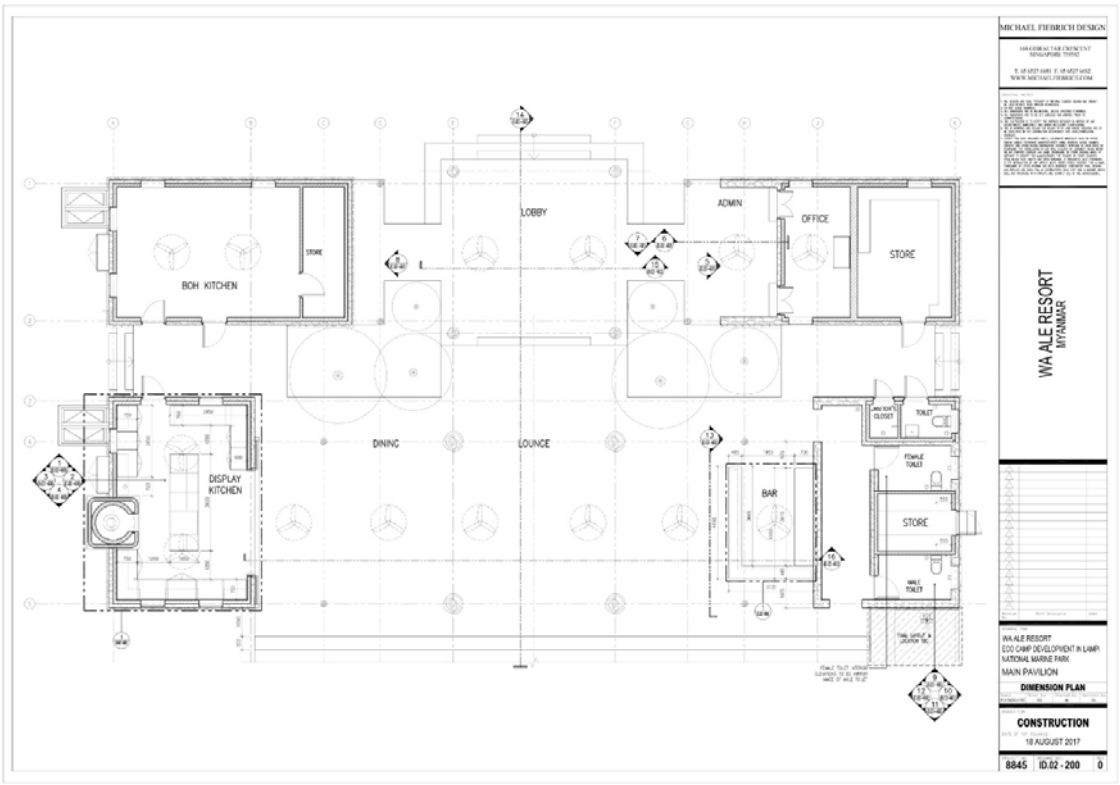
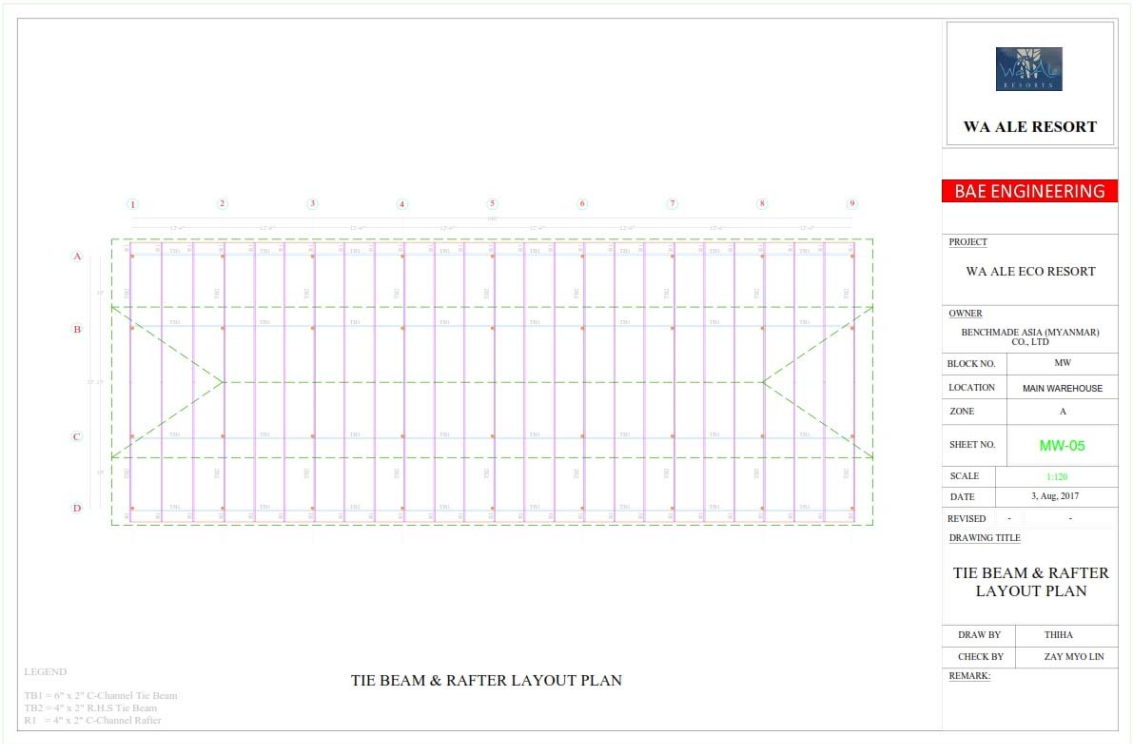
WA ALE RESORT
MYANMAR
WA ALE RESORT
ECO CAMP DEVELOPMENT IN LAMPI
NATIONAL MARINE PARK
MAIN PAVILION
ELEVATIONS
CONSTRUCTION
22 AUGUST 2017
8845 ID.02 - 600 0


LOBBY
ADMIN
OFFICE
STORE
BOH KITCHEN
STORE
DINING
LOUNGE
DISPLAY KITCHEN
BAR
STORE
TOILET
MICHAEL FIEBRICH DESIGN
WA ALE RESORT
MYANMAR
WA ALE RESORT
ECO CAMP DEVELOPMENT IN LAMPI
NATIONAL MARINE PARK
MAIN PAVILION
DIMENSION PLAN
CONSTRUCTION
18 AUGUST 2017
8845 ID.02 - 200 0


NGL
FRONT ELEVATION
WA ALE RESORT
BAE ENGINEERING
PROJECT
WA ALE ECO RESORT
OWNER
BENCHMADE ASIA (MYANMAR) CO., LTD
BLOCK NO. MW
LOCATION MAIN WAREHOUSE
ZONE A
SHEET NO. MW-08
SCALE 1:50
DATE 3, Aug, 2017
REVISED - -
DRAWING TITLE
FRONT ELEVATION
DRAW BY THIHA
CHECK BY ZAY MYO LIN
REMARK: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A
B
C
D
LEGEND
TB1 = 6" x 2" C-Channel Tie Beam
TB2 = 4" x 2" R.H.S Tie Beam
R1 = 4" x 2" C-Channel Rafter
TIE BEAM & RAFTER LAYOUT PLAN
WA ALE RESORT
BAE ENGINEERING
PROJECT
WA ALE ECO RESORT
OWNER
BENCHMADE ASIA (MYANMAR) CO., LTD
BLOCK NO. MW
LOCATION MAIN WAREHOUSE
ZONE A
SHEET NO. MW-05
SCALE 1:120
DATE 3, Aug, 2017
REVISED - -
DRAWING TITLE
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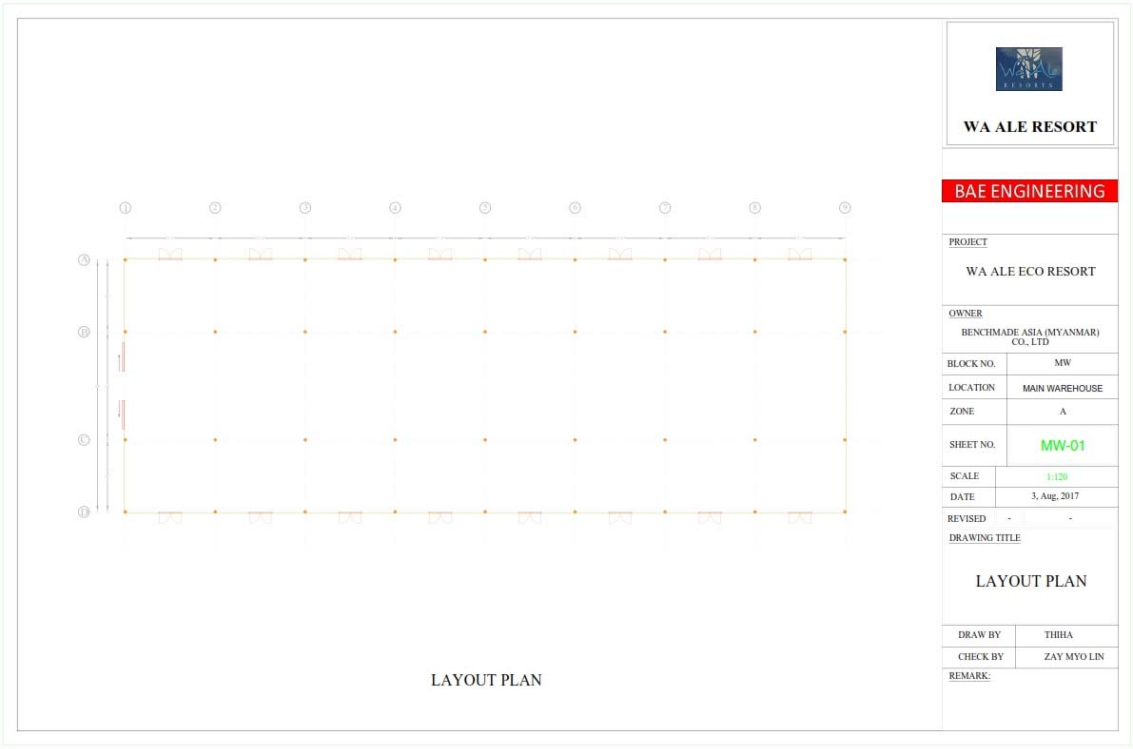
DRAW BY THIHA
CHECK BY ZAY MYO LIN
REMARK:


WA ALE RESORT
BAE ENGINEERING
PROJECT
WA ALE ECO RESORT
OWNER
BENCHMADE ASIA (MYANMAR) CO., LTD
BLOCK NO. MW
LOCATION MAIN WAREHOUSE
ZONE A
SHEET NO. MW-01
SCALE 1:120
DATE 3, Aug, 2017
REVISED - -
DRAWING TITLE
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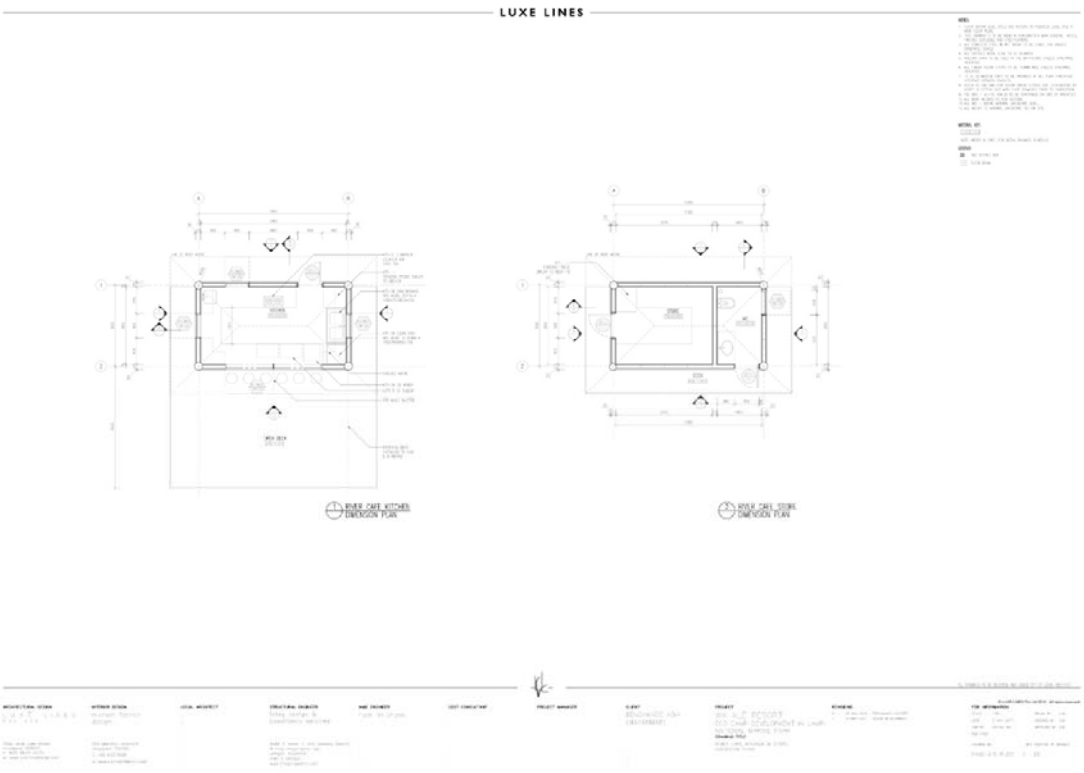
DRAW BY THIHA
CHECK BY ZAY MYO LIN
REMARK:
LAYOUT PLAN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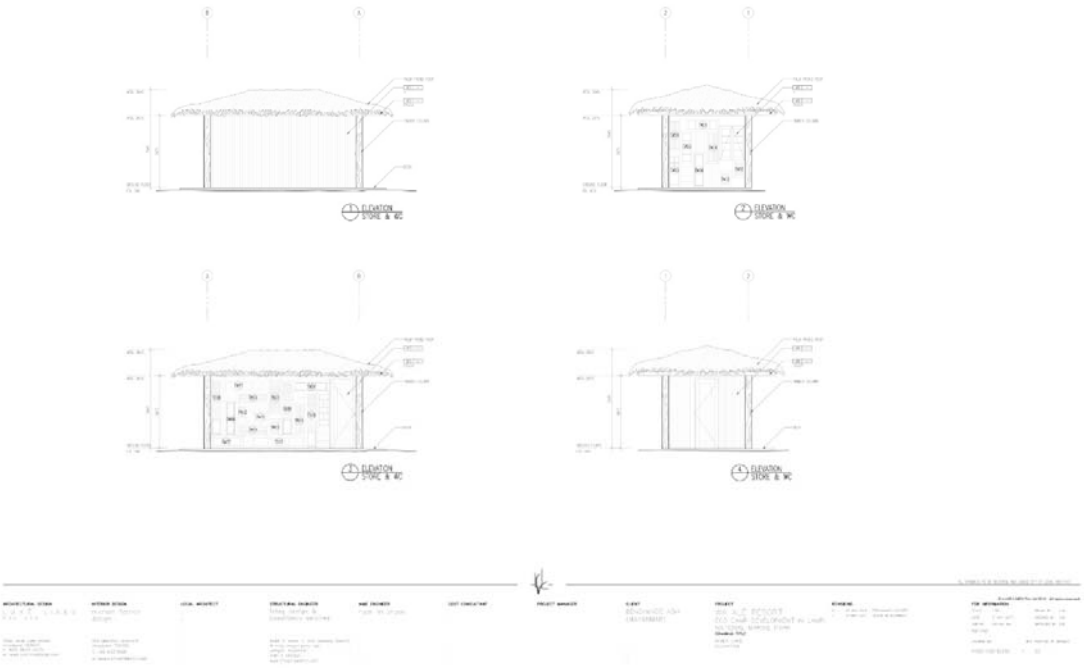
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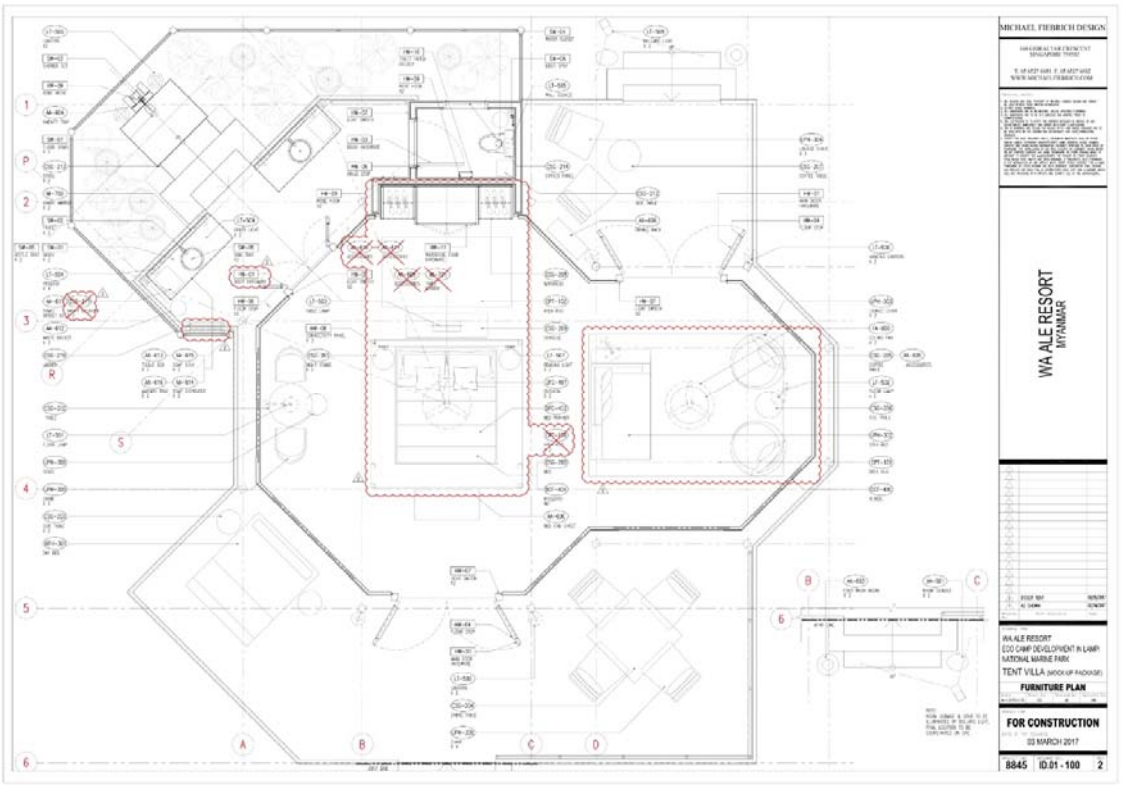
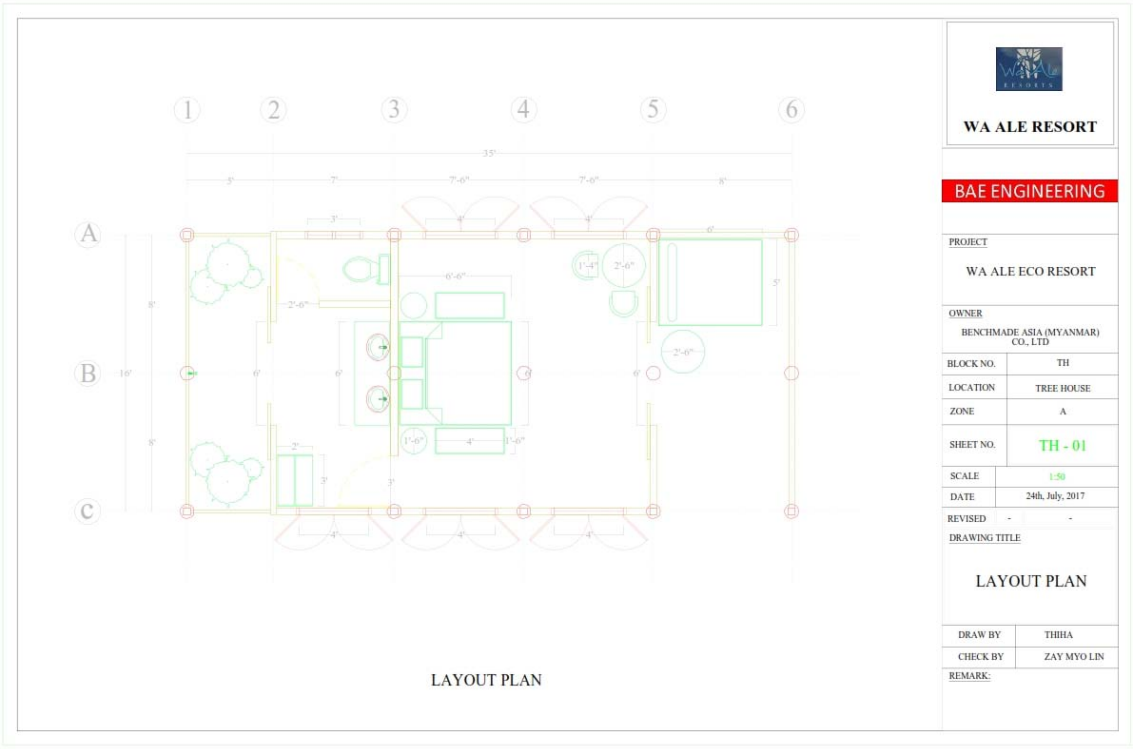

MICHAEL FIEBRICH DESIGN
WA ALE RESORT
MYANMAR
WA ALE RESORT
ECO CAMP DEVELOPMENT IN LAMP
NATIONAL MARINE PARK
TENT VILLA (MOCK-UP PACKAGE)
FURNITURE PLAN
FOR CONSTRUCTION
03 MARCH 2017
8845 ID.01 - 100 2


5 - ELEVATION
6 - ELEVATION
7 - ELEVATION
8 - ELEVATION
9 - ELEVATION
MICHAEL FIEBRICH DESIGN
WA ALE RESORT
MYANMAR
WA ALE RESORT
ECO CAMP DEVELOPMENT IN LAMP
NATIONAL MARINE PARK
TENT VILLA (MOCK-UP PACKAGE)
ELEVATIONS
FOR CONSTRUCTION
03 MARCH 2017
8845 ID.01 - 402 2


SIDE ELEVATION
WA ALE RESORT
BAE ENGINEERING
PROJECT
WA ALE ECO RESORT
OWNER
BENCHMADE ASIA (MYANMAR) CO., LTD
BLOCK NO. TH
LOCATION TREE HOUSE
ZONE A & B
SHEET NO. TH-08
SCALE 1:50
DATE 19, Aug, 2017
REVISED - -
DRAWING TITLE
SIDE ELEVATION
DRAW BY THIHA
CHECK BY ZAY MYO LIN
REMARK:


1 2 3 4 5 6
A
B
C
LAYOUT PLAN
WA ALE RESORT
BAE ENGINEERING
PROJECT
WA ALE ECO RESORT
OWNER
BENCHMADE ASIA (MYANMAR) CO., LTD
BLOCK NO. TH
LOCATION TREE HOUSE
ZONE A
SHEET NO. TH - 01
SCALE 1:50
DATE 24th, July, 2017
REVISED - -
DRAWING TITLE
LAYOUT PLAN
DRAW BY THIHA
CHECK BY ZAY MYO LIN
REMARK:

APPENDIX II: 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)

TRACE CERTIFIED

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

W0713 090

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Marine Water) Point (9)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25.1	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)	33	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)	4.2	mg/l	
Chemical Oxygen Demand (COD)	56	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	31	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Phosphate	0.0	mg/l	5 mg/l

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

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

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

(a division of WEG Co.,Ltd.)
No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-73242162, Fax: 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

ISO TECH LABORATORY

TRACE CERTIFIED

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

W0713 090

WATER QUALITY TEST RESULTS FORM

Client: Wal Lae Island
Nature of Water: Surface Water (Marine water) Point (9)
Location: ThaninTharyi Division
Date and Time of collection: 27.12.2016
Date and Time of arrival at Laboratory: 30.12.2016
Date and Time of commencing examination: 30.12.2016
Date and Time of completing: 10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.1		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	85	NTU	5 NTU
Conductivity	79	micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)		mg/l as $CaCO_3$	200 mg/l
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	301	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)		mg/l	0.2 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:
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WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W0713 089

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Marine Water) Point (8)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25.2	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)	34	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)	4.3	mg/l	
Chemical Oxygen Demand (COD)	58	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	27	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Phosphate	0.0	mg/l	5 mg/l

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

Tested by

Signature:

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

Approved by

Signature:

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

(a division of WEG Co.,Ltd.)
No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-73242162, Fax: 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

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B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
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WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0713 089

WATER QUALITY TEST RESULTS FORM

Client: Wal Lae Island
Nature of Water: Surface Water (Marine water) Point (8)
Location: ThaninTharyi Division
Date and Time of collection: 27.12.2016
Date and Time of arrival at Laboratory: 30.12.2016
Date and Time of commencing examination: 30.12.2016
Date and Time of completing: 10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.0		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	81	NTU	5 NTU
Conductivity	70	micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)		mg/l as $CaCO_3$	200 mg/l
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	290	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)		mg/l	0.2 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
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WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W0713 088

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Marine Water) Point (7)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)	30	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)	4.0	mg/l	
Chemical Oxygen Demand (COD)	52	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	22	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Phosphate	0.0	mg/l	5 mg/l

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

Tested by

Signature:

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

Approved by

Signature:

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

(a division of WEG Co.,Ltd.)
No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-73242162, Fax: 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

ISO TECH LABORATORY

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Laboratory Technical Consultant: U Saw Christopher Maung
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Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

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

W0713 088

WATER QUALITY TEST RESULTS FORM

Client: Wal Lae Island
Nature of Water: Surface Water (Marine water) Point (7)
Location: ThaninTharyi Division
Date and Time of collection: 27.12.2016
Date and Time of arrival at Laboratory: 30.12.2016
Date and Time of commencing examination: 30.12.2016
Date and Time of completing: 10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.0		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	80	NTU	5 NTU
Conductivity	71	micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)		mg/l as $CaCO_3$	200 mg/l
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	278	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)		mg/l	0.2 mg/l

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

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

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

(a division of WEG Co.,Ltd.)
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WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W0713 087

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Marine Water) Point (6)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)	25	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)	4.5	mg/l	
Chemical Oxygen Demand (COD)	68	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	30	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Phosphate	0.0	mg/l	5 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
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ISO TECH LABORATORY

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W0713 087

WATER QUALITY TEST RESULTS FORM

Client: Wal Lae Island
Nature of Water: Surface Water (Marine water) Point (6)
Location: ThaninTharyi Division
Date and Time of collection: 27.12.2016
Date and Time of arrival at Laboratory: 30.12.2016
Date and Time of commencing examination: 30.12.2016
Date and Time of completing: 10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.2		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	101	NTU	5 NTU
Conductivity	68	micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)		mg/l as $CaCO_3$	200 mg/l
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	309	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)		mg/l	0.2 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
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Issue Date - 01-12-2012
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W0713 086

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Marine Water) Point (5)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	24.8	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)	26	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)	4.7	mg/l	
Chemical Oxygen Demand (COD)	64	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	29	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Phosphate	0.0	mg/l	5 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
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Issue Date - 01-12-2012
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W0713 086

WATER QUALITY TEST RESULTS FORM

Client: Wal Lae Island
Nature of Water: Surface Water (Marine water) Point (5)
Location: ThaninTharyi Division
Date and Time of collection: 27.12.2016
Date and Time of arrival at Laboratory: 30.12.2016
Date and Time of commencing examination: 30.12.2016
Date and Time of completing: 10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.2		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	100	NTU	5 NTU
Conductivity	69	micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)		mg/l as $CaCO_3$	200 mg/l
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	310	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)		mg/l	0.2 mg/l

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

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Signature:
Name: Zaw Hein Oo
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Sr. Chemist
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W0713 085

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Marine Water) Point (4)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	24.9	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)	28	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)	4.9	mg/l	
Chemical Oxygen Demand (COD)	61	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	28	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Phosphate	0.0	mg/l	5 mg/l

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

Tested by

Signature:

Name: Zaw Hein Oo
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Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name: Soe Thit
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Issue Date - 01-12-2012
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W0713 085

WATER QUALITY TEST RESULTS FORM

Client: Wal Lae Island
Nature of Water: Surface Water (Marine water) Point (4)
Location: ThaninTharyi Division
Date and Time of collection: 27.12.2016
Date and Time of arrival at Laboratory: 30.12.2016
Date and Time of commencing examination: 30.12.2016
Date and Time of completing: 10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.2		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	98	NTU	5 NTU
Conductivity	67	micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)		mg/l as $CaCO_3$	200 mg/l
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	307	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)		mg/l	0.2 mg/l

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

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Signature:
Name: Zaw Hein Oo
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W0713 084

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Marine Water) Point (3)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)	21	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)	4.2	mg/l	
Chemical Oxygen Demand (COD)	79	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	37	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Phosphate	0.0	mg/l	5 mg/l

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

Tested by

Signature:

Name: Zaw Hein Oo
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Approved by

Signature:

Name: Soe Thit
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Issue No - 1.0/Page 1 of 2

W0713 084

WATER QUALITY TEST RESULTS FORM

Client: Wal Lae Island
Nature of Water: Surface Water (Marine water) Point (3)
Location: ThaninTharyi Division
Date and Time of collection: 27.12.2016
Date and Time of arrival at Laboratory: 30.12.2016
Date and Time of commencing examination: 30.12.2016
Date and Time of completing: 10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.0		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	102	NTU	5 NTU
Conductivity	71	micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)		mg/l as $CaCO_3$	200 mg/l
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	341	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)		mg/l	0.2 mg/l

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

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Signature:
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Signature:
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W0713 083

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Marine Water) Point (2)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)	20	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)	4.1	mg/l	
Chemical Oxygen Demand (COD)	77	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	34	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Phosphate	0.0	mg/l	5 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
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W0713 083

WATER QUALITY TEST RESULTS FORM

Client: Wal Lae Island
Nature of Water: Surface Water (Marine water) Point (2)
Location: ThaninTharyi Division
Date and Time of collection: 27.12.2016
Date and Time of arrival at Laboratory: 30.12.2016
Date and Time of commencing examination: 30.12.2016
Date and Time of completing: 10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.2		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	104	NTU	5 NTU
Conductivity	74	micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)		mg/l as $CaCO_3$	200 mg/l
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	340	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)		mg/l	0.2 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
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Issue Date - 01-12-2012
Effective Date - 01-12-2012
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W0713 082

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Marine Water) Point (1)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)	21	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)	4.2	mg/l	
Chemical Oxygen Demand (COD)	78	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	36	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Phosphate	0.0	mg/l	5 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
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Approved by

Signature:

Name: Soe Thit
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Technical Officer
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ISO TECH LABORATORY

TRACE CERTIFIED

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

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

W0713 082

WATER QUALITY TEST RESULTS FORM

Client: Wal Lae Island
Nature of Water: Surface Water (Marine water) Point (1)
Location: ThaninTharyi Division
Date and Time of collection: 27.12.2016
Date and Time of arrival at Laboratory: 30.12.2016
Date and Time of commencing examination: 30.12.2016
Date and Time of completing: 10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.1		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	102	NTU	5 NTU
Conductivity	78	micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)		mg/l as $CaCO_3$	200 mg/l
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	341	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)		mg/l	0.2 mg/l

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

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

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

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

W0713 081

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Fresh Water)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25.1	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)		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
Phosphate		mg/l	5 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
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WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0713 081

WATER QUALITY TEST RESULTS FORM

Client: Wal Lae Island
Nature of Water: Surface Water (Fresh water)
Location: ThaninTharyi Division
Date and Time of collection: 27.12.2016
Date and Time of arrival at Laboratory: 30.12.2016
Date and Time of commencing examination: 30.12.2016
Date and Time of completing: 10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	7.2		6.5 - 8.5
Colour (True)	8	TCU	15 TCU
Turbidity	1	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	91	mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)	31	mg/l as $CaCO_3$	200 mg/l
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	0.0	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	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	312	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese	0.00	mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)	0.0	mg/l	0.2 mg/l

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

Tested by
Signature:
Name: Zaw Hein Oo
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On Site WaAle Data.xlsx

SGS

ORIGINAL

ANALYSIS REPORT

Job Ref: 11941/2016
Date : 30 Dec,2016
Page 1 of 1

Sample Described as	:	**ENVIRONMENTAL WATER**
Client Name	:	**E GUARD ENVIRONMENTAL SERVICES CO., LTD.**
		No. 99, Mya Kan Thar Street, 10 Miles, Yangon, Myanmar
Project Name	:	WAL ALE ISLAND ECOTOURISM PROJECT
Sample Brought By	:	Client
Sample Marks	:	MARINE WATER POINT (9)
Location	:	LAM PI ISLAND (THANIN THARYI DIVISION)
Sample Received Date	:	30.12.2016
Analysed Date	:	31.12.2016
Lab Code No.	:	07.01.2017

No.	Test Parameter	Unit	Result	Method	Detection Limit
1.	Oil & Grease	mg/l	<5	Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012:5520B	5

End Of Report

SGS (Myanmar) Limited
(Nu Nu Yi)
Manager

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Member of SGS Group (SGS SA)

SGS

ORIGINAL

ANALYSIS REPORT

Job Ref: 11941/2016
Date : 30 Dec,2016
Page 1 of 1

Sample Described as	:	**ENVIRONMENTAL WATER**
Client Name	:	**E GUARD ENVIRONMENTAL SERVICES CO., LTD.**
		No. 99, Mya Kan Thar Street, 10 Miles, Yangon, Myanmar
Project Name	:	WAL ALE ISLAND ECOTOURISM PROJECT
Sample Brought By	:	Client
Sample Marks	:	MARINE WATER POINT (7)
Location	:	LAM PI ISLAND (THANIN THARYI DIVISION)
Sample Received Date	:	30.12.2016
Analysed Date	:	31.12.2016
Lab Code No.	:	07.01.2017

No.	Test Parameter	Unit	Result	Method	Detection Limit
1.	Oil & Grease	mg/l	<5	Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012:5520B	5

End Of Report

SGS (Myanmar) Limited
(Nu Nu Yi)
Manager

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ORIGINAL

ANALYSIS REPORT

Job Ref: 11941/2016
Date : 30 Dec,2016
Page 1 of 1

Sample Described as	:	**ENVIRONMENTAL WATER**
Client Name	:	**E GUARD ENVIRONMENTAL SERVICES CO., LTD.**
		No. 99, Mya Kan Thar Street, 10 Miles, Yangon, Myanmar
Project Name	:	WAL ALE ISLAND ECOTOURISM PROJECT
Sample Brought By	:	Client
Sample Marks	:	MARINE WATER POINT (6)
Location	:	LAM PI ISLAND (THANIN THARYI DIVISION)
Sample Received Date	:	30.12.2016
Analysed Date	:	31.12.2016
Lab Code No.	:	07.01.2017

No.	Test Parameter	Unit	Result	Method	Detection Limit
1.	Oil & Grease	mg/l	<5	Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012:5520B	5

End Of Report

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ORIGINAL

ANALYSIS REPORT

Job Ref: 11941/2016
Date : 30 Dec,2016
Page 1 of 1

Sample Described as	:	**ENVIRONMENTAL WATER**
Client Name	:	**E GUARD ENVIRONMENTAL SERVICES CO., LTD.**
		No. 99, Mya Kan Thar Street, 10 Miles, Yangon, Myanmar
Project Name	:	WAL ALE ISLAND ECOTOURISM PROJECT
Sample Brought By	:	Client
Sample Marks	:	MARINE WATER POINT (4)
Location	:	LAM PI ISLAND (THANIN THARYI DIVISION)
Sample Received Date	:	30.12.2016
Analysed Date	:	31.12.2016
Lab Code No.	:	07.01.2017

No.	Test Parameter	Unit	Result	Method	Detection Limit
1.	Oil & Grease	mg/l	<5	Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012:5520B	5

End Of Report

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ANALYSIS REPORT

Job Ref: 11941/2016
Date : 30 Dec,2016
Page 1 of 1

Sample Described as	:	**ENVIRONMENTAL WATER**
Client Name	:	**E GUARD ENVIRONMENTAL SERVICES CO., LTD.**
		No. 99, Mya Kan Thar Street, 10 Miles, Yangon, Myanmar
Project Name	:	WAL ALE ISLAND ECOTOURISM PROJECT
Sample Brought By	:	Client
Sample Marks	:	MARINE WATER POINT (3)
Location	:	LAM PI ISLAND (THANIN THARYI DIVISION)
Sample Received Date	:	30.12.2016
Analysed Date	:	31.12.2016
Lab Code No.	:	07.01.2017

No.	Test Parameter	Unit	Result	Method	Detection Limit
1.	Oil & Grease	mg/l	<5	Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012:5520B	5

End Of Report

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Page 1 of 1

Sample Described as	:	**ENVIRONMENTAL WATER**
Client Name	:	**E GUARD ENVIRONMENTAL SERVICES CO., LTD.**
		No. 99, Mya Kan Thar Street, 10 Miles, Yangon, Myanmar
Project Name	:	WAL ALE ISLAND ECOTOURISM PROJECT
Sample Brought By	:	Client
Sample Marks	:	MARINE WATER POINT (1)
Location	:	LAM PI ISLAND (THANIN THARYI DIVISION)
Sample Received Date	:	30.12.2016
Analysed Date	:	31.12.2016
Lab Code No.	:	07.01.2017

No.	Test Parameter	Unit	Result	Method	Detection Limit
1.	Oil & Grease	mg/l	<5	Standard methods for the examination of water & waste water APHA ,AWWA & WEF ,22nd ed, 2012:5520B	5

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APPENDIX III: WATER QUALITY (FRESH), LAB ANALYSIS

ISO TECH LABORATORY

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Laboratory Technical Consultant: U Saw Christopher Maung
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WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

W0713 081

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Fresh water)
Location	ThaninTharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	7.2		6.5 - 8.5
Colour (True)	8	TCU	15 TCU
Turbidity	1	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	91	mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)	31	mg/l as $CaCO_3$	200 mg/l
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	0.0	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	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	312	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese	0.00	mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Chlorine (CL)	0.0	mg/l	0.2 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
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WTL-RE-001
Issue Date - 01-12-2012
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Issue No - 1.0/Page 2 of 2

W0713 081

WATER QUALITY TEST RESULTS FORM

Client	Wal Lae Island
Nature of Water	Surface Water (Fresh Water)
Location	Thanin Tharyi Division
Date and Time of collection	27.12.2016
Date and Time of arrival at Laboratory	30.12.2016
Date and Time of commencing examination	30.12.2016
Date and Time of completing	10.01.2017

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25.1	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate (NO_3)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)		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
Phosphate		mg/l	5 mg/l

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

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APPENDIX IV: FLORA

1(a) **(b)**

(c) **(d)**

Plate (1), Scientific Name- 1(a) *Aegiceras floridum*, (b) *Caryota mitis*, (c) *Barringtonia asiatica*, (d) *Clerodendrum inerme*

2(a) **(b)**

(c) **(d)**

Plate (2), Scientific Name- 2(a) *Asplenium nidus L*, (b) *Bulbophyllum reclusum*, (c) *Calamus longisetus*, (d) *Calophyllum inophyllum*

3(a) **(b)**

(c) **(d)**

Plate (3), Scientific Name- 3(a) *Casuarina equisetifolia,* (b) *Chromolaena odorata,* (c) *Clerodendrum macrosiphon,* (d) *Cordia subcordata*

4(a) **(b)**

(c) **(d)**

Plate (4), Scientific Name- 4(a) *Crinum asiaticum*, (b) *Cycas rumphii*, (c) *Cyperus laxus*, (d) *Dicliptera reptans*

5(a) **(b)**

(c) **(d)**

Plate (5), Scientific Name- 5(a) *Dillenia parviflora*, (b) *Flagellaria indica*, (c) *Glochidion sp*, (d) *Hernandia ovigera*

6(a) **(b)**

(c) **(d)**

Plate (6), Scientific Name- 6(a) *Diospyros mollis*, (b) *Eugenia oblate*,(c) *Garcinia heterandra*,(d) *Guettarda speciosa*

7(a) ***(b)***

(c) ***(d)***

Plate (7), Scientific Name- 7(a) *Heritiera littoralis*, (b) *Ipomoea pes-caprae*, (c) *Ixora arborea*, (d) *Kyllinga melanosperma*

8(a)

(b)

(c)

(d)

Plate (8), Scientific Name- 8(a) *Hoya carnosa*, (b) Lasia spinosa, (c) *Leea aequata*, (d) *Licuala merguensis*

9(a) **(b)**

(c) **(d)**

Plate (9), Scientific Name- 9(a) *Lumnitzera littorea*, (b) *Lythophyte lithophyte*, (c) *Mikania micrantha*, (d) *Phoebe lanceolata*

10(a) **(b)**

(c) **(d)**

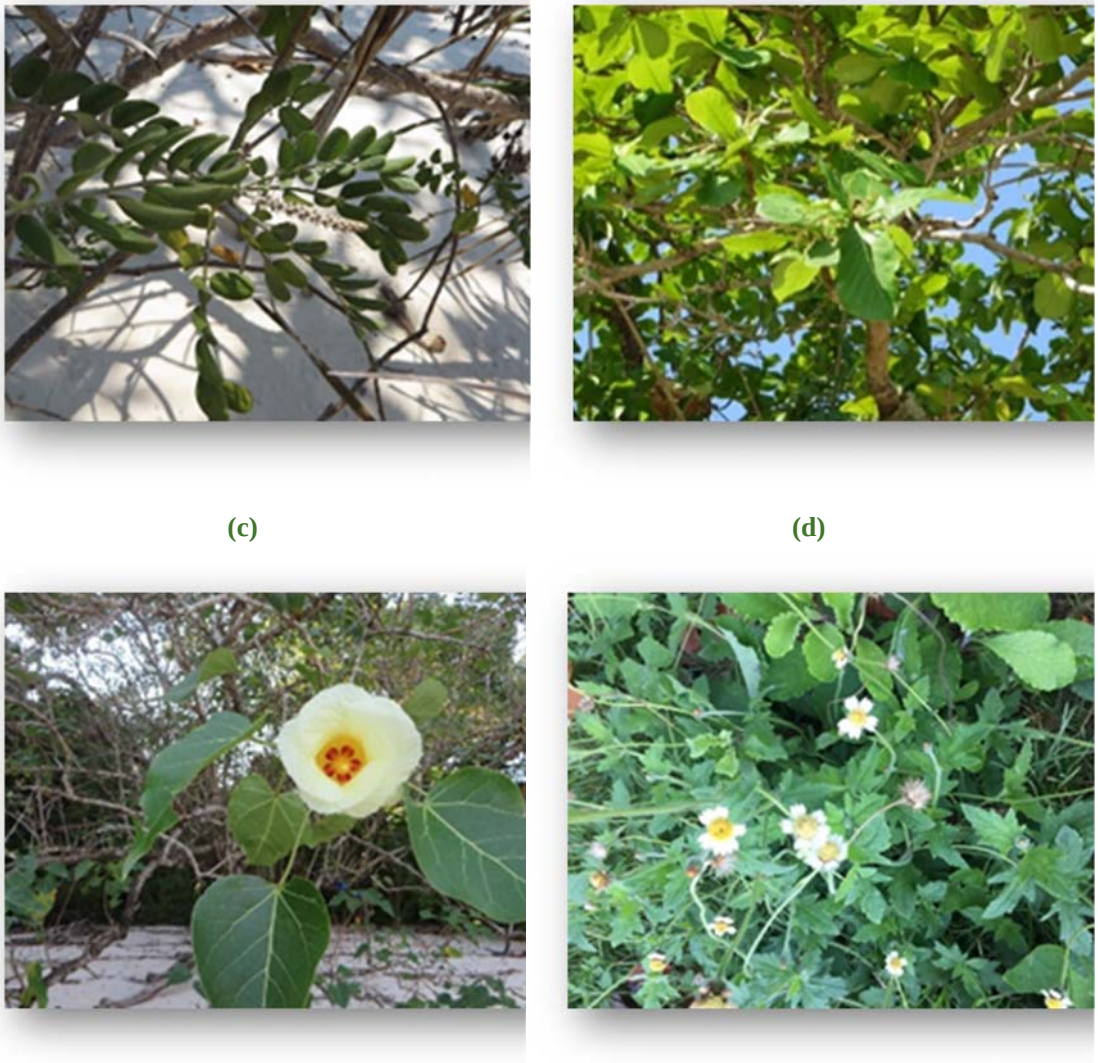
Plate (10), Scientific Name- 10(a) *Morinda angustifolia*, (b) *Potho sp,* (c) *Rhizophora mucronata,* (d) *Sonneratia caseolaris*

11(a) **(b)**

(c) **(d)**

Plate (11), Scientific Name- 11(a) *Premna integrifolia,* (b) *Rapanea yunnanensis,* (c) *Scaevola taccada,* (d) *Scoparia dulcis*

12 (a) **(b)**



(c) **(d)**

Plate (12), Scientific Name- 12(a) *Sophora tomentosa,* (b) *Terminalia catappa,* (c) *Thespesia populnea,* (d) *Tridax procumbens*

13(a) **(b)**

Plate (13), Scientific Name- 13(a) *Vatica odorata,* (b) *Vitex pubescens*

APPENDIX V: FAUNA

1(a) **(b)**

(c) **(d)**

Plate (1), 1 (a) Scientific name- *Diodon hystrix,* Common name- Spotted Porcupine Fish, (b) Scientific name- *Sepia aculeate,* Common name- Needle Cuttle Fish, (c) Scientific name- *Loligo devauceli,* Common name- Squid (d) Scientific name- *Plotosus canius,* Common name- Gray Catfish

2(a) **(b)**

(c) **(d)**

Plate (2), 2 (a) Scientific name- *Carangoides ferdau,* Common name- Blue Trerally, (b) Scientific name- Sphyraena barracuda, Common name- Great Barracuda, (c) Scientific name- *Tenualosa Ilisha,* Common name- Hilsa Shad, (d) Scientific name- *Scomberomorus guttatus,* Common name- Indo Pacific King Mackerel

3(a) **(b)**

(c) **(d)**

Plate (3), 3 (a) Scientific name- *Rastrelliger brachysoma,* Common name- Short Mackerel, (b) Scientific name- *Rastrelliger kanagurta,* Common name- India Mackerel, (c) Scientific name- *Decapterus* maruadsi, Common name- Japanese Scad, (d) Scientific name- *Selaroides leptolepis,* Common name- Yellowstripe Scad

4(a) **(b)**

(c) **(d)**

Plate (4), 4 (a) Scientific name- *Dussumieria acuta*, Common name- Rainbow Sardinem, (b) Scientific name- *Cephalopholis boenak,* Common name- Chocolate Hind, (c) Scientific name- *Epinephelus faveatus,* Common name- Barred- Chest Grouper, (d) Scientific name- *Lethrinus ornatus,* Common name- Ornate Emperor

5(a) **(b)**

(c) **(d)**

Plate (5), 5 (a) Scientific name- *Anguilla bengalensis,* Common name- Mottled Eel, (b) Scientific name- *Squalus acanthias,* Common name- Dog Fish, (c) Scientific name- *Terapon theraps,* Common name- Largescaled Therapon, (d) Scientific name- *Lutjanus vitta,* Common name- Brownstripe Red Snapper

6(a)

(b)

(c)

(d)

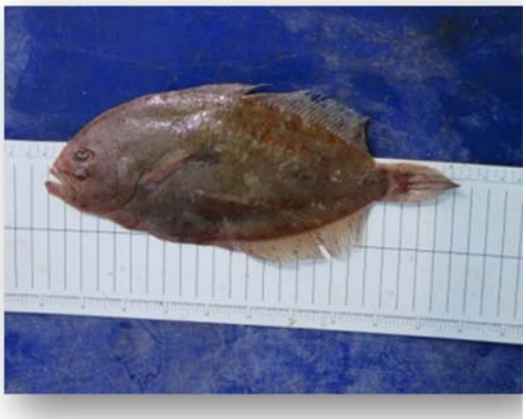


Plate (6), 6 (a) Scientific name- *Johnius belangerii,* Common name- Belanger's Croaker, (b) Scientific name- *Leiognathus equulus,* Common name- Ponylfish, (c) Scientific name- *Pastinachus sephen*, Common name- Cowtail Stingray, (d) Scientific name- *Pseudorhombus arsius,* Common name- Largetooth Flounder

7(a) **(b)**

(c) **(d)**

Plate (7), 7 (a) Scientific name- *Alutera monoceros*, Common name- Unicorn Leatherjacket, (b) Scientific name- *Sepia pharaonis*, Common name- Pharaoh Cuttle Fish, (c) Scientific name- *Scomberomorus commerson,* Common name- Spanish Mackerel, (d) Scientific name- *Lepturacanthus savala,* Common name- Savalani Hairtail

8(a)

(b)

(c)

(d)

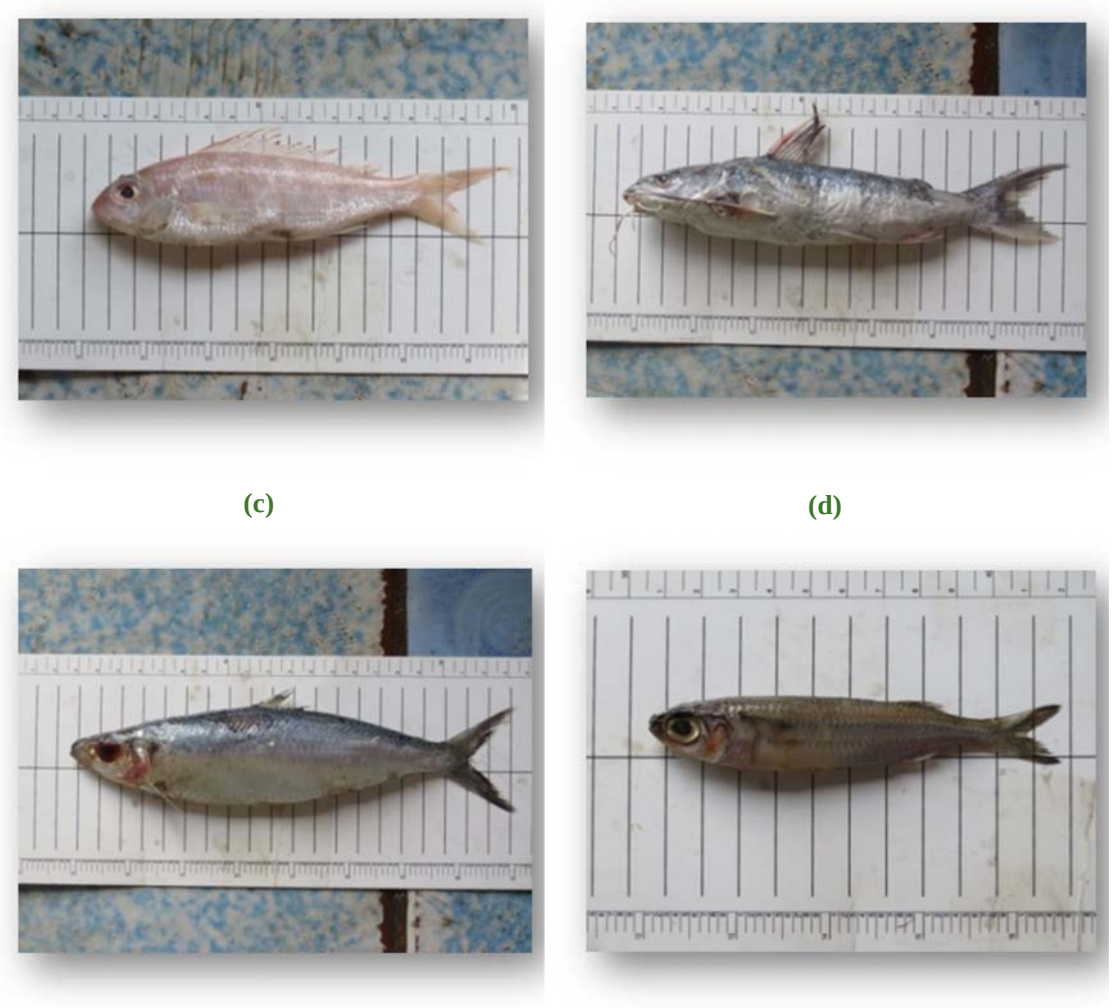
Plate (8), 8(a) Scientific name- *Muraenesox bagio,* Common name- Pike Eel, (b) Scientific name- *Seriolina sp*., Common name- Songoro Amberjack, (c) Scientific name- *Parastromateus niger,* Common name- Black Pomfret, (d) Scientific name- *Psettodes erumei,* Common name- Indian Spiny Turbot

9(a) **(b)**

(c) **(d)**

Plate (9), 9 (a) Scientific name- *Pennahia anea,* Common name- Grey Fish Croaker, (b) Scientific name- *Mugil cephalus,* Common name- Flathead Mullet, (c) Scientific name- *Tylosurus crocodiles*, Common name- Hound Needle Fish, (d) Scientific name- *Scolopsis bimaculatus*, Common name- Thumbprint Monocle Bream

10(a) **(b)**



(c) **(d)**

Plate (10), 10 (a) - Scientific name- *Nemipterus peronii,* Common name- Notchedfin Thread Fin Bream, (b) Scientific name- *Nemapteryx caelatus,* Common name- Engraved Catfish, (c) Scientific name- *Dussumieria acuta*, Common name- Rainbow Sardine, (d) Scientific name- *Dipterygonotus balteatus,* Common name- Mottled Fusilier

11(a) **(b)**

(c) **(d)**

Plate (11), 11 (a) Scientific name- *Tenualosa toil,* Common name- Toli Shad, (b) Scientific name- *Drepane punctata,* Common name- Spotted Sickle Fish, (c) Scientific name- *Siganus javus,* Common name- Streaked Spinefact, (d) Scientific name- *Clarias gariepinus,* Common name- African Catfish

12(a)

(b)

(c)

(d)

Plate (12), 12 (a) Scientific name- *Portunus sp*, (b) Scientific name- *Portunus sanquinolentus,* Common name- Redspot Swimming Crab, (c) Scientific name- *Portunus pelagicus,* Common name- Blue-Swimming Crab, (d) Scientific name- *Charybdis natatar,* Common name- Ridged Swimming Crab

13(a) **(b)**

(c)

Plate (13), 13 (a) Scientific name- *Charybdis sp*, (b) Scientific name- *Charybdis feriata*, Common name- Coral Crab, (c) Scientific name- *Ranina ranina*, Common name- Spanner Crab

1(a) **(b)**

(c) **(d)**

Plate (1), 1(a,b)- Scientific name- *Dicaeum cruentatum*, Common name- Scarlet-Backed Flowerpecker, (c) Scientific name- *Pbilentoma velatum*, Common name- Maroon-Breasted Philentoma, (d) Scientific name- *Treron vernans*, Common name- Pink-Necked Green Pigeon

2(a) **(b)**

(c) **(d)**

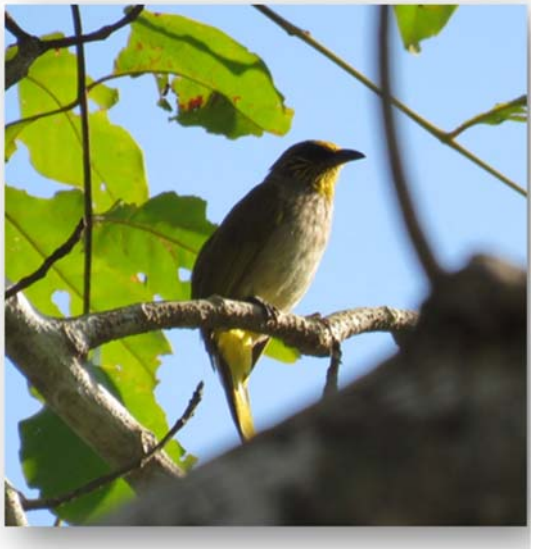
Plate (2), 2 (a,b) Scientific name- *Treron curvirostra*, Common name- Thick-Billed Green Pigeon, (c,d) Scientific name- *Ducular bicolor*, Common name- Pied Imperial Pigeon

3(a) **(b)**

(c) **(d)**

Plate (3), 3 (a) Scientific name- *Aceros corrugatus*, Common name- Wrinkled Hornbill, (b) Scientific name- *Corvus macrorhynchos*, Common name- Large-Billed Crow, (c) Scientific name- *Eurystomus orientalis*, Common name- Dollar Bird, (d) Scientific name- *Chloropsis cyanopogon*, Common name- Lesser Green Leafbird

4(a) **(b)**



(c) **(d)**

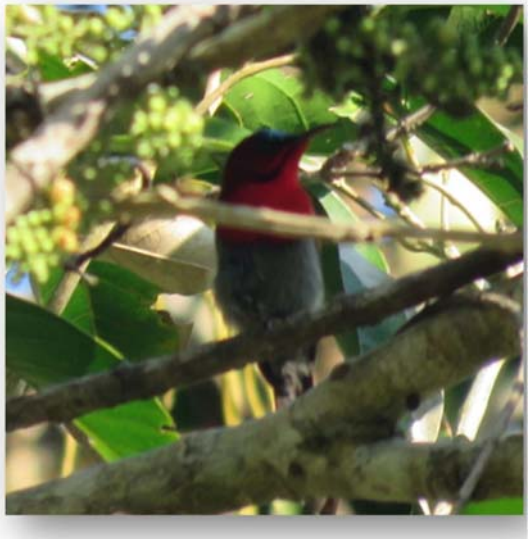
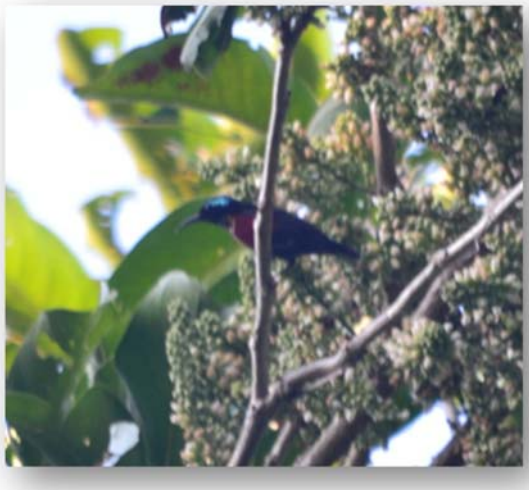


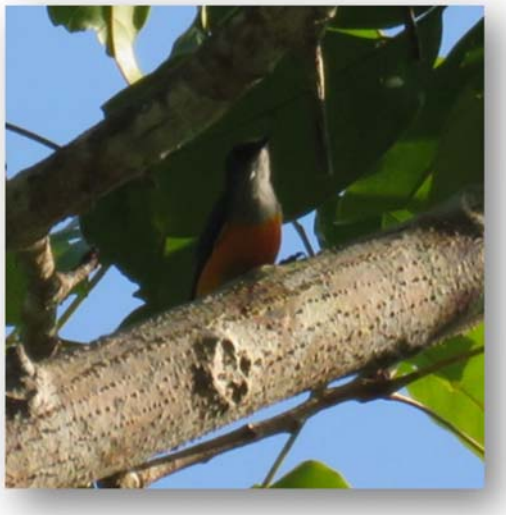
Plate (4), 4 (a,b) Scientific name- *Hypsipetes mcclellandii*, Common name- Mountain Bulbul, (c,d) Scientific name- *Aetbopyga siparaja*, Common name- Crimson Sunbird

5(a)



(b)

(c)



(d)

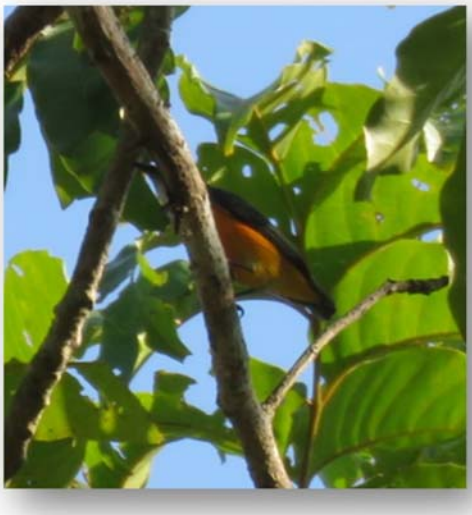


Plate (5), 5 (a) Scientific name- *Nectarinia calcostetba*, Common name- Copper-Throated Sunbird, (b) Scientific name- *Butastur indicus*, Common name- Grey-Faced Buzzard, (c,d) Scientific name- *Nectarinia zeylonica*, Common name- Purple-Pumped Sunbird

6(a) **(b)**

(c) **(d)**

Plate (6), 6 (a,b) Scientific name- *Aetbopyga ignicauda*, Common name- Fire-Tailed Sunbird, (c,d) Scientific name- *Nectatinia asiatica*, Common name- Purple Sunbird

7(a) **(b)**

(c) **(d)**

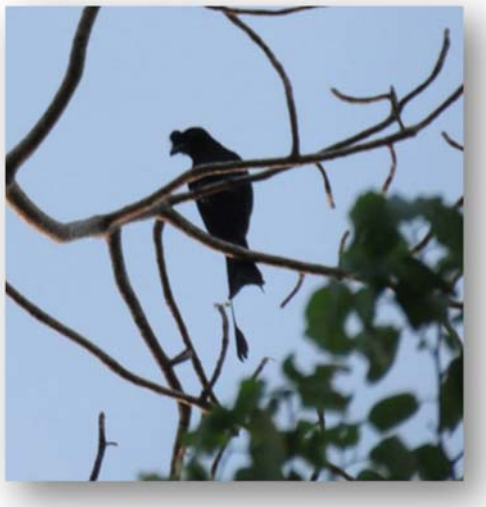


Plate (7), 7 (a,b) Scientific name- *Nectatinia jugularis*, Common name- Olive-Backed Sunbird, (c) Scientific name- *Dicrurus remifer*, Common name- Lesser Rasket-Tailed Drongo, (d) Scientific name- *Halcyon pileata*, Common name- Black-Capped Kingfisher

8(a) **(b)**

(c) **(d)**

Plate (8), 8 (a,b) Scientific name- *Ardea purpurea,* Common name- Purple Heron, (c,d) Scientific name- *Ardea herodias,* Common name- Great Blue Heron

9(a) **(b)**

(c) **(d)**

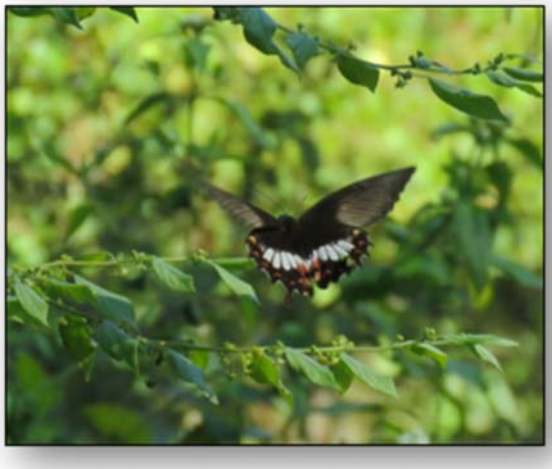
Plate (9), 9 (a,b) Scientific name- *Aredeola baccbus*, Common name- Chinese Pond Heron, (c,d) Scientific name- *Collacalia fuciphaga*, Common name- Edible-Nest Swiftlet

10(a) **(b)**

(c) **(d)**

Plate (10), 10 (a,b) - Scientific name- *Haliastur indus,* Common name- Brahminy Kite, (c) Scientific name- *Milvus migrans,* Common name- Black Kite, (d) Scientific name- *Haliaeetus leucogaster,* Common name- White-Bellied Sea Eagle

1(a)



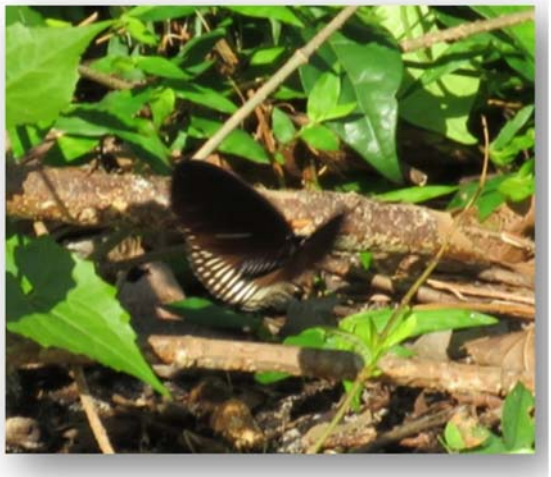
(b)

(c)

(d)

Plate (1), 1 (a) - Scientific name- *Papilio polytes*, Common name- Common Mormon, (b) Scientific name- *Papilio demoleus*, Common name- Common Lime, (c) Scientific name- *Catopsilia Pomona*, Common name- Common Emigrant, (d) Scientific name- *Eurema brigitta*, Common name- Small Grass Yellow

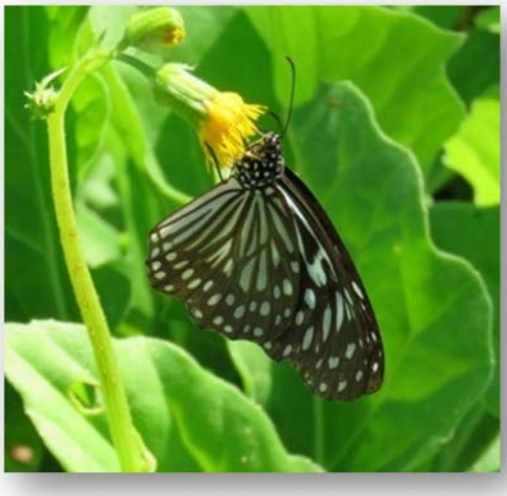
2(a) **(b)**



(c) **(d)**

Plate (2), 2 (a) Scientific name- *Euploea doubledayi*, Common name- Striped Black Crow, (b) Scientific name- *Euploea klugii,* Common name- Blue King Crow, (c) Scientific name- *Euploea core,* Common name- Common Crow, (d) Scientific name- *Euploea modesta*

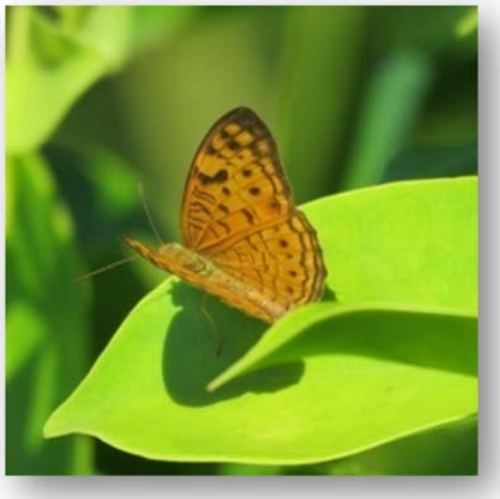
3(a) **(b)**



(c) **(d)**

Plate (3), 3 (a) Scientific name- *Danaus genutia,* Common name- Striped Tiger, (b) Scientific name- *Danaus Limniace,* Common name- Blue Tiger, (c) Scientific name- *Cupha erymanthis,* Common name- Rustic, (d) Scientific name- *Cirrochroa tyche,* Common name- Common Yeoman

4(a) **(b)**



(c) **(d)**

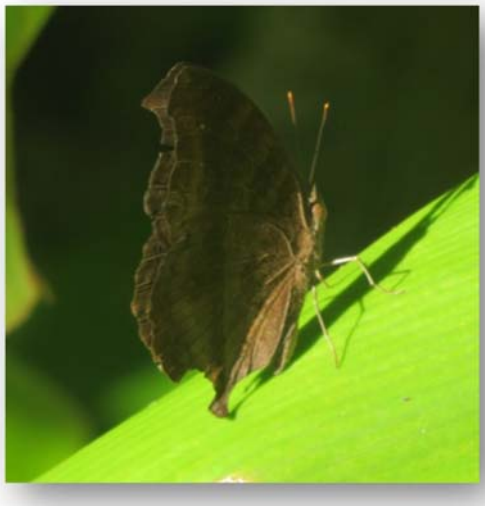


Plate (4), 4 (a) Scientific name- *Phalantha alcippe*, Common name- Small Leopard, (b) Scientific name- *Tanaecia flora*, Common name- Blue Count, (c) Scientific name- *Junonia iphita*, Common name- Chocolate Pansy or Chocolate Soldier, (d) Scientific name- *Vindula erota*, Common name- Common Cruiser

5(a) **(b)**

(c) **(d)**

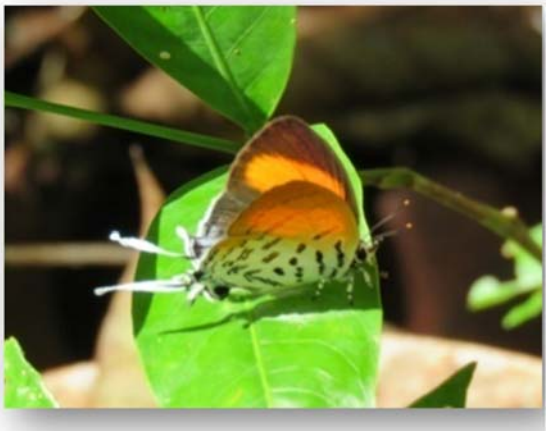


Plate (5), 5 (a) Scientific name- *Lebadea Martha*, Common name- The Knight, (b) Scientific name- *Ypthima similis*, Common name- Common Four-Ring Butterfly, (c) Scientific name- *Chilades pandava*, Common name-Plains Cupid, (d) Scientific name- *Drupadia ravindra*, Common name- Common Posy

6(a) **(b)**

(c) **(d)**

Plate (6), 6 (a) Scientific name- *Neomyrina nivea,* Common name- White Imperial Butterfly, (b) Scientific name- *Arhopala ammonides,* Common name- White Imperial Butterfly, (c,d) Scientific name- *Potanthus sp*, Common name- Darts.

1(a) **(b)**

Plate (1), 1 (a,b) Scientific name- *Macaca fascicularis*, Common name- Long-Tailed Macaque/ Crab-Eating Macaque.

Plate (1), 1 (a,b) Scientific name- *Mabuya longicaudata,* Common name- Long-Tailed Sun Skin, (c,d)Scientific name- *Calotes emma alticristatus,* Common name- Northern Forest Crested Lizard

2(a)

(b)

(c)

Plate (2), 2 (a) Scientific name- *Python reticulates,* Common name- Reticulated Python, (b,c) Scientific name- *Chrysopelea ornate,* Common name- Ornate Flying Snake.

1(a) **(b)**

(c) **(d)**

Plate (1), 1 (a,b) Scientific name- *Chelonia mydas*, Common name- Green Sea Turtle, (c,d) Scientific name- *Chelonia mydas*, Common name- Green Sea Turtle's Nest

APPENDIX VI: QUESTIONARRIE

ဝါးအလယ်ကျွန်းလူမှုစီးပွား စစ်တမ်းကောက်ယူခြင်း

စစ်တမ်းကောက်ယူသူအမည်.....ကောက်ယူသူလက်မှတ်.....

အိမ်ထောင်စုကုဒ်နံပါတ်.....ကောက်ယူသည့်နေ့ရက်: -------/-၁၂/ ၂၀၁၆

ကျေးရွာအမည်.....မြို့နယ်အမည်.....တိုင်း/ပြည်နယ်.....

၁။ ဖြေဆိုသူ၏ ယေဘုယျအချက်အလက်များ

၁။	ဖြေဆိုသူ၏အမည်			
၂။	မှတ်ပုံတင်အမှတ်			
၃။	ကျား၊မ		(၁) အမျိုးသား (၂) အမျိုးသမီး	အသက်:
၄။	လူမျိုး			
၅။	ပညာအရည်အချင်း (၀) စာမတတ်သူ၊ (၁) ဘုန်းတော်ကြီးကျောင်း၊ (၂) မူကြို၊ (၃) မူလတန်း၊ (၄) အလယ်တန်း၊ (၅) အထက်တန်း၊ (၆) ကောလိပ်နှင့်အထက်			
၆။	အလုပ်အကိုင်			
၇။	အိမ်ထောင်ဦးစီးနှင့် တော်စပ်ပုံ (၀) အိမ်ထောင်ဦးစီး, (၁) ခင်ပွန်း/ဇနီး၊ (၂) သား၊ (၃) သမီး၊ (၄) အဖေ၊ (၅) အမေ၊ (၆) ချွေးမ၊(၇) သားမက်၊ (၈) မြေး၊ (၉) အဖေ၊ (၁၀) အမေ၊ (၁၁) အစ်မ၊ ၊(၁၂) အစ်ကို၊ (၁၃) ခဲအို၊ (၁၄) ခယ်မ၊ (၁၅) အခြား(ဖော်ပြပါ)			

အပိုင်း (၁) လူမှုရေးဆိုင်ရာမေးခွန်းများ

၂။ မိသားစုဝင်များ၏ ယေဘုယျအချက်အလက်များ

၂.၁	မိသားစုအခြေအနေ	(၁) မိသားစုနှင့်အတူ နေထိုင်သည်။ (၂) ဆွေမျိုးများနှင့် ပေါင်း၍ နေထိုင်သည်။	
၂.၂	မိသားစုအတွင်း အလုပ်လုပ်ကိုင်သူဦးရေ		
၂.၃	မိသားစုအတွင်း အလုပ်လုပ်နိုင်သော်လည်း ယခု အလုပ်အကိုင်မရှိသူ ဦးရေ		

၂.၄	သင် သင်၏ရွာတွင် နေထိုင်သည်မှာ ဘယ်လောက်ကြာပြီလဲ။ (နှစ်)		

၃။မိသားစုဝင်အချက်အလက်များ

စဉ်	**အမည်**	ကျား/မ	အသက်	**အိမ်ထောင်ဦးစီးနှင့် တော်စပ်ပုံ**	**လူမျိုး**	**အလုပ်အကိုင်**	**ပညာရေး**	ကိုးကွယ်သည့် ဘာသာ	အားနည်းချက်
၁									
၂									
၃									
၄									
၅									
၆									
၇									
၈									
၉									
၁၀									
၁၁									

ကျား/မ - (၁) ကျား၊ (၂) မ

အိမ်ထောင်ဦးစီးနှင့်တော်စပ်ပုံ- (၀) အိမ်ထောင်ဦးစီး၊ (၁)ခင်ပွန်း/ဇနီး၊ (၂) သား၊ (၃) သမီး၊ (၄) ဖခင်၊ (၅)မိခင်၊ (၆) ချွေးမ၊ (၇)သမက်၊(၈) မြေး၊ (၉) ယောကျ်ွမထီး၊ (၁၀) ယောကျ်ွမ၊ (၁၁) ညီမ၊ (၁၂)ညီ၊ (၁၃) ခဲအို/ယောက်ဖ (၁၄)ခယ်မ/ယောက်မ၊ (၁၅) အခြား (ဖော်ပြပါ)

လူမျိုး - (၁) ဆလုံ၊ (၂) ဗမာ၊ (၃) ကရင်၊ (၄) အခြား (ဖော်ပြပါ)

အဓိကအလုပ်အကိုင် - (၁) ငါးဖမ်းသမား၊ (၂) လယ်သမား၊ (၃) အစိုးရဝန်ထမ်း၊ (၄) ရဲဝန်ထမ်း/စစ်သား၊ (၅)ကုမ္ပဏီပိုင်ရှင်၊ (၆) ကျွမ်းကျင်လုပ်သား၊ (၇)အလုပ်သမား၊ (၈) ကူးသန်းရောင်းဝယ်ရေး သို့မဟုတ် ဝန်ဆောင်မှု၊ (၉) သစ်တော/စိုက်ပျိုးသီးနှံရောင်းဝယ်ခြင်း၊ (၁၀) ပင်စင်စား၊ (၁၁) အငှားလုပ်သား၊ (၁၂)အိမ်ဆိုင်၊ (၁၃)အခြား (ဖော်ပြပါ)

ပညာရေး- (၀)ပညာမတတ်သူ၊(၁)ဘုန်းတော်ကြီးကျောင်း၊ (၂) မူကြို၊ (၃) မူလတန်း၊(၄) အလယ်တန်း၊ (၅) အထက်တန်း၊ (၆) ကောလိပ်၊ (၇) တက္ကသိုလ်/အဆင့်မြင့်ပညာ၊ (၈)အခြား

အားနည်းချက်- (၁) အမျိုးသမီးအိမ်ထောင်ဦးစီး၊ (၂) အသက်ကြီးသူ (အသက်(၆၉) အထက်)၊ (၃) ကိုယ်လက်အင်္ဂါချို့တဲ့သူ

၄။ အဆောက်အဦးနှင့်အိမ်ထောင်စုအနေအထား

၁။	အိမ်ဖွဲ့စည်းတည်ဆောက်ပုံ (ဥပမာ-ဝါး/ သစ်သား/သက်ကယ်/သွပ်)		
၁.၁	အမိုး		
၁.၂	ဘောင်		
၁.၃	ကြမ်းခင်း		
၁.၄	မျက်နှာကျက်		
၂။	အိမ်ပိုင်ဆိုင်မှုအခြေအနေ	(၁) ကိုယ်ပိုင်၊ (၂) အငှား	
၃။	ရေအရင်းအမြစ် (သောက်ရေ၊ ချက်ပြုတ်ရေ)	(၁) တွင်းရေ၊ (၂)စမ်းရေ၊ (၃) ပိုက်ရေ၊ (၄) ရေကန် ၊ (၅) မိုးရေ၊ (၆) သောက်ရေသန့်၊ (၇) ရေစည် (၈) အခြား (ဖော်ပြပါ)	
၄။	ရေ(ချိုးရေ၊ သုံးရေ)		
၅။	အိမ်သာ	(၁) ရေလောင်းအိမ်သာ (၂) ကျင်း (၃) အများသုံးအိမ်သာ (၄) အိမ်သာမရှိ (၅) အခြား (ဖော်ပြပါ)	
၆။	စွမ်းအင်သုံးစွဲမှု	(၁) သစ်၊ (၂) မီးသွေး၊ (၃) ရေနံ၊ (၄)မီးစက်၊ (၅) ဘက်ထရီ၊ (၆) အစိုးရ မဟာဓါတ်အားလိုင်း (၇) မရှိ၊ (၈) အခြား(ဖော်ပြပါ)	
၇။	ချက်ပြုတ်ရန်အတွက်စွမ်းအင်သုံးစွဲမှု		
၈။	အိမ်မှထွက်ရှိသော ရေဆိုးစီးဆင်းမှု	(၁) ရေမြောင်း၊ (၂) မြေထဲသို့တိုက်ရိုက် (၃) ရေကန် /ရေအိုင်/ တူးမြောင်း	

		(၄) အခြား (ဖော်ပြပါ)၊ (၅) မသိ	
၉။	သောက်ရေ သုံးရေ သုံးစွဲရတာ အဆင်ပြေလား။	(၁) ပြေ (၂) မပြေ	
၁၀။	ရေရရှိမှုသည် လုံလောက်မှုရှိပါသလား၊	(၁) ရှိ (၂) မရှိ	
၁၁။	ရေရရှိမှုသည် ရာသီဥတုအပေါ် မူတည်ရှိ/မရှိ ဖော်ပြပါ။	(၁) ရှိ၊ (၂) မရှိ	

၅။ သန့်ရှင်းရေးစနစ်

အမှိုက်ကိုမည်ကဲ့သို့စွန့်ပစ်သနည်း။		(၁) ရေအိုင်/မြစ်ချောင်းသို့စွန့်ပစ် (၂) မြေမြုပ် (၃) မီးရှို့ (၄) မည်သည့်နေရာမဆို စုပုံသည်။ (၅) သတ်မှတ်နေရာတွင်သာ စုပုံသည်။ (၆) အခြား
အမှိုက်စွန့်ပစ်သည့် အကြိမ်အရေအတွက်		(၁) နေ့စဉ် (၂) တစ်ပါတ်လျှင် သုံးကြိမ် (၃) အပတ်စဉ် (၄) လစဉ်

၆။ ပညာရေး

သင်၏ကလေးများကျောင်းတက်/မတက်ပြောပြပါ။ အကယ်၍အဖြေက(၁)ဖြစ်ခဲ့လျှင် နံပါတ်(၇)ကျန်းမာရေးအခြေအနေအကြောင်း ကျော်မေးပါ။		(၁) တက် (၂) မတက် (၉၉) မသက်ဆိုင်ပါ

၇။ ကျန်းမာရေး

၇.၁ သင်၏ရွာတွင် ကျန်းမာရေးဆေးပေးခန်းရှိပါသလား	(၁) ရှိ (၂) မရှိ	

အသေးစိတ်အချက်အလက်		
(၁) သင်ဖျားနာခဲ့လျှင် ကျန်းမာရေးဆေးပေးခန်းသို့ သွားပါသလား။	(၁) သွားပါသည် (၂) မသွားပါ	
(၂) သင်ဖျားနာခဲ့လျှင် မည်သည့်နေရာကို သွားပါသနည်း။	(၁) ဆေးရုံ (၂) ကျန်းမာရေး စောင့်ရှောက်မှု အဆောက်အအုံ (၃) ပုဂ္ဂလိကဆေးခန်း (၄) တိုင်းရင်းဆေးခန်း (၅) ဆေးဆိုင် (၆) ပယောဂဆရာ (၇) အခြား (ဖော်ပြပါ)	

၇.၂ အကယ်၍ရှိခဲ့လျှင် မည်သည့်ရောဂါအမျိုးအစားဖြစ်သနည်း။

(၁) အအေးမိဖျားနာခြင်း	
(၂) အသက်ရှူလမ်းကြောင်းဆိုင်ရာ	
(၃) အစာအဆိပ်သင့်ခြင်း	
(၄) တုပ်ကွေးရောဂါ	
(၅) ထိခိုက်ဒဏ်ရာ	
(၆) အခြား	

၇.၃ အကယ်၍ဖျားနာခဲ့လျှင် ကျန်းမာရေးဆေးခန်းသို့ မသွားရသည့်အကြောင်းအရင်းကို ရှင်းပြပါ။

(၁) ဆေးခန်းနှင့်ဝေးကွာခြင်း	
(၂) အချိန်မပေးနိုင်ခြင်း	
(၃) စရိတ်မတတ်နိုင်ခြင်း	
(၄) ကျန်းမာရေးဝန်ဆောင်မှုမကောင်းခြင်း	
(၅) ဖျားနာမှုမပြင်းထန်ခြင်း	
(၆) အခြား(ဖော်ပြပါ)	

၈။ မြေယာပိုင်ဆိုင်မှု

မေးခွန်း(၁) သင်၌ ကိုယ်ပိုင်မြေယာပိုင်ဆိုင်မှု ရှိပါသလား။ (၁) ရှိပါသည်။ (၂) မရှိပါ။ အကယ်၍မရှိခဲ့လျှင်ဤအပိုင်းကိုကျော်လိုက်ပါ။	

မေးခွန်း (၂) စိုက်ပျိုးမြေ	မေးခွန်း (၃) သစ်တောမြေ	မေးခွန်း (၄) စိုက်ပျိုး၍ မရသောမြေ

၉။ စိုက်ပျိုးမြေ

စိုက်ပျိုးသည့် ဧရိယာ (ဧက)	စပါး/သီးနှံ	တစ်နှစ်ခံ/နှစ်ရှည်ခံပင်	အခြား

၁၀။ အိမ်မွေးတိရစ္ဆာန်မွေးမြူရေး

အရေအတွက်	နွား	ဝက်	ကြက်/ဘဲ	ဆိတ်	အခြား	

၁၁။ စိုက်ပျိုးရေးနှင့်မွေးမြူရေးအတွက် ရေသုံးစွဲမှု

သင်၌စိုက်ပျိုးမြေရှိခဲ့လျှင် မည်သည့်ရေကို အသုံးပြုသနည်း။

(၁) စမ်းရေ/မြစ်ရေ၊ (၂) တွင်းရေ၊ (၃) ရေအိုင်၊ (၄) မိုးရေ၊ (၅) ချောင်းလက်တက်

၁၂။ မိသားစုဝင်ငွေ နှင့် အသုံးစရိတ်

၁၂.၁။ ဝင်ငွေရရှိမှု

မိသားစုတစ်နှစ်ပျမ်းမျှဝင်ငွေ ..... ကျပ်

အဓိကဝင်ငွေ ရရှိမှုပုံစံ:

(လစဉ်မိသားစုဝင်ငွေ (ကျပ်ဖြင့်) (မွေးမြူရေးလုပ်ငန်း၊ ဥယျာဉ်ခြံလုပ်ငန်းနှင့် စိုက်ပျိုးရေးလုပ်ငန်းမှ တစ်နှစ်ဝင်ငွေကိုမေးပြီး လစဉ်ဝင်ငွေတွက်ရန် ၁၂ ဖြင့်စားပါ။)

ငါးဖမ်းလုပ်ငန်း	ကျပ်
အမဲလိုက်လုပ်ငန်း	ကျပ်

ဥယျာဉ်ခြံသီးနှံ နှင့် စိုက်ပျိုးရေးလုပ်ငန်း((သရက်ခြံ, သီဟိုဠ်, အုန်းသီးခြံ, ကွမ်းခြံ, ငှက်ပျောခြံ,စသည်ဖြင့်).	ကျပ်
တိရိစ္ဆာန်မွေးမြူရေး	ကျပ်
သစ်လုပ်ငန်း	ကျပ်
ကူးသန်းရောင်းဝယ်ရေး	ကျပ်
စက်ရုံလုပ်ငန်း	ကျပ်
အစိုးရ	ကျပ်
မိသားစု (သို့မဟုတ်) ဆွေမျိုးများမှ ဝင်ငွေထောက်ပံမှုရရှိ သူ	ကျပ်
အခြား (ဖော်ပြပါ)	ကျပ်

၁၂.၂။ အသုံးစရိတ်

အိမ်ထောင်စုပျမ်းမျှလစဉ်အသုံးစရိတ်

ထမင်းစရိတ်	_____ ကျပ်
ကျန်းမာရေးအသုံးစရိတ်	_____ ကျပ်
ပညာရေး	_____ ကျပ်
သွားလာရေး	_____ ကျပ်
အခြားအသုံးစရိတ်များ (ရေစွမ်းအင်) လူမှုရေးနှင့် ဘာသာရေးပွဲများ	_____ ကျပ်
အခြား (ဖော်ပြပါ)	_____ ကျပ်

***လူမှုရေးနှင့် ဘာသာရေးပွဲများတွင် နှစ်စဉ်အသုံးစရိတ်ကို မေးပြီး လစဉ်အသုံးစရိတ်ရရန် ၁၂ ဖြင့် စားပါ။

၁၂.၃။ လွန်ခဲ့သော ငါးနှစ် ထက်စာလျှင် မိသားစုစီးပွားရေးအခြေအနေ ပြောင်းလဲမှုရှိပါသလား။

(၁) မပြောင်းလဲပါ။ [ ] အကြောင်းပြချက်:

_____

(၂) ပို၍ကောင်းပါသည်။ [ ] အကြောင်းပြချက်:

_____

(၃) ပို၍ဆိုးလာပါသည်။ [ ] အကြောင်းပြချက်:

_____

၁၂.၄။ အကြောင်းပြချက်ကဘာလို့ထင်ပါသလဲ။

၁၂.၅။ သင့်မိသားစုဝင်တွေ ရရှိမှုသည် ယောကျ်ားများပေါ်တွင် မူတည်နေပါသလား။ (သို့မဟုတ်) မိန်းမများပေါ်တွင် မူတည်နေပါသလား။ သင့်အမြင်ကိုပြောပြပါ။

ယောကျ်ားများရှာဖွေသော စုစုပေါင်းဝင်ငွေ ရာခိုင်နှုန်း .....%.

မိန်းမ များရှာဖွေသော စုစုပေါင်းဝင်ငွေ ရာခိုင်နှုန်း .....%.

၁၂.၆။ ကလေးစောင့်ရှောက်ခြင်း၊ အိမ်ပြင်ခြင်းနှင့် စိုက်ပျိုးရေးလုပ်ငန်းများတွင် အိမ်နီးချင်းတစ်ဦးနှင့် တစ်ဦး ကူညီကြပါသလား။

၁၃။ စီမံကိန်းအပေါ် သိမြင်နားလည်ခြင်း

၁၃.၁။ စီမံကိန်းအကြောင်းသိရှိပါသလား။

(၁) သိသည်။ (၂) မသိပါ။

၁၃.၂။ စီမံကိန်းအပေါ် သင်ဘယ်လိုမြင်ပါသလဲ။

၁၃.၃။ ဂါးအလယ် ဟိုတယ်စီမံကိန်း တည်ဆောက်ခြင်း ကြောင့် ရရှိလာမည့် ဘယ်လိုအကျိုးကျေးဇူးများ **ရရှိမည်ဟုထင်ပါသလဲ။**

၁၃.၄။ ယခုစီမံကိန်းကြောင့် ဖြစ်ပေါ်လာမည့် ဆိုးကျိုးများနှင့်ပတ်သတ်၍ သင်၏ထင်မြင်ချက်ကို ဖော်ပြပါ။

၁၃.၆။ ဂါးအလယ်ကျွန်းတွင် စီမံကိန်းလုပ်ငန်းစပါက ခရီးသွားလုပ်ငန်းများ သင်တို့၏ ဒေသယဉ်ကျေးမှုအမွေအနှစ်ကို လေ့လာကြည့်ရှုရန် လာရောက်မှုအပေါ် သင်၏သဘောထားကို ဖော်ပြပါ။

၁၃.၇။ ခရီးသွားဧည့်သည်များ ဂင်ရောက်လာမှုအပေါ် သင့်၏ အမြင်

၁၃.၈။ ဒေသအဖွဲ့အစည်းများတွင် သင်ပါဂင်မှု ရှိပါသလား။ ဖော်ပြပါ။

ဖြေဆိုသူ

လက်မှတ်

အပိုင်း (၂) ငါးဖမ်းခြင်းနှင့် ဇီဝမျိုးစုံမျိုးကွဲ

၁၈။ ငါးဖမ်းခြင်း

သင် ငါးဖမ်းပါသလား။

၁=ဖမ်းပါသည်။

၂=မဖမ်းပါ။

အဖြေ(၁)ဖြစ်ခဲ့လျှင်အောက်ပါမေးခွန်းတို့ကိုဖြေဆိုပါ။

(၁၈.၁)

ရွာ (သို့) အဖွဲ့အစည်းအမည်	အိမ်ထောင်စု အရေအတွက်	လူဦးရေ	ငါးဖမ်းခြင်းအပေါ် မှီခိုသည့် ဦးရေ

၁၈.၂

ဖမ်းဓလာသောငါးအမျိုးအစား၏တည်နေရာကိုမြေပုံပေါ်တွင်မှတ်သားပေးပါ။(အောက်ပါနံပါတ်များကိုအသုံးပြုပါ)									
စဉ်	ငါး အမျိုး အစား	ငါးဖမ်း သည့် နည်း လမ်း	ရာသီ (မှ-သို့)	ငါးဖမ်း သမား ဦးရေ	အပတ် စဉ် ငါးရှိမှု အခြေ အနေ	ရေယာဉ် အမျိုး အစား	နှစ်စဉ် ငါးဖမ်း သမား တစ်ယောက် ချင်းစီမှ ငါးရှိမှု အခြေ အနေ (ကီလို ကရမ်)	ရေ အနက် (ရေတိမ် ရေနက် ရေ အောက် ကြမ်းပြင်)	ရောင်းချ မှုပုံစံ
၁									
၂									
?									

ဖမ်းဓိလာသောငါးအမျိုးအစား၏တည်နေရာကိုမြေပုံပေါ် တွင်မှတ်သားပေးပါ။(အောက်ပါနံပါတ်များကိုအသုံးပြုပါ)									
စဉ်	ငါး အမျိုး အစား	ငါးဖမ်း သည့် နည်း လမ်း	ရာသီ (မှ-သို့)	ငါးဖမ်း သမား ဦးရေ	အပတ် စဉ် ငါးရှိမှု အခြေ အနေ	ရေယာဉ် အမျိုး အစား	နှစ်စဉ် ငါးဖမ်း သမား တစ်ယောက် ချင်းစီမှ ငါးရှိမှု အခြေ အနေ (ကီလို ကရမ်)	ရေ အနက် (ရေတိမ် ရေနက် ရေ အောက် ကြမ်းပြင်)	ရောင်းချ မှုပုံစံ
၄									
၅									
၆									
၇									
၈									
၉									
၁၀									

ငါးဖမ်းသည့်နည်းလမ်း- (၁) ငါးများချိတ်ဖြင့်ဖမ်းခြင်း၊ (၂) ကွန်ပစ်ခြင်း၊ (၃) မြီးထောင်၊ (၄) မျောပိုက်၊ (၅) ငါးများတံဖြင့်ဖမ်းခြင်း၊ (၆) တရွတ်ဆွဲဖမ်းခြင်း၊ (၇) ကမ်းခြေပိုင်းချုပ်ငါးဖမ်းခြင်း၊

(၈) ပိုင်းပတ်ပိုက်ကွန်ချ၍ဖမ်းခြင်း၊ (၉) မှိန်းထိုးငါးဖမ်းခြင်း၊ (၁၀) ပိုက်ချငါးဖမ်းခြင်း၊ (၁၁) လှေဖြင့်ငါးဖမ်းခြင်း

ငါးဖမ်းသမားဦးရေ - (၁) တစ်ဦးချင်း၊ (၂) နှစ်ယောက်တွဲ၊ (၃) အဖွဲ့လိုက်

ယာဉ်အမျိုးအစား - (၁) **မော်တော်ဘုတ်**၊ (၂) ကန္ဦလှော

ရောင်းချမှုပုံစံ - (၁) ကိုယ်တိုင် ရွာထဲတွင် ရောင်းချခြင်း၊ (၂) ကိုယ်တိုင် စျေးတွင်ရောင်း၊ (၃) စျေးကွက် (ငါးဖိုင်သို့ရောင်း)၊ (၄) ဒေသခံစီးပွားရေး လုပ်ငန်းရှင်များသို့ ရောင်း

အထက်တွင် ဖော်ပြထားသော မျိုးစိတ်များကို ဇယားတွင်ဖြည့်ပါ။

၁၈.၃

မျိုးစိတ်	တစ်နှစ်အတွင်း ငါးဖမ်းသမား တစ်ဦးချင်းမှ ငါးဖမ်း**ဆီး**ရရှိမှု (ပိဿာ/ကီလို)	ငွေ/အသက်ရှင်ရပ်တည်မှု ငွေနှင့်ငါးရရှိမှု(ငွေ/အလေးချိန်)	
		- အသက်ရှင်ရပ်တည်မှု - ဝင်ငွေရရှိမှု. - အကယ်၍ဝင်ငွေရရှိခဲ့လျှင်ပမာဏကို ဖော်ပြပါ။------------------	
		- အသက်ရှင်ရပ်တည်မှု - ဝင်ငွေရရှိမှု. - အကယ်၍ဝင်ငွေရရှိခဲ့လျှင်ပမာဏကို ဖော်ပြပါ။------------------	
		- အသက်ရှင်ရပ်တည်မှု - ဝင်ငွေရရှိမှု. - အကယ်၍ဝင်ငွေရရှိခဲ့လျှင်ပမာဏကို ဖော်ပြပါ။------------------	
		- အသက်ရှင်ရပ်တည်မှု - ဝင်ငွေရရှိမှု. - အကယ်၍ဝင်ငွေရရှိခဲ့လျှင်ပမာဏကို ဖော်ပြပါ။------------------	
		- အသက်ရှင်ရပ်တည်မှု - ဝင်ငွေရရှိမှု. - အကယ်၍ဝင်ငွေရရှိခဲ့လျှင်ပမာဏကို ဖော်ပြပါ။------------------	
		- အသက်ရှင်ရပ်တည်မှု - ဝင်ငွေရရှိမှု. - အကယ်၍ဝင်ငွေရရှိခဲ့လျှင်ပမာဏကို ဖော်ပြပါ။------------------	
		- အသက်ရှင်ရပ်တည်မှု - ဝင်ငွေရရှိမှု. - အကယ်၍ဝင်ငွေရရှိခဲ့လျှင်ပမာဏကို ဖော်ပြပါ။------------------	
		- အသက်ရှင်ရပ်တည်မှု - ဝင်ငွေရရှိမှု.	

မျိုးစိတ်	တစ်နှစ်အတွင်း ငါးဖမ်းသမား တစ်ဦးချင်းမှ ငါး**ဖမ်းဆီး**ရရှိမှု **(ဝိဿာ/ကီလို)**	ငွေ/အသက်ရှင်ရပ်တည်မှု ငွေနှင့်ငါးရရှိမှု(ငွေ/အလေးချိန်)	
		- အကယ်၍ဝင်ငွေရရှိခဲ့လျှင်ပမာဏကို ဖော်ပြပါ။----------	
		- အသက်ရှင်ရပ်တည်မှု - ဝင်ငွေရရှိမှု. - အကယ်၍ဝင်ငွေရရှိခဲ့လျှင်ပမာဏကို ဖော်ပြပါ။----------	

၁၈.၄

ရာသီအလိုက် ငါးဖမ်းခြင်း နှင့် ရိတ်သိမ်းခြင်း ဇယားကို ဖော်ပြပါ။

လုပ်ဆောင်ချက်	**ဇန်နဝါရီ**	**ဖေဖော်ဝါရီ**	**မတ်**	**ဧပြီ**	**မေ**	**ဇွန်**	**ဇူလိုင်**	**သြဂုတ်**	**စက်တင်ဘာ**	**အောက်တိုဘာ**	**နိုဝင်ဘာ**	**ဒီဇင်ဘာ**
အလွန်အမင်းငါးဖမ်းခြင်း												
အသင့်အတင့်ငါးဖမ်းခြင်း												
ငါးဖမ်းမှုလျော့နည်းခြင်း												
ငါးမဖမ်းခြင်း												
မုတ်သုန်ရာသီဥတု												
ပွဲတော်												

ဝင်ငွေအများဆုံးရရှိသည့်လ												
ဝင်ငွေအနည်းဆုံးရရှိသည့်လ												

၁၈.၅။ ကျေးရွာမှငါးဖမ်းဇရိယာသို့သွားရောက်ရာတွင်အဆင်ပြေသောတစ်ခုကိုရွေးချယ်ပါ။

- ငါးဖမ်းဇရိယာသည်ရွာနှင့် အလှမ်းဝေးပြီး အပြင်လူများဝင်ရောက်နိုင်ခြင်းမရှိပါ။
- ရွာသူရွာသားများသည် ငါးဖမ်းဇရိယာများကို ဝေမျှအသုံးချပြီး ဖမ်းယူခြင်းအတွက်ယှဉ်ပြိုင်ကြသည်။
- ငါးဖမ်းဇရိယာကိုအခြားရွာသူရွာသားများနှင့်လည်းပူးပေါင်းလုပ်ကိုင်ကြသည်။
- ငါးဖမ်းနေရာအတည်တကျမရှိပါ။ ငါးရှိသည့်နေရာတွင်သာဖမ်းပါသည်။

၁၈.၆။ အောက်ပါအချက်များက ငါးဖမ်းခြင်းကို ထိန်းချုပ်ထားလျှင် ရွေးချယ်ပေးပါ။

- ရွာသားများအား ငါးဖမ်းဇရိယာများနှင့်ဖမ်းနိုင်သောငါးအရွယ်အစားများကိုကန့်သတ်ထားခြင်းမရှိပါ။
  - ရွာသားများ(သို့)ကျေးရွာခေါင်းဆောင်သည် ငါးဖမ်းနိုင်သောကာလအပိုင်းအခြားများကို သတ်မှတ်ထားပါသည်။
  - ရွာသားများ(သို့)ကျေးရွာခေါင်းဆောင်သည် ဖမ်းနိုင်သောငါးအရွယ်အစားများကိုကန့်သတ်ထားပါသည်။
  - ကျေးရွာခေါင်းဆောင်သည် အရွယ်အစားသေးငယ်သော ငါးဖမ်းခြင်းကို တားမြစ်ထားပါသည်။
  - ငါးဖမ်းဇရိယာ အသုံးပြုခွင့်နှင့် ပတ်သက်ပြီး နိုင်ငံတော်အဆင့်/ပြည်နယ်အဆင့် သတ်မှတ်ထားသော ပြင်ပနည်းဥပဒေများ ရှိပါသည်။

၁၈.၇။ ငါးဖမ်းခြင်းနည်းလမ်းများ၊ ပစ္စည်းများနှင့် လုပ်ငန်းစဉ်

၁။ ကျေးရွာရှိ ငါးဖမ်းသမားများ (ရာခိုင်နှုန်းဖြင့်)

မိမိပိုင်လှေနှင့် ပစ္စည်းပိုင်ဆိုင်သူ အရေအတွက် .....%

ငှားရမ်းလုပ်ကိုင်သူ အရေအတွက်.....%

၂။ ကျေးရွာငါးဖမ်းသမားများပိုင်ဆိုင်သည့် ပစ္စည်းစာရင်း ဖော်ပြပါ။

၁။
၂။
၃။

၁၈.၈။ အကောင်းဆုံးသော ငါးဖမ်းထွက်သည့် ပုံစံ ကို ဖော်ပြပါ။ (တခုထက်ပိုပြီး ရွေးချယ်နိုင်ပါသည်။):

(၁) နေ့ဘက် ငါးဖမ်းခြင်း (ညအချိန်တွင် အိမ်သို့ပြန်ရောက်သည်)

(၂) ညဘက် ငါးဖမ်းခြင်း (နေ့စဉ် အိမ်သို့ပြန်ရောက်သည်)

(၃) ရက်ရှည်ငါးဖမ်းထွက်ခြင်း _____ ရက် (ညဖက်တွင် ကမ်းခြေတွင် စခန်းချသည်)

(၄) ရက်ရှည်ငါးဖမ်းထွက်ခြင်း _____ ရက် (ပင်လယ်ပြင်တွင်သာ ရက်ရှည်နေသည်)

(၅) အချိန်ဇယားမရှိပါ

(၆) အခြား

၁၈.၉။ ရရှိသောငါးအမျိုးအစားများကိုဖော်ပြပါ။

(၁) ငါးမျိုးစိတ်တစ်မျိုးသာလျှင်

(၂) တစ်နှစ်ပတ်လုံး ငါးမျိုးစိတ်အမျိုးမျိုးနှင့် ပင်လယ်မျိုးစိတ်များ

(၃) တခြားမျိုးစိတ်များ (ငါးရှဉ်း၊ အခွံမာငါးများ၊ ပုစွန်တုပ်ကြီး၊ ပုစွန်လုံး၊ ပင်လယ်ဒိုက်ပင်)

၁၈.၁၀။ ငါးဖမ်းသမားများ အများဆုံးအသုံးပြုသော ငါးဖမ်းနည်းအမျိုးအစားကို ဖော်ပြပါ။

(၁) ငါးမျှားချိတ်ဖြင့် ငါးဖမ်းခြင်း	(၄) လှေဖြင့်ငါးဖမ်းခြင်း	(၇) ကမ်းခြေပိုင်းချုပ်ငါးဖမ်းခြင်း	(၁၀) ရိုးရာငါးဖမ်းခြင်း
(၂) ကွန်ပစ်ခြင်း	(၅) မျောပိုက်	(၈) အပိုင်းပတ်ပိုက်ချခြင်း	(၁၁) အခြား
(၃) မြီးထောင်	(၆) ဘုံကျောင်းပုံငါးဖမ်းခြင်း	(၉) မှိန်းထိုးငါးဖမ်းခြင်း	

၁၈.၁၁။ ငါးဖမ်းပြီးအပြန်

အောက်တွင်ဖော်ပြထားမှုပေါ် အခြေခံပြီး ငါးဖမ်းလုပ်ငန်းဖြင့် အသက်မွေးဝမ်းမှု အခြေအနေကို ဖော်ပြပါ။

- ငါးဖမ်းခြင်းလုပ်ငန်းသည် အိမ်ထောင်စုတစ်ခုလုံးအတွက် အဓိကဝင်ငွေဖြစ်ပါသည်။.....%

- ငါးဖမ်းလုပ်ငန်းသည် အိမ်ထောင်စုရဲ့အဓိက ဝင်ငွေဖြစ်သော်လည်း တခြားလုပ်ငန်းပေါ်တွင်လည်း မှီခိုရပါသည်။..... %

- ငါးဖမ်းသမားများသည် ရာသီဥတုပေါ်မူတည်ပြီး ငါးဖမ်းပါက ကျန်သည့်အချိန်တွင် ဝင်ငွေအတွက် တခြားအလုပ်လုပ်ပါသလား။.....%

- ငါးဖမ်းခြင်းသည် စားဖို့အတွက်သာ ဖြစ်ပါသည်။ မိသားစုဝင်ငွေတစ်ခုလုံးကို မကာမိပါ။ ----------%

၁၈.၁၂။ အချိန်ပိုင်းငါးဖမ်းသမားများသည် တခြားလုပ်ငန်းပေါ်မှ ဝင်ငွေရရှိမှု အခြေအနေ။

၁။	
၂။	
၃။	
၄။	

၁၈.၁၃ ။ ငါးဖမ်းလုပ်ငန်းကို အထောက်အကူပြုရန် အိမ်တွင်းလက်မှုလုပ်ငန်းကို ဖော်ပြပါ။ (ငါးဖမ်းပိုက်ရောင်းခြင်း)

၁။

၂။
၃။

၁၈.၁၄။ ရရှိလာသော ငါးများ ရောင်းချမှု အကောင်းဆုံးပုံစံကို ဖော်ပြပါ။ (တစ်ခုထက်ပိုပြီး ရွေးချယ်ပေးပါ)

- အနီးအနားရှိ ကျေးရွာများသို့ တိုက်ရိုက်ရောင်းချခြင်း။
- ဈေးကွက်အတွင်း ရောင်းချခြင်း။
- ကျေးရွာရှိ ဈေးကွက်တာဝန်ခံများထံ ရောင်းချခြင်း။
- မိသားစုစီးပွားရေးတွင် ရောင်းချခြင်း။

၁၈.၁၅။ ငါးဖမ်းလုပ်ငန်းအပေါ် အဖွဲ့အစည်းများ၏ ယုံကြည်မှု

ကျေးရွာများသည် မိသားစုဝင်ငွေအတွက် ငါးဖမ်းလုပ်ငန်းပေါ်မူတည်ခြင်းကို သင်ဘယ်လိုထင်ပါသလဲ။

- ကျေးရွာထုအတွက် ငါးနှင့် ပင်လယ်ရေထွက် များသည် အဓိကဝင်ငွေဖြစ်ပါသည်။ (ကျေးရွာဝင်ငွေ၏ ၈၀ %ကျော်)
- ငါးဖမ်းခြင်း သည် ကျေးရွာ၏ အဓိက ဝင်ငွေဖြစ်ပါသည်။ (ကျေးရွာ၏ ဝင်ငွေ ၅၀-၈၀%)
- ငါးဖမ်းလုပ်ငန်းသည် အိမ်ထောင်စုများအတွက် အရေးပါသော်လည်း ဝင်ငွေရရှိမှု နည်းသော စီးပွားရေးလုပ်ငန်းမျှသာဖြစ်ပါသည်။ (ကျေးရွာဝင်ငွေ ၂၀-၅၀%)
- ငါးဖမ်းလုပ်ငန်းသည် ကျေးရွာအတွက် အသေးစားဝင်ငွေမျှသာဖြစ်ပါသည်။

အခြားလုပ်ငန်းများ

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၁၈.၁၆။ ငါးဖမ်းလုပ်ငန်းကို အထောက်အကူဖြစ်စေသော တခြားစီးပွားဖြစ် လုပ်ငန်းများရှိပါသလား။

- လှေဆောက်ခြင်း၊ ပြုပြင်ခြင်း။
- လောင်စာ နှင့် အခြားပစ္စည်းများ ရောင်းဝယ်ခြင်း။
- ငါးဖမ်းခြင်းဆိုင်ရာ အသုံးအဆောင်များရောင်းချခြင်း။
- စက်ပစ္စည်းများ ပြင်ဆင်ထိန်သိမ်းခြင်း။
- လှေငှားရမ်းခြင်း။
- အခြား။

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၁၈.၁၇။ သင့်ရွာအနေဖြင့် ငါးဖမ်းလုပ်ငန်းနှင့် ငါးအမြောက်အများဖမ်းနိုင်ရန်အတွက် တခြားစီးပွားရေးလုပ်ငန်းများ ရှိပါသလား။

စီးပွားရေးလုပ်ငန်းများ		ပြည်တွင်း (D)
လုပ်ငန်းအမျိုးအစား	လုပ်ငန်းတည်နေရာ	ပြည်ပ (E)

၁၉။ တည်နေရာပြ မြေပုံ နှင့် ဝါးလုပ်ငန်းလုပ်ကိုင်ခြင်း မရှိသည့် အချိန်

၁၉.၁။ ဝါးဖမ်းခြင်းအပြင် သင့်လုပ်ငန်းအတွက် ဂါးအလယ်ကျွန်းကို အသုံးပြုပါသလား။

(၁) သုံးပါသည်။ (၂) မသုံးပါ။)

- **သုံးပါက အသေးစိတ်ဖော်ပြပေးပါ။**----------

ဝါးဖမ်းလုပ်ငန်းမဟုတ်သော ဂါးအလယ်ကျွန်းတွင် တခြားသင်လုပ်ကိုင်နေသော လုပ်ငန်းများကို အသေးစိတ် ဖော်ပြပါ။

လုပ်ဆောင်ချက်	အချိန် (မည်သည့် ရာသီ၊ မည်သည့်လ)	နေရာ (မြေပုံတွင် ဖော်ပြပါ)ကို လိုမီတာ	ဂါးအလယ် ကျွန်းသို့ သွားလျှင် အချိန် မည်မျှကြာ ပါသလဲ။	သွားလာသည့်ပုံစံ
အမဲလိုက်ခြင်း				
ဥယျာဉ်ခြံလုပ်ငန်းနှင့် စိုက်ပျိုးရေးလုပ်ငန်း (သရက်ခြံ၊ သီဟိုဠ်စေ့၊အုန်းသီးခြံ၊ကွမ်းခြံ၊ငှက်ပျောခြံ၊ စသည်ဖြင့်)				
တိရိစ္ဆာန်မွေးမြူရေးလုပ်ငန်း				
သစ်ထုတ်လုပ်ငန်း				
ကူးသန်းရောင်းဝယ်ရေးလုပ်ငန်း				
စက်မှုလုပ်ငန်း				
အခြား				

ဖြေဆိုသူ **ကျေးရွာအုပ်ချုပ်ရေးမှူး**

လက်မှတ် **လက်မှတ်**

APPENDIX VII: PUBLIC CONSULTATION AND DISCLOSURE

FIRST PUBLIC CONSULTATION MEETING PRESENTATION

Wa Ale
RESORT
MYEIK ARCHIPELAGO, MYANMAR

Benchmade Asia (Myanmar) Ltd. Overview

September 2015

Locations

Benchmade Asia (Myanmar) Ltd.
Office Address
No. 64 B, 1st Floor, Shwegone Plaza
Kominkochin Street, Bahan township
Yangon

Location of Eco Hotel
Wa Ale Kyun
Lampi Marine National Park
Kawthoung District
Bokyin Township, Taninthari Region
Myanmar

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ရည်ရွယ်ချက်

BOT စနစ်ဖြင့် သဘာဝအခြေခံ အပန်းဖြေစခန်း တည်ဆောက်၍ သဘာဝအခြေခံ ခရီးသွားလာရေး လုပ်ငန်းများဖြင့်တင်ပေးရန်။

တည်နေရာ၊ အကွေ့အဝန်း

တနင်္သာရီတိုင်းဒေသကြီး၊ ကော့သောင်းခရိုင်၊ ဘုတ်ပြင်းမြို့နယ်၊ လန်ပိအရှာဝါအမျိုးသားဥယျာဉ်အတွင်းရှိ၊ ဝါးအလယ်ကျွန်း၊ အကွေ့အဝန်း ၃၉၃၄ ဧကခန့်

3

အကောင်အထည်ဖော်မည့် အဖွဲ့အစည်း

- Benchmade Asia (Myanmar) Ltd. မှ အကောင်အထည်ဖော် ဆောင်ရွက်ပါမည်။

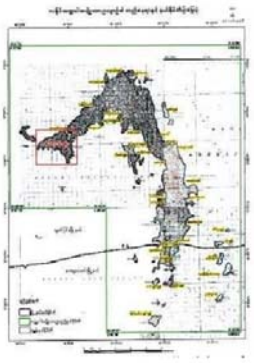
ကျွန်းအကွေ့အဝန်းနှင့်ဆသုံးပြုမည့်မြေနေရာ

- ကျွန်းအကွေ့အဝန်း- ၃၉၃၄ ဧကခန့်
- အသုံးပြုမည့်မြေနေရာ- စုစုပေါင်း ၁၀၀.၁၅ ဧကခန့်

(မြကွက်နံပါတ် (၁)- ၃၉.၂၅ ဧကခန့်၊ မြကွက်နံပါတ်(၂)- ၅၃.၇၀ ဧကခန့်၊ မြကွက်နံပါတ် (၃)- ၇.၂၀ ဧကခန့်)

4

5



ငှားရမ်းမည့်ကာလ

➢ နှစ် (၅၀) နှင့် (၁၀)နှစ် သက်တမ်း (၂) ကြိမ်တိုး

အာမခံနှင့်ငှားရမ်းခ

➢ မြေငှားစပေါ်ဒီပိုဆစ်ငွေကြေး- အမေရိကန်ဒေါ်လာ ၇၅၀၀၀

➢ (မြေငှားရမ်းခ-(၁) ဧက× (အမေရိကန်ဒေါ်လာ ၄၀၀) နှုန်း

မှတ်ချက်။ ။ မြေငှားရမ်းခ နှုန်းထားများကို (၅) နှစ်လျှင် (၁) ကြိမ် ညှိနှိုင်းသတ်မှတ်မည်။

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ဆောက်လုပ်မည့် အဆောက်အဦများ

မြေကွက်(၁)-

(က) ပင်လယ်ပြင်ကိုမျက်နှာမူထားသော Eco Villa အလုံး(၂၀)

(ခ) စားသောက်ဆိုင်၊ မီးဖိုဆောင်၊ ဧည့်ကြိုဌာန နှင့် ဝန်ထမ်းအိမ်ရာ အတွက်အဆောက်အအုံ

(ဂ) spa

(ဃ) မီးစက်

(င) နေရောင်ခြည်စွမ်းအင်သုံးလျှပ်စစ် (ရှုခင်းအလှကို မထိခိုက်စေရန် အတတ်နိုင်ဆုံး ဆောင်ရွက်လျက်)

(စ) မိလ္လာသွဲ့ဖြားသန့်စင်သည့် နည်းစနစ် နှင့် ရေဆိုးသန့်စင်သည့်စနစ် (Bio-pure extended aeration septic system and gray water purification system)

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ဆောက်လုပ်မည့် အဆောက်အဦများ

မြေကွက်(၂)-

(က) ပင်လယ်ပြင်ကိုမျက်နှာမူထားသော အိပ်ခန်း (၁) ခန်းမှ (၂) ခန်းအထိပါဝင်သော အဆင့်မြင့်ဘန်ဂလို (သို့မဟုတ်) African Safari Tent အလုံး (၁၉) လုံး

(ခ) စားသောက်ဆိုင်၊ မီးဖိုဆောင်၊ ဧည့်ကြိုဌာန နှင့် ဝန်ထမ်းအိမ်ရာအတွက်အဆောက်အအုံ

(ဂ) spa

(ဃ) မီးစက်

(င) နေရောင်ခြည်စွမ်းအင်သုံးလျှပ်စစ် (ရှုခင်းအလှကို မထိခိုက်စေရန် အတတ်နိုင်ဆုံးဆောင်ရွက်လျက်)

(စ) မိလ္လာသွဲ့ဖြားသန့်စင်သည့်နည်းစနစ် နှင့် ရေဆိုးသန့်စင်သည့်စနစ် (Bio-pure extended aeration septic system and gray water purification system)

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ဆောက်လုပ်မည့် အဆောက်အဦများ

မြေကွက်(၃)-

(က) အခန်း (၂) ခန်းပါအဆောက်အဦး (သို့မဟုတ်) Eco Villa (၅) လုံး

(ခ) စားသောက်ဆိုင်များ

(ဂ) မီးစက်

(ဃ) နေရောင်ခြည်စွမ်းအင်သုံးလျှပ်စစ်(ရှုခင်းအလှကို မထိခိုက်စေရန် အတတ်နိုင်ဆုံးဆောင်ရွက်လျက်)

(င) မိလ္လာသွဲ့ဖြားသန့်စင်သည့်နည်းစနစ်နှင့်ရေဆိုးသန့်စင်သည့်စနစ် (Bio-pure extended aeration septic system and gray water purification system)

ရင်းနှီးမြှုပ်နှံမှုတန်ဖိုး

➢ နိုင်ငံခြားငွေ US $ ၁၀,၀၀၀,၀၀၀ (အမေရိကန်ဒေါ်လာ သန်းတစ်ဆယ်တိတိ)

11 Wa Ale

7 Wa Ale

ယခုဆောင်ရွက်နေသော သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းစောင့်ရှောက်မှု လုပ်ငန်းစဉ်များ

ပင်လယ်လိပ်ထိန်းသိမ်းစောင့်ရှောက်ခြင်း

12 Wa Ale

ယခုဆောင်ရွက်နေသော သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းစောင့်ရှောက်မှု လုပ်ငန်းစဉ်များ

13

Wa Ale

Wa Ale Community Involvement (CSR)

- Job creation for local fishermen. We will educate them as to the benefits of environmental stewardship and give them jobs to help protect the forest and waters. Other CSR investments include:

Wa Ale Group members visiting the Salet Galet school to donate school supplies

- Micro-finance new businesses to supply eco-hotel operations. e.g. chicken farming and organic vegtable farming on Ma Kyone Galet
- Improve access to technology and energy solutions for local fishermen
- Support local schools through gifts in kind
- Build and equip new clinic for the village

14

Wa Ale

Phase I

- 30 guest units on Wa Ale
- Housing & recreation facilities for 60-90 employees
- Amenities: restaurants, spa, common area, nature centre

Phase I will focus on environmental stewardship, brand execution, staff training, and foundation work.

Phase II

- 40 guest units on Wa Ale
- Housing & recreation facilities for 60-90 employees
- Amenities: restaurants, spa, common area, nature centre

Phasing will open even more opportunities for innovations in sustainability solutions & environmental stewardship.

18

Wa Ale

Project Location and Access

- Wa Ale is part of the Myeik archipelago in southern Myanmar
- 60 Nautical miles from Kawthaung
- Wa Ale is adjacent to Lampi Island, one of the largest islands in the archipelago
- 45 minute drive from Kawthaung
- 45 minute boat ride to Wa Ale from new port
- Alternative sea plane flight from Phuket. I am still negotiating this.

17

Wa Ale

Wa Ale & Lampi Foundation

- Lampi Foundation is the charitable foundation that will fund social welfare and conservation projects in LMNP
- The foundation will be funded by room revenue contributions from the eco-hotel
- The foundation will also endeavor to win funding from other international foundations as well as guest donations
- 20% of Christopher Kingsley's profit will fund the Lampi Foundation

Wa Ale

Wa Ale Resort Design – Conservation Objectives

- **Eco-friendly design villas produced offsite – Sites developed with No Heavy Machinery**

No Heavy Machinery

- To minimize environmental impact, very little heavy machinery will be used during Wa Ale construction
- All construction techniques will consider optimal environmental outcomes

32

Wa Ale Resort Design – Conservation Opportunities

Native Tree Preservation

- Native trees will be preserved and protected as assets
- No cutting of non-invasive trees greater than 15 cm in diameter

31

Wa Ale Resort Design – Conservation Opportunities

Minimal Concrete Use

- No concrete paths or roads will be installed
- Use of concrete will be kept to an absolute minimum

30

Wa Ale Resort Design – Conservation Objectives

No Laundry Facilities

- There will be minimal laundry facilities on Wa Ale, as laundry chemicals can be very harmful to fragile environments
- Most Laundry will be done in Kawthaung
- Eco-friendly laundry kept to a bare minimum onsite

33


Benchmade Asia (Myanmar) Limited ၏ သဘာဝအခြေခံ
ခရီးသွားအပန်းဖြေစခန်း စီမံကိန်းနှင့် ပတ်သတ်၍ ပတ်ဝန်းကျင်ထိခိုက်မှု
ဆန်းစစ်ခြင်း (EIA) နှင့် သက်ဆိုင်သူများ နှင့်တွေ့ဆုံပွဲ (ကနဦးအဆင့်)
အခမ်းအနား
PRESENTED BY E GUARD ENVIRONMENTAL SERVICES CO., LTD
eguard


MONREC
eguard
(MONREC)
E Guard Environmental Services Co. Ltd
eguard

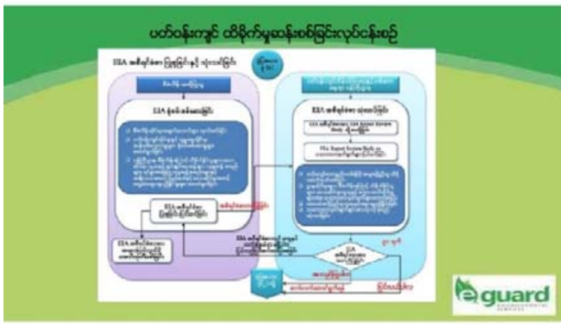

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း
Environmental Impact Assessment (EIA)
သက်ဆိုင်သူများ နှင့်တွေ့ဆုံပွဲ (ကနဦး အဆင့်)
eguard


အခမ်းအနား အစီအစဉ်
Benchmade Asia (Myanmar) Limited
E Guard Environmental Services Co., Ltd.
Benchmade Asia (Myanmar) Limited
eguard


eguard


ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်


ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်

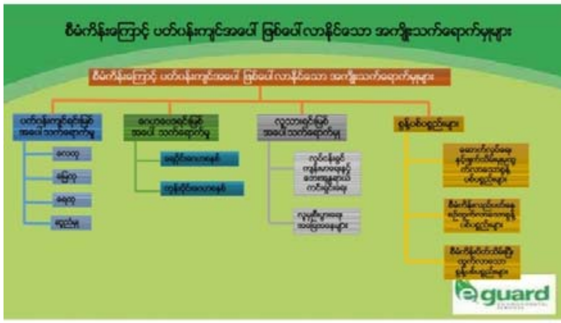

ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်

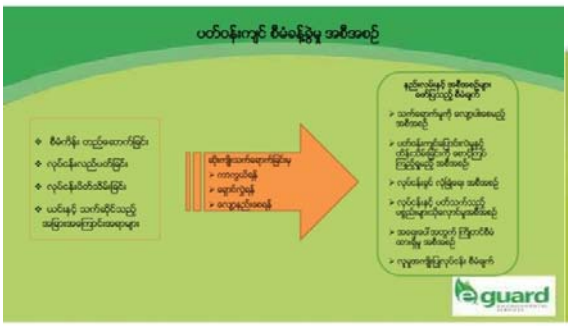

ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်


ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်


စီမံကိန်းနှင့်သက်ဆိုင်သည့် လိုက်နာရမည့် ဥပဒေများ အကျဉ်းချုပ်
ဥပဒေများ နည်းဥပဒေများ နှင့် လုပ်ထုံးလုပ်နည်းများ
ခုနှစ်
သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ ဥပဒေများ
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ နှင့် နည်းဥပဒေ
၂၀၁၂ နှင့် ၂၀၁၄
ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်း လုပ်ထုံးလုပ်နည်းများ
၂၀၁၅
အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ
၂၀၁၅
ရေအရင်းအမြစ်နှင့်မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ နှင့် နည်းဥပဒေ
၂၀၀၆ နှင့် ၂၀၁၃
မြေအောက်ရေအက်ဥပဒေ
၁၉၃၀


စီမံကိန်းနှင့်သက်ဆိုင်သည့် လိုက်နာရမည့် ဥပဒေများ အကျဉ်းချုပ်
ဥပဒေများ နည်းဥပဒေများ နှင့် လုပ်ထုံးလုပ်နည်းများ
နှစ်
ရင်းနှီးမြှုပ်နှံမှုဆိုင်ရာ ဥပဒေများ
နိုင်ငံခြား စီမူးဒေလုပ်ငန်းများ ဥပဒေ ၁၉၈၉
မြန်မာနိုင်ငံသားဝင်ရောက်နိုင်မြင်မှု ဥပဒေ ၂၀၁၃
နိုင်ငံခြားဝင်ရောက်နိုင်မြင်မှု ဥပဒေ ၂၀၁၂
နိုင်ငံခြားဝင်ရောက်နိုင်မြင်မှု ဥပဒေကို ပြင်ဆင်သည့် ဥပဒေ ၂၀၁၅
နိုင်ငံခြားဝင်ရောက်နိုင်မြင်မှု နည်းဥပဒေများ ၂၀၁၆
guard
စီမံကိန်းနှင့်သက်ဆိုင်သည့် လိုက်နာရမည့် ဥပဒေများ အကျဉ်းချုပ်
ဥပဒေများ နည်းဥပဒေများ နှင့် လုပ်ထုံးလုပ်နည်းများ
နှစ်
သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ ဥပဒေများ
သစ်တောဥပဒေ ၁၉၉၂
တောရိုင်းတိရစ္ဆာန်နှင့် သဘာဝထွက်ပင်များကာကွယ်ရေးနှင့်သဘာဝနယ်မြေများထိန်းသိမ်းရေးဥပဒေ ၁၉၉၄
ပင်လယ်နှင့် ဒေသလုပ်ငန်း ဖိုင်ရာဥပဒေများ
မြေမဟုတ်လယ်ပြင်အခြေ ဥပဒေ ၁၉၉၀
ပိုင်နက်ပင်လယ်နှင့် ပင်လယ်ဖုန်းများ ဥပဒေ ၁၉၇၇
guard
စီမံကိန်းနှင့်သက်ဆိုင်သည့် လိုက်နာရမည့် ဥပဒေများ အကျဉ်းချုပ်
ဥပဒေများ နည်းဥပဒေများ နှင့် လုပ်ထုံးလုပ်နည်းများ
နှစ်
အလုပ်သမားဆိုင်ရာ ဥပဒေများနှင့် အခြားသော ဥပဒေများ
အလုပ်သမား အဖွဲ့အစည်းဥပဒေ ၂၀၁၁
အနည်းဆုံး အခစားငွေဆွဲ အက်ဥပဒေ ၂၀၁၃
လူမှုဖူလုံရေး အက်ဥပဒေ ၂၀၁၂
အလုပ်အကိုင်နှင့် ကျွမ်းကျင်မှု ဖွံ့ဖြိုးရေး ဥပဒေ ၂၀၁၃
မြန်မာ့ပုံတယ်နှင့် ဝရီသွားလာရေး ဥပဒေ ၁၉၉၀
မြန်မာနိုင်ငံ အင်းနှင့်ပိုးဟ ကောင်စီ ဥပဒေ ၂၀၁၅
မြည်သွားမှုမြေကရေး ဥပဒေ ၁၉၆၂
guard
ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်လေ့လာမှု ပြုလုပ်မည့် အစီအစဉ်ဇယား
လုပ်ငန်းစဉ်
နိုဝင်ဘာ
ဒီဇင်ဘာ
ဇန်နဝါရီ
ဖေဖော်ဝါရီ
မတ်
ရေပြီ
သက်ဆိုင်သူများနှင့်
ဆွေးနွေးပွဲ(ကနဦးအဆင့်)
အကြိုလွှင်းဆင်းလေ့လာခြင်း
ဒေသဆိုင်ရာအချက်အလက်များကောက်ယူခြင်း
လက်ရှိပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးများ
တိုင်းတာခြင်းနှင့်ပုံစံများစစ်တမ်းကောက်ယူခြင်း
ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း
အစီရင်ခံစာပေးသောခြင်း
အများပြည်သူသဘောထားကောက်ယူခြင်း
guard
လေ့လာမည့် သဘာဝဝန်းကျင်ဆိုင်ရာ နှင့် လူမှုစုတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်များ
လေ့လာမည့်ကိစ္စရပ်များ
လေ့လာတန်ဖိုးစစ်ဆေးခြင်းနည်းလမ်းများ
ရောဆည်ဆောင်း
မြေပေါ်အမြဲအောက်ရေနုန်းမှာ ကောက်ယူခြင်းနှင့် စစ်ဆေးခြင်း
လေးဆည်းဆောင်း
လေထဲတွင် ပါဝင်သော အမှုန်အမွှားများနှင့် ဓာတ်ငွေ့များအားကိုင်းတာခြင်း
မြေဆည်ဆောင်း
မြေမှုန်မှာ ကောက်ယူခြင်းနှင့် ဆန်းစစ်လေ့လာခြင်း
ထူညံသံ
ထူညံသံများအား တိုင်းတာခြင်း
ဒီဇယ်ဖုတ် မိုးကွဲများ
ဒီဇယ်ဖုတ် မိုးကွဲများအား လေ့လာခြင်း
လူမှုစုန်းကျင်
စီမံကိန်းနယ်ကျင်ရှိ လူမှုစစ်တမ်း ကောက်ယူလေ့လာခြင်း
guard
စီမံကိန်း တည်နေရာပြ မြေပုံ
LN MN
LM MM
guard

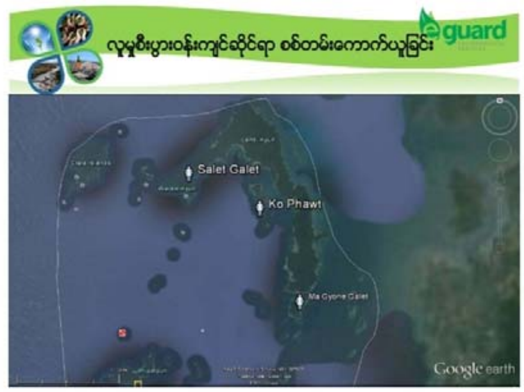





ကျေးဇူးတင်ပါသည်။
Email: info@eguardservices.com

SECOND PUBLIC CONSUTATION AND DISCLOSURE MEETING PRESENTATION


ဇီဝမျိုးစုံမျိုးကွဲများ လေ့လာခြင်း
guard
The habitat of Lampi island is evergreen forest 22%, mangrove forest 2%, dune and beach forest 1%, marine habitat 75%. There are 195 trees species, 19 mammal species, 228 bird species, 29 reptile and amphibian species, 370 marine flora species and 165 marine fauna species are recorded (Source: FD, OIKOS, BANCA, Project completion report).
ဇီဝမျိုးစုံမျိုးကွဲများ လေ့လာခြင်း: စီမံကိန်းဧရိယာမှ ၅၀၀ မီတာနှင့် ၁၀၀၀ မီတာ အတွင်း
➢ရေနေသတ္တဝါ မျိုးစိတ် : ၅၁ မျိုး
➢ငှက်မျိုးစိတ် : ၂၇ မျိုး
➢နို့တိုက်သတ္တဝါ မျိုးစိတ် : ၁ မျိုး
➢လိပ်ပြာမျိုးစိတ် : ၂၄မျိုး
➢တွားသွားသတ္တဝါမျိုးစိတ်: ၈ မျိုး
➢ပုစဉ်းမျိုးစိတ် : ၇ မျိုး



ကျား၊ မ	အမျိုးသား	၆၀ %
	အမျိုးသမီး	၄၀ %
အသက်	၂၁-၃၀	၁၆ %
	၄၁-၅၀	၂၄ %
	၆၀ +	၁၂ %
အိမ်ခြေ	ကိုယ်ပိုင်	၉၂ %
	အငှား	၈ %
ရေသုံးစွဲမှု	အဝီစိတွင်း	၄၈ %
	စမ်းချောင်း	၄ %
အိမ်သာအသုံးပြုမှု	ရေလောင်းအိမ်သာ	၅၂ %
	ကျင်းအိမ်သာ	၄ %

လျှပ်စစ်မီးရရှိမှု	မီးစက်	၈၀ %
	မီးမရရှိမှု	၄ %
ချက်ပြုတ်ရေး လောင်စာ	မီးသွေး	၇၆ %
	မီးစက်	၄ %
စွန့်ပစ်ရေ	ကုန်းမြေ	၅၂ %
	မြောင်း	၄ %
အမှိုက်စွန့်ပစ်ခြင်း	မီးရှို့ဖျက်ဆီးခြင်း	၄၄ %
	အမှိုက်ပုံ	၄ %
အမှိုက်စွန့်ပစ်အကြိမ်အရေအတွက်	အပတ်စဉ်	၄၀ %
	လစဉ်	၄ %

လူမှုစီးပွားရေးစစ်တမ်းကောက်ယူခြင်းရလဒ်များ

အလုပ်အကိုင်	ငါးဖမ်းလုပ်ငန်း	၄၄ %
	အစိုးရလုပ်ငန်း	၄ %
ငါးဖမ်းခြင်းနည်းလမ်းများ	Hand Line	၄ %
	ရိုးရာငါးဖမ်းနည်း	၄ %
	မြို့	၃၂ %
ငါးဖမ်းသည့်အချိန်	နေ့	၂၈ %
	ည	၁၆ %
ငါးဖမ်းရေ့	မော်တော်ဘုတ်	၂၄ %
	ကန္း	၂၀ %

လူမှုစီးပွားရေးစစ်တမ်းကောက်ယူခြင်းရလဒ်များ

ကျန်းမာရေး	အသက်ရှူလမ်းကြောင်းဆိုင်ရာရောဂါ	၈ %
	အခြား	၄ %
ပညာရေး	မူလတန်း	၃၂%
	အလယ်တန်း	၃၂%
	တက္ကသိုလ်	၈ %

ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးများအား တိုင်းတာခြင်း

လေထုအရည်အသွေး တိုင်းတာခြင်းရလဒ်များ

လေအရည်အသွေးတိုင်းတာခြင်း

လေအရည်အသွေးနမူနာကောက်ယူသည့် စက်ကိရိယာများ

- **Grimm (Environmental Dust Monitor) Operating Principle**
- **Acroqual (Portable Environmental Monitor) Operating Principle**

နမူနာကောက်ယူသည့်အချိန် ၂၄ နာရီ

ပြင်ပလေအရည်အသွေးအတိုင်းအတာများ

အမှုန်များ PM_{10}, $PM_{2.5}$

ဓာတ်ခွဲများ NO_2, SO_2, CO, CO_2, O_3

မိုးလေဝသအတိုင်းအတာများ အပူချိန်နှင့် စိုထိုင်းဆ

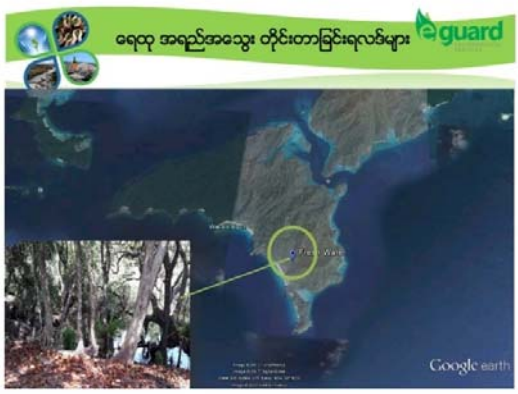
လေထုအရည်အသွေး တိုင်းတာခြင်းရလဒ်များ

Substance (μg/m³)	Result (μg/m³)	NEQ (Emission) Guidelines
NO_2 (μg/m³)	42.76 (μg/m³)	200 μg/m³
SO_2 (μg/m³)	128.14(μg/m³)	200 μg/m³
CO (μg/m³)	107.11 (μg/m³)	499.6 (μg/m³)
CO_2 (ppm)	941.87 ppm	9000 (ppm)
PM_{10} (μg/m³)	25.76 (μg/m³)	50 (μg/m³)
$PM_{2.5}$ (μg/m³)	15.52 (μg/m³)	25 μg/m³
O_3	80	100

လေထုအရည်အသွေး တိုင်းတာခြင်းရလဒ်များ

eguard

Substance (µg/m³)	Result (µg/m³)	NEQ (Emission) Guidelines
NO_2 (µg/m³)	39.48 (µg/m³)	200 µg/m³
SO_2 (µg/m³)	0 (µg/m³)	200 µg/m³
CO (µg/m³)	29.10 (µg/m³)	499.6 (µg/m³)
CO_2 (ppm)	1032 ppm	9000 (ppm)
PM_{10} (µg/m³)	32.9 (µg/m³)	50 (µg/m³)
$PM_{2.5}$ (µg/m³)	16.3 (µg/m³)	25 µg/m³
O_3	37.49	100



ရေအရည်အသွေးတိုင်းတာခြင်း

eguard

ရေအရည်အသွေးနမူနာကောက်ယူသည့် စက်ကိရိယာ

- WTW 3430 Multi-parameter (Onsite Water Quality Measuring Devices)

Laboratory

- **ISO TECH Laboratory**
- **SGS Laboratory**

Parameters	Lab results	WHO Guideline
pH	7.2	6.5-8.5
Color (True)	8 TCU	15 TCU
Turbidity	1 NTU	5NTU
Total Hardness	91 mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium (Ca)	31 mg/l as $CaCO_3$	200 mg/l
Iron	0.0 mg/l	0.3 mg/l
Chloride (as CL)	mg/l	250 mg/l
Sulphate (as SO4)	mg/l	200 mg/l
Total Solids	mg/l	1500 mg/l
Suspended Solids	312 mg/l	
Dissolved Solids	mg/l	1000 mg/l
Manganese	0.00 mg/l	0.05 mg/l
Chlorine (CL)	0.0 mg/l	0.2 mg/l
Temperature(°C)	25.1 °C	
Fluoride (F)	mg/l	1.5 mg/l
Lead (as Pb)	mg/l	0.01 mg/l
Arsenic (As)	mg/l	0.01 mg/l
Nitrate(NO_3)	mg/l	50 mg/l
Cyanide (CN)	mg/l	0.07 mg/l
Zinc (Zn)	mg/l	3 mg/l
Copper (Cu)	mg/l	2 mg/l
Phosphate	mg/l	5 mg/l

ရေထု အရည်အသွေး တိုင်းတာခြင်းရလဒ်များ

Parameters	S1	S2	S3	S4	S5	S6	S7	S8	S9
pH	8.1	8.2	8	8.2	8.2	8.2	8	8	8.1
Salinity	32.2	32.1	32.2	32.4	32.4	32.4	32.5	32.6	32.5
Turbidity	102	104	102	98	100	101	80	81	85
Conductivity	78	74	71	67	69	68	71	70	79
Suspended Solids	341	340	341	307	310	309	278	290	301
Temperature(°C)	25	25	25	24.9	24.8	25	25	25.2	25.1
NO_3	21	20	21	28	26	25	30	34	33
DO	4.2	4.1	4.2	4.9	4.7	4.5	4	4.3	4.2
COD	78	77	79	61	64	68	52	58	56
BOD	36	34	37	28	29	30	22	27	31
Oil and Grease	<5	<5	<5	<5	<5	<5	<5	<5	<5

ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ နည်းလမ်းများ

ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ နည်းလမ်းများ

အဆိုပြုစီမံကိန်း၏ ဖွဲ့ပြီးမှုအဆင့်ပေါ် မူတည်၍ ဖြစ်ပေါ်လာနိုင်သော သက်ရောက်မှုများကို ဖော်ပြပါအတိုင်း ခွဲခြားသတ်မှတ်သည်။

- လုပ်ငန်းတည်ဆောက်ဆဲ ကာလ သက်ရောက်မှုများ၊
- လုပ်ငန်းဆောင်ရွက်စဉ် ကာလ သက်ရောက်မှုများ၊
- လုပ်ငန်း ဖျက်သိမ်းစဉ် ကာလ သက်ရောက်မှုများ။

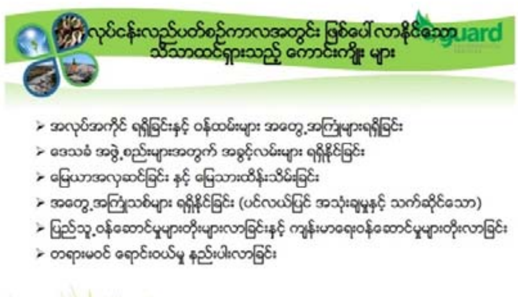
ဆောက်လုပ်ရေးကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ဆိုးကျိုးများ

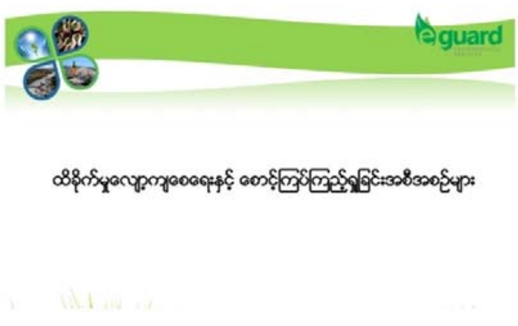
- နေရာနှင့် အသုံးပြုနိုင်စွင့်များ ပြောင်းလဲခြင်း
- မြေနေရာ ရှင်းလင်းခြင်း
- ဆူညံသံများ
- ဆောက်လုပ်ရေးပစ္စည်းများ သိုလှောင်ခြင်း
- မိလ္လာအညစ်အကြေးများ စွန့်ပစ်ခြင်း
- အမှိုက်စွန့်ပစ်ပစ္စည်းများထွက်ရှိခြင်း
- အလင်းနှောက်ယှက်မှုများ

ဆောက်လုပ်ရေးကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ကောင်းကျိုးများ

- အလုပ်အကိုင်များရရှိနိုင်ခြင်း

Impacts	Likely Impacted environment			Impact Types								Receptors' sensitivity	Magnitude of impact	Impact Assessment	Potential Mitigation Reference	Residual Impact
				Duration		Positive		Negative		Irreversible	Cumulative					
	Terrestrial	Marine/Coastal	Socio-economic	Long Term	Short Term	Significant	Not Significant	Significant	Not Significant							
Operation Phase																
Resource consumption	☑		☑	☑				☑		☑		High	Medium	Moderate	5.8.2	Minor
Change access rights and usage	☑	☑	☑	☑				☑		☑		Medium	Medium	Moderate	5.8.2	Minor
Sewage disposal	☑	☑	☑	☑				☑			☑	High	Medium	Moderate	5.8.2	Minor
Generate Solid waste and disposal	☑	☑	☑	☑				☑			☑	High	Medium	Moderate	5.8.2	Minor
Light pollution	☑	☑	☑		☑			☑				Medium	Medium	Moderate	5.8.2	Minor
Noise	☑	☑	☑	☑				☑				Medium	Low	Minor	5.8.2	Minor
Misuse of marine resources		☑			☑			☑			☑	High	Medium	Moderate	5.8.2	Minor
Diesel and oil spills	☑	☑			☑				☑			High	Low	Moderate	5.8.2	Minor
Population increase	☑		☑		☑				☑			Medium	Low	Minor	5.8.2	Minor
GHG emission increase	☑			☑					☑		☑	Medium	Low	Minor	5.8.2	Negligible
Anchoring		☑			☑				☑		☑	Medium	Low	Minor	5.8.2	Negligible
Transportation and Navigation		☑	☑		☑				☑		☑	Low	Medium	Minor	5.8.2	Negligible
less illegal trading	☑	☑	☑	☑		☑						High	High	Major	5.8.2	-
Employment			☑	☑		☑						Medium	High	Moderate	5.9	-





သိသာထင်ရှားသော သက်ရောက်မှုများ	လျှော့ချ လျော့ချ နည်းလမ်းများ	စောင့်ကြပ်ကြည့်ရှုရမည့် အချိန်ကာလ
မြေနေရာ ရှင်းလင်းခြင်း	➢ မြေနေရာ ရှင်းလင်းခြင်း မစတင်မီ အရေးပါသော မျိုးစုံမျိုးကွဲ များအား ရှာဖွေလေ့လာ မှတ်တမ်းတင်ခြင်း။ ➢ မြေယာအလှဆင်ခြင်းနှင့် အပင်ပြန်လည် စိုက်ပျိုးခြင်း အတွက် မှတ်တမ်းတင် ထားသော အပင်မျိုးစိတ်များကို ထိန်းသိမ်း ထားခြင်း။ ➢ မြေနေရာရှင်းလင်းခြင်း လုပ်ဆောင်ရာတွင် အပင်ကြီးများကို ထိန်းသိမ်းခြင်း။ ➢ မြေယာအလှဆင်ခြင်းတွင် ဒေသတွင်း အပင်များသာ ပြန်လည်စိုက်ပျိုးစေခြင်း။ ➢ ဆောက်လုပ်ရေး ကန်ထရိုက်တာ များကို ရေးဆွဲထားသော ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်များနှင့် အညီရှင်းလင်းပြသခြင်း၊ လိုက်နာဆောင်ရွက်စေခြင်း။	ဆောက်လုပ်ရေး အချိန်ကာလ တလျှောက်လုံး

ဆောက်လုပ်ရေးကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ဆိုးကျိုးများ

သိသာထင်ရှားသော သက်ရောက်မှုများ	လျော့ချ လျော့ချ နည်းလမ်းများ	စောင့်ကြပ်ကြည့်ရှုရမည့် အချိန်ကာလ
ဆူညံသံများ	➢ ဆူညံသံ ဖြစ်ပေါ်စေသော ဆောက်လုပ်ရေး လုပ်ငန်းများအား ပုံမှန်အလုပ်ချိန် အတွင်းသာ လုပ်ဆောင်ခြင်း ➢ ဆူညံသံဖြစ်ပေါ်စေသော ကိရိယာများကို အသုံးပြုရာတွင် ဆူညံသံ အကာအကွယ် ပစ္စည်းများ ဝတ်ဆင်ခြင်း ➢ ဆူညံသံ ၈၀ dBA အထက်ဖြစ်ပေါ်စေသော ကိရိယာများကို အသုံးပြုသော အလုပ်သမားများအနေဖြင့် ၈ နာရီ အထက် အသုံးပြုခဲ့ပါက earmuff ကိုတတ်ဆင်ခြင်း ➢ ဆောက်လုပ်ရေးကာလ အတွင်း ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးဆိုင်ရာ လေ့ကျင့်ရေးများ ပြုလုပ်ခြင်း	ဆောက်လုပ်ရေး အချိန်ကာလ တလျှောက်လုံး

ဆောက်လုပ်ရေးကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ဆိုးကျိုးများ

သိသာထင်ရှားသော သက်ရောက်မှုများ	လျော့ချ လျော့ချ နည်းလမ်းများ	စောင့်ကြပ်ကြည့်ရှုရမည့် အချိန်ကာလ
အလင်းရောင်ဆိုးယှက်မှုများ	➢ ဆောက်လုပ်ရေး လုပ်ငန်းစဉ်အားလုံး မနက်နာရီပတ်ဝန်း မတောင်ရန် နှင့် ညနေနာရီတွင် ရပ်နားရန်။ ➢ မီးထလင်းဆုတ် အသုံးပြုခြင်းကို ည (၇) နာရီအထိသာ အသုံးပြုခြင်း (၇) နာရီနောက်ပိုင်းတွင် အလေအလင်မီးမှ လွဲ၍ အခြားသောမီးကိုပိတ်ထားခြင်း။	ဆောက်လုပ်ရေး အချိန်ကာလ တလျှောက်လုံး

ဆောက်လုပ်ရေးကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ဆိုးကျိုးများ

သိသာထင်ရှားသော သက်ရောက်မှုများ	လျော့ချ လျော့ချ နည်းလမ်းများ	စောင့်ကြပ်ကြည့်ရှုရမည့် အချိန်ကာလ
မိလ္လာစွန့်ပစ်ခြင်း နှင့် အမှိုက်များ စွန့်ပစ်ခြင်း	➢ မိလ္လာကန်များကို လုံလောက်သော အရေအတွက်ထားရှိရန်၊ ➢ စွန့်ပစ်ရွှေ့ပြောင်းပိုးမွှေးစေခြင်းကို ဆောက်လုပ်ရေး မစတင်မီ ဦးစွာ ပြုလုပ်ထားရှိပြီး ဧည့်သက်များကို စာရင်းပြုလုပ်စစ်ဆေးခြင်း။ ➢ အမှိုက်ထွက်ရှိမှု လျော့နည်းစေရန် သေချာစွာလုပ်ဆောင်ခြင်း ➢ အပင်အကြွင်းအကျန်များနှင့် အမှိုက်များအား ပြန်လည်ပြုပြင်အသုံးချခြင်း ➢ အမှိုက်ပုံများအား လူသုံးကုသိုလ်ရောက်သော နေရာများတွင် လုံလောက်သော ပမာဏ ထားရှိရန်၊ ➢ ဆောက်လုပ်ရေးမှ ထွက်ရှိလာသော အညစ်အကြေးများကို သက်ဆိုက်ထားသော အမှိုက်ပုံနေရာတွင်စွန့်ပစ်ရန်။	ဆောက်လုပ်ရေး အချိန်ကာလ တလျှောက်လုံး

ဆောက်လုပ်ရေးကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ဆိုးကျိုးများ

သိသာထင်ရှားသော သက်ရောက်မှုများ	လျော့ချ လျော့ချ နည်းလမ်းများ	စောင့်ကြပ်ကြည့်ရှုရမည့် အချိန်ကာလ
ဆောက်လုပ်ရေးစွန့်ပစ်ပစ္စည်းများ ဆိုးလာခြင်း	➢ ဆောက်လုပ်ရေးစွန့်ပစ်ပစ္စည်းများကို ခေတ်ဆန်မှုများသည့် နေရာများမှ အပေးတွင် သင့်တင့် လျော်ကန်စွာ ဝယ်ယူရန်၊ ➢ ဆောက်လုပ်ရေးစွန့်ပစ်ပစ္စည်းများကို မီးဖေါက်ခံစားနှုန်းများမှ ကာလုပ်ရန် တာဝောင်များအတွင်း ထားရှိခြင်း၊ တာလယ်ပတ်များတွင် ဖုံးအုပ်ထားရှိခြင်း။ ➢ လုံခြုံစိတ်ချရသော သိုလှောင်ခရိယာကို သတ်မှတ် ထားရန်၊ ➢ ဓာတ်ဆီများ၊ ဒီဇယ်ဆီများကို သိုလှောင်ရာတွင် လုံခြုံစွာ သိမ်းဆည်းထားရန်နှင့် သိုလှောင်ထား မိုးသေနေရာ အနီးတွင် ထပ်ဆွဲထားသော သတ်ပေးစက်ပိုးတုတ်များ ကပ်ထားရန်။	ဆောက်လုပ်ရေး အချိန်ကာလ တလျှောက်လုံး

လုပ်ငန်းလည်ပတ်စဉ်ကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ဆိုးကျိုးများ

သိသာထင်ရှားသော သက်ရောက်မှုများ	လျော့ချ လျော့ချ နည်းလမ်းများ	စောင့်ကြပ်ကြည့်ရှုခြင်းနည်းလမ်းများ
အရင်းအမြစ်များ သုံးစွဲခြင်း	➢ သင့်လျော်၊ လုံလောက်သော ရေပမာဏကို သိုလှောင်ထားရှိရန်၊ ➢ မိုးရေ ရွေဆောင်ရန်၊ ➢ Ultra low flush toilet နှင့် spray nozzels ကဲ့သို့သော ရေခန္ဓာကိုင်းသည့် ကိရိယာများကို အသုံးပြုရန်၊ ➢ လျှပ်စစ်မှီတင် ထုတ်ပွဲများကို လျော့ချခြင်း၊	➢ ရေထုထည်အသေးအဖွဲ့ (၃) နှစ်လွှင် နှစ်ကြိမ် တိုင်းတာစစ်ဆေးခြင်း၊ ➢ ရေထုထည်အသေးအဖွဲ့ (၃) နှစ်လွှင် နှစ်ကြိမ် တိုင်းတာစစ်ဆေးခြင်း၊ ➢ သဘာဝပတ်ဝန်းကျင်အား ထိခိုက်မှု လျော့နည်းစေသော စွမ်းအင် အရင်းအမြစ်များကို ရွာခေတ်ထုတ် အသုံးပြုခြင်း ➢ မူလမန်များ တွေ့ရှိပါက HSE Coordinator နှင့် သက်ဆိုင်ရာ တာဝန်ရှိသူများအား သတင်းပို့ ခြင်း။
နေထုနှင့်အသုံးပြုနိုင်စွမ်းများ ပြောင်းလဲခြင်း	➢ ပင်လယ်ဝိုင် အသိုက်များကို ရွာခွာမှတ်တမ်းတင်ခြင်း နှင့် ငှက်ကို၏ အလေ့အထများကို နောက်ယှက်ခြင်း မပြုရန်၊ ➢ ထလုံလွှဲများ၏ အလေ့အထ နှင့် ငှက်ကို၏ လုပ်ဆောင်ချက်များကို အနေနှင့်အယှက်ပပေးရန်။	➢ ဝီဇမျိုးစိတ်ပွားကို စီမံခန့်ခွဲမှု အစီအစဉ် တွင်ပါရှိသော တာဖြစ်ချက်များကို လိုက်နာရန်၊ ➢ ယဉ်ကျေးမှုအမွေအနှစ်များအရာယှက် ပြောင်းလဲမှုကို လျော့ချခြင်း အစီအစဉ် တွင်ပါရှိသော သတ်မှတ်ချက်များကို လိုက်နာရန်။

လုပ်ငန်းလည်ပတ်စဉ်ကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သိသာထင်ရှားသည့် ဆိုးကျိုးများ

သိသာထင်ရှားသော သက်ရောက်မှုများ	လျော့ချ လျော့ချ နည်းလမ်းများ	စောင့်ကြပ်ကြည့်ရှုခြင်းနည်းလမ်းများ
မိလ္လာအညစ်အကြေးများ စွန့်ပစ်ခြင်း	➢ ကုတိုကာရေဧရိယာနှင့် စင်စက်ကို အသုံးပြုခြင်း	➢ ကုတိုကာရေဧရိယာနှင့်စင်စက်များအား ပုံမှန်စစ်ဆေးခြင်း ➢ (၁) နှစ်လွှင် (၁) ကြိမ် overall ထိန်းသိမ်းစစ်ဆေးမှုများ ပြုလုပ်ခြင်း။
အမှိုက်စွန့်ပစ်ပစ္စည်းများ ထွက်ရှိခြင်းနှင့် စွန့်ပစ်ခြင်း	➢ စွန့်ပစ်ပစ္စည်းများကို နည်းလမ်းကျစွာ စီမံခန့်ခွဲရန်၊ ➢ စွန့်ပစ်ပစ္စည်း များကို အမျိုးအစားခွဲခြင်း နှင့် reuse, recycle, renew စနစ်အား အသုံးပြုခြင်း။ ➢ ကောင်းသောနည်းနာသိရှိ အခိုက်စွန့်ပစ်သော နေရာသို့ မသွယ်တင်ဝဲ စုံမှတ်ထားရှိရေး ညှိနှိုင်းမှု မပြုခဲ့ခင် အန္တရာယ်ကင်းအား တွန်းကန်ရေး (သို့) လိုင်စင်ပြုခြင်း ဖုံးအုပ်ထားရန်။	➢ HSE Coordinator မှ အပတ်စဉ် စောင့်ကြပ်ကြည့်ရှုစစ်ဆေးခြင်း

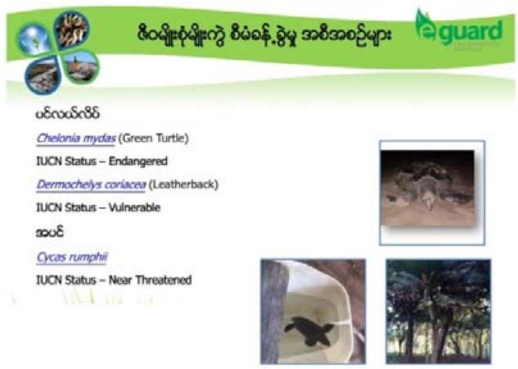

လုပ်ငန်းလည်ပတ်စဉ်ကာလအတွင်း ဖြစ်ပေါ်လာနိုင်သော သီသာထင်ရှားသည့် ဆိုးကျိုးများ
guard
HSE Coordinator နှင့် Biodiversity Management Officer
HSE Coordinator နှင့် Biodiversity Management Officer
mooring buoys


ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် (EMP)
guard
Benchmade Asia Myanmar Ltd ၏ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်ကို အောက်ပါအတိုင်း ခွဲခြားနိုင်သည်။
(၁) ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်
(၂) စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်
(၃) လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် လုံခြုံရေး အစီအစဉ်
(၄) အရေးပေါ်တုန့်ပြန်မှု အစီအစဉ်
(၅) ဆီများယိုဖိတ်မှုတုန့်ပြန်မှု အစီအစဉ်
(၆) စွန့်ပစ်အမှိုက်နှင့် အညစ်အကြေးများစီမံခန့်ခွဲမှု အစီအစဉ်
(၇) လူမှုရေးဆိုင်ရာ တာဝန်ခံဆောင်ရွက်မှု အစီအစဉ်
(၈) ဇီဝမျိုးစုံမျိုးကွဲ စီမံခန့်ခွဲမှု အစီအစဉ်
(၉) ယဉ်ကျေးမှုများရောယှက်ခြင်း လျှော့ချခြင်း အစီအစဉ်


ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်၏ ရည်ရွယ်ချက်များ
guard
စီမံကိန်း၏ သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုရေးဆိုင်ရာ လုပ်ငန်းများကို စောင့်ကြပ်ရန်အတွက် လမ်းညွှန်စာတမ်း အနေဖြင့်ထားရှိရန်၊
သဘာဝပတ်ဝန်းကျင် အပေါ် ထိခိုက်နိုင်သည့် ဆိုးကျိုးများကို လျှော့ချရန် အခြေခံမူဘောင်အ အဖြစ် ထားရှိနိုင်ရန်နှင့်၊ စီမံကိန်းအား ကောင်းမွန်သင့်လျော်စွာ အကောင်အထည် ဖော်ဆောင်ရွက်နိုင်ရန်။


ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်၏ ရည်ရွယ်ချက်များ
guard
စီမံကိန်းကာလအတွင်း စီမံကိန်းအဆိုပြုသူမှ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်အား ဆောက်လုပ်ရေးကာလ၊ လုပ်ငန်းလည်ပတ်ချိန်ကာလ နှင့် လုပ်ငန်းချက်သိမ်းစဉ်ကာလ တစ်ခုစီတွင် အကောင်အထည်ဖော် ဆောင်ရွက်ပါမည် ဟူသော ကတိကဝတ်အား မှတ်တမ်းတင်ထားရှိနိုင်စေရန်၊
သယံဇာတ နှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာန လက်အောက်ရှိ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဦးစီးဌာန မှ တောင်းဆိုချက်များကို ဖြည့်ဆည်းပေးနိုင်ရန်၊


ဇီဝမျိုးစုံမျိုးကွဲ စီမံခန့်ခွဲမှု အစီအစဉ်များ
guard
စုစုပေါင်း မျိုးစိတ် - ၁၁၈ မျိုး
နို့တိုက်သတ္တဝါ
Macaca leonina (Northern Pig-tailed Macaque)
IUCN Status – Vulnerable
ငှက်
Philentoma velata (Maroon-breasted Philentoma)
IUCN Status – Near Threathened
Chloropsis cyanopogon (Lesser Green Leafbird)
IUCN Status – Near Threathened
Rhabdotorrhinus corrugatus (Wrinkled Hornbill)
IUCN Status – Near Threatened


ဇီဝမျိုးစုံမျိုးကွဲ စီမံခန့်ခွဲမှု အစီအစဉ်များ
guard
ပင်လယ်လိပ်
Chelonia mydas (Green Turtle)
IUCN Status – Endangered
Dermochelys coriacea (Leatherback)
IUCN Status – Vulnerable
အပင်
Cycas rumphii
IUCN Status – Near Threatened

(Reference: http://www.myanmartourism.org/index.php/tourist-information/dos-don-ts; http://www.dosanddontsfortourists.com/)


လူမှုစီးပွားတာဝန်ယူမှုအစီအစဉ်
eguard
➢ လန်ပိ ဖောင်ဒေးရှင်း : ဝါးအလယ်သဘာဝအပန်းဖြေစခန်းမှအမြတ်ငွေ၏ ၂၀% နှင့် အခန်းခအားလုံး၏ ၂%
➢ လိပ်ထိန်းသိမ်းစောင့်ရှောက်ရေး : ပင်လယ်လိပ်ပေါက်ပေါင်း ၁၅၀၀ ကျော် (WCS, MONREC (MOECAF) , Lampi Foundation)
➢ စားဝတ်နေရေးထောက်ပံ့ပေးခြင်း : စွမ်းအင်အရင်းအမြစ်များ ထောက်ပံ့ပေးခြင်း
➢ ပြည်သူ့ကျန်းမာရေး : ဆေးဝါးပစ္စည်းများ ထောက်ပံ့ပေးခြင်း
➢ သန္တာကျောက်တန်းများကိုပြန်လည်ထိန်းသိမ်းခြင်း : WCS


eguard
ကျေးဇူးတင်ပါသည်။