PROJECT NO. - 2603055

HOANG ANH GIA LAI MYANMAR COMPANY LIMITED

ENVIRONMENTAL AND SOICAL IMPACTS ASSESSMENT REPORT FOR MYANMAR CENTER PROJECT (PHASE-2)

Environmental Compliance Consultancy Co., Ltd

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Approved by Myat Mon Swe

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Particulars	Responsible Consultant	Signature	Project Manager	Date	Version	Signature
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Commitment for Environmental Impact Assessment (EIA) Report in regard to the Myanmar Center Project (Phase 2)

Dear Sir,

We refer to the captioned EIA, which is prepared by **Environmental Compliance Consultancy Co., Ltd. (EnvCC)** in accordance with the Environmental Conservation Law (2012), Environmental Conservation Rules (2014), Environmental impact Assessment procedures and National Environmental Quality (Emission) Guideline under the instructions of Ministry of Natural Resources and Environmental Conservation dated on 2015 intending to be legally bound hereby to the Ministry of Natural Resources and Environmental Conservation hereunder, we endorse and confirm to Ministry of Natural Resources and Environmental Conservation:

a. The accuracy and completeness of the EIA;

b. Confirm and undertake to Ministry of Natural Resources and Environmental Conservation that the EIA has been prepared in strict compliance with applicable Environmental Conservation Law, Rules and Procedures including Environmental impact Assessment Procedure: Claus 76 (2015), and other related laws and regulations for the type of project;

c. Comply fully with all commitments for Third party Organization. The issuance of this confirmation and undertaking has been duly authorized by Environmental Compliance Consultancy Co., Ltd. who has signed below.

Myat Mon Swe

Director/ Principle Consultant

Environmental Compliance Consultancy Co., Ltd

Environmental Compliance Consultancy Co., Ltd. ECC

ကတိကဝတ်များ

(က) ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာကို တိကျခိုင်မာမှုများ နှင့်ပြည့်စုံစွာ ဆောင်ရွက်ထားပါသည်။

(ခ) စီမံကိန်းဖော်ဆောင်သူသည် ဤအစီရင်ခံစာကို လုပ်ထုံးလုပ်နည်းများအပါအဝင် သက်ဆိုင်ရာ ဥပဒေများကို တိကျစွာလိုက်နာ၍ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်များကို ရေးဆွဲထားပါသည်။

(ဂ) စီမံကိန်းသည် ပတ်ဝန်းကျင်နှင့် လူမှု ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာပါ ကတိကဝတ်၊ ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့ချရေး လုပ်ငန်းများနှင့် အစီအစဉ်များကို အပြည့်အဝ အစဉ်အမြဲလိုက်နာ ဆောင်ရွက်သွားမည် ဖြစ်ကြောင်း ကတိကဝတ်ပြုပါ သည်။

(ဃ) လုပ်ငန်းလည်ပတ်ဆောင်ရွက်နေသည့် ကာလအတွင်း အတည်ပြုထားသည့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ်အား တိုးတက်နေသည့် နည်းပညာများ၊ စနစ်များနှင့် လုပ်ငန်းလိုအပ်ချက်အပေါ် မူတည်၍ ပိုမိုကောင်းမွန်သည့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ် ဖြစ်စေရန်အတွက် ပြင်ဆင်ဖြည့်စွက်ရန် ညွှန်ကြားချက်ရှိလာပါက ဆောင်ရွက်မည်ဖြစ်ကြောင်းနှင့် လုပ်ငန်းဆောင် ရွက်သူမှ ပြင်ဆင်ဖြည့်စွက်လိုပါက အတည်ပြုချက်ရယူ၍ ပြင်ဆင်ဆောင်ရွက်မည် ဖြစ်ပါသည်။

(c) လုပ်ငန်းလည်ပတ်သည့် ကာလတစ်လျှောက်တွင် ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ထိခိုက်မှု အနည်ဆုံးဖြစ်အောင် လည်ပတ်ဆောင်ရွက်ကာ စီမံခန့်ခွဲမှုများ ပြုလုပ်သွားမည် ဖြစ်ပါသည်။

(စ) စီမံကိန်း၏ ကတိကဝတ်များအားလုံးကို ဖြည့်ဆည်းရန်အတွက် လိုအပ်သည့် ငွေကြေးနှင့် လူစွမ်းအား အရင်းမြစ်များအား ထောက်ပံ့ပေးမည်ဖြစ်ကြောင်း ကတိကဝတ်ပြုပါသည်။

(ဆ) စီမံကိန်းပိတ်သိမ်းချိန်တွင် လူမှုဝန်းကျင်အား ထိခိုက်မှုအနည်းဆုံး ဖြစ်စေရန် စီမံဆောင်ရွက်သွားမည်ဖြစ်ပြီး ထိခိုက်မှုများ ရှိလာပါက မူလအခြေအနေသို့ ရောက်ရှိစေရန် ဆောင်ရွက်ပေးမည် ဖြစ်ပါသည်။

Hoang Anh Gia Lai Myanmar Co., Ltd.

ကတိကဝတ်

ကတိကဝတ်၏ အတိုချုပ်အမည်	အမှတ်စဉ်	ကတိကဝတ်ရှင်းလင်းဖော်ပြချက်	အခန်း
ဥပဒေ/နည်းဥပဒေ	၂.၁	စီမံကိန်းနှင့် သက်ဆိုင်သော ဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ	အခန်း(၂)
	၂.၂	သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဆိုင်ရာ ဥပဒေနှင့် ဆက်စပ်သည့် ဥပဒေ/နည်းဥပဒေများကို ဖော်ပြထားပါသည်။	
	၂.၃	ညစ်ညမ်းမှုထိန်းချုပ်ခြင်းနှင့် ကျန်းမာရေးဆိုင်ရာ ဥပဒေနှင့် ဆက်စပ်သည့် ဥပဒေ/နည်းဥပဒေများကို ဖော်ပြထားပါသည်။	
	၂.၄	ဇီဝမျိုးစုံမျိုးကွဲများနှင့် သဘာဝအရင်းအမြစ် ထိန်းသိမ်းရေးဆိုင်ရာ ဥပဒေနှင့် ဆက်စပ်သည့် ဥပဒေ/နည်းဥပဒေများကို ဖော်ပြထားပါသည်။	
	၂.၅	မြေယာနှင့် သက်ဆိုင်သည့် ဥပဒေ	
	၂.၆	မြို့ပြဖွံ့ဖြိုးတိုးတက်မှုနှင့်စီမံခန့်ခွဲမှု	
	၂.၇	လူ့အခွင့်အရေးဆိုင်ရာ	
	၂.၈	ရေးဟောင်းယဉ်ကျေးမှုနှင့် ဆက်စပ်သည့် ထိန်းသိမ်းရေး ဥပဒေများကို ဖော်ပြထားပါသည်။	
	၂.၉	အလုပ်သမားဆိုင်ရာ ဥပဒေနှင့် ဆက်စပ်သည့် ဥပဒေ/နည်းဥပဒေများကို ဖော်ပြထားပါသည်။	
	၂.၁၀	မော်တော်ယာဉ်များဆိုင်ရာ ဥပဒေ	
	၂.၁၁	မီးဘေးအန္တရာယ် ဆိုင်ရာ	
	၂.၁၂ - ၂.၁၃	စီမံကိန်းနှင့် ဆက်စပ်သည့် အခြားဥပဒေ/ နည်းဥပဒေများကိုလည်း ဖော်ပြထားပါသည်။	
	၂.၁၄	သဘာဝဘေးအန္တရာယ်နှင့် ရာသီဥတုပြောင်းလဲမှု	
	၂.၁၅	မြန်မာနိုင်ငံ၏ အစိုးရအဖွဲ့အစည်းဆိုင်ရာ မူဘောင်	
	၂.၁၆	အပြည်ပြည်ဆိုင်ရာ ဥပဒေနှင့်ဆက်စပ်သည့် လမ်းညွှန်ချက်များကို ဖော်ပြထားပါသည်။	
သဘာဝပတ်ဝန်းကျင်အပေါ် ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှု	၅	သဘာဝပတ်ဝန်းကျင်၊ လူမှုရေးနှင့် ကျန်းမာရေး သက်ရောက်မှုများကို လေ့လာဆန်းစစ်ထားပါသည်။	အခန်း(၅)

ကတိကဝတ်၏ အတိုချုပ်အမည်	အမှတ်စဉ်	ကတိကဝတ်ရှင်းလင်းဖော်ပြချက်	အခန်း
များကို ဆန်းစစ်ခြင်းနှင့် လျော့ပါး ရေး နည်းလမ်း များ	၅.၅	တည်ဆောက်စဉ်တွင် ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများကို လေ့လာဆန်းစစ်ထားပြီး လျော့ပါးရေးနည်းလမ်းများကိုပါ ထည့်သွင်းဖော်ပြ ထားပါသည်။	
	၅.၆	လည်ပတ်စဉ်တွင် ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများကို လေ့လာဆန်းစစ်ထားပြီး လျော့ပါးရေး နည်းလမ်းများကိုပါ ထည့်သွင်းဖော်ပြ ထားပါ သည်။	
	၅.၇	ပိတ်သိမ်းစဉ်တွင် ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများကို လေ့လာဆန်းစစ်ထားပြီး လျော့ပါးရေး နည်းလမ်းများကိုပါ ထည့်သွင်းဖော်ပြ ထားပါ သည်။	
	၅.၈	လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးကို လေ့လာဆန်းစစ်ထားပြီး လျော့ပါးရေးနည်းလမ်းများကိုပါ ထည့်သွင်းဖော်ပြ ထားပါသည်။	
	၅.၉	ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းကို ဖော်ပြထားပါ သည်။	
ဆက်စပ်သက်ရောက်ခြင်းများကို ဆန်းစစ်ခြင်း	၆	စုပေါင်းသက်ရောက်မှုများကို လေ့လာဆန်းစစ် ဖော်ပြထားပါသည်။	အခန်း(၆)
	၆.၃	ဖြစ်နိုင်ချေရှိသော စုပေါင်းသက်ရောက်မှုများကို လေ့လာဆန်းစစ်ထားပြီး လျော့ပါးရေးနည်းလမ်းများကိုပါ ထည့်သွင်းဖော်ပြထားပါသည်။	
ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်	၇	ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်တွင် စီမံကိန်းတည်ဆောက်ချိန်၊ လည်ပတ်ချိန်နှင့် ပိတ်သိမ်းချိန်တို့တွင် သဘာဝဘေးအန္တရာယ်နှင့် ပတ်ဝန်းကျင် အရည်အသွေးများထိခိုက်မှု မရှိစေရန် ဆောင်ရွက်မှုများ၊ လျှော့ချရေး ပြုလုပ်မည့် အစီအစဉ်များကို ဖော်ပြထား ပါသည်။	အခန်း(၇)
	၇.၅	လုပ်ငန်းလည်ပတ်စဉ်ကာလနှင့် လုပ်ငန်းပိတ်သိမ်းချိန်ကာလတွင် စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်များကို ဇယားနှင့်တကွ ဖော်ပြထားပါ သည်။	
	၇.၆	ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်တွင် စောင့်ကြပ်ကြည့်ရှုမည့် နေရာများနှင့် အကြိမ်အရေ	

ကတိကဝတ်၏ အတိုချုပ်အမည်	အမှတ်စဉ်	ကတိကဝတ်ရှင်းလင်းဖော်ပြချက်	အခန်း
		အတွက်များ၊ သုံးစွဲအသုံးပြုမည့် ခန့်မှန်း ရန်ပုံငွေ လျာထားချက်များကိုလည်း ဖော်ပြထား ပါသည်။	
	၇.၇	ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ်တွင် ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု ကဏ္ဍအလိုက်ဆောင်ရွက်မည့် စီမံခန့်ခွဲမှု အစီအစဉ်များကို ရေးဆွဲ ထားပါသည်။	
	၇.၈	အရေးပေါ်တုံ့ပြန်ရေး အစီစဉ်များကို ရေးဆွဲထား ပါသည်။	
	၇.၉	သဘာဝဘေးအန္တရာယ်ဆိုင်ရာစီမံခန့်ခွဲမှု အစီအ စဉ်များကို ရေးဆွဲ ထားပါသည်။	
	၇.၁၀	လေ့ကျင့်သင်ကြားရေး အစီအစဉ်များကို ဖော်ပြ ထားပါသည်။	
	၇.၁၁	မှတ်တမ်းတင်ခြင်းနှင့် စာရွက်စာတမ်းပြုစုခြင်း များကို ဖော်ပြ ထားပါသည်။	
	၇.၁၂	လူထု အကျိုးပြု ပူးပေါင်းပါဝင်ဆောင်ရွက်မှု များတွင် အကျိုးအမြတ်များမှ ၂ ရာခိုင်နှုန်း ကို လှူဒါန်းသွားမည်ဖြစ်ကြောင်း ဖော်ပြထားပါ သည်။	

ဤအစီရင်ခံစာတွင် ထည့်သွင်းရေးသားထားသည့် အထက်ဖော်ပြပါ အခန်းကဏ္ဍများဖြစ်သည့် မူဝါဒများ၊ ဥပဒေ၊ နည်းဥပဒေနှင့် မူဘောင်များကိုလည်းကောင်း၊ စီမံကိန်းဆောင်ရွက်မှုကြောင့် လူမှုပတ်ဝန်းကျင်အပေါ် ဆိုးကျိုးသက်ရောက်မှုများကို လျော့ပါးရေးနည်းလမ်းများ၊ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ၎င်းတို့၏ လျော့ပါးရေးနည်းလမ်းများ၊ ဆက်စပ်သက်ရောက်မှုများအတွက် လျော့ချရေးနည်းလမ်းများနှင့် စီမံခန့်ခွဲမှု အစီအစဉ်များနှင့်တကွ လူမှုအကျိုးပြုလုပ်ငန်းများစသည်တို့ကို အပြည့်အဝလိုက်နာ အကောင်အထည်ဖော် ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်းကို ဝန်ခံကတိရေးထိုးပါသည်။

Hoang Anh Gia Lai Myanmar Co., Ltd.

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အစီရင်ခံစာအကျဉ်းချုပ်

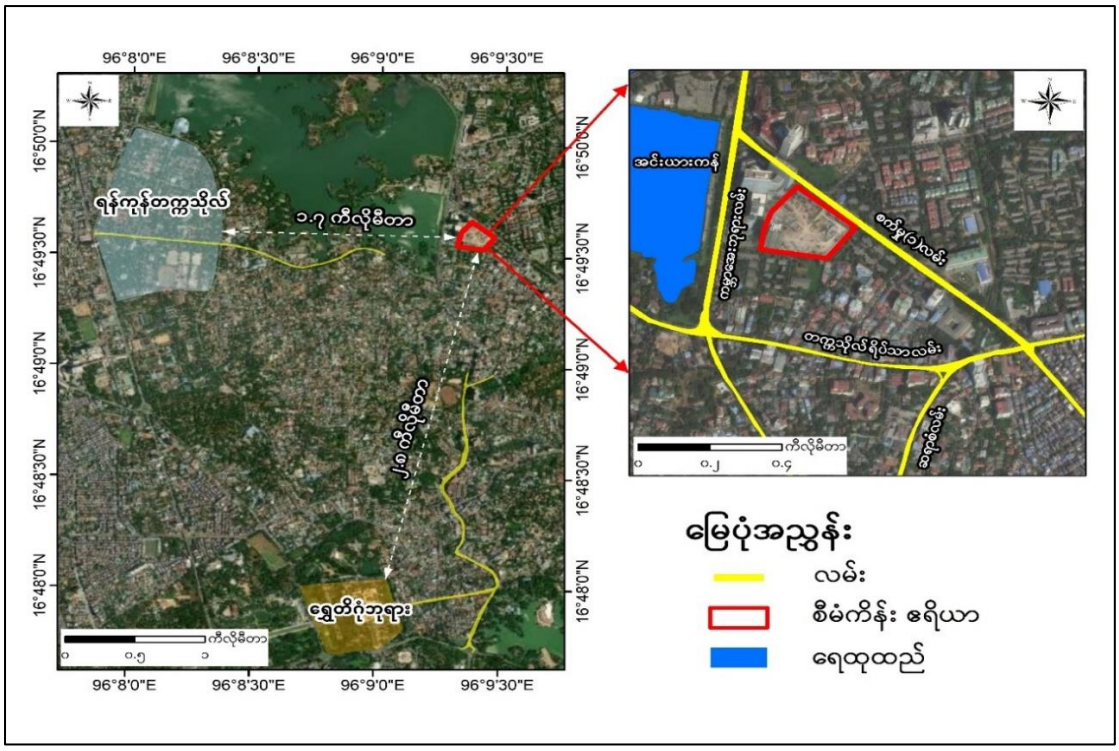
၁. စီမံကိန်းအကြောင်းအရာ

Hoang Anh Gia Lai Myanmar Co., Ltd. (HAGL Myanmar) သည် နိုင်ငံတကာ အဆင့်မှီ ၁၀၀ ရာခိုင်နှုန်း ဗီယက်နမ် နိုင်ငံမှ မြန်မာနိုင်ငံတွင် ရင်းနှီးမြှုပ်နှံ ထားသော စီမံကိန်း တစ်ခုဖြစ်ပြီး အမှတ် ၁၉၂၊ ကမ္ဘာအေး ဘုရားလမ်း၊ ဗဟန်းမြို့နယ်၊ ရန်ကုန်တွင်တည်ရှိပါသည်။ ယခု ပတ်ဝန်းကျင်နှင့် လူမှု ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာ သည် HAGL Myanmar Centre စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေး စီမံကိန်း အတွက်ရေးဆွဲထားခြင်း ဖြစ်ပါသည်။ အဆိုပါ စီမံကိန်းအဆင့် ၂ တွင် Residential Block B1, B2,၊ B3, Serviced Apartment A1, A2, Commercial, နှင့် Serviced Apartment A3, A4 တို့ပါဝင်ပါသည်။ စုစုပေါင်း မြေဧရိယာမှာ ၃၇,၈၁၆.၅၅ စတုရန်းမီတာ ဖြစ်သည်။ စီမံကိန်းတည်နေရာကို အောက်ပါ ပုံ ၁ တွင်ဖော်ပြ ထားပါသည်။

စီမံကိန်းအကောင်အထည်ဖော်ရသည့်ရည်ရွယ်ချက်မှာ

- တိုင်းပြည်၏ စီးပွားရေးပြုပြင်ပြောင်းလဲမှုလုပ်ငန်းစဉ်တွင် ပါဝင်ရန်၊
- မြန်မာပြည်သူများအတွက် သက်တောင့်သက်သာရှိသောနေထိုင်မှုဘဝပုံစံကို ပံ့ပိုးပေးရန်၊
- မျိုးဆက်သစ်လူငယ်များအတွက် ပိုမိုတောက်ပသောအနာဂတ်ကိုဖန်တီးပေးနိုင်ရန်။

ဖြစ်ပါသည်။



ပုံ ၁ စီမံကိန်းတည်နေရာပြပုံ

၁.၁. **စီမံကိန်းဖော်ဆောင်သူ**

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာ အတွက် စီမံကိန်းအဆိုပြုသူ၏ ဆက်သွယ်ရန်လိပ်စာကို ဇယား ၁/ ဇယား၂ နှင့် စီမံကိန်းဖော်ဆောင်သူ၏ ဖွဲ့စည်းပုံ ဇယားကို အခန်း ၁ တွင်ဖော်ပြထားပါသည်။

ဇယား ၁ စီမံကိန်းအဆိုပြုသူ၏ ဆက်သွယ်ရန်လိပ်စာ

အမည်	Mr. Nguyen Van Kha
ရာထူး	Director
လိပ်စာ	အမှတ် (၁၉၂)၊ ကမ္ဘာအေးဘုရားလမ်း၊ ဗဟန်းမြို့နယ်၊ ရန်ကုန်တိုင်း ဒေသကြီး။
ဖုန်းနံပါတ်	၀၉-၂၅၀၉၀၀၂၄၄

ဇယား ၂ စီမံကိန်းတာဝန်ခံ၏ ဆက်သွယ်ရန်လိပ်စာ

အမည်	ဦးရဲမြင့်အောင်
ရာထူး	စီမံကိန်းအကောင်အထည်ဖော်ရေး အလုပ်အမှုဆောင်
လိပ်စာ	အမှတ် (၁၉၂)၊ ကမ္ဘာအေးဘုရားလမ်း၊ ဗဟန်းမြို့နယ်၊ ရန်ကုန်တိုင်း ဒေသကြီး။
ဖုန်းနံပါတ်	၀၉-၂၅၀၉၀၀၂၄၄
အီးမေးလ်	ye.aung@thiso.vn

၂. မူဝါဒများ၊ဥပဒေဆိုင်ရာနှင့် ဖွဲ့စည်းဆောင်ရွက်ပုံဆိုင်ရာ လေ့လာသုံးသပ်ချက်

ဤအခန်းတွင် စီမံကိန်း၏ သဘာဝပတ်ဝန်းကျင်၊ လူမှုစီးပွားရေးနှင့် သက်ဆိုင်သော မြန်မာနိုင်ငံ၏မူဝါဒများ၊ သက်ဆိုင်သောဥပဒေများကို ဧယား ၃ တွင် အကျဉ်းချုပ်ဖော်ပြထားသည်။ စီမံကိန်းဖော်ဆောင်သူသည် ဤဥပဒေ ပြဋ္ဌာန်းချက်များ လိုက်နာရမည် ဖြစ်ပါသည်။

ဧယား ၃ စီမံကိန်းနှင့် သက်ဆိုင်သော မြန်မာနိုင်ငံ၏ ဥပဒေနှင့် စည်းမျဉ်းစည်းကမ်းများ

စဉ်	ဥပဒေနှင့် နည်းဥပဒေအမည်များ	ခုနှစ်
သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး		
၁.	ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ	၂၀၁၂
၂.	ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေများ	၂၀၁၄
၃.	ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း	၂၀၁၅
၄.	မြန်မာနိုင်ငံ အမျိုးသားပတ်ဝန်းကျင်ရေးရာ မူဝါဒ	၂၀၁၉
ညစ်ညမ်းမှုထိန်းချုပ်ခြင်းနှင့်ကျန်းမာရေး		
၅.	အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး လမ်းညွှန်ချက်များ (ထုတ်လွှတ်မှု)	၂၀၁၅
၆.	သောက်သုံးရေအရည်အသွေးဆိုင်ရာ မြန်မာစံချိန်စံညွှန်း	၂၀၁၉
၇.	အမျိုးသား မြေပေါ်ရေ အရည်အသွေး စံချိန်စံညွှန်း	၂၀၂၄
၈.	ပြည်ထောင်စုမြန်မာနိုင်ငံပြည်သူ့ကျန်းမာရေးဆိုင်ရာဥပဒေ	၁၉၇၂
၉.	ကူးစက်ရောဂါများ နှိမ်နှင်းရေး ဥပဒေ	၁၉၉၅ (၂၀၁၁ ပြင်ဆင်)
၁၀.	ဆေးလိပ်နှင့်ဆေးရွက်ကြီးထွက် ပစ္စည်းသောက်သုံးမှုထိန်းချုပ်ရေးဥပဒေ	၂၀၀၆
၁၁.	လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ကျန်းမာရေးဆိုင်ရာဥပဒေ	၂၀၁၉
၁၂.	မြန်မာနိုင်ငံ အမျိုးသားအဆင့် စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှုမဟာဗျူဟာနှင့် ပင်မလုပ်ငန်း အစီအစဉ်	(၂၀၁၈-၂၀၃၀)
ဇီဝမျိုးစုံမျိုးကွဲများနှင့် သဘာဝအရင်းအမြစ်ထိန်းသိမ်းရေး		
၁၃.	ဇီဝမျိုးစုံမျိုးကွဲများနှင့် သဘာဝထိန်းသိမ်းရေး နယ်မြေများ ကာကွယ်စောင့်ရှောက်ခြင်း ဆိုင်ရာဥပဒေ	၂၀၁၈
၁၄.	ငါးမွေးမြူခြင်းဆိုင်ရာဥပဒေ	၁၉၈၉
၁၅.	ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများ ထိန်းသိမ်းရေးဥပဒေ	၂၀၀၆ (၂၀၁၇ ပြင်ဆင်)
၁၆.	ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းထိန်းသိမ်းရေးနည်းဥပဒေများ	၂၀၁၃
၁၇.	မြေအောက်ရေဥပဒေ	၁၉၃၀
၁၈.	သစ်တောဥပဒေ	၂၀၁၈
မြေယာဥပဒေ		
၁၉.	မြေသိမ်း အက်ဥပဒေ	၁၈၉၄

စဉ်	ဥပဒေနှင့် နည်းဥပဒေအမည်များ	ခုနှစ်
၂၀.	လယ်ယာမြေဥပဒေ	၂၀၁၂
၂၁.	လယ်ယာမြေနည်းဥပဒေများ	၂၀၁၂
၂၂.	မြေလွတ်၊ မြေလပ်နှင့်မြေရိုင်းများစီမံခန့်ခွဲရေးဥပဒေ	၂၀၁၈
၂၃.	စာချုပ်စာတမ်းများမှတ်ပုံတင်ဥပဒေ	၂၀၁၈
၂၄.	နယ်နိမိတ်တိုင်းတာပိုင်းခြား သတ်မှတ်ရေးဥပဒေ	၂၀၁၉
မြို့ပြဖွံ့ဖြိုးတိုးတက်မှုနှင့်စီမံခန့်ခွဲမှု		
၂၅.	မြို့တော်စည်ပင်သာယာရေးကော်မတီ ဥပဒေ	၂၀၁၃
၂၆.	ရန်ကုန်မြို့တော်စည်ပင်သာယာရေးဥပဒေ	၂၀၁၈
၂၇.	မြန်မာနိုင်ငံအင်ဂျင်နီယာကောင်စီဥပဒေ	၂၀၁၃
၂၈.	စုပေါင်းပိုင်အဆောက်အအုံဆိုင်ရာ ဥပဒေ	၂၀၁၆
၂၉.	လျှပ်စစ်ဥပဒေ	၂၀၁၄
လူ့အခွင့်အရေး		
၃၀.	တိုင်းရင်းသားလူမျိုးများ၏အခွင့်အရေးကာကွယ်စောင့်ရှောက်သည့် ဥပဒေ	၂၀၁၅
၃၁.	တိုင်းရင်းသားလူမျိုးများ၏အခွင့်အရေးကာကွယ်စောင့်ရှောက်သည့် နည်းဥပဒေများ	၂၀၁၉
၃၂.	မသန်စွမ်းသူများ၏ အခွင့်အရေးဥပဒေ	၂၀၁၅
ယဉ်ကျေးမှုအမွေအနှစ်များ		
၃၃.	ယဉ်ကျေးမှုအမွေအနှစ်ဒေသများ ကာကွယ်ထိန်းသိမ်းရေးဥပဒေ	၂၀၁၉
၃၄.	ရှေးဟောင်းဝတ္ထုပစ္စည်းများ ကာကွယ်ထိန်းသိမ်းရေးဥပဒေ	၂၀၁၅
၃၅.	ရှေးဟောင်းအဆောက်အအုံများ ကာကွယ်ထိန်းသိမ်းရေးဥပဒေ	၂၀၁၅
အလုပ်သမား		
၃၆.	အလုပ်သမားအဖွဲ့အစည်းဥပဒေ	၂၀၁၁
၃၇.	အလုပ်အကိုင်နှင့်ကျွမ်းကျင်မှု ဖွံ့ဖြိုးတိုးတက်ရေး ဥပဒေ	၂၀၁၃
၃၈.	အနည်းဆုံးအခကြေးငွေဥပဒေ	၂၀၁၃
၃၉.	အခကြေးငွေပေးချေရေးဥပဒေ	၂၀၁၆
၄၀.	အလုပ်သမားလျော်ကြေးအက်ဥပဒေ	၁၉၂၃
၄၁.	အလုပ်သမားရေးရာ အငြင်းပွားမှုဖြေရှင်းရေးဥပဒေ	၂၀၁၂
၄၂.	လူမှုဖူလုံရေးဥပဒေ	၂၀၁၂ (၂၀၂၀ ပြင်ဆင်)
မော်တော်ယာဉ်များ		
၄၃.	ယာဉ်အန္တရာယ်ကင်းရှင်းရေးနှင့် မော်တော်ယာဉ်စီမံခန့်ခွဲမှုဥပဒေ	၂၀၂၀
၄၄.	ယာဉ်အန္တရာယ်ကင်းရှင်းရေးနှင့် မော်တော်ယာဉ်စီမံခန့်ခွဲမှုနည်းဥပဒေများ	၂၀၂၂

စဉ်	ဥပဒေနှင့် နည်းဥပဒေအမည်များ	ခုနှစ်
မီးဘေးအန္တရာယ်		
၄၅.	ရေနံနှင့် ရေနံထွက်ပစ္စည်းဆိုင်ရာ ဥပဒေ	၂၀၁၇
၄၆.	မြန်မာနိုင်ငံမီးသတ်တပ်ဖွဲ့ဥပဒေ	၂၀၁၅
ကုမ္ပဏီစီမံအုပ်ချုပ်မှု		
၄၇.	မြန်မာအာမခံ ဥပဒေ	၁၉၉၃ (၁၉၉၆ ပြင်ဆင်)
၄၈.	မြန်မာအာမခံလုပ်ငန်း နည်းဥပဒေများ	၂၀၁၇
၄၉.	မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု ဥပဒေ	၂၀၁၆ (၂၀၁၉ ပြင်ဆင်)
၅၀.	မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု နည်းဥပဒေများ	၂၀၁၇
၅၁.	ပြည်ထောင်စု၏အခွန်ကောက်ဥပဒေ	၂၀၁၉
၅၂.	ပို့ကုန်သွင်းကုန်ဥပဒေ	၂၀၁၂
အထပ်မြင့်အဆောက်အဦး		
၅၃.	Guidelines for High-Rise Building Construction Projects from Committee for Quality Control of High-Rise Building Construction Projects (CQHP)	-
၅၄.	မြန်မာနိုင်ငံအဆောက်အအုံဆိုင်ရာ စံချိန်စံညွှန်းလမ်းညွှန်ချက်များ	၂၀၂၅
သဘာဝဘေးအန္တရာယ်နှင့် ရာသီဥတုပြောင်းလဲမှု		
၅၅.	သဘာဝဘေးအန္တရာယ်ဆိုင်ရာစီမံခန့်ခွဲမှုဥပဒေ	၂၀၁၃
၅၆.	ရာသီဥတုပြောင်းလဲမှုဆိုင်ရာ မူဝါဒ	၂၀၁၉
၅၇.	Green Building Chapter in Myanmar National Building Code	၂၀၂၀
၅၈.	မြန်မာနိုင်ငံ ရာသီဥတုပြောင်းလဲမှုဆိုင်ရာ မဟာဗျူဟာနှင့် လုပ်ငန်းအစီအစဉ်	၂၀၁၈-၂၀၃၀
မြန်မာနိုင်ငံ၏ အစိုးရအဖွဲ့အစည်းဆိုင်ရာ မူဘောင်		
၅၉.	အမျိုးသားအဆင့်နှင့် ကဏ္ဍအလိုက် စီစဉ်ဆောင်ရွက်ချက်များ	
၆၀.	EIA အစီရင်ခံစာတွင် စီစဉ်ဆောင်ရွက်ထားရှိမှုများ	
နိုင်ငံတကာသဘောတူညီချက်များ		
၆၁.	IFC’s Standards and Guidelines	
၆၂.	World Bank’s Pollution Prevention and Abatement Handbook (၁၉၈၈)	
၆၃.	Vienna Convention for the Protection of the Ozone Layer (၁၉၈၅)	
၆၄.	Montreal Protocol on Substances that Deplete the Ozone Layer (၁၉၈၇)	
၆၅.	Kyoto Protocol	
၆၆.	United Nations Framework Convention on Climate Change (UNFCCC)	

၃. စီမံကိန်းအကြောင်းအရာအသေးစိတ်ဖော်ပြချက်

၃.၁. စီမံကိန်းတည်နေရာ

စီမံကိန်းသည် အမှတ် (၁၉၂)၊ ကမ္ဘာအေး ဘုရားလမ်း၊ ဗဟန်းမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီးတွင် ရှိသည်။ စီမံကိန်း၏ တစ်ဖက်တစ်ချက်တွင် ကမ္ဘာအေးဘုရားလမ်းတစ်လျှောက် အင်းလျားကန်တွင်ရှိပါသည်။ တက္ကသိုလ်ရိပ်သာလမ်းသည် ကမ္ဘာအေးဘုရားလမ်းအားဖြတ်၍ အနောက်တောင်ဘက်တွင်ရှိပြီး စက်မှု ၁ လမ်းကို အရှေ့တောင်တစ်လျှောက်ကိုဖြတ်သွားသည်။ စီမံကိန်း တည်နေရာပြ မြေပုံကို ပုံ ၁ တွင် ပြထားသည်။

၃.၂. အခြားရွေးချယ်စရာနည်းလမ်းများ

HAGL Myanmar သည် ဗီယက်နမ်-မြန်မာ နှစ်နိုင်ငံအစိုးရ ချစ်ကြည်ရေး ခိုင်မြဲစေရန် ရည်ရွယ်ချက်ဖြင့် ဟိုတယ်နှင့် ခရီးသွားညွှန်ကြားမှုဦးစီးဌာန၊ ဟိုတယ်နှင့် ခရီးသွားဝန်ကြီးဌာန နှင့် Build၊ Operate and Transfer ('BOT') Contract ဖြင့် အမှတ် ၁၉၂၊ ကမ္ဘာအေးဘုရားလမ်း ဗဟန်းမြို့နယ်တွင် HAGL Myanmar Centre Project အား အကောင်အထည်ဖော် တည်ဆောက်လျှက် ရှိပါသည်။ နိုင်ငံခြားတိုက်ရိုက် ရင်းနှီးမြှုပ်နှံမှုဖြစ်ပြီး နိုင်ငံတော်သို့ ၂၀၁၂ ခုနှစ်မှ စတင်ကာ နှစ်ရှည်မြေငှားရမ်းခနှင့် အခွန်အခများစွာ ပေးသွင်းနေသည့် စီမံကိန်းဖြစ်ပါသည်။

စီမံကိန်းအတွက် အဆောက်အဦတည်ဆောက်မည့် မြေနေရာ ရွေးချယ်ခြင်းနှင့် တရားဝင်လွှဲပြောင်းရယူခြင်းတို့သည် အချိန်ကြာမြင့်နိုင်ပြီး အဆိုပါ လိုအပ်သော မြေနေရာကို ရရှိရန်မှာ မသေချာပါ။ ထို့အပြင် ယခုအချိန်တွင် အဆိုပြု စီမံကိန်းသည် သက်ဆိုင်ရာအစိုးရဌာနများ၏ ဆောက်လုပ်မှု ခွင့်ပြုချက်များ အရ လုပ်ဆောင်နေပြီ ဖြစ်ပါသည်။

စီမံကိန်းဖော်ဆောင်သူသည် စီမံကိန်းအကောင်အထည် ဖော်ဆောင်မှု အဆင့်မတိုင်မီ ဒီဇိုင်းနှင့် တည်ဆောက်ပုံများအတွက် အချိန်ကာလနှင့် ငွေကြေးအကုန်အကျခံကာ သက်ဆိုင်ရာ အစိုးရဌာနများမှ အဆောက်အဦ ဒီဇိုင်းများအား တည်ဆောက်ခွင့်ပြုမိန့် ရရှိရေးအတွက် ဆောင်ရွက်ခဲ့ပြီး စီမံကန်းအဆင့် ၂ အတွက် လိုအပ်သော ခွင့်ပြုမိန့်တင်ပြမှုများအား အချိန်ကြာမြင့်စွာ ဆက်လက်ဆောင်ရွက်ရမည်ဖြစ်သည်။ စီမံကိန်း၏ ၆၀ % သည် တည်ဆောက်မှုပြီးစီးကာ စီမံကိန်းအဆင့် ၁ (Phase 1) အဖြစ် လုပ်ငန်းလည်ပတ်နေပြီ ဖြစ်ပါသည်။ ထို့ကြောင့် အဆိုပြုစီမံကိန်းအတွက် အခြားသင့်တော်သော ရွေးချယ်စရာနည်းလမ်းများ မရှိနိုင်ပါ။

အထက်ဖော်ပြပါ အကြောင်းအရာများကြောင့် လက်ရှိ အဆိုပြု နေရာတွင်သာ စီမံကိန်းကို ဆက်လက်အကောင်အထည်ဖော်သင့်ပြီး စီမံကိန်းအတွက် တခြားမြေနေရာ ပြန်လည်ရွေးချယ်ခြင်းသည် သင့်တော်မှုမရှိနိုင်ပါ။

၃.၃. **စီမံကိန်းအကြောင်းအရာဖော်ပြချက်**

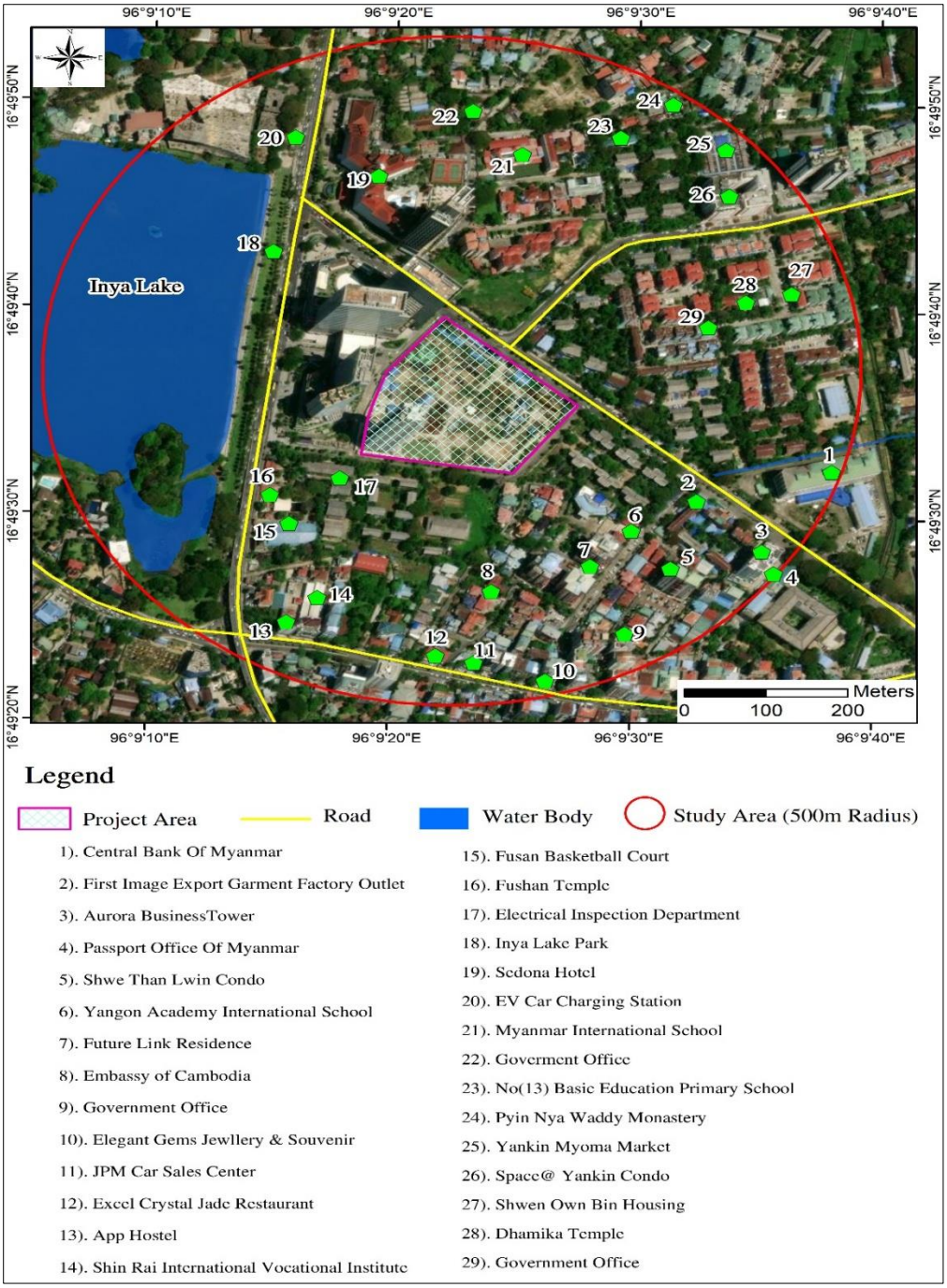
၃.၃.၁. **စီမံကိန်းဖော်ပြချက်**

စီမံကိန်း အဆင့် ၂ သည် စုစုပေါင်းမြေကွက်ဧရိယာအကျယ် ၃၇,၈၁၆.၅၅ စတုရန်းမီတာ အပေါ်တွင် တည်ဆောက်မည် ဖြစ်ပါသည်။ ယခုအချိန်တွင် စီမံကိန်း အဆင့် ၁ သည် တည်ဆောက်ပြီးဖြစ်၍ လုပ်ငန်းလည်ပတ်နေပြီ ဖြစ်သည်။ ထို့ကြောင့် စီမံကိန်းနေရာတွင် အဆင့် ၂ သာ တည်ဆောက်မည် ဖြစ်သည်။ စီမံကိန်းအတွက် အဆောက်အဦပျမ်းမျှအချိုးမှာ မြေကွက်အကျယ်၏ ၅၁.၇၂ % ရှိပါသည်။ ပုံ ၂ တွင် ပန်းခြံ၊ စိမ်းလန်းနယ်မြေ၊ သက်ဆိုင်ရာ အဆောက်အဦများနှင့် လမ်းကြောင်းပတ်လမ်းများ တည်ဆောက်မည့် ပုံစံကို ဖော်ပြထားပါသည်။

ပုံ ၂ စီမံကိန်း အဆင့် ၂ ၏ အဆောက်အဦတည်ဆောက်မည့် ပုံစံပြပုံ

၃.၃.၂. **စီမံကိန်း၏အနီးပတ်ဝန်းကျင်ရှိ အခြေအနေများ**

စီမံကိန်းနေရာနှင့် အနီးပတ်လည်မီတာ ၅၀၀ ရှိ အဆောက်အဦများကို လေ့လာရာတွင် လူနေအိမ်များ၊ ဘာသာရေးနေရာများ၊ ဆေးရုံများ၊ စီးပွားရေးနယ်မြေဧရိယာများ၊ အစိုးရရုံးများ နှင့် ကျောင်းများ အဖြစ် အသုံးချခြင်းများတွေ့ရှိရပါသည်။ စီမံကိန်း၏ ၅၀၀ မီတာ အနီးပတ်လည်ရှိ အဆောက်အဦပြမြေပုံ နှင့် စီမံကိန်းအနီးဧရိယာရှိ သွင်ပြင်လက္ခဏာများကို ပုံ ၃ တွင် ဖော်ပြထားပြီး အသေးစိတ် အချက်အလက်များကို အခန်း ၃ တွင်ဖော်ပြ ထားပါသည်။



ပုံ ၃ စီမံကိန်း၏ လက်ရှိ အနီးပတ်လည် အဆောက်အဦပြမြေပုံ

၃.၄. စီမံကိန်းတွင်ဖော်ဆောင်မှုတွင် ပါဝင်မည့် အဆောက်အဦများ

၃.၄.၁. အဆောက်အဦနှင့် လုပ်ငန်းဧရိယာအမျိုးအစား

စီမံကိန်း အဆင့် ၁ သည် တည်ဆောက်ပြီးဖြစ်၍ လုပ်ငန်းလည်ပတ်နေပြီ ဖြစ်သည်။ စီမံကိန်း အဆင့် ၂ တွင် Commercial Centre၊ Serviced Apartment A3၊ A4။ Serviced Apartment A1၊ A2၊ Residential Block B1၊ B2၊ B3 တို့ပါဝင်ပါသည်။ စီမံကိန်းအဆင့် ၂ ကားရပ်နားရန် B1 တွင် Basement ၂ ထပ် ပါဝင်ပြီး ကျန်ရှိသော စီမံကိန်းအဆင့် ၂ တွင် Basement ၄ ထပ်ပါ ရှိပါသည်။ ထို့အတူ ၃၀ ထပ်အမြင့် ရှိသော (Commercial Centre အမှတ် ၂) သည် စီမံကိန်းအဆင့် ၁ မှ Commercial Centre 1 နှင့် တွဲဆက်၍ တည်ဆောက်မည်ဖြစ်သည်။

Residential Units Block B1, B2, B3 - လူနေထိုင်ရန်၊ Serviced Apartment A1, A2 - လူနေအခန်းများ နှစ်ရှည် ငှားရမ်းရန်၊ Commercial Center No. 2 + Serviced Apartment A3, A4 - စျေးဝယ်စင်တာနှင့် လူနေအခန်းများ နှစ်ရှည် ငှားရမ်းရန် စသည့် ဝန်ဆောင်မှုများကို ပေးမည်ဖြစ်ပါသည်။

၃.၅. အခြေခံအဆောက်အဦများနှင့် ကွန်ဒို အဆောက်အဦ အထောက်အပံ့များ

၃.၅.၁. စီမံကိန်း ဖွံ့ဖြိုးတိုးတက်မှု

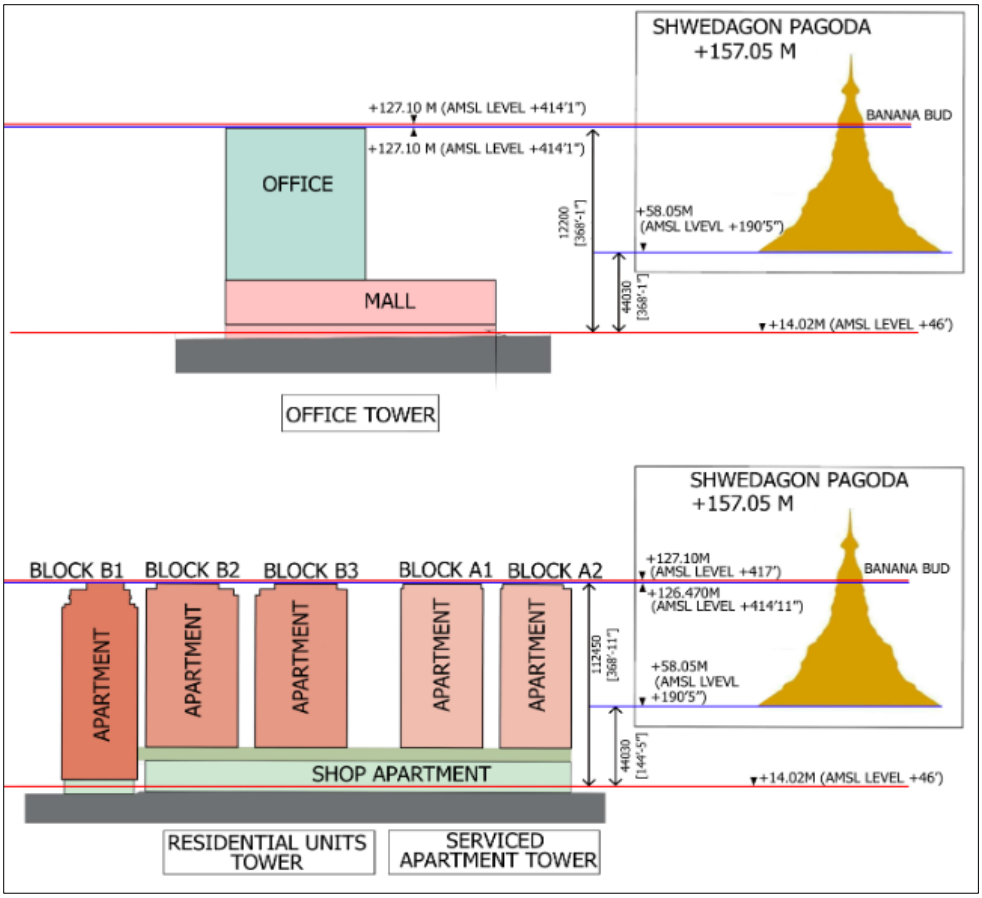
အဆိုပြုထားသော စီမံကိန်းတည်ဆောက်မှုတွင် High-rise Residendial နှင့် Commercial Building များပါဝင်ပြီး အသုံးပြုမှုများမှာ အောက်ဖော်ပြပါ အတိုင်း ဖြစ်ပါသည်။

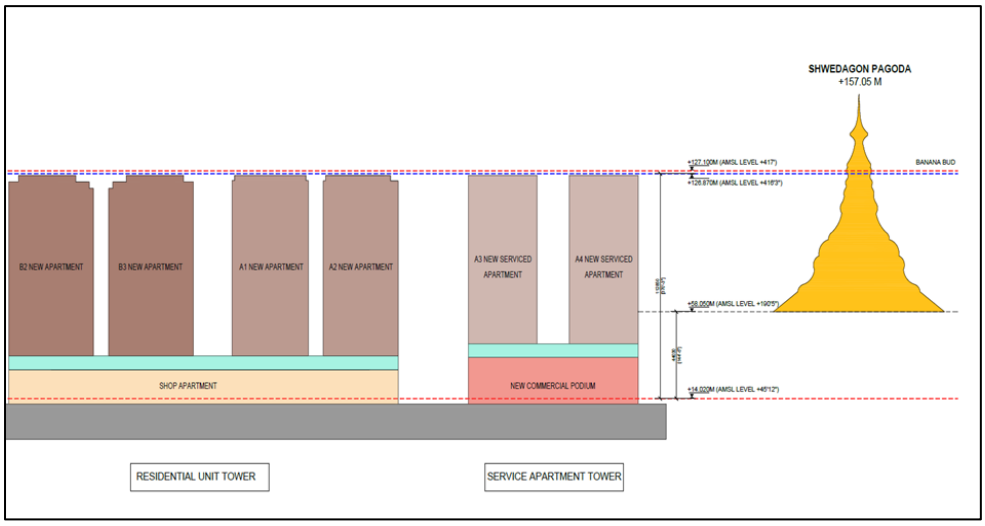
- လူနေအဆောက်အအုံ (Residential Block - B1) - ၃၃ ထပ်
- လူနေအဆောက်အအုံ (Residential Block – B2, B3) -၃၀ ထပ်
- ဝန်ဆောင်မှုဆိုင်ရာ တိုက်ခန်းများ (Serviced Apartment - A1, A2) - ၃၀ ထပ်
- Commercial Centre နှင့် အထပ်မြင့်ဝန်ဆောင်မှုဆိုင်ရာ တိုက်ခန်းများ (High-Rise Serviced Apartment - A3, A4) - ၃၀ ထပ်
- စိမ်းလန်းနယ်မြေများ
- မြေအောက် ကားရပ်နားရန်နေရာ

၃.၅.၂. စီမံကိန်းအတွင်း မြေအသုံးချမှု

စီမံကန်း အဆင့် ၂ အတွက် စုစုပေါင်း မြေအကျယ်အဝန်း မှာ ၃၇,၈၁၆.၅၅ စတုရန်းမီတာ ဖြစ်ပါသည်။ အဆောက်အဦ၏ခေါင်မိုးထပ်ပေါ်ရှိ စိမ်းလန်းဧရိယာ မှာ ၃,၇၃၆.၃၄ စတုရန်းမီတာဖြစ်ပြီး အဆောက်အဦ၏အပြင်ဘက် စိမ်းလန်းဧရိယာ မှာ ၁၁,၄၇၈.၅၂ စတုရန်းမီတာ ဖြစ်ပါသည်။ Residential and Serviced Building အတွက် အမြင့်မှာ ပင်လယ်ရေမျက်နှာပြင်အမြင့် အထက် ၁၂၆ မီတာရှိပါသည်။ မြေအသုံးချမှု အညွှန်းအတွက် အသေးစိတ်အချက်အလက်များကို အခန်း ၃ တွင် ဖော်ပြထားပါသည်။

ထို့အတူ အဆောက်အဦအားလုံးသည် ရန်ကုန်တိုင်းဒေသကြီး၏ အထပ်မြင့်အသုံးပြုမှုမူဝါဒ အောက်ရှိလုပ်ငန်းစဉ်များအတိုင်း စီစဉ်ထားပြီး ရွှေတိဂုံစေတီတော်နှင့်စီမံကိန်းနေရာ အကွာအဝေးမှာ ၂.၈ ကီလိုမီတာ ကျော်ရှိပါသည်။ အဆောက်အဦအားလုံး၏အမြင့်ဆုံးနေရာမှာ ၁၂၆.၈၇ မီတာရှိပြီး ရွှေတိဂုံ စေတီတော် အောက်ဌက်ပျောဖူးအမြင့်မှာ အပေါ်တွင် ၁၂၇.၁၀ မီတာခန့်ရှိပါသည်။ ထို့ကြောင့် စီမံကိန်း ဆောင်ရွက်ခြင်းကြောင့် ရွှေတိဂုံစေတီတော် အပေါ်တွင် မြင်ကွင်းဆိုင်ရာ သက်ရောက်မှု တစ်စုံတစ်ရာမှ မရှိနိုင်ပါ။ ရွှေတိဂုံစေတီတော်နှင့် အမြင့် နှိုင်းယှဉ်မှုကို ပုံ ၄ တွင် ဖော်ပြထားပါသည်။





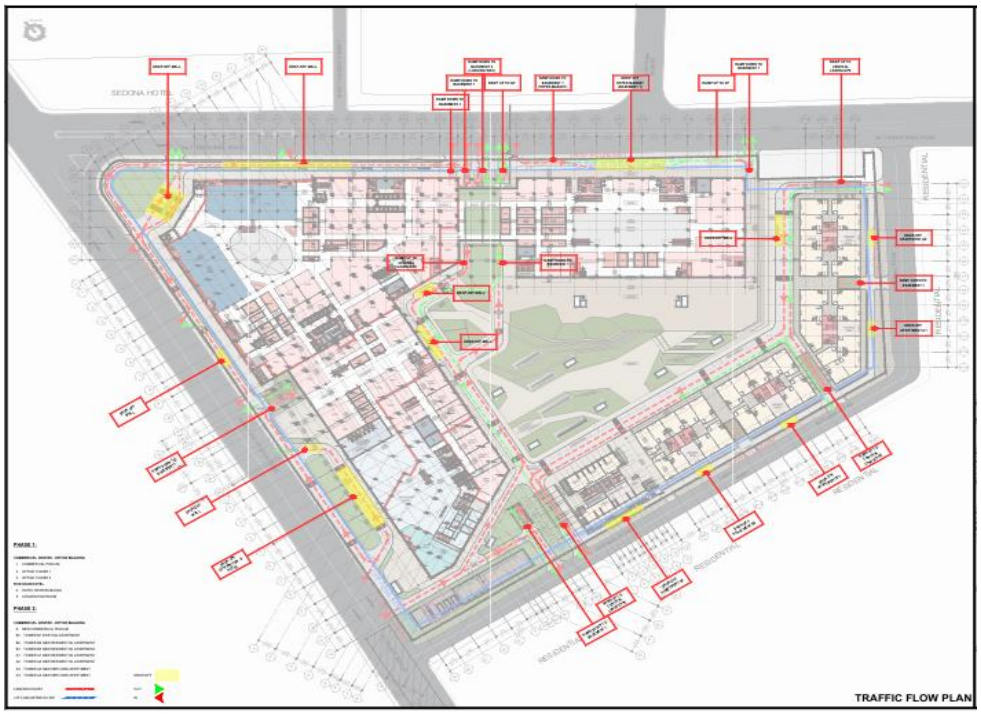
ပုံ ၄ ရွှေတိဂုံစေတီတော်နှင့် အမြင့် နှိုင်းယှဉ်မှုပြပုံ

၃.၅.၃. ယာဉ်ကြောစနစ်

၃.၅.၃.၁. အဝင်လမ်း၊ အထွက်လမ်းနှင့် အတွင်းလမ်း

စီမံကိန်းဧရိယာအတွင်းသို့ ဝင်ရန် အဓိကအဝင်လမ်း ၆ လမ်းရှိပါသည်။ အဝင်လမ်း ၂ ခုမှာ အမှတ် ၁ စက်မှုလမ်းတွင် တည်ရှိပြီး အဓိကရည်ရွယ်ချက်မှာ Commercial Centre သို့လာရောက်ပြီး ပြန်ထွက်သည့် ဧည့်သည်ကားများအတွက် ဖြစ်ပါသည်။ စီမံကိန်း၏ အခြားတစ်ဖက်ရှိ အဓိကအဝင်လမ်း ၄ လမ်းမှာ ကမ္ဘာအေးဘုရားနှင့် အမှတ် ၁ စက်မှုလမ်းကြားရှိ ဆက်သွယ်ထားသော အတွင်းလမ်းပေါ်တွင် ရှိပါသည်။

အထွက်လမ်း ၃ လမ်းမှာ Residential Block တွင်နေသူများနှင့် ဧည့်သည်များ ဝင်ထွက်ရန် အဓိက ဖြစ်ပါသည်။ ယာဉ်ကြောပိတ်ဆို့မှုအတွက် သက်သာစေရန် အရံလမ်းများ စီစဉ်ထားပါသည်။ ထို့ကြောင့် စီမံကိန်းဧရိယာသည် Residential Block တွင်နေသူများနှင့် ဧည့်သည်များ သွားလာရန် အဆင်ပြေပါသည်။ စီမံကိန်းဧရိယာ တစ်ခုလုံးအတွက် Basement ၄ ထပ်တွင် လုံလောက်သော ကားပါကင်ကို တည်ဆောက်မည်ဖြစ်ပြီး ယာဉ်သွားလာမှုအစီအစဉ်ပြပုံ ကို ပုံ ၅ တွင်ဖော်ပြထားပါသည်။



ပုံ ၅ ယာဉ်သွားလာမှုအစီအစဉ်ပြပုံ

၃.၅.၃.၂. ကားရပ်နားရန်နေရာ

စီမံကိန်း အဆင့် ၂ ရှိ အဆောက်အဦတိုင်း၏ Basement ၄ ထပ်တွင် စီမံကိန်းဧရိယာ တစ်ခုလုံးအတွက် လုံလောက်သောကားရပ်နားရန်နေရာများကို တည်ဆောက်မည် ဖြစ်သည်။ စီမံကိန်း အတွက် လိုအပ်သော ကားရပ်နားရန်နေရာ တွက်ချက်မှုမှာ ၂,၇၉၃ နေရာ ဖြစ်ပါသည်။ စုစုပေါင်း ကားရပ်နားရန် နေရာကို ရန်ကုန်မြို့တော် စည်ပင်သာယာရေးကော်မတီ ဥပဒေနှင့်အညီ အခြေခံပြီး တွက်ချက်ခဲ့ပါသည်။ ထို့အပြင် အနာဂတ်စီမံကိန်း တိုးချဲ့မှုအတွက် ကားရပ်နားရန်နေရာနေရာ ၂၀% ကိုထည့်သွင်း တွက်ချက်ခဲ့ပါသည်။

၃.၅.၄. အိမ်သုံးရေအတွက် ရေထောက်ပံ့မှုစနစ်

၃.၅.၄.၁. ရေအရင်းအမြစ်

စီမံကိန်း အဆင့် ၂ တွင် Residential Building ၃ ခု၊ Serviced Apartment ၂ လုံး နှင့် Commercial Building နှင့်တွဲထားသော Serviced Apartment ၂လုံး တို့ပါဝင်ပါသည်။ သက်ဆိုင်သော အဆောက်အဦ တစ်ခု ချင်းစီတွင် ဆိုင်နေရာနှင့် ပစ္စည်းထားရာနေရာ နှင့် မြေအောက်ထပ်ကား ရပ်နားရန် နေရာ ပါရှိပါသည်။ ရေ အသုံးပြုမည့် စနစ်အား ရန်ကုန်မြို့တော် စည်ပင်သာယာရေးကော်မတီ၏ ရေပေး

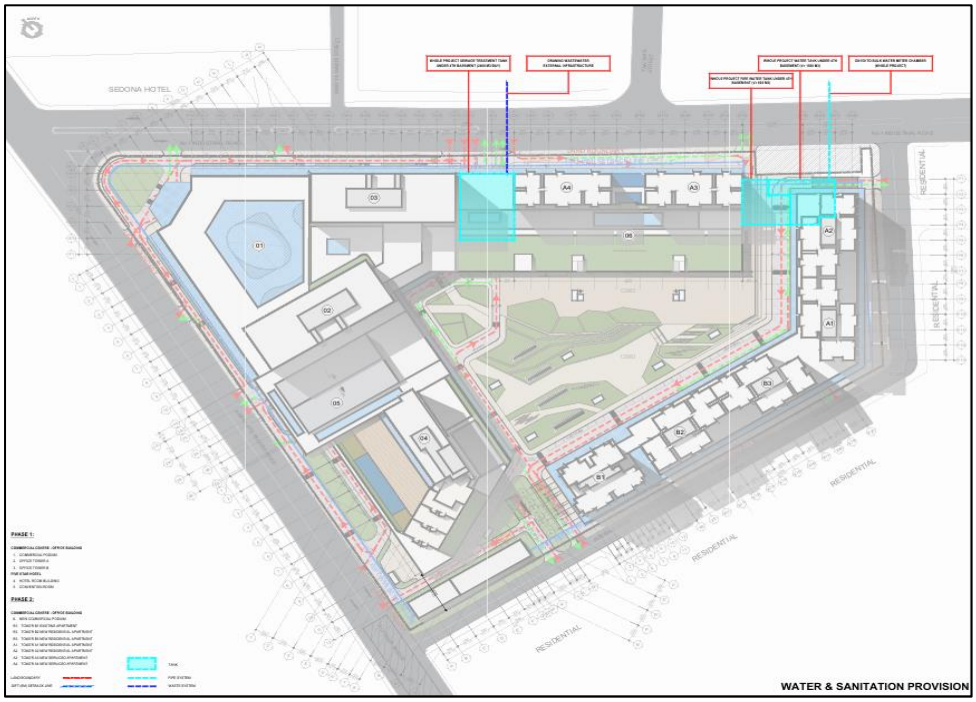
ဝေရေးစနစ်မှ ရယူ မည်ဖြစ်ပြီး စနစ်အားလုံးတွင် အစိုးရ၏နည်းလမ်းနှင့်လမ်းညွှန်ချက်များကို လိုက်နာပြီး ဆောင်ရွက်မည် ဖြစ်သည်။ စီမံကိန်းဧရိယာတွင် ရေအသုံးပြုမှုအရံအနေဖြင့် အဝီစိရေတွင်းများကို အသုံးပြုမည် မဟုတ်ပါ။

၃.၅.၄.၂. ရေလိုအပ်ချက်ပမာဏ

စီမံကိန်းအဆင့် ၂ အတွက် ၁,၈၇၅ ကုဗမီတာ သိုလှောင်နိုင်သော ရေသိုလှောင်ကန်ကို Basement ၃ ထပ်နှင့် ၄ ထပ်တွင် ထားရှိမည်ဖြစ်ပြီး စီမံကိန်းတစ်ခုလုံးသို့ ဖြန့်ဝေမည် ဖြစ်ပါသည်။ စီမံကိန်းတည်ဆောက်စဉ်ကာလတွင် ရေသုံးစွဲမှုခန့်မှန်းခြေမှာ တစ်နေ့လျှင် ၆၄ မှ ၉၅ ကုဗမီတာ အထိ ရှိနိုင်ပါသည်။ မီးသတ်ရေကန်ကို Serviced Apartment - Residential unit များ (စီမံကိန်း အဆင့် ၂) ၏ Basement ၂ ထပ် နှင့် ၃ ထပ်တွင် တည်ဆောက်မည်ဖြစ်ပြီး ထိုရေလှောင်ကန်မှာ ရေ ၁,၀၀၀ ကုဗမီတာ သိုလှောင်နိုင်မည်ဖြစ်ပြီး ရန်ကုန်မြို့တော် စည်ပင်သာယာရေး ကော်မတီ၏ ရေပေးဝေရေးစနစ်မှ ပိုက်လိုင်းစနစ်ဖြင့် အဓိက ဆက်သွယ်ထားမည် ဖြစ်ပါသည်။

၃.၅.၄.၃. ရေသုံးစွဲမှု အရေအတွက်

စီမံကိန်းတွင် အသုံးပြုရန် ရေသိုလှောင်ကန်၏ ထုထည်ပမာဏမှာ ၁,၈၇၅ ကုဗမီတာဖြစ်ပြီး ယခုစီမံကိန်းတည်ဆောက်စဉ်ကာလတွင် ရေသုံးစွဲမှုခန့်မှန်းခြေမှာ တစ်နေ့လျှင် ၆၄ မှ ၉၅ ကုဗမီတာအထိ ရှိနိုင်ပါသည်။ စီမံကိန်းလည်ပတ်စဉ်ကာလတွင် စီမံကိန်းအဆင့် ၂ ရှိ အဆောက်အဦ အားလုံးအတွက် သုံးစွဲမည့် ရေပမာဏမှာ ခန့်မှန်းခြေအရ တစ်နေ့လျှင် ၁,၈၀၀ ကုဗမီတာခန့် ရှိနိုင်ပါသည်။ ရေကူးကန် B2 နှင့် A1 အတွက် ရေသုံးစွဲမှုမှာ ခန့်မှန်းခြေအရ တစ်နေ့လျှင် ၅၅၂ ကုဗမီတာ ခန့် ရှိနိုင်ပါသည်။ အသေးစိတ် အချက်အလက်များကို ပုံ ၆ တွင် ဖော်ပြထားပါသည်။

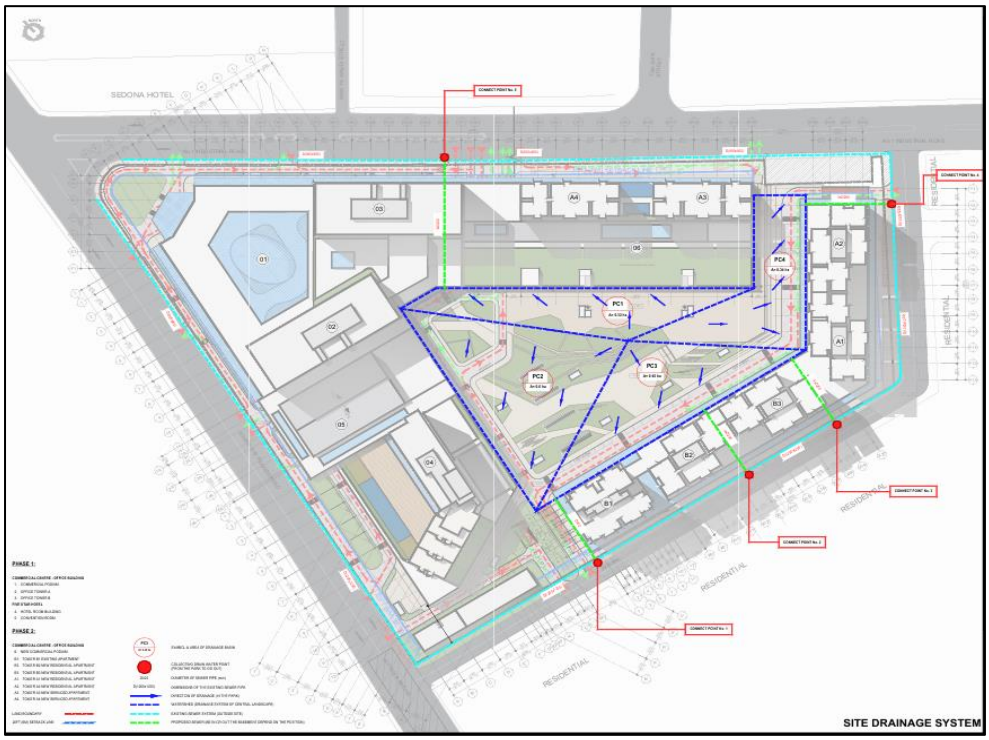


ပုံ ၆ ရေ နှင့် မိလ္လာစနစ်ပြမြေပုံ

၃.၅.၄.၄. စွန့်ပစ်ရေပမာဏနှင့် ရေစီးဆင်းမှုစနစ်

စီမံကိန်းတည်ဆောက်စဉ်ကာလတွင် စွန့်ပစ်ရေထွက်ရှိမှုပမာဏမှာ ခန့်မှန်းခြေအရ တစ်နေ့လျှင် ၂၁၀ ကုဗမီတာ ခန့်ရှိနိုင်ပါသည်။ စီမံကိန်း ပြင်ပရှိပိုက်များကို အဓိကရေမြောင်းမှတဆင့် စည်ပင်ပိုက်လိုင်းဖြင့် ဆက်သွယ်မည် ဖြစ်သည်။ ပန်းခြံနေရာ၏ရေဆင်းစနစ်မှ တိုးချဲ့ထားသော ရေမြောင်း အခွဲနှင့် အဆောက်အဦများ၏ ရေမြောင်းအခွဲများကို အဓိကရေမြောင်းဖြင့် တိုက်ရိုက်ဆက်သွယ်ထားမည် ဖြစ်ပါသည်။

စီမံကိန်း အဆင့် ၁ ၏ အပြင်ဘက်ရှိ အရွယ်အစား ၉၀၀ x ၉၀၀ မီလီမီတာ ရှိသော မိလ္လာပိုက်သည် စီမံကိန်း အဆင့် ၂ ရှိ အရွယ်အစား ၁၂၀၀ x ၁၂၀၀ မီလီမီတာ ရှိသော မိလ္လာပိုက်အတွင်းသို့ စီးဝင်မည်ဖြစ်သည်။ Residential Building၊ Serviced Apartment နှင့် ပန်းခြံအလယ်ရှိ အချင်းဝက် ၄၀၀ မှ ၂၀၀ မီလီမီတာရှိသော မိလ္လာပိုက်မှ အရွယ်အစား ၁၂၀၀ x ၁၂၀၀ မီလီမီတာ ရှိသော မိလ္လာပိုက်အတွင်းသို့ စွန့်ထုတ်မည် ဖြစ်သည်။ Commercial နှင့် Office Buildingများ မှ အချင်းဝက် ၂၀၀ မီလီမီတာရှိ မိလ္လာပိုက်သည် ပန်းခြံနှင့် အဆောက်အဦများမှ စီးဝင်သည့် အရွယ်အစား ၉၀၀ x ၉၀၀ မီလီမီတာ ရှိသော မိလ္လာပိုက်နှင့် ဆက်သွယ်မည် ဖြစ်ပါသည်။ ရေဆင်းစနစ်အတွက် အသေးစိတ် အချက်အလက်များကို ပုံ ၇ တွင် ဖော်ပြထားပါသည်။



ပုံ ၇ စီမံကိန်း၏ရေဆင်းစနစ်ပြပုံ

၃.၅.၄.၅. အဆောက်အဦ အတွင်း စွန့်ပစ်ရေနှင့် မိလ္လာရေ စုဆောင်းမှုစနစ် (မိလ္လာကန်၏ တည်နေရာ)

အဆောက်အဦအားလုံးမှ စွန့်ပစ်ရေ များကို မိလ္လာနှင့် ရေဆိုးစွန့်ပစ် သိုလှောင်ကန်ထဲသို့ စွန့်ပစ်မည် ဖြစ်ပါသည်။ သိုလှောင်ကန်၏ ထုထည်ပမာဏမှာ တစ်နေ့လျှင် ၂,၄၀၀ ကုဗမီတာ ဖြစ်ပြီး သတ်မှတ်ထားသော BOD စံချိန်စံညွှန်း ပမာဏရှိသော စွန့်ပစ်ရေကို ပြင်ပသို့ စနစ်တကျ စွန့်ထုတ်ပါမည်။ စီမံကိန်းသည် ယခုတွင် အဆင့် ၂ ရှိပြီး ဆောက်လုပ်ရေးလုပ်ငန်းမှ စွန့်ထုတ်သော ရေဆိုးများကို သန့်စင်ရန် ကိုယ်ပိုင်ရေဆိုးသန့်စင် စနစ်ရှိပါသည်။

၃.၅.၄.၆. စွန့်ပစ်ရေနှင့် မိလ္လာသန့်စင်ကန်

စီမံကိန်းဧရိယာမှ စွန့်ပစ်ရေ သန့်စင်ရန်အတွက် equalization, anoxic and aeration tank အသုံးပြုထားသော စွန့်ပစ်ရေသန့်စင်ကန်ကို ထားရှိမည်ဖြစ်သည်။ ထို စွန့်ပစ်ရေသန့်စင်ကန်ကို စီမံကိန်းဧရိယာနှင့် အိမ်သုံးစွန့်ပစ်ရေ သန့်စင်ရန် နှစ်မျိုးလုံးအတွက် ဆောင်ရွက်ထားခြင်းဖြစ်သည်။ စွန့်ပစ်ရေသန့်စင်ကန်သိုလှောင်နိုင်မှု ပမာဏမှာ ၇၁၈ ကုဗမီတာဖြစ်ပြီး တစ်နေ့လျှင် ၁,၂၅၀ ကုဗမီတာ သန့်စင်နိုင်ပါသည်။ သန့်စင်ပြီးသော စွန့်ပစ်ရေကန် သိုလှောင်နိုင်မှုပမာဏမှာ ၂၀၅.၇၈ ကုဗမီတာ ဖြစ်ပါသည်။

၃.၅.၄.၇. မိုးရေစီးဆင်းမှုစနစ်

စီမံကိန်း အဆင့် ၂ တွင် မိုးရေဆင်းမှုစနစ်ကို အဆောက်အဦပြင်ပရှိ ပိုက်လိုင်းတစ်လျှောက်တွင် မိုးရေစုဆောင်းနေရာများ ထည့်သွင်းတည်ဆောက်မည် ဖြစ်သည်။ ပန်းခြံနှင့် အဆောက်အဦများမှ မိုးရေစုဆောင်းရန် အဓိက ၅ နေရာရှိပါသည်။ ထိုနေရာအားလုံးမှ မိုးရေများကို ရန်ကုန်မြို့တော် စည်ပင်သာယာရေးကော်မတီ၏ ရေထွက်ပေါက်အတွင်းသို့ အဓိက စီးဆင်းစေမည် ဖြစ်သည်။

၃.၅.၅. အစိုင်အခဲစွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှု

၃.၅.၅.၁. အစိုင်အခဲစွန့်ပစ်မှုစနစ်

Second Basement တွင် အရွယ်အစား ၁၃၀ စတုရန်းမီတာ နှင့် ၁၃၅ စတုရန်းမီတာ အသီးသီးရှိသောအမှိုက်စွန့်ပစ်ခန်း ၂ ခန်းရှိပါသည်။ စီမံကိန်းနေရာတွင် အမှိုက်ပုံးများ လုံလောက်စွာရှိမည် ဖြစ်ပြီး ထိုအမှိုက်များကို စနစ်တကျ စုဆောင်းထားပြီး ရန်ကုန်မြို့တော် စည်ပင်သာယာရေးကော်မတီ၏ လမ်းညွှန်ချက်များအတိုင်း စွန့်ပစ်မည်ဖြစ်သည်။

၃.၅.၅.၂. စွန့်ပစ်အမှိုက်ပမာဏ

IGES (၂၀၁၆) အရ လူတစ်ယောက်၏ အမှိုက်စွန့်ပစ်မှုမှာ တစ်နေ့လျှင် ၀.၄ ကီလိုဂရမ်ခန့် ရှိနိုင်ပါသည်။ တည်ဆောက်စဉ်ကာလတွင် လုပ်သားဦးရေ ၃၉၂ ယောက်ခန့်ထားမည်ဖြစ်ပြီး အမှိုက်ထွက်ရှိမှုမှာ တစ်နေ့လျှင် ၁၅၆.၈ ကီလိုဂရမ်ခန့် ရှိနိုင်ပါသည်။ စီမံကိန်းလည်ပတ်စဉ်ကာလတွင် အမှိုက်ထွက်ရှိမှုမှာ တစ်နေ့လျှင် ၂၁၀ ကုဗမီတာခန့် ထွက်ရှိနိုင်ပါသည်။ ဤစီမံကိန်းသည် လူနေတိုက်ခန်းများ၊

ဟိုတယ်နှင့် ကုန်တိုက်တည်ဆောက်မည်ဖြစ်သောကြောင့် လုပ်ငန်းလည်ပတ်သည့် ကာလတွင် ထွက်ရှိမည့် စွန့်ပစ်အမှိုက်အမျိုးအစားနှင့် ပမာဏကို ခန့်မှန်း၍ မရနိုင်ပါ။

၃.၅.၅.၃. စွမ်းအင်ထောက်ပံ့မှု

လျှပ်စစ်ဓာတ်အားထောက်ပံ့မှုအတွက် ၁,၆၀၀ မှ ၅,၀၀၀ ကေဗွီအေ အားရှိသော ထရန်စဖော်မာ ၁၀ လုံး စီစဉ်ထားပါသည်။ စီမံကိန်းအတွက် လျှပ်စစ်ဓါတ်အားကို အစိုးရလျှပ်စစ်ဓါတ်အားလိုင်းမှ ရယူမည်ဖြစ်သည်။ အသေးစိတ်အချက်အလက်များကို အခန်း ၃ တွင် ဖော်ပြထားပါသည်။

၃.၆. **စီမံကိန်းအကောင်အထည်ဖော်ဆောင်ရွက်မှု**

စီမံကိန်းရှိအခြားအဆောက်အဦများအားလုံး၏ အနာဂတ် အစီအစဉ် များ မှာ Residential Units Block B2 နှင့် B3 ကို စတုတ္ထလပတ်၊ ၂၀၃၀ ခုနှစ်တွင် ပြီးစီးတည်ဆောက်ရန် မျှော်မှန်းထားပြီး Serviced Apartment A1 နှင့် A2 နှင့် Commercial နှင့် Serviced Apartment A3 နှင့် A4 များကို ၂၀၃၆ ခုနှစ် တွင် ပြီးစီးမည်ဟု မျှော်မှန်းထားပါသည်။ သို့သော် မြန်မာနိုင်ငံရှိ COVID-19 ရောဂါဖြစ်ပွားမှုနှင့် လက်ရှိ စီးပွားရေး အခြေနေများအပေါ်တွင် မူတည်ပြီး စီမံကိန်းအကောင်အထည်ဖော် ဆောင်ရွက်မှု အစီအစဉ်များ အချိန်နှင့်အမျှ ပြောင်းလဲနိုင်ပါသည်။

၄. ပတ်ဝန်းကျင်ဆိုင်ရာအခြေခံအချက်အလက်များ

စီမံကိန်း၏လေ့လာသည့် ဧရိယာအတွင်းတွင် သဘာဝပတ်ဝန်းကျင်၊ လူမှုစီးပွားပတ်ဝန်းကျင်၊ ပတ်ဝန်းကျင်အရည်အသွေးတိုင်းတာမှုနှင့် ဇီဝဗေဒဆိုင်ရာလေ့လာမှုများ စသည့် ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက်များကို တိုင်းတာခဲ့ပြီး အနှစ်ချုပ်ကို ဇယား ၄ တွင်ဖော်ပြထားပါသည်။

ဇယား ၄ ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက်များ ကောက်ယူခြင်း အနှစ်ချုပ်

စဉ်	အမျိုးအစား	အကြောင်းအရာ
သဘာဝပတ်ဝန်းကျင်		
၁.	ရာသီဥတု	ဗဟန်းနှင့် ရန်ကင်းမြို့နယ်၏ ၂၀၂၃ ခုနှစ် ဒေသဆိုင်ရာ အချက်အလက်များအရ ဗဟန်းမြို့နယ်၏ ပျမ်းမျှအမြင့်ဆုံးအပူချိန်မှာ ၄၀.၂ ဒီဂရီစင်တီဂရိတ်၊ ရင်ကင်းမြို့နယ်၏ ပျမ်းမျှအမြင့်ဆုံးအပူချိန်မှာ ၄၂.၂ ဒီဂရီစင်တီဂရိတ် ရှိပါသည်။ ပျမ်းမျှအနိမ်းဆုံး အပူချိန်မှာ ၁၁.၅ ဂရီစင်တီဂရိတ် ရှိပါသည်။
၂.	မြေမျက်နှာသွင်ပြင်	စီမံကိန်းတည်ရှိရာ ဗဟန်းမြို့နယ်သည် ပင်လယ်ရေမျက်နှာပြင်အထက် ၁၄.၀၂ မီတာ မြင့်ပါသည်။ ဗဟန်းမြို့နယ်၏ အရှေ့ဘက်တွင် မြေနိမ့်ပိုင်းမြေပြန့်ဒေသရှိသည်။ ထို့အပြင် ပဲခူးရုံးမ၏တောင်ဘက်အဆုံးတွင် တည်ရှိသောကြောင့် ကုန်းမြင့်နှင့်လျှိုမြောင်များရှိပါသည်။ ရန်ကုန်မြစ်သည် စီမံကိန်း၏ အနောက်ဘက်တွင်ရှိပြီး တောင်ဘက်တွင် ကုန်းမြင့်များရှိပါသည်။ စီမံကိန်းဧရိယာမှာမူ မြေပြန့်ဒေသဖြစ်သည်။
၃.	ဘူမိဗေဒ, မြေဆီလွှာနှင့် ငလျင်	စီမံကိန်းတည်ရှိရာ ဗဟန်းမြို့နယ်ရှိ စီမံကိန်းဧရိယာသည် ပလစ်တိုဆင်းအဏုယုဂ် မှ ခေတ်သစ် (Pleistocene to recent) သက်တမ်းရှိ အနည်ကျ နုန်းကျောက်လွှာ၊ ပလိုင်ယိုဆင်း အဏုယုဂ် (Pliocene) သက်တမ်းရှိ သည့်

စဉ်	အမျိုးအစား	အကြောင်းအရာ
		ဧရိယာဝတီကျောက်လွှာ၏ မြစ်ချောင်းမှပို့ချသော အနည်ကျ ကျောက်များ နှင့် အစောပိုင်းမှ နှောင်း ပိုင်း မိုင်ယိုဆင်း အဏုယုဂ် (Early-late Miocene) သက်တမ်းရှိသည့် ပဲခူးကျောက်စဉ်တန်း၏ မာကျောပြီး ထုထည်လိုက်ပေါ်ထွက် နေသော သဲကျောက်များအပေါ်တွင် တည်ရှိနေသည်။ မြေအမျိုးအစားမှာ ဂဝံဆန်သောမြေဖြစ်ပါသည်။ ယေဘူယျအားဖြင့် ဂဝံမြေတွင် သံဓါတ်နှင့် အလူမီနီယံဓါတ်ကြွယ်ဝပြီး ထုံး၊ ပိုတက်ဆီယမ်နှင့် မဂ္ဂနီဆီယမ်တို့ နည်းပါသည်။ ထိုမြေများသည် ပူပြင်းပြီး အပူပိုင်းဒေသများ တွင် ဖြစ်ပေါ်သည်ကို တွေ့ရပါသည်။ ဂဝံမြေအားလုံး နီးပါးသည် သံဓါတ် ပါဝင်မှုများသောကြောင့် သံချေး အနီရောင်ရှိပါသည်။ ငလျင်ဇုန်မြေပုံအရ ရန်ကုန်တိုင်းဒေသကြီးသည် ပြင်းထန်၍ အင်အား အသင့်အတင့်ရှိသော နေရာတွင်တည်ရှိသည်။ ထို့ကြောင့် ငလျင်ဒဏ်ခံ ဒီဇိုင်းပုံစံကို လေ့လာသင့်သည်။ ထို့အပြင် မြေပြင်ရွှေ့လျားမှု ပုံစံကိုလည်း စနစ်တကျ လေ့လာသင့်သည်။ ငလျင်လှုပ်မှု မှတ်တမ်းများအရ ရန်ကုန်တိုင်းဒေသကြီးသည် နိမ့်ရာမှာ အလယ်အလတ်အဆင့်ရှိသော ငလျင်ရပ်ဝန်းတွင် ရှိနိုင်ပါသည်။
၄.	ဧလဗေဒ	စီမံကိန်းဧရိယာသည် ဗဟန်းမြို့နယ်တွင် တည်ရှိပြီး မြစ်များ နှင့် ချောင်းများ အနည်းငယ် ရှိပါသည်။ စီမံကိန်းဧရိယာအနီးရှိ ချောင်းမှာ ငမိုးရိပ်ချောင်းဖြစ်ပြီး စီမံကိန်း၏အရှေ့ဘက် ခန့်မှန်း ခြေအရ ၃.၆၁ ကီလိုမီတာခန့်တွင် တည်ရှိပါသည်။ အင်ယားကန်သည် စီမံကိန်း၏အနောက်ဘက် ခန့်မှန်းခြေအရ ၂၄၂ မီတာခန့်တွင် တည်ရှိပါသည်။
လူမှုစီးပွားဆိုင်ရာ ပတ်ဝန်းကျင်		
၅.	မြေအသုံးပြုမှု	မြေအသုံးချမှုကို စီမံကိန်း၏ ၃ ကီလိုမီတာ အတွင်းတွင် လေ့လာခဲ့ ပါသည်။ လေ့လာရာတွင် စက်မှုဧရိယာ၊ မြေလွတ်၊ အများပြည်သူပိုင်နေရာ၊ လမ်း၊ ဘာသာရေးဧရိယာ၊ ရေထုထည်၊ စီးပွားရေးဧရိယာ၊ သုသန်၊ အစိုးရ အဆောက်အဦများ နှင့် လူနေဧရိယာများ ကဲ့သို့သော လမ်းအသုံးပြုမှု အမျိုးအစား ၁၀ မျိုး တွေ့ရှိရပါသည်။ လေ့လာတွေ့ရှိချက်အရ လူနေဧရိယာသည် ၃ ကီလိုမီတာအတွင်းတွင် အကြီးဆုံးအပိုင်းဖြစ်ပြီး သုသန်ဧရိယာသည် အသေးဆုံးအပိုင်း ဖြစ်သည်။
၆.	လူဦးရေနှင့် အသက်အုပ်စု	စီမံကိန်းသည် ဗဟန်းနှင့် ရန်ကင်းမြို့နယ်တို့နှင့် နီးကပ်စွာ တည်ရှိနေပြီး ၎င်းဧရိယာအတွင်းတွင် အိမ်ခြေ ၁၅,၀၀၀ ကျော် နှင့် လူဦးရေ ၁၄၀,၀၀၀ ကျော် နေထိုင်ကြပါသည်။ အမျိုးသမီးဦးရေသည် အသက် ၁၈ နှစ် အောက်နှင့် အထက် အားလုံးတွင်အနည်းငယ် များသည်ကိုတွေ့ရှိရပါသည်။
၇.	လူမျိုးများနှင့် ကိုးကွယ်မှု	စီမံကိန်းဧရိယာတွင် ဗမာလူမျိုးများ အဓိကနေထိုင်ကြပါသည်။ ဗမာလူမျိုး (၁၂၄,၈၇၂) ယောက် တွေ့ရပြီး ရခိုင်လူမျိုးမှာ ဒုတိယအကြီးဆုံးဖြစ်ပြီး (၃,၃၀၈)ယောက်ရှိသည်။ ၎င်းနောက်ကရင်လူမျိုးသည် အခြားလူမျိုးများထက် အနည်းငယ်များပြီး (၂,၆၄၁) ယောက်အထိ ရှိသည်။ ဗဟန်း၊ ရန်ကင်းနှင့် မရမ်းကုန်းမြို့ လူဦးရေအများဆုံးမှာ ဗုဒ္ဓဘာသာ ဖြစ်ပြီး ကျန်သောလူများမှာ ခရစ်ယာန်ဘာသာဝင်များ ဖြစ်သည်။ ဟိန္ဒူ၊ မူဆလင်နှင့် အခြားကိုးကွယ်သူများကိုလည်း အနည်းငယ်တွေ့ရှိရပါသည်။

စဉ်	အမျိုးအစား	အကြောင်းအရာ
၈.	ပညာရေး	စီမံကိန်းမြို့နယ်များတွင် ပညာရေးစင်တာများစွာရှိပြီး မူလတန်းကျောင်း (၂၆)ခု၊ မူလတန်းကြီးကျောင်း (၄)ခု၊ အထက်တန်းကျောင်း (၅)ခုနှင့် အလယ်တန်းကျောင်း (၁၀) ခုရှိသည်။
၉.	အသက်မွေးမှု (အလုပ်အကိုင်၊ ဝင်ငွေ၊ ကျန်းမာရေး၊ အခြေခံအဆောက်အဦ၊ လျှပ်စစ်နှင့် ရေအသုံးပြုမှု)	စီမံကိန်းမြို့နယ်အတွင်းတွင်အလုပ်လုပ်ကိုင်မှုပုံစံများစွာတွေ့ရသည်။ အခြားလုပ်ငန်းများလုပ်သော လူဦးရေမှာ အများဆုံးဖြစ်ပြီး နောက်တွင် အစိုးရဝန်ထမ်းမှာ အများဆုံးဖြစ်သည်။ ကုန်သွယ်ရေးနှင့် စက်မှုလက်မှုလုပ်ကိုင်သူများမှာ အရေအတွက် အတူနီးပါး ဖြစ်သည်။ အဓိကဝင်ငွေရရှိမှုမှာ ပုဂ္ဂလိကကုမ္ပဏီများနှင့် အစိုးရရုံးများတွင် လုပ်ကိုင်သော နေ့စားအလုပ်များမှဖြစ်ပါသည်။ စီမံကိန်းဧရိယာတွင် တီဘီရောဂါဖြစ်ပွားမှုအများဆုံးဖြစ်ပြီး နောက်တွင် HIV/AIDS ရောဂါဖြစ်ပွားမှု အများဆုံးဖြစ်သည်။ ဝမ်းလျှောရောဂါ သည် သေဆုံးမှုအနည်းဆုံးဖြစ်ပါသည်။ စီမံကိန်းမြို့နယ်များတွင် ဈေးများ၊ ကုန်စုံဆိုင်ကဲ့သို့အခြေခံ အဆောက်အဦများ ရှိပါသည်။ ထို့အပြင် NGO၊ လူမှုရေးအသင်းအဖွဲ့များနှင့် မိခင်နှင့်ကလေးစောင့်ရှောက်ရေး စသည့် လူမှုအဖွဲ့အစည်းများ ရှိပါသည်။ အဓိကလူများမှာ ဗုဒ္ဓဘာသာ ဖြစ်သောကြောင့် ဘုန်းကြီး ကျောင်း၊ သီလရှင်ကျောင်းနှင့် ဓမ္မာရုံကဲ့သို့ သာသနာ့နယ်မြေများစွာ ရှိပါသည်။ ရန်ကုန်တိုင်းအတွင်းတွင် အစိုးရဓါတ်အားလိုင်းများရှိသည်။ ထို့အပြင် ရန်ကုန်မြို့နယ်စည်ပင်သာယာရေးမှ ရေဖြန့်ဝေရေးကို လုပ်ဆောင် ပေးသည်။
၁၀.	သယ်ယူပို့ဆောင်ရေး	စီမံကိန်းမြို့နယ်များတွင် သွားလာရန် အဆင်ပြေသော လမ်းများ ရှိပါသည်။
ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအရည်အသွေး တိုင်းတာမှု		
၁၁.	လေထုအရည်အသွေး	လေအရည်အသွေးတိုင်းတာခြင်းအား စီမံကိန်းအနီးပတ်ဝန်းကျင်ရှိ ဗဟန်းမြို့နယ်တွင် နေရာ ၅ နေရာ တိုင်းတာခဲ့ပါသည်။ ပထမအကြိမ်တိုင်းတာ ရရှိခဲ့သောရလဒ်များအရ ဆာလဖာဒိုင်အောက်ဆိုဒ် နှင့် အိုဇုန်းအရည်အသွေးရလဒ်မှာ အရည်အသွေးမှာ ဆောက်လုပ်ရေး လုပ်ငန်းများနှင့် ယာဉ်သွားလာမှု များသောကြောင့် အမျိုးသား အရည်အသွေးထုတ်လွှတ်မှုလမ်းညွှန်ချက် (၂၀၁၅) ထက်ကျော်လွန်နေပြီး အခြားလေထု အရည်အသွေးများမှာ လမ်းညွှန်ချက်အတွင်းတွင် ရှိပါသည်။ ဒုတိယအကြိမ်တွင် လေတိုင်းတာမှုရလဒ်များမှာ စည်းကမ်းချက်များအတွင်း ကျရောက်လျက်ရှိပါသည်။
၁၂.	လေတိုက်နှုန်းနှင့် လေတိုက်ရာအရပ်	လေတိုက်နှုန်း၏ ၇၇.၈ % သည် လေငြိမ်နေပြီး ၂၄ နာရီအတွင်း ပျမ်းမျှ လေတိုက်နှုန်း၏ ၉၉.၉ % သည် တစ်စက္ကန့်လျှင် ၁.၅ မီတာနှုန်း အောက်ရှိပါသည်။ လေသည် အရှေ့မြောက်အရပ်သို့ အများဆုံး တိုက်ခတ်ပါသည်။ ကွင်းဆင်းတိုင်းတာချက်အများအရ လူနေဧရိယာသည် စီမံကိန်း၏ အနီးဆုံးနေရာတွင် ရှိပြီး စီမံကိန်းအတွင်းလေတိုက်နှုန်းမှာ တစ်စက္ကန့်လျှင် ၁.၀၆ မီတာဖြင့် အရှေ့မြောက်အရပ်သို့ တိုက်ခတ်ပါသည်။
၁၃.	ဆူညံသံ	ပထမအကြိမ်တိုင်းတာမှုအတွင်းတွင် N1 နေရာ၌ နေ့အချိန်နှင့် ညအချိန် တိုင်းတာသော ရလဒ်မှာ လမ်းညွှန်ချက်ထက် အနည်းငယ်ကျော်လွန်နေသည်

စဉ်	အမျိုးအစား	အကြောင်းအရာ
		ကို တွေ့ရပါသည်။ သို့သော် အခြား ၄ နေရာရှိ ရလဒ်များမှာ လမ်းညွှန်ချက် အတွင်းတွင် ရှိနေပါသည်။ ဒုတိအကြိမ်တိုင်းတာမှုတွင် တိုင်းတာမှုနေရာအားလုံး၏ ဆူညံသံရလဒ်မှာ NEQEG (2015) ၏ စက်မှုလုပ်ငန်းနှင့် စီးပွားရေးလုပ်ငန်းများအတွက် သတ်မှတ်ထားသည့် စည်းကမ်းချက်အတွင်း ကျရောက်သော်လည်း၊ လူနေထိုင်မှု၊ အသက်မွေးဝမ်းကျောင်းနှင့် ပညာရေးဆိုင်ရာ သတ်မှတ်ချက် ထက် အနည်းငယ်ပိုမြင့်မားနေပါသည်။ ၎င်းမှာ ကားပိတ်မှုပြဿနာများပြားခြင်း၊ လက်တွန်းလှည်းအရောင်းဆိုင်များတွင် အသံချဲ့စက်အသေးများ တပ်ဆင်ခြင်း၊ ဆောက်လုပ်ရေးလုပ်ငန်းများ၊ ပြည်သူများ၏ သွားလာ လှုပ်ရှားမှုများနှင့် စီးပွားရေးဆိုင်ရာ လုပ်ငန်းစဉ်များကြောင့် ဖြစ်ပါသည်။
၁၄.	တုန်ခါမှု	တုန်ခါမှုကို စီမံကိန်းဧရိယာ၏ ၃ ကီလိုမီတာအတွင်း ၅ နေရာခွဲ၍ တိုင်းတာခဲ့ပါသည်။ ရလဒ်များကို ဂျာမန် တုန်ခါမှုစံသတ်မှတ်ချက်နှင့် နှိုင်းယှဉ်ထားပါသည်။ ကွင်းဆင်း တိုင်းတာချက်များအရ နေရာအားလုံးရှိ ပထမအကြိမ်နှင့် ဒုတိယအကြိမ် တုန်ခါမှုဆိုင်ရာ ရလဒ်များမှာ စံသတ်မှတ်ချက်အတွင်းတွင် ရှိပါသည်။
၁၅.	ရေအရည်အသွေး	မြေပေါ်ရေနှင့်စွန့်ပစ်ရေဆိုး အရည်အသွေးများကို စီမံကိန်း၏ ၃ ကီလိုမီတာ အတွင်းတွင် ကောက်ယူခဲ့ပါသည်။ ရလဒ်များကို အမျိုးသားအရည်အသွေး ထုတ်လွှတ်မှုလမ်းညွှန်ချက် (၂၀၁၅)၊ မြေပေါ်ရေအရည်အသွေး စံချိန်စံနှုန်း (၂၀၂၄) နှင့် မြန်မာအမျိုးသား သောက်သုံးရေ အရည်အသွေး လမ်းညွှန်ချက် (၂၀၁၉) တို့ဖြင့် နှိုင်းယှဉ်ထားပါသည်။ မြေပေါ်ရေ အရည်အသွေးရလဒ်များမှာ လမ်းညွှန်ချက်များအတွင်းတွင် ရှိပါသည်။ စွန့်ပစ်ရေအရည်အသွေးတွင် pH အရည်အသွေးသည် သတ်မှတ်ချက်ထက် ကျော်လွန်နေပြီး အခြားအရည်အသွေးများမှာ အမျိုးသားအရည်အသွေး ထုတ်လွှတ်မှု လမ်းညွှန်ချက် (၂၀၁၅) အတွင်းတွင် ရှိနေပါသည်။
၁၆.	မော်ယာဉ် သွားလာမှုစစ်တမ်း ကောက်ယူခြင်း	အစိုးရရုံးဖွင့်ရက်များနှင့် ပိတ်ရက်များတွင် မော်ယာဉ်သွားလာမှုစစ်တမ်း ကောက်ယူခြင်းကို ၂ နေရာခွဲ၍ စစ်တမ်းကောက်ယူခဲ့ပါသည်။ ပထမအကြိမ် TC-1 တွင် စစ်တမ်းကောက်ယူမှု ရလဒ်အရ ဖွင့်ရက်နှင့် ပိတ်ရက်များတွင် ယာဉ်လမ်းကြောင်းမှာ သွားလာရလွယ်ကူပြီး ဒုတိယအကြိမ် စစ်တမ်းကောက်ယူရာတွင် စက်မှု (၁) လမ်းသည် ယာယီဖြတ်သန်းသွားလာခွင့် မပြုသောကြောင့် TC-2 နှင့် TC-3 ကိုသာ စစ်တမ်းကောက်ယူခဲ့ရခြင်း ဖြစ်ပါသည်။ ပထမအကြိမ် စစ်တမ်းကောက်ယူမှုတွင် ရုံးဖွင့်ရက်တွင် TC-2 သည် ယာဉ်သွားလာမှုများခြင်းတွေ့ရပြီး ပိတ်ရက်တွင် ယာဉ်လမ်းကြောင်း ရှင်းပြီးသွားလာခြင်း အဆင်ပြေသည်ကို တွေ့ရပါသည်။ TC-3 သည် ရုံးဖွင့်ရက်နှင့် ရုံးပိတ်ရက်များတွင်ပါ ယာဉ်လမ်းကြောင်း ရှင်းပြီးသွားလာခြင်း အဆင်ပြေသည်ကို ရလဒ်များအရ သိရှိရပါသည်။ သို့သော် ဒုတိယအကြိမ် စစ်တမ်းကောက်ယူရာတွင် TC-2 သည် ရက်သတ္တပတ်လုံး ယာဉ်သွားလာမှုများပြီး ယာဉ်များထူထပ်သည်ကို တွေ့ရပါ သည်။ TC-3 သည် ယာဉ်လမ်းကြောင်း ရှင်းပြီးသွားလာခြင်း အဆင်ပြေသည်ကို တွေ့ရပါသည်။
ဇီဝဗေဒဆိုင်ရာ ပတ်ဝန်းကျင်		

စဉ်	အမျိုးအစား	အကြောင်းအရာ
၁၇.	အပင်များကို လေ့လာခြင်း	အပင်များအားလေ့လာရာတွင် အပင်မျိုးစိတ် ၃၁ မျိုးကို တွေ့ရှိခဲ့ပါသည်။ အန္တရာယ်မကျရောက်နိုင်သေးသောမျိုးစိတ် ၁၄ ခု၊ မျိုးသုဉ်းမှု အန္တရာယ်ကျရောက်ခြင်းအတွက် အချက်အလက်အပြည့်စုံမရှိသေးသောမျိုးစိတ် ၁ ခုနှင့် မျိုးသုဉ်းမှုအန္တရာယ်ကျရောက်ခြင်းကို တွက်ချက်မှုမပြုရသေးသော မျိုးစိတ် ၁၅ ခုတွေ့ရှိရပါသည်။
၁၈.	သတ္တဝါများကို လေ့လာခြင်း	နို့တိုက်သတ္တဝါမျိုးစိတ် ၃ မျိုး၊ မျိုးရင်း ၂ မျိုးအား ကွင်းဆင်းလေ့လာချိန်တွင် မှတ်တမ်းခဲ့ပါသည်။ ၎င်းမျိုးစိတ်များသည် အန္တရာယ်မကျရောက်နိုင်သေးသော အဆင့်တွင် ပါဝင်ပြီး အခြားအန္တရာယ်ကျရောက်လျက်ရှိသည့် မျိုးစိတ်များအား လေ့လာမှုနယ်ပယ်တွင် မတွေ့ရှိရပါ။ တွားသွားသတ္တဝါမျိုးစိတ် ၇ မျိုး၊ မျိုးရင်း ၅ မျိုးအား ကွင်းဆင်းလေ့လာချိန်တွင်မှတ်တမ်းတင်ခဲ့ရပါသည်။ ၎င်းမျိုးစိတ်များသည် အန္တရာယ်မကျရောက်နိုင်သေးသောအဆင့်တွင် ပါဝင်ပြီး အခြားအန္တရာယ်ကျရောက်လျက်ရှိသည့် မျိုးစိတ်များအား လေ့လာမှုနယ်ပယ်တွင် မတွေ့ရှိရပါ။ လိပ်ပြာမျိုးစိတ် ၉ ခု၊ မျိုးရင်း ၅ ခုအား မှတ်တမ်းတင်ခဲ့ရပါသည်။ ၄က်မျိုးစိတ် အနေဖြင့် ၂၁ ခု တွေ့ရှိရပါသည်။

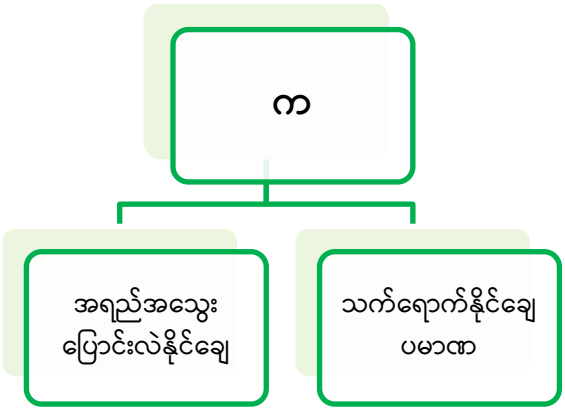
၅. ဖြစ်နိုင်ချေရှိသော သဘာဝပတ်ဝန်းထိခိုက်နိုင်မှုနှင့်လျော့ချခြင်း

၅.၁. ထိခိုက်မှုဆန်းစစ်ခြင်း

အမျိုးသာ သဘာဝပတ်ဝန်းကျင်မူဝါဒ (၁၉၆၉) အရ ဖြစ်နိုင်ခြေရှိသော ပတ်ဝန်းကျင်ထိခိုက်မှု အန္တရာယ်ကို ဆန်းစစ်လေ့လာရာတွင် ယေဘူယျအားဖြင့် အဆိုပြုထားသော စီမံကိန်း၏ ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားအပေါ်အခြေခံ၍ ဆန်းစစ်တွက်ချက်ရပါမည်။ အဆိုပါလေ့လာဆန်းစစ်မှုတွင် ကာလတို၊ ကာလရှည်ဖြစ်နိုင်ချေရှိသော လေထုညစ်ညမ်းမှု၊ ရေထုညစ်ညမ်းမှုနှင့် အသံဆူညံမှု စသော အချက်များ၊ ဒေသခံပြည်သူများအပေါ် သက်ရောက်မှု၊ အသက်ရှင်နေထိုင်မှုနှင့် ကျန်းမာရေး စံချိန်စံညွှန်းများအပြင် အခြားသောစိတ်ပိုင်းဆိုင်ရာအပေါ်သက်ရောက်မှုအချက်အလက်များ ပါဝင်ပါသည်။

စီမံကိန်းဖော်ဆောင်မှုများကြောင့် ပတ်ဝန်းကျင်အပေါ် ကောင်းကျိုးသက်ရောက်မှုနှင့် ဆိုးကျိုးသက်ရောက်မှုများတွက်ချက်ရာတွင် ရုပ်ပိုင်းဆိုင်ရာ၊ လူမှုစီးပွား၊ ဇီဝမျိုးစုံမျိုးကွဲ၊ ကျန်းမာရေး စသည်တို့အပေါ် အခြေခံပါသည်။ စီမံကိန်းလုပ်ငန်းစဉ်များနှင့် လိုအပ်ချက်များသည် ပတ်ဝန်းကျင်၏ အရင်းအမြစ်ကို သုံးစွဲရသောကြောင့် ပတ်ဝန်းကျင်အပေါ် ထိခိုက်မှုများ ဖြစ်ပေါ်စေသည်။

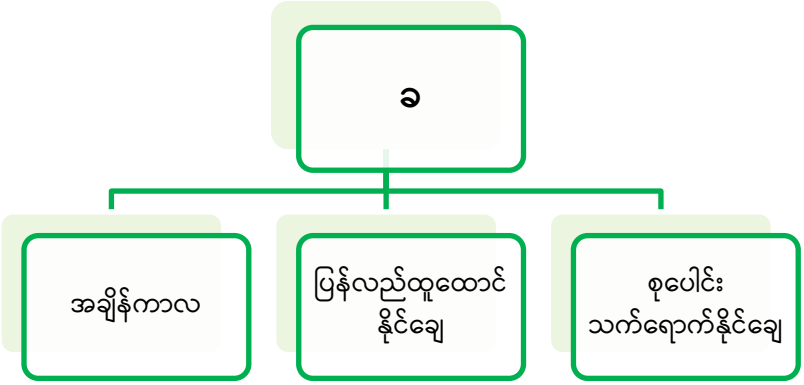
၅.၁.၁. သိသာသော သက်ရောက်မှု အကဲဖြတ်ခြင်း



ဇယား ၅ အန္တရာယ်ထိခိုက်နိုင်မှုဆန်းစစ်ခြင်း အဆင့်သတ်မှတ်ချက်

အုပ်စု	အမျိုးအစား	အဆင့်	ဖော်ပြချက်
က	ပြောင်းလဲ နိုင်ချေ	၄	အပြည်ပြည်ဆိုင်ရာ
		၃	နိုင်ငံလုံးဆိုင်ရာ
		၂	မြို့နယ်ဆိုင်ရာ (စီမံကိန်း ပြင်ပ)
		၁	စီမံကိန်း အနီးအဝိုက်
		၀	ပြောင်းလဲနိုင်ခြင်း မရှိသော
	ပမာဏ	+၃	များစွာသော အကျိုးသက်ရောက်မှု
		+၂	သိသာသော ကောင်းကျိုးရှိခြင်း
		+၁	ကောင်းကျိုးရှိခြင်း
		၀	ပြောင်းလဲနိုင်ခြင်း မရှိသော
		-၁	ဆိုးကျိုးရှိခြင်း
		-၂	သိသာသော ဆိုးကျိုးရှိခြင်း
		-၃	များစွာသော ဆိုးကျိုးသက်ရောက်မှု

၅.၁.၂. ဖြစ်နိုင်ချေများကို အကဲဖြတ်ခြင်း



ဇယား ၆ ဖြစ်နိုင်ချေများကို ဆန်းစစ်ခြင်း

အုပ်စု	အမျိုးအစား	အဆင့်	ဖော်ပြချက်
ခ	အချိန်ကာလ	၁	ပြောင်းလဲခြင်း မရှိသော
		၂	ယာယီ
		၃	ရေရှည်
	ပြန်လည်ထူထောင်ခြင်း	၁	ပြောင်းလဲခြင်း မရှိသော
		၂	ပြန်လည်ထူထောင်နိုင်သော
		၃	ပြန်လည်ထူထောင်၍ မရနိုင်သော
	စုပေါင်းသက်ရောက်နိုင်ချေ	၁	ပြောင်းလဲခြင်း မရှိသော
		၂	စုပေါင်းသက်ရောက်ခြင်း မရှိသော
		၃	စုပေါင်းသက်ရောက်မှု ရှိခြင်း

၅.၁.၃. သက်ရောက်မှု အဆင့်သတ်မှတ်ခြင်း

အဆင့်သတ်မှတ်ချက် = သိသာထင်ရှားသည့် သက်ရောက်မှု (အုပ်စု က) x ဖြစ်နိုင်ချေ (အုပ်စု ခ)

ပတ်ဝန်းကျင်အပေါ်တွင် ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုများကို ထိခိုက်မှုမရှိ၊ အနည်းငယ်၊ အသင့်အတင့် နှင့် အမြင့်ဆုံး စသည့် သိသာသော သတ်မှတ်ချက်များအပေါ်အခြေခံပြီး ခွဲခြားနိုင်ပါသည်။ ဖြစ်နိုင်ချေရှိသော ပတ်ဝန်းကျင် ထိခိုက်မှု အဆင့်များကို ဇယား ၆ တွင် တွေ့နိုင်ပါသည်။ တည်ဆောက်ချိန်၊

ပိတ်သိမ်းချိန် နှင့် လုပ်ငန်းဆောင်ရွက်စဉ်ကာလများတွင် ဖြစ်ပေါ်နိုင်သော ပတ်ဝန်းကျင်အပေါ်ထိခိုက်မှု ဖြစ်နိုင်ခြေများအား ဆန်းစစ်ခန့်မှန်းခြင်းများကို ဇယား ၇၊ ဇယား ၈ နှင့် ဇယား ၉ တွင် ဖော်ပြထားပါသည်။

ဇယား ၇ ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု အဆင့် သတ်မှတ်ခြင်း

အဆင့်သတ်မှတ်ချက်	အဆင့်သတ်မှတ်ချက်ရလဒ်	အဆင့်သတ်မှတ်ချက်ရလဒ် (ကိန်းဂဏာန်း)	ဖော်ပြချက်များ
၁၀၈ မှ ၇၂	+c	+၅	များစွာသော အကျိုးသက်ရောက်မှု
၃၆ မှ ၇၁	+ဃ	+၄	သိသာသော ကောင်းကျိုးသက်ရောက်မှု
၁၉ မှ ၃၅	+ဂ	+၃	ကောင်းကျိုးသက်ရောက်မှု (အသင့်အတင့်)
၁၀ မှ ၁၈	+ခ	+၂	ကောင်းကျိုးသက်ရောက်မှု (အနည်းငယ်)
၁ မှ ၉	+က	+၁	ကောင်းကျိုးသက်ရောက်မှု (လျော့နည်းလာခြင်း)
၀	မျှချေ	၀	ပြောင်းလဲမှု မရှိခြင်း
- ၁ မှ - ၉	- က	-၁	ဆိုးကျိုးရှိခြင်း (လျော့နည်းလာခြင်း)
-၁၀ မှ -၁၈	- ခ	-၂	ဆိုးကျိုး အနည်းငယ်ရှိခြင်း
- ၁၉ မှ - ၃၅	- ဂ	-၃	ဆိုးကျိုးသက်ရောက်မှု (အသင့်အတင့်)
- ၃၆ မှ - ၇၁	- ဃ	-၄	သိသာသော ဆိုးကျိုးသက်ရောက်မှု
- ၇၂ မှ - ၁၀၈	- c	-၅	များစွာသော ဆိုးကျိုးသက်ရောက်မှု

ဇယား ၈ တည်ဆောက်ချိန်ကာလတွင် ဖြစ်ပေါ်နိုင်သော ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု ဖြစ်နိုင်ချေများအားဆန်းစစ်ခန့်မှန်းခြင်း

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စု က	အုပ်စု ခ	သက်ရောက်မှု အဆင့်	အဆင့် အမျိုးအစား	ဖော်ပြချက်	လျော့ပါးရေးနည်းလမ်းများ အကျဉ်းချုပ်
၁.	လေ	မြေတူးဖော်ခြင်း	ဖုန်နှင့် အမှုန်များ	-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	တူးဖော်ထားသည့်မြေများကို စနစ်တကျ ထားရှိခြင်း၊ ရေဖြန်းကိရိယာများ တပ်ဆင်ထားခြင်း၊ စက်ယန္တယားများကို ပုံမှန်စစ်ဆေးခြင်း၊
		စက်ယန္တယားများအသုံးပြုခြင်း	CO_2, NO_x, PMs, VOCs, CO and CH_4, C_6H_6 and CH_2O						
		သယ်ယူပို့ဆောင်ရေးယာဉ်များ	CO_2, PM_{10}, $PM_{2.5}$, CO_2, SO_x, NO_x, CO and GHG						
		ဒီဇယ်မီးစက် အသုံးပြုခြင်း	NO_x, SO_2, CO_2, PM, HC, etc.						
၂.	အသံ တုန်ခါမှု	စက်ယန္တယားများအသုံးပြုခြင်း	ဆူညံသံနှင့် တုန်ခါမှု	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	အသံထိန်းချုပ်နိုင်သည့် ကိရိယာများ တပ်ဆင်ထားခြင်း၊ စက်ယန္တ ယားများကို ပုံမှန် စစ်ဆေးခြင်း၊ Damper အသုံးပြုခြင်း၊
		ဒီဇယ်မီးစက် အသုံးပြုခြင်း							
		Foundation တူးခြင်းဆိုင်ရာ လုပ်ငန်းစဉ်များ							
၃.	ရေ	မြေတူးရာမှ ထွက်ရှိလာသည့် ရေများကို ဖယ်ရှားခြင်း	သဲနှင့် အနည်များ ပါဝင်မှု	-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	သဲစစ်ဇကာများ ထားရှိခြင်း ရေမြောင်းများ တည်ဆောက်ထားခြင်း၊
		ဓာတုပစ္စည်းများ သိုလှောင်ထားသည့် နေရာများမှ ၎င်းပစ္စည်းများ ယိုဖိတ်/ စိမ့်ခြင်း	အန္တရာယ်ရှိ ဓာတုပစ္စည်း/ ဒြပ်ပေါင်းများ ပါဝင်မှု						
		ဝန်ထမ်းယာယီ အဆောင်များမှ ရေဆိုးထွက်ရှိခြင်း							

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စု က	အုပ်စု ခ	သက်ရောက်မှု အဆင့်	အဆင့် အမျိုးအစား	ဖော်ပြချက်	လျော့ပါးရေးနည်းလမ်းများ အကျဉ်းချုပ်
၄.	အထွေထွေ စွန့်ပစ်အမှိုက်	ဆောက်လုပ်ရေးဆိုင်ရာ စွန့်ပစ်အမှိုက်များ	သဲ, ကျောက်၊ မဆလာ၊ အလူမီနီယံ၊ သံ/ သစ်/ စတီးနှင့် ပိုက် စသည်	-၁	၆	-၆	-၁	ဆိုးကျိုးသက်ရောက်မှု လျော့နည်းလာခြင်း	ဆောက်လုပ်ရေးမှ ထွက်ရှိသည့် အမှိုက်များကို အမျိုးအစားခွဲ၍ စနစ်တကျ YCDC နှင့် ချိတ်ဆက် စွန့်ပစ်ခြင်း၊
		အိမ်သုံးစွန့်ပစ် ပစ္စည်းများ	မီးဖိုဆောင်မှ အမှိုက်များ၊ စားကြွင်း စားကျန်များ၊ ပလပ်စတစ်အမှိုက် များ စသည်						
၅.	အန္တရာယ်ရှိ ပစ္စည်းများ	ဆောက်လုပ်ရေးဆိုင်ရာ ပစ္စည်းများ	ဘိလပ်မြေ၊ အိမ်သုတ်ဆေး၊ တင်နာ စသည်	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	အစိုးရ၏ လမ်းညွှန်ချက်များနှင့် အညီ စွန့်ပစ်ခြင်း၊
၆.	မြေဆီလွှာ	မြေဆီလွှာ ပျက်ဆီးခြင်း	အပေါ်ယံ မြေဆီလွှာဆုံးရှုံးခြင်း၊ အဏုဇီဝ ပိုးမွှားများ ဆုံးရှုံးခြင်းနှင့် မြေဆီလွှာရှိ အာဟာရများ လျော့ နည်းလာခြင်း	-၄	၈	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	မြေဆီလွှာ တိုက်စားမှု မဖြစ်စေရန် ရေမြောင်းများ တည်ဆောက်ထားခြင်း၊
၇.	လမ်းပိုင်းဆိုင်ရာ ကြံ့ခိုင်မှု	ဆောက်လုပ်ရေး လုပ်ငန်းစဉ် တစ်လျှောက်	လမ်းသား ကျစ်လစ်မှု၊ ကြံ့ခိုင်မှု လျော့နည်းလာခြင်း၊	-၂	၇	-၁၄	-၂	ဆိုးကျိုးအနည်းငယ်ရှိခြင်း	ယာဉ်များအား တင်ဆောင်နိုင်သည့် ဝန်အားထက်ပို၍ တင်ဆောင်ခြင်းမပြုရ၊

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စု က	အုပ်စု ခ	သက်ရောက်မှု အဆင့်	အဆင့် အမျိုးအစား	ဖော်ပြချက်	လျော့ပါးရေးနည်းလမ်းများ အကျဉ်းချုပ်
	ယာဉ်သွား/လာ လမ်းကြောင်းများ ပိတ်ဆို့ ခြင်း		နေ့စဉ်လမ်းသွားလမ်းလာများ အတွက် ခက်ခဲခြင်း၊ အသေးစားနှင့် အကြီးစား ယာဉ်မတော်တဆများ ဖြစ်ပေါ်စေနိုင်ခြင်း	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	
၈.	ဂေဟစနစ်	ဆောက်လုပ်ရေး လုပ်ငန်းများ	ဂေဟစနစ် ပျက်စီးခြင်း	-၄	၈	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	လောင်စာဆီများ၊ ဓာတုပစ္စည်းများ မယိုဖိတ်စေရန် စနစ်တကျ အသုံးပြုခြင်း၊
၉.	လူမှု-စီးပွား	ဆောက်လုပ်ရေး လုပ်ငန်းများ	အလုပ်အကိုင် အခွင့်လမ်းများ (ယာယီ)	၂	၇	၁၇	+၂	အနည်းငယ် ကောင်းကျိုးသက် ရောက်မှု	-

ဇယား ၉ စီမံကိန်းလည်ပတ်ချိန်ကာလတွင် ဖြစ်ပေါ်နိုင်သော ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု ဖြစ်နိုင်ချေများအားဆန်းစစ်ခန့်မှန်းခြင်း

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စု က	အုပ်စု ခ	သက်ရောက်မှု အဆင့်	အဆင့် အမျိုးအစား	ဖော်ပြချက်	လျော့ပါးရေးနည်းလမ်းများ အကျဉ်းချုပ်
၁.	လေ	လူနေအိမ်များနှင့် အဆောက် အအုံများ၊ လျှပ်စစ်မီး သုံးစွဲခြင်း	CO_2	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	အပင်များ (နံရံကပ်) များ စိုက်ပျိုးခြင်း၊ ဆိုလာများ တပ်ဆင်ခြင်း၊
		ဒီဇယ်မီးစက် အသုံးပြုခြင်း	CO_2, NO_x, PMs, VOCs, CO and CH_4, C_6H_6 and CH_2O						
		ချက်ပြုတ်ခြင်း	CO_2, and VOCs						
၂.	အသံ တုန်ခါမှု	ဒီဇယ်မီးစက် အသုံးပြုခြင်း၊ (အခါအားလျော်စွာ) အိမ်ခန်း အတွင်းပိုင်း ပြင်ဆင်ခြင်း	အလယ်လတ်မှ အနည်းငယ်အဆင့် ဆူညံသံနှင့် တုန်ခါမှု ထွက်ရှိခြင်း	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	အသံလုံသည့် စနစ်များ ထည့်သွင်းတည်ဆောက် ထားခြင်း၊
၃.	ရေ	နေအိမ်များမှ ထွက်ရှိသည့် စွန့်ပစ်ရေများနှင့် ရေဆိုးများ ထွက်ရှိခြင်း	BOD and COD နှင့် အန္တရာယ်ရှိ ဒြပ် ပေါင်းများ	-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	ရေနွတ်မြောင်းထား တည် ဆောက်ထားခြင်း၊ ရေဆိုး သန့်စင်စနစ်ထားရှိခြင်း၊
၄.	အထွေထွေ စွန့်ပစ်အမှိုက်	အိမ်သုံးစွန့်ပစ် ပစ္စည်းများ	မီးဖိုချောင်မှ ထွက်ရှိသည့် အမှိုက် များနှင့် စားကြွင်းစားကျန်များ၊ ပလပ် စတစ် အမှိုက်များ စသည်	-၁	၆	-၆	-၁	ဆိုးကျိုးသက်ရောက်မှု လျော့နည်းလာခြင်း	အိမ်ယာဝန်းအတွင်း အမှိုက်ပုံးများ ထားရှိခြင်း၊

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စု က	အုပ်စု ခ	သက်ရောက်မှု အဆင့်	အဆင့် အမျိုးအစား	ဖော်ပြချက်	လျော့ပါးရေးနည်းလမ်းများ အကျဉ်းချုပ်
၅.	အန္တရာယ်ရှိ ပစ္စည်းများ	ပျက်စီးနေသည့် အိမ်သုံးလျှပ်စစ်ပစ္စည်းများ၊ လျှပ်စစ်မီး ချောင်းများနှင့် ဘက်ထရီများ	အန္တရာယ်ရှိ ဓာတ်သတ္တုများ ယိုစိမ့်ခြင်း နှင့် ပတ်ဝန်းကျင်သို့ ပျံ့နှံ့လာခြင်း	-၁	၇	-၇	-၁	ဆိုးကျိုးသက်ရောက်မှု လျော့နည်းလာခြင်း	အန္တရာယ်ရှိ ပစ္စည်းများ သီးခြားစွန့်ပစ်ခြင်း၊
၆.	မြေဆီလွှာ ကျန်းမာရေး	အိမ်ယာဝန်းအတွင်းတွင် အပင်များ စိုက်ပျိုးကာ ပန်းခြံ ကဲ့သို့ ပြုလုပ်ထားခြင်း	မြေဆီလွှာကျန်းမာရေး အတော်အသင့် ကောင်းမွန်လာခြင်းနှင့် မျိုးရင်းအပင် များကို ပြန်လည် ထိန်သိမ်း၍ စိုက်ပျိုး နိုင်ခြင်း	+၂	၈	+၁၆	+၂	ကောင်းကျိုးသက် ရောက်မှု အနည်းငယ် ရှိခြင်း	ဥယျာဉ်ထားရှိခြင်း၊ အပတ်စဉ် မြေဆီလွှာ ကျန်းမာရေး ကို ထိန်းသိမ်းခြင်း၊
၇.	ဂေဟစနစ်	အိမ်ယာဝန်းအတွင်း ပန်းခြံ ကဲ့သို့ ပြုလုပ်ထားခြင်း	ဂေဟစနစ်ဆိုင်ရာ ဝန်ဆောင်မှုများ (အင်းဆက်များမှ ဝတ်မှုန်ကူးခြင်း စသဖြင့်) အနည်းငယ် တိုးတက်ကောင်း မွန်လာခြင်း	+၁	၈	+၈	+၁	ကောင်းကျိုးသက် ရောက်မှု (လျော့နည်းလာခြင်း)	-
၈.	လူမှု-စီးပွား	အိမ်ယာဝန်းအတွင်းတွင် စီးပွားရေးဆိုင်ရာ ဧရိယာများ ပါဝင်ခြင်း (ကုမ္ပဏီရုံးခန်း၊ ဆိုင်များ စသည်)	အလုပ်အကိုင် အခွင့်လမ်းများ	+၄	၈	၃၂	+၃	ကောင်းကျိုးသက်ရောက်မှု (အသင့်အတင့်)	-

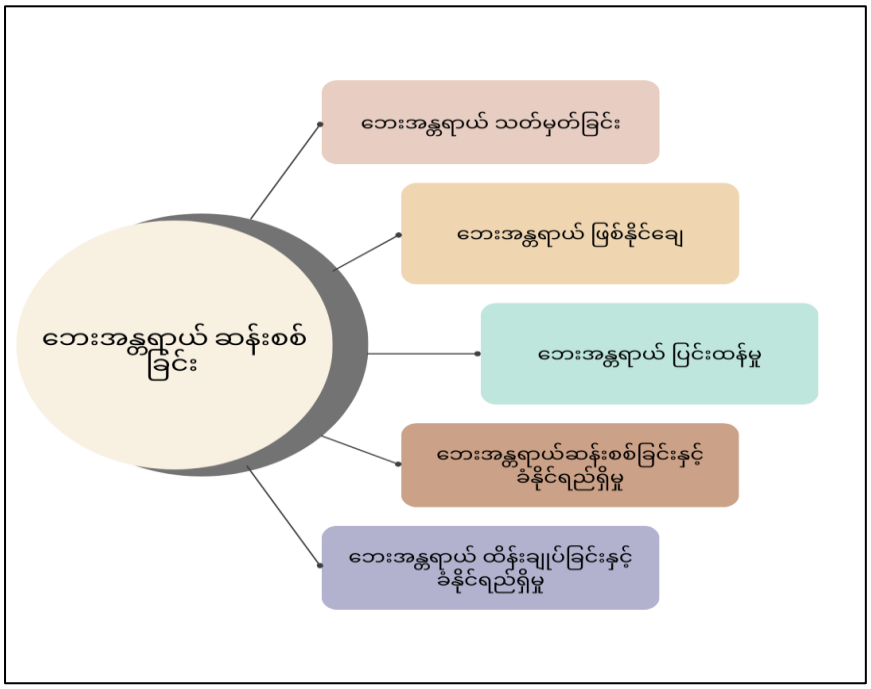
ဇယား ၁၀ စီမံကိန်းပိတ်သိမ်းချိန်တွင် ဖြစ်ပေါ်နိုင်သော ပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု ဖြစ်နိုင်ချေများအားဆန်းစစ်ခန့်မှန်းခြင်း

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စု က	အုပ်စု ခ	သက်ရောက်မှု အဆင့်	အဆင့် အမျိုးအစား	ဖော်ပြချက်	လျော့ပါးရေးနည်းလမ်းများ အကျဉ်းချုပ်
၁.	လေ	အဆောက်အဦ ဖြိုဖျက်ခြင်း	ဖုန်နှင့် အမှုန်များ	-၆	၈	-၄၈	-၄	ထင်ရှားသည့် ဆိုးကျိုးသက်ရောက်မှု	တူးဖော်ထားသည့်မြေများကို စနစ်တကျ ထားရှိခြင်း၊ ရေဖြန်းကိရိယာများ တပ်ဆင်ထားခြင်း၊ စက်ယန္တယားများကို ပုံမှန်စစ်ဆေးခြင်း၊
		စက်ယန္တယားများအသုံးပြုခြင်း	CO_2, NO_x, PMs, VOCs, CO and CH_4, C_6H_6 and CH_2O						
		သယ်ယူပို့ဆောင်ရေး ယာဉ် များ	CO_2, PM_{10}, $PM_{2.5}$, CO_2, SO_x, NO_x, CO and GHG						
		ဒီဇယ်မီးစက် အသုံးပြုခြင်း	NO_x, SO_2, CO_2, PM, HC, etc.						
၂.	အသံ တုန်ခါမှု	စက်ယန္တယားများအသုံးပြုခြင်း	အားပြင်းသည့် ဆူညံသံနှင့် တုန်ခါမှု	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	အသံထိန်းချုပ်နိုင်သည့် ကိရိယာများ တပ်ဆင်ထားခြင်း၊ စက်ယန္တ ယားများကို ပုံမှန် စစ်ဆေးခြင်း၊ Damper အသုံးပြုခြင်း၊
		ဒီဇယ်မီးစက် အသုံးပြုခြင်း							
၃.	ရေ	အဆောက်အဦ ဖြိုဖျက်ခြင်း၊ ဘိလပ်မြေပါဝင်သည့် အုတ်ခဲကြိုးအပိုင်းအစများ	သဲနှင့် အနည်များပါဝင်မှု၊ pH ပြောင်းလဲခြင်း	-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	သဲစစ်ဇကာများထားရှိ ခြင်း ရေမြောင်းများ တည် ဆောက်ထားခြင်း၊
၄.	အထွေထွေ စွန့်ပစ်အမှိုက်	အဆောက်အဦ ဖြိုဖျက်ခြင်း	အုတ်ကျိုးပဲ့စာများ၊ သစ်သားအပိုင်းအစများ၊ ပိုက်များနှင့် မှန်များ	-၂	၆	-၁၂	-၂	ဆိုးကျိုးသက်ရောက်မှု အနည်းငယ်ရှိခြင်း	ဖြိုဖျက်ခြင်းလုပ်ငန်းမှ ထွက်ရှိသည့် အမှိုက်များ ကို အမျိုးအစားခွဲ၍ စနစ် တကျ

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	ဖြစ်ပေါ်နိုင်သည့် အရင်းအမြစ်များ	ထွက်ရှိမှုများ	အုပ်စု က	အုပ်စု ခ	သက်ရောက်မှု အဆင့်	အဆင့် အမျိုးအစား	ဖော်ပြချက်	လျော့ပါးရေးနည်းလမ်းများ အကျဉ်းချုပ်
		အိမ်သုံးစွန့်ပစ် ပစ္စည်းများ	မီးဖိုဆောင်မှ အမှိုက်များ၊ စားကြွင်း စားကျန်များ၊ ပလပ်စတစ်အမှိုက်များ စသည်						YCDC နှင့် ချိတ်ဆက်စွန့်ပစ်ခြင်း၊
၅.	အန္တရာယ်ရှိ ပစ္စည်းများ	အဆောက်အဦ ဖြိုဖျက်ခြင်း	ဓာတုပစ္စည်းပါဝင်သည့် အကြွင်းအကျန် များ၊ ဘက်ထရီ၊ လောင်စာ/ပုံးခွံများ၊ လျှပ်စစ်မီးချောင်းများမှ အန္တရာယ်ရှိ ဓာတု ပစ္စည်းများ စိမ့်ထွက်ခြင်း	-၁	၇	-၇	-၁	ဆိုးကျိုးသက်ရောက်မှု လျော့နည်းလာခြင်း	အစိုးရ၏ လမ်းညွှန်ချက်များနှင့် အညီ စွန့်ပစ်ခြင်း၊
၆.	မြေဆီလွှာ	အဆောက်အဦ ဖြိုဖျက်ခြင်း	မြေဆီလွှာသိပ်သည်းဆများလာခြင်း၊ လောင်စာနှင့် ဆီများယိုဖိတ်/စိမ့်ခြင်းမှ ဓာတုပစ္စည်း ထွက်ရှိလာခြင်း	-၄	၈	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	မြေဆီလွှာ တိုက်စားမှု မဖြစ်စေရန် ရေမြောင်းများ တည်ဆောက်ထားခြင်း၊
၇.	ပြန်လည်ထူထောင်ခြင်း	ဖြိုဖျက်ရေးလုပ်ငန်းစဉ်များပြီးဆုံးပြီးနောက်	ဒေသမျိုးရင်း/မျိုးစိတ်များကို ပြန်လည် ထိန်းသိမ်းခြင်း (အပင်နှင့် တိရစ္ဆာန်)	+၆	၈	၄၈	+၄	ထင်ရှားသည့် ကောင်းကျိုးသက်ရောက်မှု	-

၅.၂. ဘေးအန္တရာယ် ဆန်းစစ်ခြင်း

ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနည်းလမ်းအား International Civil Aviation Organization-ICAO (2013) မှ ကိုးကားဆန်းစစ်ထားပါသည်။ ပတ်ဝန်းကျင်ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းသည် သဘာဝပတ်ဝန်းကျင်နှင့် လူသားတို့၏ လုပ်ဆောင်မှုတို့ကြောင့် ဘေးအန္တရာယ်ဖြစ်ပွားမှုတို့ကြောင့် လူမှုအသက်မွေးဝမ်းကြောင်းအပေါ် ဆိုးကျိုးများအား လေ့လာဆန်းစစ်ခြင်းလုပ်ငန်းစဉ် ဖြစ်ပါသည်။ ဘေးအန္တရာယ် အမျိုးအစားခွဲခြားခြင်း လုပ်ငန်းစဉ်ဖြစ်သည့် ဘေးအန္တရာယ်သတ်မှတ်ခြင်း၊ ဘေးအန္တရာယ် ဖြစ်နိုင်ချေ၊ ဘေးန္တရာယ် ပြင်းထန်မှု၊ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ခံနိုင်ရည်ရှိမှု တို့အပေါ် မူတည်၍ ဘေးအန္တရာယ် ဆန်းစစ်ခြင်းအား တွက်ချက်ထားပါသည်။ သတ္တုသန့်စင်ခြင်း လုပ်ငန်း၏ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းအား တည်ဆောက်စဉ် နှင့်လည်ပတ်စဉ် လုပ်ငန်းစဉ်တွင် ဖြစ်ပေါ်လာနိုင်သော ဘေးအန္တရာယ်များ အပေါ် အခြေခံ၍ ဆန်းစစ်ဖော်ထားပါသည်။ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် စီမံခန့်ခွဲမှုအစီအစဉ်အား ပုံ ၈ တွင် ဖော်ပြထားပါသည်။



ပုံ ၈ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် စီမံခန့်ခွဲမှုလုပ်ငန်းစဉ်

၅.၂.၁. ဘေးအန္တရာယ်သတ်မှတ်ခြင်း

Canadian Centre for Occupational Health and Safety အရ မည်သည့်တည်နေရာ၊ အရာဝတ္ထုပစ္စည်းတစ်ခုသည် ဘေးအန္တရာယ်ကျရောက်နိုင်သော အလားအလာရှိပါက ဘေးအန္တရာယ် သတ်မှတ်ခြင်းအား လုပ်ငန်းစဉ်တစ်နေအနေဖြင့် ဆောင်ရွက်ရပါသည်။ လူတို့၏ လုပ်ဆောင်ချက်ကြောင့်ဖြစ်စေ သဘာဝကြောင့်ဖြစ်စေ ဖြစ်ပေါ်လာသော ဘေးအန္တရာယ်အား ဖြေရှင်းရာတွင် ပြည့်စုံသော ဘေးဒုက္ခကာ

ကွယ်မှုနှင့် ဘေးအန္တရာယ် လျော့ပါးသက်သာမှုများမှာ အရေးပါ ပါသည်။ သဘာဝဘေး အန္တရာယ် (ရုပ်ပိုင်းဆိုင်ရာ ဘေးအန္တရာယ်) ဖြစ်သည့် ရေကြီးခြင်း၊ မုန်တိုင်းထန်ခြင်းနှင့် ငလျင်လှုပ်ခတ်ခြင်းနှင့် လူ့ပယောဂကြောင့်ဖြစ်သည့် လုပ်ငန်းခွင်ဆိုင်ရာ ဓာတု ဘေးအန္တရာယ်၊ ရုပ်ပိုင်းဆိုင်ရာ ဘေးအန္တရာယ်နှင့် ဇီဝဘေးအန္တရာယ်တို့သည် ယခုစီမံကိန်းအတွက် အဓိက စဉ်းစားထားသည့် အရာများဖြစ်သည်။

၅.၂.၂. ဘေးအန္တရာယ်ဖြစ်နိုင်ချေ

ICAO ဖော်ပြချက်အရ ဘေးအန္တရာယ်ဖြစ်နိုင်ချေမှာ ဘေးအန္တရာယ်ဖြစ်ပေါ်စေနိုင်သော အကြိမ်အရေအတွက်ကို ကိုယ်စားပြုပါသည်။ ဘေးအန္တရာယ်ဖြစ်နိုင်ချေအဆင့်အား အောက်ဖော်ပြပါ ဇယား ၁၁ တွင် ဖော်ပြထားပါသည်။

ဇယား ၁၁ ဘေးအန္တရာယ်ဖြစ်နိုင်ချေရှိမှုအဆင့်

ဖြစ်နိုင်ခြေ	အဓိပ္ပါယ်ဖွင့်ဆိုချက်	ကိန်းဂဏန်း
မကြာခဏ	ဘေးအန္တရာယ် ဖြစ်နိုင်ခြေ အလွန်များပါသည်။	၅
ရံဖန်ရံခါ	ဘေးအန္တရာယ် တစ်ခါတစ်ရံသာ ဖြစ်နိုင်ပါသည်။	၄
ခဲယဉ်းသော	ဘေးအန္တရာယ်ဖြစ်နိုင်ခြေမရှိသော်လည်း ချင်းချက်အခြေအနေမျိုးတွင် ဖြစ်နိုင်ပါသည်။	၃
ဖြစ်နိုင်ခြေမရှိသော	ဘေးအန္တရာယ်မှာ အလွန် ဖြစ်နိုင်ခြေမရှိပါ။	၂
အလွန် ဖြစ်နိုင်ခြေမရှိသော	ဘေးအန္တရာယ်ဖြစ်နိုင်ခြေမှာ စိတ်ကူးရှိပင် မရနိုင်အောင် နည်းပါးပါသည်။	၁

၅.၂.၃. ဘေးအန္တရာယ် ပြင်းထန်မှု

ဘေးအန္တရာယ်ပြင်းထန်မှုမှာ ဘေးအန္တရာယ်နှင့် ထိတွေ့ကြုံတွေ့လာခြင်းကြောင့် ဖြစ်နိုင်ချေရှိသော ထိခိုက်မှု (သို့မဟုတ်) ဆိုးကျိုးသက်ရောက်မှုအဆင့်ဖြင့် လေ့လာနိုင်သည်။ ဘေးအန္တရာယ် ပြင်းထန်မှုအား အဆင့် ၅ ဆင့်ဖြင့် ဖော်ပြထားပါသည်။ ၎င်းအား ဇယား ၁၂ တွင်ဖော်ပြထားပါသည်။

ဇယား ၁၂ ဘေးအန္တရာယ် ပြင်းထန်မှုပြဇယား

ပြင်းထန်မှု	အဓိပ္ပါယ်ဖွင့်ဆိုချက်	ကိန်းဂဏန်း
ကပ်ဘေး	စက်ကိရိယာများ ပျက်စီးစေနိုင်ခြင်း သေဆုံးမှုအများအပြား ဖြစ်နိုင်ခြင်း	က
အန္တရာယ်ရှိသော	ပြင်းထန်သော ဒဏ်ရာရရှိမှု အဓိက စက်ကိရိယာများ ပျက်စီးခြင်း	ခ
အဓိကဖြစ်သော	ပြင်းထန်သော အခြေအနေဖြစ်ပွားခြင်း	ဂ

ပြင်းထန်မှု	အဓိပ္ပါယ်ဖွင့်ဆိုချက်	ကိန်းဂဏန်း
	လူအများကို ထိခိုက်ဒဏ်ရာ ဖြစ်စေနိုင်ခြင်း	
အသေးအဖွဲ့	စိတ်အနှောက်အယှက်ဖြစ်ခြင်း လည်ပတ်မှုကန့်သတ်ချက်များ အရေးပေါ်လုပ်ငန်းစဉ်များ အသုံးပြုခြင်း အသေးအဖွဲ့ အခြေအနေဖြစ်ပွားခြင်း	၁
မပြောပလောက်သော	အကျိုးဆက်နည်းခြင်း	၀

၅.၂.၄. **အန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ခံနိုင်ရည်ရှိမှု**

ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းအား ဆောင်ရွက်ရာတွင် ဘေးအန္တရာယ်ဖြစ်နိုင်ချေရှိမှုနှင့် ဘေးအန္တရာယ် ပြင်းထန်မှုပေါ်မူတည်၍ ဆန်းစစ်ပါသည်။ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ခံနိုင်ရည်ရှိမှုအား ဇယား ၁၃ တွင် လေ့လာအကဲဖြတ်ထားပါသည်။

ဇယား ၁၃ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ခံနိုင်ရည်ရှိမှုပြဇယား

ဘေးအန္တရာယ် ဖြစ်နိုင်ခြေ	ဘေးအန္တရာယ် ပြင်းထန်မှု				
	ကပ်ဘေး-(က)	အန္တရာယ်ရှိသော-(ခ)	အဓိကဖြစ်သော-(ဂ)	အသေးအဖွဲ-(ဃ)	မပြောပလောက်သော(၀)
မကြာခဏ-၅	၅ (က) (ခံနိုင်ရည်မရှိသော)	၅ (ခ) (ခံနိုင်ရည်မရှိသော)	၅ (ဂ) (ခံနိုင်ရည်မရှိသော)	၅ (ဃ) (ခံနိုင်ရည်ရှိသော)	၅ (၀) (ခံနိုင်ရည်ရှိသော)
ရံဖန်ရံခါ-၄	၄ (က) (ခံနိုင်ရည်မရှိသော)	၄ (ခ) (ခံနိုင်ရည်မရှိသော)	၄ (ဂ) (ခံနိုင်ရည်ရှိသော)	၄ (ဃ) (ခံနိုင်ရည်ရှိသော)	၄ (၀) (ခံနိုင်ရည်ရှိသော)
ခဲယဉ်းသော-၃	၃ (က) (ခံနိုင်ရည်မရှိသော)	၃ (ခ) (ခံနိုင်ရည်ရှိသော)	၃ (ဂ) (ခံနိုင်ရည်ရှိသော)	၃ (ဃ) (ခံနိုင်ရည်ရှိသော)	၃ (၀) (လက်ခံနိုင်သော)
ဖြစ်နိုင်ခြေမရှိသော-၂	၂ (က) (ခံနိုင်ရည်ရှိသော)	၂ (ခ) (ခံနိုင်ရည်ရှိသော)	၂ (ဂ) (ခံနိုင်ရည်ရှိသော)	၂ (ဃ) (လက်ခံနိုင်သော)	၂ (၀) (လက်ခံနိုင်သော)
အလွန်ဖြစ်နိုင်ခြေမရှိသော-၁	၁ (က) (ခံနိုင်ရည်ရှိသော)	၁ (ခ) (လက်ခံနိုင်သော)	၁ (ဂ) (လက်ခံနိုင်သော)	၁ (ဃ) (လက်ခံနိုင်သော)	၁ (၀) (လက်ခံနိုင်သော)

၅.၂.၅. ဘေးအန္တရာယ် ထိန်းချုပ်ခြင်းနှင့် လျော့ချခြင်း

ထိန်းချုပ်ခြင်းသည် မလိုလားအပ်သည့် သတ်မှတ်ထားသော အကြောင်းအရာ၏ ဖြစ်နိုင်ချေရှိမှု သို့မဟုတ် ဖြစ်ပွားမှုအကြောင်းအရင်းအား လျော့ချခြင်းဟု သတ်မှတ်နိုင်သည်။ ထိခိုက်မှုလျော့နည်းခြင်းအား သတ်မှတ်ထိန်းချုပ်မှုစနစ် (post control actions) ဖြင့် ဆောင်ရွက်နိုင်ပါသည်။ ထိန်းချုပ်ခြင်းနှင့် ကာကွယ်ခြင်းဆိုင်ရာ လုပ်ငန်းများ ဆောင်ရွက်ပြီးသော်လည်း ၎င်းထိခိုက်မှုမှာ လူမှုပတ်ဝန်းကျင်နှင့် သဘာဝပတ်ဝန်းကျင် အပေါ် သက်ရောက်မှု ရှိနိုင်ပါသေးသည်။ ဘေးအန္တရာယ် ထိန်းချုပ်ခြင်းနှင့် လျော့နည်းသက်သာစေရေးအစီအစဉ်များမှာ အမျိုးမျိုးသော ဘေးအန္တရာယ်အမျိုးအစားအပေါ် မူတည်၍ ပြောင်းလဲမှု ရှိနိုင်ပါသည်။

၅.၂.၆. ပတ်ဝန်းကျင်နှင့် လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေးနှင့် ဆိုင်သော ဘေးအန္တရာယ်ဆန်းစစ်ခြင်း အနှစ်ချုပ်

ပတ်ဝန်းကျင်နှင့် လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေးနှင့်ဆိုင်သော ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ဆိုင်သည့် ဘေးအန္တရာယ်ဆန်းစစ်ခြင်း အကျဉ်းချုပ်အား ဇယား ၁၄ တွင် ဖော်ပြထားပါသည်။

ဇယား ၁၄ လုပ်ငန်းခွင်ဆိုင်ရာ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး နှင့်သက်ဆိုင်သည့် ဘေးအန္တရာယ်ဆန်းစစ်ခြင်း အကျဉ်းချုပ်

စီမံကိန်း အခြေအနေ	ဘေးအန္တရာယ်	ဖြစ်ပေါ်နိုင်သည့် ဘေးအန္တရာယ်	ဘေးအန္တရာယ် အဆင့် သတ်မှတ်ချက်	
			လျော့ပါးရေး အစီအစဉ်များ မလုပ်ဆောင်မီ	လျော့ပါးရေး အစီအစဉ်များ လုပ်ဆောင်ပြီး
တည်ဆောက်စဉ်ကာလ/ ပိတ်သိမ်းစဉ်ကာလ	လေညစ်ညမ်းခြင်း	ဓာတုဆိုင်ရာ	၃ (က)(ခံနိုင်ရည်မရှိသော)	၃ (ဂ) (ခံနိုင်ရည်ရှိသော)
	ရေညစ်ညမ်းခြင်း		၃ (က)(ခံနိုင်ရည်မရှိသော)	၃ (ဃ) (ခံနိုင်ရည်ရှိသော)
	အန္တရာယ်ရှိ စွန့်ပစ်အစိုင်အခဲ		၃ (က)(ခံနိုင်ရည်မရှိသော)	၂ (ဃ) (လက်ခံနိုင်သော)
တည်ဆောက်စဉ်ကာလ/ ပိတ်သိမ်းစဉ်ကာလ	ဖုန်မှုန့်များထွက်ရှိခြင်း၊ အသံအရည်အသွေး၊ , လျှပ်စစ်၊ အထွေထွေ ထိခိုက် ဒဏ်ရာများ ရရှိနိုင်ခြင်း	ရူပဆိုင်ရာ	၃ (က)(ခံနိုင်ရည်မရှိသော)	၂ (ခ) (ခံနိုင်ရည်ရှိသော)

စီမံကိန်း အခြေအနေ	ဘေးအန္တရာယ်	ဖြစ်ပေါ်နိုင်သည့် ဘေးအန္တရာယ်	ဘေးအန္တရာယ် အဆင့် သတ်မှတ်ချက်	
			လျော့ပါးရေး အစီအစဉ်များ မလုပ်ဆောင်မီ	လျော့ပါးရေး အစီအစဉ်များ လုပ်ဆောင်ပြီး
တည်ဆောက်စဉ်ကာလ/ ပိတ်သိမ်းစဉ်ကာလ	ကူးစက်ရောဂါများ နှင့် ကြွက်၊ ခြင်၊ ယင်နှင့် ပိုးဟပ် စသည်တို့မှ ကူးစက် စေနိုင်သည့် ရောဂါများ	ဇီဝဆိုင်ရာ	၃ (ခ) (ခံနိုင်ရည်ရှိသော)	၂ (ဃ) (လက်ခံနိုင်သော)

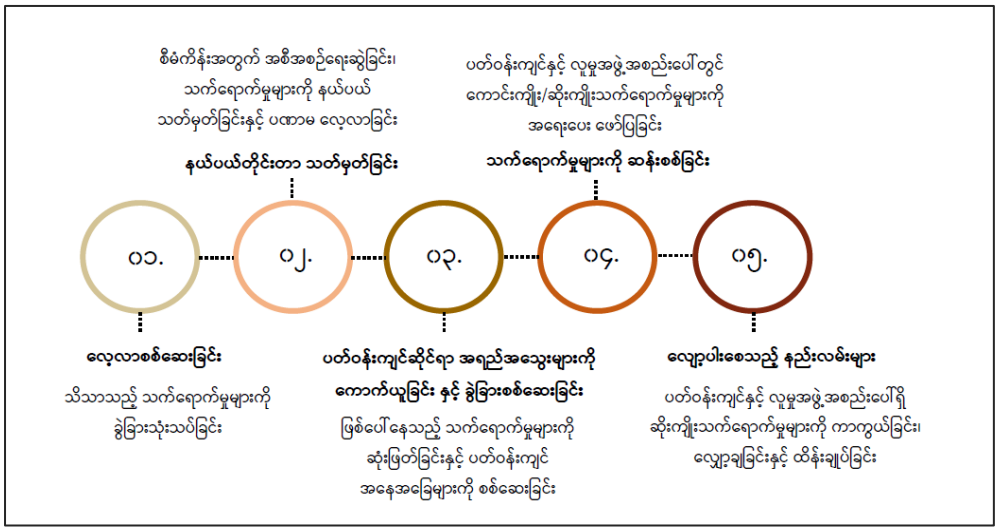
၆. ဆက်စပ်သက်ရောက်မှုများ

၆.၁. ဆက်စပ်သက်ရောက်မှုများ ဆန်းစစ်ခြင်း၏ အခန်းကဏ္ဍ

ဆက်စပ်သက်ရောက်မှုများကို ခွဲခြားရာတွင် များစွာသော ဓာတုပစ္စည်းများ၊ အရင်းအမြစ်များ၊ ပြည်သူ့ကျန်းမာရေး၊ ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများနှင့် ကျန်းမာရေးရလဒ်များကို လွှမ်းမိုးထားသည့် လူဦးရေဆိုင်ရာ ဝိသေသလက္ခဏာများကို ဆန်းစစ်ပေးပါသည်။ ဆက်စပ်သက်ရောက်မှုဆိုသည်မှာ ဧရိယာတစ်ခုတည်း တွင်ရှိသည့် တစ်ခုထက်ပိုသည့် အမျိုးမျိုးသော အရင်းအမြစ်များမှ မတော်တဆ၊ ပုံမှန်လုပ်ဆောင်ချက် သို့မဟုတ် အခြားနည်းလမ်းများကြောင့် သော်လည်းကောင်း စုပေါင်းထုတ်လွှတ်လိုက်သည့် ပတ်ဝန်းကျင်ကို ညစ်ညမ်းစေသည့် အရာများသည် အများပြည်သူကျန်းမာရေး သို့မဟုတ် ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုများကို ဆိုလိုပါသည်။ ဤသို့ ဆန်းစစ်ခြင်းသည် လူမှုရေးနှင့် သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ အချက်များတွင် သိသာထင်ရှားသည့် ပြောင်းလဲမှုများကို ဖော်ပြပါသည်။ ထို့ကြောင့် ဆက်စပ်သက်ရောက်မှုများ (CIA) သည် သဘာဝပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အဆင့်တွင် ဆိုးကျိုးသက်ရောက်မှုများကို ဖြစ်ပေါ်စေသည့် အရင်းအမြစ်ကို ခြေရာခံခြင်းနှင့် သင့်လျော်သော ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအတွက် ဆုံးဖြတ်ချက်ချရာတွင် အရေးပါသည့် အစိတ်အပိုင်းတစ်ခု ဖြစ်သည်ဟု ကောက်ချက်ချနိုင်ပါသည်။

၆.၂. ဆက်စပ်သက်ရောက်မှုများ ဆန်းစစ်ရာတွင် ပါဝင်သည့် အဆင့်များ

ပုံ ၉ တွင် ဖော်ပြထားသည့် အောက်ပါ အဆင့် (၅)ဆင့်ကို အသုံးပြု၍ စုပေါင်းသက်ရောက်မှုများ ဆန်းစစ်ရာမှုများကို လုပ်ဆောင်ပါသည်။



ပုံ ၉ ဆက်စပ်သက်ရောက်မှု ဆန်းစစ်ခြင်း လုပ်ငန်းစဉ်

၆.၂.၁. **လေ့လာဆန်းစစ်ခြင်း (Screening)**

ဤလေ့လာဆန်းစစ်ခြင်းသည် အကဲဖြတ်မှုအဆင့် (Impact Assessment) ကို မပြုလုပ်မီ သိသာထင်ရှားသည့် သက်ရောက်မှုအဆင့်များကို ကနဦး ခွဲခြားစီစစ် ပေးနိုင်ပါသည်။ ထို့ကြောင့် သက်ရောက်မှုများ ဖြစ်ပေါ်စေသည့် အရင်းအမြစ်များကို သိရှိပြီးဖြစ်သောကြောင့် Impact Assessment ပြုလုပ်သည့် အခါတွင် အချိန်နှင့် ကုန်ကျစရိတ်သက်သာစေနိုင်ခြင်း၊ အဓိက ဆိုးကျိုးသက်ရောက်နေသည့် ဧရိယာများတွင် ထိရောက်စွာဖြင့် လျော့ပါးရေးနည်းလမ်းများနှင့် လူမှု-ပန်းဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုများ ပြုလုပ်နိုင်ခြင်းစသည့် အကျိုးကျေးဇူးတို့ကို ရရှိနိုင်ပါသည်။ ထို့ အတွက်ကြောင့် လေ့လာဆန်းစစ်ခြင်း (Screening) အဆင့်သည် CIA တွင် အရေးပါသည့် ကဏ္ဍတစ်ခု အဖြစ် ပါဝင်ပါသည်။

ညစ်ညမ်းမှု ဒဏ်	ထိတွေ့မှုများ *ညစ်ညမ်းသည့် အရာများနှင့် ထိတွေ့ခြင်း	လူဦးရေဆိုင်ရာ အချက်အလက်များ	ထိခိုက်လွယ်သော လူဦးရေအုပ်စု *ညစ်ညမ်းစေသော အရာဝတ္ထုများ ထိတွေ့မိရာတွင် ဇီဝဗေဒဆိုင်ရာ ထူးခြားသည့် စရိုက်လက္ခဏာများ ရှိသည့် အုပ်စုများတွင် သက်ရောက်မှု ရှိနိုင်ခြင်း
	အများပြည်သူ ကျန်းမာရေးအပေါ် သက်ရောက်မှုများ *ရောဂါနှင့် ညစ်ညမ်းသည့် အရာများကို ထိတွေ့သောကြောင့် အခြားသော ကျန်းမာရေး အခြေအနေများ		လူမှု-စီးပွားရေးဆိုင်ရာ အကြောင်းအရင်းများ *ညစ်ညမ်းမှုဒဏ်ကို ပိုမိုခံရနိုင် သည့် လူမှုအဖွဲ့အစည်း၏ ဝိသေသ လက္ခဏာများ
	ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများ *ညစ်ညမ်းစေသောအရာများကြောင့် ဖြစ်ပေါ်လာသော ဆိုးရွားသည့် ပတ်ဝန်းကျင် အခြေအနေများ		

ပုံ ၁၀ လေ့လာဆန်းစစ်မှုတွင် ပါဝင်သည့် အဆင့် ၅ ဆင့်

လေ့လာဆန်းစစ်ခြင်း နည်းလမ်း (Screening methodology) သည် လူမှုအဖွဲ့အစည်း၏ ဖွံ့ဖြိုးတိုးတက်ရေး (ကျန်းမာရေး၊ စီးပွားရေး စသဖြင့်) နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးများ ကောင်းမွန်မှုတို့ကို လေ့လာရာတွင် ညစ်ညမ်းမှု နှင့် လူဦးရေဆိုင်ရာ အချက်အလက်များ စသည့် အချက် ၂ ချက် (ပုံ ၁၀) ပေါ်တွင် ခြေခံ၍ လေ့လာပါသည်။ လေ့လာသည့် နည်းလမ်းမှာ အထက်ဖော်ပြပါ အချက် ၂ ချက်ကို မြှောက်ခြင်း မှ ရရှိလာသည့် ရလဒ်များအပေါ်တွင် ဆန်းစစ်သုံးသပ်ပါသည်။

ဆက်စပ်သက်ရောက်မှု ရလဒ် = (ညစ်ညမ်းမှုဒဏ် ရလဒ်) x (လူဦးရေဆိုင်ရာ အချက်အလက်များ ရလဒ်)

ဆက်စပ်သက်ရောက်မှု ရလဒ်စုစုပေါင်းကို ၆ မှ ၁၂၀ အတွင်း သတ်မှတ်ထားပြီး ညစ်ညမ်းမှုဒဏ်နှင့် လူဦးရေဆိုင်ရာ အချက်အလက်များတွင် ပါဝင်သည့် ကဏ္ဍတစ်ခုစီ၏ ရလဒ်သတ်မှတ်ချက်များကို ဇယား ၁၅ တွင် ဖော်ပြထားပါသည်။ အသေးစိတ်ဖော်ပြချက်များကို အခန်း ၆ တွင် ကြည့်ရှုနိုင်ပါသည်။

ဇယား ၁၅ ပါဝင်သည့် ကဏ္ဍတစ်ခုစီ၏ ရလဒ်သတ်မှတ်ချက်များ

စံသတ်မှတ်ချက်	ပါဝင်သည့် အချက်အလက်များ	ရမှတ်များ
ညစ်ညမ်းမှုဒဏ်	ထိတွေ့မှုများ	၁-၁၀
	အများပြည်သူ ကျန်းမာရေးအပေါ် သက်ရောက်မှုများ	၁-၅
	ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများ	၁-၅
လူဦးရေဆိုင်ရာ အချက်အလက်များ	ထိခိုက်လွယ်သော လူဦးရေအုပ်စု	၁-၃
	လူမှု-စီးပွားရေးဆိုင်ရာ အကြောင်းအရင်းများ	၁-၃
	ဆက်စပ်သက်ရောက်မှု	၆-၁၂၀

၆.၂.၁.၁. လေ့လာဆန်းစစ်ခြင်းနည်းလမ်းကို အသုံးပြု၍ ဆက်စပ်သက်ရောက်မှုကို အကဲဖြတ်ခြင်း

လေ့လာဆန်းစစ်ခြင်းနည်းလမ်းကို အသုံးပြု၍ ဆက်စပ်သက်ရောက်မှုကို အကဲဖြတ်ခြင်း ရလဒ်များကို ဇယား ၁၆ တွင် ဖော်ပြထာပါသည်။

ဇယား ၁၆ တည်ဆောက်ချိန်နှင့် လုပ်ငန်းပိတ်သိမ်းချိန်တို့တွင် ဖြစ်ပေါ်နိုင်သော လေ့လာဆန်းစစ်ခြင်း ရလဒ်

မြို့နယ်	ဗဟန်းမြို့နယ်	ရန်ကင်းမြို့နယ်	
ရပ်ကွက်	**ဆရာစံ**	**၅**	**၆**
လူဦးရေ **အိမ်ခြေ** **အိမ်ထောင်စု**	၄,၂၁၀ ၃၄၈ ၁,၀၀၃	၃,၇၅၆ ၃၁၂ ၉၃၄	၂,၅၉၇ ၂၀၉ ၆၅၀
ထိတွေ့မှုများ	၆	၇	
အများပြည်သူ ကျန်းမာရေးအပေါ် သက်ရောက်မှုများ	၂	၃	
ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှု များ	၃	၄	
ညစ်ညမ်းမှုဒဏ်	**၁၁**	**၁၄**	
ထိခိုက်လွယ်သော လူဦးရေအုပ်စု	၁	၂	
လူမှု-စီးပွားရေးဆိုင်ရာ အကြောင်းအရင်းများ	၁	၁	
လူဦးရေဆိုင်ရာ အချက်အလက်များ	**၂**	**၃**	
ဆက်စပ်သက်ရောက်မှု ရလဒ်	**၂၂**	**၄၂**	

၆.၂.၂. ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း

ဆက်စပ်သက်ရောက်မှုများ ဆန်းစစ်ခြင်းကို ဇယား ၁၇ တွင် ဖော်ပြထားပါသည်။

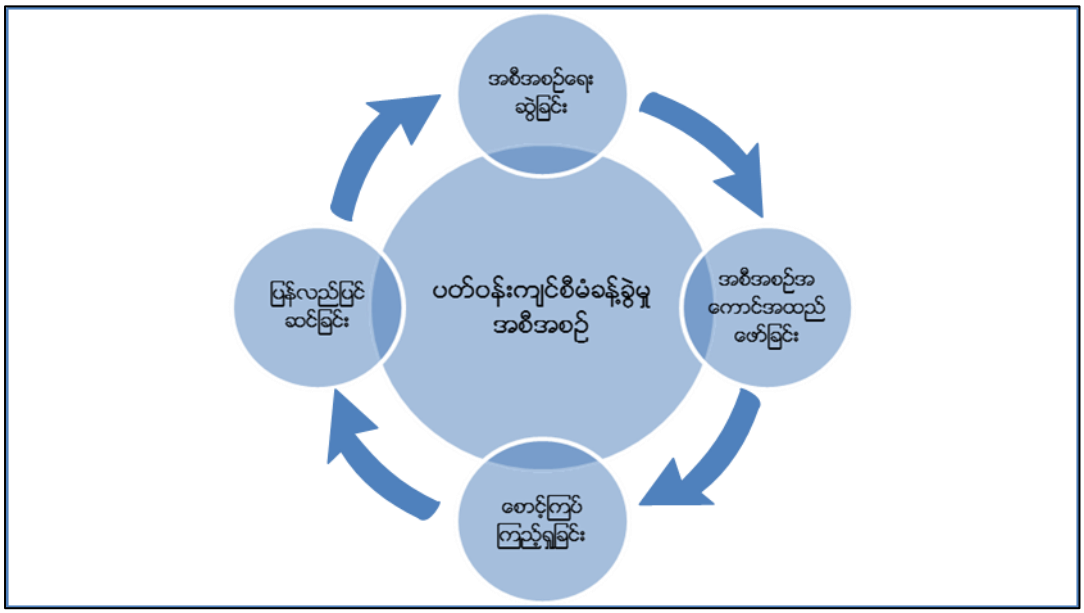
ဇယား ၁၇ ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း

သက်ရောက်မှုအမျိုးအစား	သက်ရောက်မှုများ ဖြစ်ပေါ်စေသည့် အရင်းအမြစ်	သက်ရောက်မှုများ	ထွက်ရှိသည့် ဒြပ်ပေါင်းများ	အဓိက	အခြား	သက်ရောက်မှုရေတွက်	သက်ရောက်မှုအဆင့်	ဖော်ပြချက်များ
ထိတွေ့မှုများ	ယာဉ်လမ်းကြောင်း ပိတ်ဆို့မှု	လေအရည်အသွေး	Dust, PMs, CO_2, NO_x, CO and etc.,	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
	အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းများ စုပုံထားရှိခြင်း	မိုးရွာချိန်တွင် ရေစီးနှင့် အတူ မျောပါခြင်းမှ မြေပေါ်ရေ ညစ်ညမ်းခြင်း ဓာတုပစ္စည်းများ စိမ့်ထွက်ခြင်းမှ မြေအောက်ရေ ညစ် ညမ်းခြင်း	ဘိလပ်မြေ အကြွင်းအကျန်များ၊ အိမ်သုတ်ဆေး၊ တင်နာ၊ ဖျက်ဆေးများ စသည်	-၃	၇	-၂၁	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
			အိမ်သုံးလျှပ်စစ်ပစ္စည်း အပျက်များနှင့် မီးချောင်းအပျက်အစီးများ					
	အမှိုက်စွန့်ပစ်သည့် ဇရိယာ	မိုးရွာချိန်တွင် ရေစီးနှင့် အတူ မျောပါခြင်းမှ မြေပေါ်ရေ ညစ်ညမ်းခြင်း အင်းဆက်ပိုးမွှားနှင့် ဘက်တီးရီးယားများ ပေါက်ဖွားခြင်း	စားကြွင်းစားကျန်များ၊ အစားအသောက်ထည့်သည့် အိတ်များ/ဘူးများ	-၂	၇	-၁၄	-၂	ဆိုးကျိုးသက်ရောက်မှု လျော့နည်းလာခြင်း
			မီးဖိုချောင်မှ စားကြွင်းစားကျန်များနှင့် ရပ်ကွက်အတွင်းရှိ စျေးမှ အမှိုက်အကြွင်းအကျန်များ၊ အိမ်များမှ ထွက်ရှိသည့် အမှိုက်များ					

၇. ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်သည် စီမံကိန်း၏ထုတ်လုပ်မှုလုပ်ငန်းကြောင့် ပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှုမရှိစေရန် သက်ဆိုင်ရာအာဏာပိုင်အဖွဲ့အစည်းများ၏ ချမှတ်ထားသော သဘာဝပတ်ဝန်းကျင်ဆိုင်ရာ ဥပဒေ၊ စည်းမျဉ်းများနှင့်အညီ သင့်လျော်သော လျှော့ချရေးအစီအစဉ်များကို အကောင်အထည်ဖော်ဆောင်ရွက်ခြင်းဖြစ်ပါသည်။ ထိုသို့အကောင်အထည်ဖော်ဆောင်ရွက်ရာ၌ အောက်

တွင် ဖော်ပြထားသော ပုံ ၁၁ စက်ဝိုင်းအတိုင်း စီမံခန့်ခွဲမှုအစီအစဉ် Plan-Do-Check-Act (PDCA) အချက်လေးချက် ပေါ်မူတည်ပြီး ပြုလုပ်ရပါမည်။



ပုံ ၁၁ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုပြ မြေပုံ

- **Plan (P) - အစီအစဉ်ရေးဆွဲခြင်း**

စီမံကိန်းကြောင့် ပတ်ဝန်းကျင်အပေါ်ထိခိုက်မှု ဖြစ်စေနိုင်သော လေထုညစ်ညမ်းမှု၊ အသံဆူညံမှု၊ ရေဆိုးစွန့်ပစ်မှု၊ အမှိုက်စွန့်ပစ်မှု၊ ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းမှု စသော ထိခိုက်မှုများ လျော့ပါးရေးအတွက် အချိန်ဇယားအစီအစဉ်များ ရေးဆွဲရပါမည်။

- **Do (D) - အကောင်အထည်ဖော်ဆောင်ခြင်း**

ပတ်ဝန်းကျင်ထိခိုက်မှုအတွက် ရေးဆွဲထားသော လျှော့ချရေးအစီအစဉ်များကို စီမံကိန်းမှ တာဝန်ရှိသူများက အကောင်အထည်ဖော် ဆောင်ရွက်ရပါမည်။

- **Check (C)- စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့်စစ်ဆေးခြင်း**

လျှော့ချရေးအစီအစဉ်များ အကျိုးသက်ရောက်မှုရှိမရှိကို စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် စစ်ဆေးခြင်းများ ပြုလုပ်ရပါမည်။ စောင့်ကြည့်မှုအတွက် စီမံကိန်းဖော်ဆောင်သူ အပါအဝင် သက်ဆိုင်ရာ အနီးပတ်ဝန်းကျင်ရှိ ပုဂ္ဂိုလ်များ၊ အုပ်ချုပ်ရေးပိုင်းဆိုင်ရာပုဂ္ဂိုလ်များ အစရှိသော သက်ဆိုင်ရာအဖွဲ့အစည်း များ စုပေါင်း၍ လေ့လာစောင့်ကြည့်မှု ပြုလုပ်ရပါမည်။ ၎င်းစောင့်ကြည့်မှုကိုလည်း အစီရင်ခံစာပြုစုပြီး သက်ဆိုင်ရာ ဝန်ကြီးဌာနသို့ တင်ပြရမည်ဖြစ်သည်။

- **Act (A)- ပြန်လည်ပြင်ဆင်ခြင်း**

စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်တွင် လက်ရှိဖြစ်ပေါ်သော ပတ်ဝန်းကျင် ထိခိုက်မှုများနှင့် ကိုက်ညီမှု မရှိခဲ့လျှင် လျှော့ချရေး အစီအစဉ်များကို ပြန်လည်ပြင်ဆင်ခြင်းများ ပြုလုပ်ရပါမည်။

၇.၁. ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့နည်းသက်သာစေရေးအစီအစဉ်

ပတ်ဝန်းကျင်ထိခိုက်မှုလျော့နည်းသက်သာစေရေးအစီအစဉ်အား စီမံကိန်း တည်ဆောက်စဉ်၊ ပိတ်သိမ်းစဉ်နှင့် လည်ပတ်စဉ်ကာလဟူ၍ ခွဲခြား၍ အောက်ဖော်ပြပါ ဇယား ၁၈၊ ဇယား ၁၉ နှင့် ဇယား ၂၀ တွင် ဖော်ပြထားပါသည်။

ဇယား ၁၈ တည်ဆောက်စဉ် ကာလအတွင်း ပတ်ဝန်းကျင်ထိခိုက်မှုအား လျော့နည်းသက်သာစေရေးအစီအစဉ်အကျဉ်းချုပ်

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
၁.	လေထုညစ်ညမ်းမှု - လေထုထဲသို့ SO_2, CO_2, NO_x, CO and VOCs ဓာတ်ငွေ့များနှင့် အမှုန်အမွှားများ ထုတ်လွှတ် ခြင်း။	• တည်ဆောက်ခြင်း မလုပ်ဆောင်မီ အန္တရာယ်ရှိသော နေရာများအား သတ်မှတ်ခြင်းနှင့် အသိပေးကြေငြာဆိုင်းဘုတ်များနှင့် အတားအဆီးများ ထားရှိခြင်း။ • လေဖြင့်သယ်ဆောင်နိုင်သော အမှုန်အမွှားများ ပျံ့လွင့်မှုနည်းပါးစေရန် လုပ်ငန်းဆောင်ရွက်နေစဉ်အတွင်း ရေဖြန်းပေးခြင်း။ (ရွှံ့ထူမြေ ဖြစ်နိုင်သောကြောင့် ရေအမြောက်အများ အသုံးပြုခြင်းအား ကန့်သတ်ခြင်း) • တည်ဆောက်ရေးမှ ထွက်ရှိသော ပြန်လည်အသုံးပြုရသောအမှိုက်များကို ၎င်းတို့၏ ကြံ့ခိုင်အားစစ်ဆေးပြီးမှ ပြန်လည်အသုံးပြုခြင်း။ • ကုန်ကြမ်းပစ္စည်းများအား လေဟာနယ်တွင် စုပုံခြင်းကို တားမြစ်ခြင်း။ • လေနှင့်အတူလွင့်ပါနိုင်သော ကုန်ကြမ်းပစ္စည်းများ သယ်ယူခြင်းနှင့် စုပုံခြင်းတွင် လုံခြုံရေးကွန်ရက်များ၊ အဖုံးအကာများ အသုံးပြုခြင်း။ • ထုတ်လွှတ်အခိုးအငွေ့ နည်းပါးသည့် နည်းပညာပါရှိသော အသုံးပြုသည့် စက်ပစ္စည်းများကိုအသုံးပြုခြင်းနှင့် ၎င်းတွင် သန့်စင်သောရုပ်ကြွင်းလောင်စာ ကိုသာ အသုံးပြုခြင်း (ခဲသတ္တုနှင့် ဆာလဖာကင်းစင်သော လောင်စာ) • တည်ဆောက်ရေးလုပ်ငန်းသုံးယာဉ်များ၏ အရှိန်နှင့် လည်ပတ်မှုစနစ်အား ထိန်းချုပ်ခြင်း။ • စက်ပစ္စည်းများနှင့် အင်ဂျင်များအား ပုံမှန်ထိန်းသိမ်းခြင်းနှင့် ပြုပြင်ခြင်း။ • ဆောက်လုပ်ရေးဝန်ထမ်းများအား ထုတ်လွှတ်အခိုးငွေ့ထွက်ရှိမှုနည်းပါးသော နည်းလမ်းများနှင့်ပတ်သက်၍ အသိပညာပေးခြင်း။	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	စီမံကိန်းတည်ဆောက်ခြင်း ကုန်ကျစရိတ်တွင် ပါဝင်ပါသည်။
၂.	ဆူညံသံနှင့် တုန်ခါမှု - အနီးပတ်ဝန်းကျင်ကို ဆူညံသံ ဖြစ်ပေါ်ခြင်း	• ဆူညံသံနှင့် တုန်ခါမှု နည်းပါးသည့် ခေတ်မီစက်ပစ္စည်းများအား အစားထိုး လဲလှယ်ခြင်း။ • ဆူညံသံနှင့် တုန်ခါမှု နည်းပါးစေရန် ပစ္စည်းများအား စနစ်တကျ ပြုပြင်ထိန်းသိမ်းခြင်း။	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	စီမံကိန်းတည်ဆောက်ခြင်း ကုန်ကျစရိတ်တွင် ပါဝင်ပါသည်။

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
	- တုန်ခါမှုဒဏ်ခံရခြင်းကြောင့် လုပ်ငန်းခွင် ဘေးအန္တရာယ်များနှင့် အဆောက်အအုံများ ထိခိုက်ပျက်စီးခြင်း	• တုန်ခါမှုနှင့် ဆူညံသံထွက်ရှိသည့် အရင်းအမြစ်နေရာများတွင် ထိန်းချုပ်ရေးပစ္စည်းများ ဖြစ်သည့် အခင်းများနှင့် နံရံအတားအဆီးများ အသုံးပြုခြင်း။ • ဆူညံသံထွက်ရှိသည့်အရင်းအမြစ် (မီးစက်အား) လူနေဧရိယာနှင့် ဝေးကွာသောနေရာ တွင် ဆူညံသံအတားအဆီးများဖြင့် ထားရှိခြင်း။ • ဆူညံသည့်ဧရိယာတွင် အလုပ်လုပ်ကိုင်သည့် လုပ်သားများအား အလုပ်ချိန်ပြောင်းလဲပေးခြင်းနှင့် တစ်ကိုယ်ရေသုံးအကာအကွယ်ပစ္စည်း (နားကြပ်)များ ထောက်ပံ့ပေးခြင်း။ • အသံလုံသည့် မီးစက်နှင့် အင်ဂျင်များအား ဖြစ်နိုင်ပါက အသုံးပြုခြင်း။ အင်ဂျင်များအား မလိုအပ်ပဲ စက်ဖွင့်နိုးခြင်းအား တားမြစ်ခြင်း။ • တည်ဆောက်ရေးအချိန်ဧယားသတ်မှတ်ခြင်းနှင့် အနီးဝန်းကျင်ရှိ နေထိုင်သူ နှင့် လုပ်ငန်းများ သိရှိနိုင်ရန် တည်ဆောက်ရေးလုပ်ငန်းစဉ်နှင့် အချိန်အား အသိပေးဆိုင်းဘုတ်များဖြင့် အကြောင်းကြားခြင်း။		
၃.	ရေအရည်အသွေး - စီးဆင်းရေများသည် တည်ဆောက်ရေးဧရိယာအတွင်းရှိ အနည်အနှစ်၊ ဓာတုပစ္စည်းနှင့် အမှိုက်များအား သယ်ယူခြင်းဖြင့် ရေအရည်အသွေးကျဆင်းခြင်းနှင့် ရေသတ္တဝါ၊ အပင်များအပေါ် ထိခိုက်မှု ဖြစ်ပေါ်နိုင်ပါသည်။	• တည်ဆောက်ရေးလုပ်ငန်းသုံးပစ္စည်းများအား ဟင်းလင်းနယ်တွင် ထားရှိခြင်းအား ကန့်သတ်ခြင်း၊ အမိုးအကာများဖြင့်သာ ထားရှိရန်။ • တည်ဆောက်ရေးကာလအတွင်းရှိ ရေကြီးရေလျှံမှုမှ ကာကွယ်နိုင်ရန် ရေနုတ်မြောင်းသည် စွန့်ပစ်ရေများ စည်ပင်ရေနုတ်မြောင်းသို့ ကောင်းမွန်စွာ စီးဆင်းနိုင်သည့် ဒီဇိုင်းကိုသာ ရွေးချယ်အသုံးပြုခြင်း။ • ရေနုတ်မြောင်းများအား သင့်လျော်သောလျှောစောက်နှင့် တိုက်စားမှု ထိန်းချုပ်ရေး ကိရိယာတပ်ဆင်အသုံးပြုခြင်း(နွံစစ်စကာ) • ရေနုတ်မြောင်းများအား ဘေးအန္တရာယ်ကျရောက်မှုမှ ကာကွယ်နိုင်ရန်နှင့် အခြားအညစ်အကြေးများ ဝင်ရောက်မှုမရှိစေရန် သံကွန်ရက် သို့မဟုတ် အခြားခွင့်ပြုထားသည့် ပစ္စည်းများဖြင့် ဖုံးအပ်ထားရှိခြင်း။ • တံစက်မြိတ်မှ မိုးရေများအား စုဆောင်ခြင်း၊ သိုလှောင်ခြင်းနှင့် အထွေထွေ လုပ်ငန်း များတွင် ပြန်လည်အသုံးပြုခြင်းဖြင့် ရေနုတ်မြောင်းသို့ ရောက်ရှိမည့် စွန့်ပစ်ရေ ပမာဏအား လျော့ချပေးနိုင်ခြင်း။	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	စီမံကိန်းတည်ဆောက်ခြင်း ကုန်ကျစရိတ်တွင် ပါဝင်ပါသည်။

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
		• သန့်ရှင်းသည့် သန့်စင်ခန်းများနှင့် လုံလောက်သော မိလ္လာကန်များအား ထောက်ပံ့ခြင်း။ • မိလ္လာကန်များမှ အနည်အနှစ်များအား ပုံမှန်ဖယ်ရှားခြင်းနှင့် စိမ့်ထွက်မှု မရှိစေရန် စနစ်တကျ ထိန်းချုပ်ခြင်း။		
၄.	မြေအရည်အသွေး -တည်ဆောက်ရေးလုပ်ငန်းများကြောင့် မြေဝိသေသလက္ခဏာများ ပြောင်းလဲခြင်း	• ရေဖြန်းသည့်ဧရိယာအနီးတွင် ယာယီနွံစစ်စကာများ ထားရှိခြင်း။ • ရှပ်ကြွင်းလောင်စာ၊ အဆီနှင့်ချောဆီတို့အား ကောင်းမွန်စွာ ကိုင်တွယ်ခြင်းနှင့် သိုလှောင် ခြင်း။ • ဆီယိုဖိတ်မှုရှိပါက ညစ်ညမ်းမြေအား ချက်ချင်း ဖယ်ရှားခြင်း။ • အသုံးပြုပြီးသော အင်ဂျင်ဆီနှင့် ချောဆီတို့အား လုံခြုံသောဗူးခွံများတွင် သိုလှောင်၍ ၎င်းတို့၏ လုပ်ထုံးလုပ်နည်းစံညွှန်း (SOP) အရ စွန့်ပစ်ခြင်း။ • စွန့်ပစ်ပစ္စည်းများ စုဆောင်းခြင်း၊ ခွဲခြားခြင်းနှင့် သယ်ယူပို့ဆောင်ခြင်းအတွက် သတ် မှတ်နေရာထားရှိခြင်းဖြင့် ညစ်ညမ်းမှုကို ကာကွယ်နိုင်ခြင်း။ • ရေစိမ့်ဝင်နိုင်သည့်နေရာများအား လုံလောက်စွာ ထားရှိခြင်း။ • စီးဆင်းရေများအား စီးဆင်းရာလမ်းကြောင့်အား အဆင့်ဆင့်ပြုလုပ်ခြင်းဖြင့် ရေနုတ်မြောင်းသို့ ရေစီးဝင်မှုဆိုင်ရာ ထိခိုက်မှုကို တားဆီးနိုင်ခြင်း။ • မြေတူးခြင်းဆိုင်ရာလုပ်ငန်းများအား ထိန်းချုပ်ခြင်းနှင့် လုပ်ဆောင်ပါက မြေတိုက်စားမှု ထိန်းချုပ်ရေးနည်းလမ်းများနှင့်လုပ်ငန်းစဉ်များအား ဆောင်ရွက်ခြင်း (အထူးသဖြင့် မိုးရာသီနှင့် မတ်စောက်သောနေရာများ)	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင် စီမံခန့် ခွဲမှုအဖွဲ့	စီမံကိန်းတည်ဆောက်ခြင်း ကုန်ကျစရိတ်တွင် ပါဝင်ပါသည်။
၅.	စွန့်ပစ်အမှိုက် • ဆောက်လုပ်ရေးလုပ်ငန်းစဉ်များမှ အန္တရာယ်မရှိသောအမှိုက်များနှင့် အန္တရာယ်ရှိသောအမှိုက်များ ထွက်ရှိခြင်း။	အန္တရာယ်မရှိသော တည်ဆောက်ရေးအမှိုက်များ • လုပ်ငန်းမစတင်မီ ထွက်ရှိနိုင်သည့် စွန့်ပစ်ပစ္စည်းအမျိုးအစား၊ ပမာဏများအား စမ်းစစ်ခြင်းနှင့် တွက်ချက်ခြင်း။ • စွန့်ပစ်ပစ္စည်းအမျိုးစား (သစ်သား၊ ကွန်ကရစ်၊ သတ္တုများ)အား ထွက်ရှိသည့် နေရာတွင် ခွဲခြားခြင်းနှင့် ၎င်းတို့၏ ဖွဲ့စည်းမှုအမျိုးအစားများအလိုက် စုပုံခြင်း။ • ပြန်လည်အသုံးပြု၍ရသောအမျိုးအစားများအား လုပ်ငန်းခွင်တွင် ပြန်လည်အသုံးပြု ခြင်းနှင့် ဝယ်ယူသူများထံသို့ ရောင်းချခြင်း။	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	စီမံကိန်းတည်ဆောက်ခြင်း ကုန်ကျစရိတ်တွင် ပါဝင်ပါသည်။

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
		• ပြန်လည်အသုံးပြု၍ မရသောပစ္စည်းများအား ဒေသစည်းမျဉ်းစည်းကမ်းများ နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ သတ်မှတ်စည်းကမ်းများနှင့် စွန့်ပစ်ခြင်း။ • လေဟာနယ်တွင်အမှိုက်မီးရှို့ခြင်းအား တားမြစ်ခြင်း။ • စွန့်ပစ်ပစ္စည်းများအား သတ်မှတ်နေရာတွင် တရားဝင်ခွင့်ပြုသည့် နည်းလမ်းဖြင့် စွန့်ပစ်ခြင်း • အနံ့ဆိုးများနှင့် အမှိုက်စိမ့်ထွက်ရည်များ ထွက်ရှိမှုမရှိစေရန် အမှိုက်ပုံးများအား အဖုံးအကာတပ်ဆင်ခြင်းနှင့် အမှိုက်ပုံးများအား ပုံမှန်သန့်ရှင်းခြင်းနှင့် ပိုးသတ်ခြင်း။		
		အန္တရာယ်ရှိသော တည်ဆောက်ရေးအမှိုက်များ • အန္တရာယ်ရှိသော အမှိုက်နှင့် လျှပ်စစ်ပစ္စည်းဆိုင်ရာ စွန့်ပစ်ပစ္စည်းများအား အသုံးပြုနိုင်သော အမှိုက်များမှ ခွဲခြား၍ သတ်မှတ်စည်းကမ်းချက်များနှင့်အညီ သိုလှောင်ခြင်းနှင့် စွန့်ပစ်ခြင်း။ • အမှိုက်စီမံခန့်ခွဲခြင်းဆိုင်ရာ လုပ်ငန်းတာဝန်များအား သတ်မှတ်လိုင်စင်ရပြီး လူပုဂ္ဂိုလ်ကိုသာ တာဝန်ပေးအပ်ခြင်း။ • အမှိုက်စုပုံရာနေရာသည် စိမ့်ဝင်နိုင်မှုမရှိသည့်ကြမ်းခင်းရှိခြင်းနှင့် မိုးနှင့် အခြားရာသီ ဥတုဒဏ်အား ကာကွယ်နိုင်သော နေရာဖြစ်ခြင်း။		
၆.	မြေအသုံးချခြင်းနှင့် ဒေသဆိုင်ရာ အရင်းအမြစ်များ သုံးစွဲခြင်း • မြေအသုံးချမှုပြောင်းလဲခြင်းနှင့် အရင်းအမြစ်များသုံးစွဲမှုများပြားလာခြင်း။	• စဉ်ဆက်မပြတ်ဖွံ့ဖြိုးတိုးတက်မှုကိုအခြေခံထားသည့် ဒီဇိုင်းနှင့် အစီအစဉ်များ ကျင့်သုံး ခြင်းဖြင့် မြေယာရှင်းလင်းမှုအား အနည်းဆုံးဖြစ်ခြင်း။ • ရေအသုံးပြုမှုထိန်းချုပ်ရေး နည်းလမ်းများအသုံးပြုခြင်းနှင့် လေလွင့်မှု နည်းပါးစေရန် လိုအပ်သည့်ရေပမာဏကိုသာ အသုံးပြုခြင်း။ • စွမ်းအင်ထိန်းချုပ်ခြင်းနည်းလမ်းများ အသုံးပြုခြင်း (အသုံးမပြုပါက မီးပိတ်ခြင်းနှင့် ဖြစ်နိုင်ပါက သဘာဝအလင်းရောင်ကိုသာ အသုံးပြုခြင်း) • လုပ်ဆောင်နိုင်မှုမြင့်မာသော စက်ပစ္စည်းများနှင့် စွမ်းအင်ချွေတာသည့် နည်းပညာသုံး စက်ပစ္စည်းများအား ဦးစားပေးအသုံးပြုခြင်း။	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	စီမံကိန်းတည်ဆောက်ခြင်း ကုန်ကျစရိတ်တွင် ပါဝင်ပါသည်။

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
၇.	ယာဉ်လမ်းကြောင်း ပိတ်ဆို့ခြင်း • ယာဉ်ကြီးများ တိုးပွားလာခြင်းနှင့် ယာဉ်လမ်းမကြီးတွင် ယာဉ်ကြောပိတ် ဆို့ခြင်းများဖြစ်ပေါ်ခြင်း။	• ယာဉ်ကြီးများဝင်ထွက်မှုပြု သတိပေးဆိုင်းဘုတ်များ ထားရှိခြင်းနှင့် စီမံကိန်းဧရိယာဝန်းကျင်တွင် အရှိန်သတ်မှတ်ထားရှိခြင်း။ • သတ်မှတ်ထားသည့်ယာဉ်အရှိန်ကို စီမံကိန်း၏ ယာဉ်မောင်းသူများအား လိုက်နာစေခြင်း။ • တည်ဆောက်ခြင်းလုပ်ငန်းစဉ်များအား လမ်းဧရိယာအတွင်းမှ လုပ်ကိုင်ခြင်းမပြုရန်နှင့် သတ်မှတ်ထားသည့် မော်တော်ယာဉ်ကန့်သတ်ချက်များနှင့် ယာဉ်လမ်းမကြီးဆိုင်ရာ သတ်မှတ်ချက်များအား လိုက်နာဆောင်ရွက်ခြင်း။ • စီမံကိန်း၏ မော်တော်ယာဉ်များအား ကောင်းမွန်သောအခြေအနေရရှိစေရန် ပြုပြင်ထိန်းသိမ်းခြင်း။ • လမ်းဘေးတွင် ကားပါကင်ထိုးခြင်းကို ရှောင်ရှားရန် လုပ်ငန်းခွင်အတွင်းတွင် လုံလောက်သော ကားပါကင်နေရာများကို ဆောက်လုပ်ထားရှိမည်ဖြစ်သည်။ • လမ်းမပေါ်တွင် ယာဉ်အရေအတွက်ကို လျှော့ချရန် အလုပ်သမားများအတွက် ဘတ်စ်ကားများ စီစဉ်ပေးမည် ဖြစ်ပါသည်။	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	စီမံကိန်းတည်ဆောက်ခြင်း ကုန်ကျစရိတ်တွင် ပါဝင်ပါသည်။
၈.	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး • လုပ်ငန်းခွင် မတော်တဆဖြစ်ပွားမှုများ (ထိခိုက်ဒဏ်ရာများနှင့် ကူးစက်ရောဂါများ)	• စက်ယန္တရားပစ္စည်းများနှင့် အရေးပေါ်ကိရိယာများအား ကိုင်တွယ်အသုံးပြုနိုင်ရန် အလို့ငှာ လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေး သင်တန်းများ ပြုလုပ်ပေးခြင်း။ • ဖြစ်နိုင်ချေရှိသော အန္တရာယ်များ (ဥပမာ-ရွှေ့လျားနိုင်သော စက်ပစ္စည်း အစိတ်အပိုင်း) များအား အသိပေးဆိုင်းဘုတ်ထားရှိခြင်း။ • အလုပ်သမားများအား စက်ပစ္စည်းများမှ ဖြစ်ပေါ်နိုင်သော ထိခိုက်မှုများနှင့် ပတ်သက်၍ အသိပညာပေးခြင်းနှင့် ပစ္စည်းကိရိယာများအသုံးပြုမှုနှင့်ပတ်သက်၍ လုံလောက်သော သင်တန်းများ ပို့ချပေးခြင်း။ • အလုပ်သမားများအား တစ်ကိုယ်ရည်သုံးအကာအကွယ်ပစ္စည်းများအား လုံလောက်စွာ ထောက်ပံ့ပေးခြင်းနှင့် ၎င်းထောက်ပံ့ပေးမှုအား လစ်ဟာမှုမရှိစေရန် စောင့်ကြပ်ကြည့်ရှု စစ်ဆေးခြင်း။ • စီမံကိန်းဧရိယာအတွင်း လူအဝင်အထွက်အား ကန့်သတ်နိုင်ရန်အလို့ငှာ လုံခြုံရေးများ ထားရှိခြင်း။	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ လုပ်ငန်းခွင် ဘေးအန္တရာယ် ကင်းရှင်းမှုအဖွဲ့	စီမံကိန်းတည်ဆောက်ခြင်း ကုန်ကျစရိတ်တွင် ပါဝင်ပါသည်။

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
		• မီးသတ်ပစ္စည်းများအား လွယ်ကူသွားလာနိုင်သည့်နေရာများတွင် ထားရှိခြင်း နှင့် အလုပ်သမားများအား ၎င်းတို့ကိုအသုံးပြုနိုင်ရန်အလို့ငှာ ကောင်းမွန်စွာ လေ့ကျင့်ပေးခြင်းနှင့် ပုံမှန်ပြုပြင်ထိန်းသိမ်းခြင်း။ • ထိခိုက်နိုင်ချေရှိသော ဓာတုပစ္စည်းများနှင့် အရာဝတ္ထုများအား ၎င်းတို့၏ ထိခိုက်နိုင်မှု အလိုက် အသိပေးစာများ ချိတ်ဆွဲထားရှိခြင်း။ • မီးဘေးအန္တရာယ်ကာကွယ်ရေးနှင့် အရေးပေါ်စုရပ်အမှတ်များအား လုံလောက်စွာ ထားရှိ၍ အများပြည်သူသိရှိစေရန်အသိပေးစာများ ထားရှိခြင်း • ဘေးအန္တရာယ်များနှင့်ပတ်သက်၍ အရေးပေါ်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ ချမှတ်ခြင်းနှင့် အလုပ်သမားများအား ၎င်းလုပ်ထုံးလုပ်နည်းများကို လိုက်နာ စေရန် ကြပ်မတ်ခြင်း/ အရေးပေါ်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများကို ပုံမှန်ဇာတ်တိုက် လေ့ကျင့်ခြင်း။		

ဧယား ၁၉ စီမံကိန်းလည်ပတ်စဉ်ကာလအတွင်း ပတ်ဝန်းကျင်ထိခိုက်မှုအား လျော့နည်းသက်သာစေရေးအစီအစဉ်အကျဉ်းချုပ်

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
၁.	လေထုညစ်ညမ်းမှု - လူနေထိုင်ခြင်းကြောင့် ဝန်းကျင်လေထုအတွင်း ကာဗွန်ပမာဏနှင့် အမှုန်အမွှားများ ပါဝင်မှု မြင့်မားလာခြင်း။	• ပြန်လည်အသုံးပြုနိုင်သော သန့်စင်သည့်စွမ်းအင်၊ ပတ်ဝန်းကျင်ကို ထိခိုက်မှုနည်းပါးသော အအေးပေးပစ္စည်းများနှင့် အအေးပေးစက်များ အသုံးပြုခြင်း။ • မော်တော်ယာဉ်များတွင် ဆာလဖာနှင့် ခဲသတ္တုပါဝင်မှုနည်းသည့် လောင်စာဆီကို ရွေးချယ်အသုံးပြုခြင်း။ • လုပ်ငန်းခွင်အတွင်းတွင် စွန့်ပစ်အမှိုက်များနှင့်အခြားပစ္စည်းများ မီးရှို့ဖျက်စီးခြင်းအား တားမြစ်ခြင်း။ • နေထိုင်သူများမှ ထွက်ရှိသော ကာဗွန်အား စုပ်ယူနိုင်ရန် သစ်ပင်လွှမ်းမိုး ဧရိယာများ ဖန်တီးပေးခြင်း။	HAGL၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၅,၀၀၀,၀၀၀
၂.	ဆူညံသံနှင့် တုန်ခါမှု - နေ့စဉ်လူနေထိုင်မှုပုံစံအလိုက် ဆူညံသံနှင့် တုန်ခါမှု ထွက်ရှိခြင်း။	• ဆူညံသံဖြစ်ပေါ်နိုင်သည့် လုပ်ငန်းစဉ်များကို ဆောင်ရွက်နေသူများအား သတိပြုနိုင်ရန် အကြောင်းကြားခြင်း။ • ခွင့်ပြုထားသည့် အသံမြင့်မားသော လုပ်ငန်းစဉ်များကို နေ့အချိန်အတွင်း ဆောင်ရွက်စေခြင်း။ • အဆောက်အအုံနှင့် အခန်းများကို ဆူညံသံကို ထိန်းချုပ်နိုင်သည့် ဒီဇိုင်းနှင့် ဖွဲ့စည်းမှုပုံစံ ဖြင့် ဆောင်ရွက်ထားရှိခြင်း။ • အဆောက်အအုံအတွင်းတွင် လက်ခံနိုင်သော ဆူညံသံနှင့် တုန်ခါမှုပမာဏကို သတ်မှတ်ခြင်းနှင့် နေထိုင်သူများအား လိုက်နာစေခြင်း။ အကယ်၍လိုအပ်ပါက ဒဏ်ကြေးနှင့် ပြစ်ဒဏ်ချမှတ်ခြင်း။ • အထူးသဖြင့် ည ၁၁ ခွဲမှ မနက် ၆ နာရီအထိ လူနေထိုင်ရာဧရိယာအတွင်းတွင် ဟွန်းသံ ကင်းမဲ့ဇုန်များ သတ်မှတ်ခြင်း။ • အခန်းအကြီးစားပြင်ဆင်မှုများဆောင်ရွက်ပါက အဆောက်အအုံစီမခန့်ခွဲမှု ကော်မတီ၏ ခွင့်ပြုချက်အား ရယူခြင်း။	HAGL၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၅,၀၀၀,၀၀၀

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
		• ပြင်ဆင်မှုများဆောင်ရွက်နေစဉ်အတွင်း ဆူညံသံနှင့်တုန်ခါမှု နည်းပါးစေရန် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ အပြုအမူများ (ဆူညံသံနှင့် တုန်ခါမှု နည်းပါးစေသည့် အတားအဆီးများ၊ ကိရိယာများ အသုံးပြုခြင်း) ဆောင်ရွက်ခြင်း။		
၃.	ရေအရည်အသွေး - အထွေထွေစွန့်ပစ်ရေနှင့် မိလ္လာရေများ ထွက်ရှိခြင်း။	• စည်ပင်ရေနုတ်မြောင်းသို့ မစွန့်ပစ်မီ စွန့်ပစ်ရေများအား သန့်စင်နိုင်ရန် စွန့်ပစ်ရေ သန့်စင်သည့်စနစ် တပ်ဆင်ထားရှိခြင်း။ • ၎င်းရေဆိုးသန့်စင်စနစ်၏ လုပ်ဆောင်နိုင်စွမ်းအား ပုံမှန်ဆန်းစစ်ခြင်းနှင့် ၎င်း၏ လုပ်ထုံး လုပ်နည်းအတိုင်း လိုအပ်သော ပြုပြင်ထိန်းသိမ်းရေးလုပ်ငန်းစဉ်ကို ပုံမှန်လုပ်ဆောင် ခြင်း။ • မြေယာပြုပြင်ခြင်းလုပ်ဆောင်ရာတွင် မိုးရေများ မြေအောက်သို့ အလွယ်တကူ စိမ့်ဝင် နိုင်ရန် စီစဉ်ထားရှိခြင်း။ • ရေနုတ်မြောင်းများအား မိုးရာသီတွင် စီးဆင်းရေများ ကောင်းမွန်စွာ စီးဆင်းနိုင်ရန်အတွက် သင့်တော်သောပမာဏထားရှိခြင်းနှင့် ၎င်းတို့အတွင်း ပိတ်ဆို့မှုမရှိ စေရန် စောင့်ကြပ်စစ်ဆေးခြင်း။	HAGL၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၅,၀၀၀,၀၀၀
၄.	မြေအရည်အသွေး - စီမံကိန်းလည်ပတ်ခြင်းကြောင့် မြေညစ်ညမ်းမှုဖြစ်ပေါ်မှုမှာ ကန့်သတ်မှုရှိသောကြောင့် မြေဝိသေသနလက္ခဏာနှင့် အရည်အသွေးအပေါ် သက်ရောက်မှု အနည်းငယ်သာရှိနိုင်ခြင်း။	• ရာသီဥတုတိုက်စားမှုမှ ကာကွယ်နိုင်ရန် လစ်လပ်မြေများကို သစ်ပင်များ စိုက်ပျိုးခြင်း။ • မြေယာပြုပြင်ရာတွင် သဘာဝဇီဝပစ္စည်းများဖြင့် လုပ်ထားသော မြေဩဇာများ ကိုသာ အသုံးပြု၍ မြေအရည်အသွေး တိုးမြှင့်ခြင်း။ • အဆီနှင့်ချောဆီများအား ၎င်းတို့၏ လုပ်ထုံးလုပ်နည်းလမ်းညွှန်ချက်နှင့်အညီ ဂရုပြု၍ ကိုင်တွယ်ခြင်းနှင့် သိုလှောင်ခြင်း။ • မမျှော်လင့်ထားသော ဖိတ်စင်မှုများဖြစ်ပေါ်ပါက ညစ်ညမ်းမြေအား ချက်ချင်း ဖယ်ရှား ခြင်း။	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် ၏ HAGL ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၅,၀၀၀,၀၀၀
၅.	စွန့်ပစ်အမှိုက် • လူနေအိမ်ယာမှ ထွက်ရှိသော အထွေထွေ အိမ်သုံးစွန့်ပစ်အမှိုက်များ ထွက်ရှိခြင်း။	အန္တရာယ်မရှိသော စွန့်ပစ်အမှိုက်များ • အမှိုက်စွန့်ပစ်သည့်စနစ်အား ရန်ကုန်မြို့တော်စည်ပင်သာယာရေး၏ လမ်းညွှန်ချက်နှင့် အညီ ဆောင်ရွက်ခြင်း။	HAGL၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၅၀၀,၀၀၀

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
		• အမျိုးအစားခွဲခြားထားသည့်အမှိုက်ပုံးများအား အမျိုးအစားအလိုက်အရောင်ခွဲ၍ အများ ပြည်သူ သိရှိစေရန် မြင်သာစွာ တံဆိပ် တပ်ဆင်ခြင်း။ • အနံ့ဆိုးနှင့် အမှိုက်စိမ့်ထွက်ရည်များ မထွက်ရှိရန် အမှိုက်ပုံများကို ပုံမှန်သန့်ရှင်းခြင်းနှင့် ပိုးသတ်ခြင်း။ • မြို့နယ်စည်ပင်သာယာရေးကော်မတီနှင့် ချိတ်ဆက်၍ ပုံမှန်အမှိုက် သိမ်းယူခြင်းနှင့် စွန့်ပစ်ခြင်းအား ပြုလုပ်ခြင်း။ • အမှိုက်များအား သတ်မှတ်ထားသည့် တရားဝင်နည်းလမ်းများနှင့်အညီ ၎င်းတို့၏ သတ်မှတ်ထားသောဧရိယာတွင် စွန့်ပစ်ခြင်း။ • အမှိုက်များကို စုဆောင်းခြင်း၊ အမျိုးအစားခွဲခြားခြင်းနှင့် စွန့်ပစ်ခြင်းတို့တွင် အသုံးပြုသည့် သင့်လျော်သော အထောက်အပံ့ပစ္စည်းများ ထောက်ပံ့ခြင်း။ • ပြန်လည်အသုံးပြုနိုင်သော ပစ္စည်းများအား ပြန်လည်အသုံးပြုခြင်း (သို့မဟုတ်) ဒေသတွင်းလိုအပ်သူများထံ ပြန်လည်ရောင်းချခြင်း။ • အမှိုက်ပုံးများအား မိုးရေနှင့်အခြားသောသက်ရှိသတ္တဝါ အန္တရာယ်မှ ကာကွယ်ရန် စနစ်တကျ ထားရှိခြင်း။		
		အန္တရာယ်ရှိသော စွန့်ပစ်အမှိုက်များ • အန္တရာယ်ရှိသော စွန့်ပစ်အမှိုက်များမှာ အဓိကအားဖြင့် လူနေအိမ်မှ ထွက်ရှိသော ဘက်ထရီ၊ မီးချောင်းနှင့် ပိုးသတ်ဆေးဗူးခွံများဖြစ်ပါသည်။ • အန္တရာယ်ရှိအမှိုက်များအား ခွဲခြားစုဆောင်း၍ သတ်မှတ်ထားသည့် လူပုဂ္ဂိုလ် (သို့) အဖွဲ့အစည်းများမှ တစ်ဆင့် မြို့တော်စည်ပင်သာယာရေးကော်မတီ၏ လမ်းညွှန်ချက် နှင့်အညီ စွန့်ပစ်ခြင်း။ • အမှိုက်များကို ကိုင်တွယ်ရာတွင် လက်အိတ်များဖြင့် ကိုင်တွယ်ခြင်း။ (အသားဖြင့် တိုက်ရိုက်ထိတွေ့ခြင်းအား ရှောင်ရှားရန်) • ချွန်ထက်နေသော အရာဝတ္ထုများအား စွန့်ပစ်ရာတွင် လုံခြုံရေးဗူးကို အသုံးပြု၍ စွန့်ပစ်ခြင်း။		၂,၅၀၀,၀၀၀

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
၆.	မြေအသုံးချခြင်းနှင့် ဒေသဆိုင်ရာ အရင်းအမြစ်များ သုံးစွဲခြင်း • မြေအသုံးချမှုပြောင်းလဲခြင်းနှင့် အရင်းအမြစ်များသုံးစွဲမှုများပြားလာခြင်း။	• စီမံကိန်း၏ ရည်မှန်းချက်များကို အမျိုးသားမြေအသုံးချမှု မူဝါဒများနှင့် ဖွံ့ဖြိုးရေးအစီအစဉ်များကို အထောက်အပံ့ပြုနိုင်ရန် စီစဉ်ထားရှိခြင်း။ • ရေထိန်းသိမ်းခြင်း နည်းလမ်းများအသုံးပြုခြင်း (ဥပမာ အလိုအလျှောက် ရေပိတ်ခြင်း စနစ်ကို လက်ဆေးကန်တွင် တပ်ဆင်ခြင်း) • ရေနှင့် လျှပ်စစ်စွမ်းအင်အသုံးပြုမှုနှင့်ပတ်သက်၍ အသိပညာပေးခြင်း။ • နေ့အချိန်တွင် သဘာဝနေ့အလင်းရောင်ကို ဦးစားပေးအသုံးပြုစေခြင်း။ • စွမ်းအင်ချွေတာသည့် စက်များနှင့် စက်ကိရိယာများကို ရုံးခန်းများနှင့် လူနေအိမ်များတွင် တပ်ဆင်ထားရှိခြင်းနှင့် ၎င်းတို့၏ စွမ်းဆောင်ရည် မြင့်မားစေရန် ပုံမှန်ပြုပြင် ထိန်းသိမ်းခြင်း။	HAGL၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၃,၀၀၀,၀၀၀
၇.	ယာဉ်လမ်းကြောင်း ပိတ်ဆို့ခြင်း • သယ်ယူပို့ဆောင်ရေးယာဉ်များ တိုးပွားလာခြင်းနှင့် ယာဉ်ကြောပိတ်ဆို့ခြင်း ကို ဖြစ်ပေါ်ခြင်း။	• စီမံကိန်းဧရိယာမှ ယာဉ်အဝင်အထွက်ပြသတိပေးဆိုင်းဘုတ်များ ထားရှိခြင်း။ • အခြားအသုံးပြု၍ရသော ဝင်ပေါက်များနှင့်အရေးပေါ်ထွက်ပေါက်များ ထားရှိခြင်း။ • ယာဉ်မောင်းသူများအား ယာဉ်စည်းကမ်းနှင့်ပတ်သက်၍ အသိပညာပေးခြင်း။ • လမ်းဘေးတွင် ကားပါကင်ထိုးခြင်းကို ရှောင်ရှားရန် လုပ်ငန်းခွင်အတွင်းတွင် လုံလောက်သော ကားပါကင်နေရာများကို ဆောက်လုပ်ထားရှိမည်ဖြစ်သည်။ • ကားပါကင်ရရှိနိုင်မှုအခြေအနေအား အလိုအလျှောက်ပြသည့် စနစ်အား တပ်ဆင်ခြင်းအားဖြင့် ကားပါကင်ရရှိမှုအတွက် အချိန်ကုန်ကျမှုကို လျော့ချနိုင်ခြင်း။	HAGL၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၃,၀၀၀,၀၀၀
၈.	ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး • အဆောက်အဦ စီမံအုပ်ချုပ်မှုနှင့် လုံခြုံရေးအခြေအနေ အားနည်းမှုကြောင့် နေထိုင်သူများ၏ ကျန်းမာရေးနှင့် လုံခြုံရေးပြဿနာများ ဖြစ်ပေါ်နိုင်ခြင်း။	• အဆိုပြုစီမံကိန်းတွင် လုံခြုံရေးအစောင့်များ ထားရှိခြင်းနှင့် စီမံကိန်းဧရိယာ အတွင်းသို့ မော်တော်ယာဉ်နှင့်လူအဝင်အထွက် စစ်ဆေးခြင်း။ • စီမံကိန်းဧရိယာ၏ လုံခြုံရေးစောင့်ကြပ်စစ်ဆေးနိုင်ရန်အလို့ငှာ စောင့်ကြည့် ကင်မရာများ တပ်ဆင်ထားရှိခြင်း။ • လုံခြုံရေးဆိုင်ရာကိစ္စရပ်များအား အမျိုးအသားရဲဌာနနှင့် ပူးပေါင်းဆောင်ရွက်ခြင်း။	HAGL၏ လုပ်ငန်းခွင် ဘေးအန္တရာယ် ကင်းရှင်းမှုအဖွဲ့	၅,၀၀၀,၀၀၀

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
		• စီမံကိန်းဧရိယာအတွင်း အရေးပေါ်အချက်ပေး ကိရိယာများတပ်ဆင်ထားရှိခြင်းနှင့် အရေးပေါ်ဆောင်ရွက်ရမည့်အစီအစဉ်များနှင့် လုပ်ငန်းစဉ်များအား ဆောင်ရွက်ထားရှိ ခြင်း။ • ကူးစက်ရောဂါဖြစ်ပွားမှု လျော့ချနိုင်ရန်အလို့ငှာ အသိပညာပေးခြင်း၊ စွန့်ပစ်အမှိုက် စီမံခန့်ခွဲခြင်းစနစ်နှင့် ပြန်လည်အသုံးချခြင်းဆိုင်ရာလုပ်ငန်းများ တိုးမြှင့်ဆောင်ရွက်ခြင်းဖြင့် သန့်ရှင်းကျန်းမာသည့် လူမှုအဖွဲ့အစည်းတည်ဆောက်ခြင်း။		

ဇယား ၂၀ လုပ်ငန်းပိတ်သိမ်းစဉ်ကာလအတွင်း ပတ်ဝန်းကျင်ထိခိုက်မှုအား လျော့နည်းသက်သာစေရေးအစီအစဉ် အကျဉ်းချုပ်

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
၁.	လေထုညစ်ညမ်းမှု - လေထုထဲသို့ SO_2, CO_2, NO_x, CO and VOCs ဓာတ်ငွေ့များနှင့် အမှုန်အမွှားများ ထုတ်လွှတ်ခြင်း။	• ဖြိုဖျက်မည့်ဧရိယာအား အသိပေးဆိုင်းဘုတ်နှင့် ယာယီခြံစည်းဝင်းများ (အမှုန်အမွှားပျံ့လွင့်မှု အတားအဆီးပါဝင်သည့်) ဆောက်လုပ်ခြင်းဖြင့် အများပြည်သူ ကျန်းမာရေးနှင့် အမှုန်အမွှားပျံ့လွင့်မှုအား လျော့ချခြင်း။ • လုပ်ငန်းစဉ်အတွင်း ရေဖျန်းပေးခြင်း၊ ၎င်းတွင် ရေပမာဏအမြောက်အများ အသုံးပြု ခြင်းသည် ရွှံ့မြေဖြစ်စေခြင်းကြောင့် တားမြစ်ခြင်း။ • ဖြိုဖျက်ခြင်းမှ ထွက်ရှိလာသောအမှိုက်များအား သယ်ယူရာတွင် လုံခြုံရေးကွန်ရက်များ၊ အကာများ အသုံးပြုခြင်း။ • အဆောက်အအုံများအား ဂရုပြု၍ ဖြိုချခြင်းဖြင့် ဖုန်မှုန့်ထွက်ရှိမှု လျော့ချနိုင်သည့် အပြင် ပြန်လည်အသုံးပြုနိုင်သော ပစ္စည်းများ ထွက်ရှိခြင်း။ • ဖြိုဖျက်ပစ္စည်းများမှ ပြန်လည်အသုံးပြု၍ရသောအမှိုက်များဖြစ်သည့် ကွန်ကရစ်၊ သတ္တုတို့အား ၎င်းတို့၏ ကြံ့ခိုင်မှုပမာဏကို စစ်ဆေး၍ ပြန်လည်အသုံးပြုခြင်း။ • လေဟာနယ်တွင် ကုန်ကြမ်းများစုပုံထားရှိခြင်းကို ကန့်ကွက်ခြင်း။ • ထုတ်လွှတ်အခိုးအငွေ့ ထွက်ရှိမှုနည်းပါးသည့် အင်ဂျင်နှင့် စက်ယန္တရားများကို ရွေးချယ် အသုံးပြုခြင်း။	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် ၏ HAGL ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၃,၀၀၀,၀၀၀

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
		• ဖုန်ထူထပ်သည့်နေရာတွင် စက်ယန္တရားများဖြင့် လုပ်ကိုင်သော အလုပ်သမားများအား တစ်ကိုယ်ရေသုံးအကာအကွယ်ပစ္စည်းများကို လုံလောက်စွာ ထောက်ပံ့ပေးခြင်း။ • လုပ်ငန်းခွင်နေရာတွင် ဆောင်ရွက်မည့် လုပ်ငန်းစဉ်နှင့် အချိန်တို့အား ပြည်သူများ သိရှိစေရန် အသိပေးဆိုင်းဘုတ်ဖြင့် အသိပေးခြင်း။		
၂.	ဆူညံသံနှင့် တုန်ခါမှု - အနီးပတ်ဝန်းကျင်ကို ဆူညံသံ ဖြစ်ပေါ်ခြင်း - တုန်ခါမှုဒဏ်ခံရခြင်းကြောင့် လုပ်ငန်းခွင် ဘေးအန္တရာယ်များနှင့် အဆောက်အအုံများ ထိခိုက်ပျက်စီးခြင်း	• ဆူညံသံ ပြင်းထန်နိုင်သော ဖြိုဖျက်ခြင်းလုပ်ငန်းများအား မနက် ၁၀ နာရီမှ ညနေ ၃ နာရီ အတွင်းသာ လုပ်ကိုင်စေခြင်း။ • ပွတ်တိုက်ခြင်းမှ ထွက်ပေါ်လာနိုင်သော ဆူညံသံကို လျော့ချနိုင်ရန်အတွက် စက်ပစ္စည်းများကို ပုံမှန်ဆန်းစစ်ခြင်း။ • ဆူညံသံပြင်းထန်သောလုပ်ငန်းခွင်တွင် လုပ်ကိုင်ရသောအလုပ်သမားများနှင့် ဆူညံသံ ထွက်ရှိသည့် စက်ပစ္စည်းများကိုမောင်းနှင်ရသူများအတွက် တစ်ကိုယ်ရည်သုံး အကာအကွယ်ပစ္စည်း (နားကြပ်များ) ထောက်ပံ့ခြင်း။ • အများပြည်သူများသိရှိစေရန် လုပ်ငန်းခွင်ဆောင်ရွက်ချက်များနှင့် အချိန်ဇယားတို့အား ဆိုင်းဘုတ်များဖြင့် ချိတ်ဆွဲအသိပေးခြင်း။ • ဆူညံသံပျံ့လွင့်မှုကိုလျော့ချနိုင်ရန် လုပ်ငန်းခွင်အား အကာအကွယ်၊ အတားအဆီးများ ထားရှိခြင်း။ • ဆူညံသံနှင့် တုန်ခါမှုထွက်ရှိမှုနည်းပါးသော ခေတ်မီစက်ပစ္စည်းများအား အစားထိုးခြင်း။ • ဆူညံသံနှင့် တုန်ခါမှု ထွက်ရှိမှုနည်းပါးသည့် ဖြိုဖျက်ခြင်းဆိုင်ရာ နည်းလမ်းများ (ဥပမာ ပစ္စည်းများမြေပေါ်သို့ ချသည့်အမြင့်ပမာဏအား အနည်းဆုံးဖြစ်စေခြင်း) အသုံးပြုခြင်း။ • လိုအပ်ပါက အသံလုံသည့် မီးစက်နှင့် အင်ဂျင်များကို အသုံးပြုခြင်း။	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် ၏ HAGL ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၃,၀၀၀,၀၀၀
၃.	ရေအရည်အသွေး - ဝန်ထမ်းများမှ အထွေထွေစွန့်ပစ်ရေနှင့် မိလ္လာရေဆိုးများ ထွက်ရှိခြင်း။	• ဖြိုဖျက်ခြင်းမှ ထွက်ရှိသောပစ္စည်းများနှင့်အမှိုက်များအား အမိုးအကာမရှိသည့် နေရာ တွင် စုပုံခြင်းအား တားမြစ်ခြင်း။	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် ၏ HAGL ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၃,၀၀၀,၀၀၀

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
	- စီးဆင်းရေများသည် အနည်အနှစ်၊ ဓာတုပစ္စည်း နှင့် အမှိုက်များအား သယ်ယူခြင်းဖြင့် ရေအရည်အသွေးကျဆင်းခြင်းနှင့် ရေသတ္တဝါ၊ အပင်များအပေါ် ထိခိုက်မှု ဖြစ်ပေါ်နိုင်ပါသည်။	• သင့်တော်သော ဆင်ခြေလျောရှိသည့် ရေနုတ်မြောင်းများ သွယ်တန်းခြင်းဖြင့် စီးဆင်း ရေများသည် စည်ပင်ရေနုတ်မြောင်းသို့ ကောင်းမွန်စွာ စီးဝင်နိုင်ခြင်း။ • ရေနုတ်မြောင်းတွင် တိုက်စားမှုကို ထိန်းချုပ်သည့်စနစ် (ဥပမာ နွံဖမ်းစနစ်) အား ထည့်သွင်းတည်ဆောက်ခြင်း။ • စွန့်ပစ်ရေအတွင်းသို့ မမျှော်လင့်ထားသည့် အဆီဖိတ်စင်မှုများရှိခဲ့ပါက အဆီစုပ်စက္ကူ ဖြင့် ပြန်လည်ဖမ်းယူစေခြင်း။ • သန့်ရှင်းသည့် အိမ်သာနှင့် လုံလောက်သော မိလ္လာကန်များ ထောက်ပံ့ပေးခြင်း။ • မိလ္လာကန်မှ အနည်အနှစ်များအား ပုံမှန်ဖယ်ရှားခြင်းနှင့် ညစ်ညမ်းရေများ စိမ့်ထွက်မှု မရှိစေရန် ဆောင်ရွက်ခြင်း။		
၄.	မြေအရည်အသွေး -ဖြိုဖျက်ခြင်းလုပ်ငန်းများကြောင့် မြေဝိသေသလက္ခဏာများ ပြောင်းလဲခြင်း	• ရေဖြန်းသည့်နေရာတွင် ယာယီနုန်းထိန်းများ တပ်ဆင်အသုံးပြုခြင်း။ • လောင်စာဆီ၊ ချောဆီနှင့်အဆီများအား ကောင်းမွန်စွာ သိုလှောင်၍ ကိုင်တွယ်အသုံးပြုခြင်း။ • အဆီယိုဖိတ်ပြီးပါက ညစ်ညမ်းနေသည့်မြေအား ချက်ချင်းဖယ်ရှားခြင်း။ • ဖြိုဖျက်ခြင်းလုပ်ငန်းပြီးဆုံးသွားပါက လုပ်ငန်းခွင်မြေနေရာအား ပြုပြင်ခြင်း။ (မြေကြီခိုင် မှုရှိစေရန် သစ်ပင်များဖြင့်ဖုံးအုပ်ထားရှိခြင်းဖြင့် မြေတိုက်စားမှု လျော့ကျခြင်းနှင့် ဂေဟစနစ်အား ပြန်လည်ကောင်းမွန်ခြင်း)	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် ၏ HAGL ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၃,၀၀၀,၀၀၀
၅.	စွန့်ပစ်အမှိုက် • ဖြိုဖျက်ခြင်းမှ ထွက်ရှိလာသောအမှိုက်များနှင့် ဝန်ထမ်းများမှ ထွက်ရှိသော အထွေထွေအမှိုက်များ	အန္တရာယ်မရှိသော ဖြိုဖျက်ရေးအမှိုက်များ • စွန့်ပစ်ပစ္စည်းအမျိုးစား (သစ်သား၊ ကွန်ကရစ်၊ သတ္တုများ)အား ထွက်ရှိသည့် နေရာတွင် ခွဲခြားခြင်းနှင့် ၎င်းတို့၏ ဖွဲ့စည်းမှုအမျိုးအစားများအလိုက် စုပုံခြင်း။ • ပြန်လည်အသုံးပြု၍ရသောအမျိုးအစားများအား လုပ်ငန်းခွင်တွင် ပြန်လည်အသုံးပြုခြင်းနှင့် ဝယ်ယူသူများထံသို့ ရောင်းချခြင်း။ • ပြန်လည်အသုံးပြု၍ မရသောပစ္စည်းများအား ဒေသစည်းမျဉ်းစည်းကမ်းများ နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ သတ်မှတ်စည်းကမ်းများနှင့် စွန့်ပစ်ခြင်း။ • လုပ်ငန်းခွင်ဧရိယာအနှံ့တွင် အမှိုက်ပုံးများ ထားရှိ၍ ဝန်ထမ်းများမှ ထွက်ရှိသော အထွေထွေအမှိုက်များကို ပုံမှန်သိမ်းယူခြင်းနှင့် စွန့်ပစ်ခြင်း	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် ၏ HAGL ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၅၀၀,၀၀၀

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
		• တိရစ္ဆာန်နှင့် ရာသီဥတုသက်ရောက်မှုများမှ ကာကွယ်ရန် ယာယီအမှိုက်သိုလှောင် ထားရှိရာနေရာတွင် မစိမ့်ဝင်နိုင်သောအခင်းနှင့် အမိုးအကာများကို တပ်ဆင်ခြင်း။ • အမှိုက်များကို လေဟာနယ်တွင်အမှိုက်မီးရှို့ခြင်းအား တားမြစ်ခြင်း။		
		အန္တရာယ်ရှိသော ဖြိုဖျက်ရေးအမှိုက်များ • အန္တရာယ်ရှိသော အမှိုက် (ခဲအခြေခံထားသည့်သုတ်ဆေး၊ ပြဒါး၊ ချွန်ထက်သော အစိုင်အခဲများနှင့် အဆောက်အအုံအတွင်းတွင် ကြွင်းကျန်သည့် ဓာတုပစ္စည်းများ) ကို ထွက်ရှိရာနေရာတွင် ခွဲခြားခြင်း။ • အလုပ်သမားများအား အန္တရာယ်ရှိအမှိုက်များ ခွဲခြားခြင်းနှင့် ကိုင်တွယ်ခြင်းဆိုင်ရာ သင်တန်းများ ပို့ချခြင်း။ • အမှိုက်များအား စွန့်ပစ်ရာတွင် မြို့နယ်စည်ပင်သာယာရေး (သို့မဟုတ်) လိုင်စင်ရရှိပြီး အမှိုက်စီမံခန့်ခွဲမှုကုမ္ပဏီနှင့် ချိတ်ဆက်၍ စွန့်ပစ်ခြင်း။ • အမှိုက်များ စုဆောင်းခြင်း၊ ခွဲခြားခြင်းနှင့် စွန့်ပစ်ခြင်းတို့ ဆောင်ရွက်ရာတွင် သင့်လျော်သော တစ်ကိုယ်ရည်အကာအကွယ်သုံးပစ္စည်းများနှင့် အထောက်အကူပြု ပစ္စည်းများကို အသုံးပြုခြင်း။	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် ၏ HAGL ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၅၀၀,၀၀၀
၆.	ယာဉ်လမ်းကြောင်း ပိတ်ဆို့ခြင်း • ယာဉ်ကြီးများ တိုးပွားလာခြင်း။	• ယာဉ်ကြီးများဝင်ထွက်မှုပြု သတိပေးဆိုင်းဘုတ်များ ထားရှိခြင်းနှင့် စီမံကိန်းဧရိယာဝန်းကျင်တွင် အရှိန်သတ်မှတ်ထားရှိခြင်း။ • သတ်မှတ်ထားသည့်ယာဉ်အရှိန်ကို စီမံကိန်း၏ ယာဉ်မောင်းသူများအား လိုက်နာစေခြင်း။ • ဖြိုဖျက်ခြင်းလုပ်ငန်းစဉ်များအား လမ်းဧရိယာအတွင်းမှ လုပ်ကိုင်ခြင်း မပြုရန်နှင့် သတ်မှတ်ထားသည့် မော်တော်ယာဉ်ကန့်သတ်ချက်များနှင့် ယာဉ်လမ်းမကြီးဆိုင်ရာ သတ်မှတ်ချက်များအား လိုက်နာဆောင်ရွက်ခြင်း။ • စီမံကိန်း၏ မော်တော်ယာဉ်များအား ကောင်းမွန်စွာ လုပ်ဆောင်နိုင်ရန်အတွက် လိုအပ် သည့် ပြုပြင်ထိန်းသိမ်းခြင်းများ ဆောင်ရွက်ခြင်း။	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် ၏ HAGL ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၀၀၀,၀၀၀

စဉ်	ဖြစ်နိုင်ဖွယ်ရှိသော သက်ရောက်မှု အကဲဖြတ်ခြင်း	လျော့နည်းစေရေးလုပ်ငန်းများ	တာဝန်ရှိအဖွဲ့အစည်း	နှစ်စဉ်ကုန်ကျစရိတ် (MMK)
၇.	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး • လုပ်ငန်းခွင် မတော်တဆဖြစ်ပွားမှုများ (ထိခိုက်ဒဏ်ရာများနှင့် ကူးစက်ရောဂါများ)	• စက်ယန္တရားပစ္စည်းများနှင့် အရေးပေါ်ကိရိယာများအား ကိုင်တွယ်အသုံးပြုနိုင်ရန်အလို့ငှာ လုပ်ငန်းခွင်ဘေးအန္တရာယ်ကင်းရှင်းရေး သင်တန်းများ ပြုလုပ်ပေးခြင်း။ • ဖြစ်နိုင်ချေရှိသော အန္တရာယ်များ (ဥပမာ-ရွှေ့လျားနိုင်သော စက်ပစ္စည်း အစိတ်အပိုင်း) များအား အသိပေးဆိုင်းဘုတ်ထားရှိခြင်း။ • အလုပ်သမားများအား စက်ပစ္စည်းများမှ ဖြစ်ပေါ်နိုင်သော ထိခိုက်မှုများနှင့် ပတ်သက်၍ အသိပညာပေးခြင်းနှင့် ပစ္စည်းကိရိယာများ အသုံးပြုမှုနှင့် ပတ်သက်၍ လုံလောက်သော သင်တန်းများ ပို့ချပေးခြင်း။ • အလုပ်သမားများအား တစ်ကိုယ်ရည်သုံးအကာအကွယ်ပစ္စည်းများအား လုံလောက်စွာ ထောက်ပံ့ပေးခြင်းနှင့် ၎င်းထောက်ပံ့ပေးမှုအား လစ်ဟာမှုမရှိစေရန် စောင့်ကြပ်ကြည့်ရှု စစ်ဆေးခြင်း။ • စီမံကိန်းဧရိယာအတွင်း လူအဝင်အထွက်အား ကန့်သတ်နိုင်ရန်အလို့ငှာ လုံခြုံရေးများ ထားရှိခြင်း။ • မီးသတ်ပစ္စည်းများအား လွယ်ကူသွားလာနိုင်သည့်နေရာများတွင် ထားရှိခြင်း နှင့် အလုပ်သမားများအား ၎င်းတို့ကိုအသုံးပြုနိုင်ရန်အလို့ငှာ ကောင်းမွန်စွာ လေ့ကျင့်ပေးခြင်းနှင့် ပုံမှန်ပြုပြင်ထိန်းသိမ်းခြင်း။ • ထိခိုက်နိုင်ချေရှိသော ဓာတုပစ္စည်းများနှင့် အရာဝတ္ထုများအား ၎င်းတို့၏ ထိခိုက်နိုင်မှုအလိုက် အသိပေးစာများ ချိတ်ဆွဲထားရှိခြင်း။ • မီးဘေးအန္တရာယ်ကာကွယ်ရေးနှင့် အရေးပေါ်စုရပ်အမှတ်များအား လုံလောက်စွာ ထားရှိ၍ အများပြည်သူသိရှိစေရန်အသိပေးစာများ ထားရှိခြင်း • ဘေးအန္တရာယ်များနှင့်ပတ်သက်၍ အရေးပေါ်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ ချမှတ်ခြင်းနှင့် အလုပ်သမားများအား ၎င်းလုပ်ထုံးလုပ်နည်းများကို လိုက်နာစေရန် ကြပ်မတ်ခြင်း/ အရေးပေါ်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများကို ပုံမှန်ဇာတ်တိုက် လေ့ကျင့်ခြင်း။	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် ၏ HAGL လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းမှုအဖွဲ့	၃,၀၀၀,၀၀၀

၇.၂. စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်

စီမံကိန်းတည်ဆောက်စဉ်၊ ပိတ်သိမ်းစဉ်နှင့် လည်ပတ်စဉ်အတွက် ရေးဆွဲထားသော စောင့်ကြပ်ကြည့်ရှုရေး အစီရင်ခံစာအား ဇယား ၂၁၊ ၂၂ နှင့် ၂၃ တွင် အသီးသီး ဖော်ပြထားပါသည်။

ဇယား ၂၁ စီမံကိန်း တည်ဆောက်စဉ်ကာလအတွင်း ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်များ

စဉ်	စောင့်ကြပ်ကြည့်ရှုမည့်အရာ	ပါရာမီတာ	နေရာ	ကိုဩဒိနိတ်အမှတ်	အကြိမ်အရေ	တာဝန်ယူမည့်အဖွဲ့	Annual Estimated Cost (MMK)
၁.	လေအရည်အသွေး	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC	A1, စီမံကိန်းတည် နေရာ	၁၆°၄၉'၃၅.၄၃"N ၉၆° ၉'၂၂.၁၇"E	တည်ဆောက်စဉ် တစ်ကြိမ်	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၅,၀၀၀,၀၀၀
			A2, မင်္ဂလာဧယျံ ကျောင်းတိုက်	၁၆°၄၉'၅၀.၅၉"N ၉၆° ၉'၃၇.၀၇"E			
			A3, နိဗ္ဗာန်ကျောင်းတိုက်	၁၆°၄၉'၂၀.၀၀"N ၉၆° ၉'၄၄.၆၇"E			
			A4, မိုးညှင်းဝိပဿနာ ဘုန်းတော်ကျောင်း	၁၆°၄၈'၂၆.၉၆"N ၉၆° ၈'၅၅.၀၀"E			
			A5 လူနေဧရိယာ	၁၆°၄၉'၃၃.၅၆"N ၉၆°၁၀'၄၆.၉၄"E			
၂.	ရေအရည်အသွေး	pH, BOD, COD, TSS, DO, Pb, NH_4^+-N	W1, ကျိုးဖြူရေလှောင်ကန်	၁၆°၄၉'၃၇.၃၁"N ၉၆°၉'၁၉.၆၈" E	တည်ဆောက်စဉ် တစ်ကြိမ်	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၀၀၀,၀၀၀
		pH, TDS, TSS, Chloride, DO, Sulfate, BOD, COD, Phosphate, Pb, Hg, Cr 6, Total	W2, စွန့်ပစ်ရေ	၁၆° ၄၉' ၃၃.၁၂" N ၉၆°၉'၂၀.၀၄" E			

စဉ်	စောင့်ကြပ်ကြည့်ရှုမည့်အရာ	ပါရာမီတာ	နေရာ	ကိုဩဒိနိတ်အမှတ်	အကြိမ်အရေ	တာဝန်ယူမည့်အဖွဲ့	Annual Estimated Cost (MMK)
		Nitrogen, Oil and grease					
၃.	ဆူညံသံ	နေ့အချိန်နှင့် ညအချိန် ဆူညံသံ	N1, စီမံကိန်း တည်နေရာ	၁၆°၄၉'၃၅.၄၃"N ၉၆° ၉'၂၂.၁၇"E	Once in Construction Phase	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၁,၅၀၀,၀၀၀
			N2, မင်္ဂလာဇေယျံ ကျောင်းတိုက်	၁၆°၄၉'၅၀.၅၉"N ၉၆° ၉'၃၇.၀၇"E			
			N3, နိဗ္ဗာန်ကျောင်းတိုက်	၁၆°၄၉'၂၀.၀၀"N ၉၆° ၉'၄၄.၆၇"E			
			N4, မိုးညှင်းဝိပဿနာ ဘုန်းတော်ကျောင်း	၁၆°၄၈'၂၆.၉၆"N ၉၆° ၈'၅၅.၀၀"E			
			N5, လူနေဇရိယာ	၁၆°၄၉'၃၃.၅၆"N ၉၆°၁၀'၄၆.၉၄"E			
၄.	တုန်ခါမှု	Peak particle velocity	V1, စီမံကိန်း တည်နေရာ	၁၆°၄၉'၃၅.၄၃"N ၉၆° ၉'၂၂.၁၇"E	Once in Construction Phase	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၅၀၀,၀၀၀
			V2, မင်္ဂလာဇေယျံ ကျောင်းတိုက်	၁၆°၄၉'၅၀.၅၉"N ၉၆° ၉'၃၇.၀၇"E			
			V3, နိဗ္ဗာန်ကျောင်းတိုက်	၁၆°၄၉'၂၀.၀၀"N ၉၆° ၉'၄၄.၆၇"E			
			V4, မိုးညှင်းဝိပဿနာ ဘုန်းတော်ကျောင်း	၁၆°၄၈'၂၆.၉၆"N ၉၆° ၈'၅၅.၀၀"E			
			V5, လူနေဇရိယာ	၁၆°၄၉'၃၃.၅၆"N ၉၆°၁၀'၄၆.၉၄"E			

စဉ်	စောင့်ကြပ်ကြည့်ရှုမည့်အရာ	ပါရာမီတာ	နေရာ	ကိုးကားနိုင်တဲ့အမှတ်	အကြိမ်အရေ	တာဝန်ယူမည့်အဖွဲ့	Annual Estimated Cost (MMK)
၅.	အန္တရာယ်မရှိ အမှိုက်	အမှိုက်ပမာဏနှင့် အမျိုးအစား စွန့်ပစ်မှုပုံစံ	အမှိုက်ပုံးများ၊ ယာယီအမှိုက်သိုလှောင်ကန်နှင့် စီမံကိန်းဧရိယာအတွင်း		အပတ်စဉ်	တည်ဆောက်ရေးကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၅၀၀,၀၀၀
၆.	အန္တရာယ်ရှိအမှိုက်	အမှိုက်ပမာဏနှင့် အမျိုးအစား စွန့်ပစ်မှုပုံစံ	အမှိုက်ပုံးများ၊ ယာယီအမှိုက်သိုလှောင်ကန်နှင့် စီမံကိန်းဧရိယာအတွင်း		အပတ်စဉ်	တည်ဆောက်ရေးကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၅၀၀,၀၀၀
၇.	ယာဉ်ကြော အခြေအနေ	ယာဉ်ကြီးအရေအတွက် တိုးပွားလာခြင်း ယာဉ်လမ်းကြော အခြေအနေ	အဓိက သယ်ယူပို့ဆောင်ရေးလမ်းမနှင့် စီမံကိန်းဧရိယာဝန်းကျင်		အပတ်စဉ်	တည်ဆောက်ရေးကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၁,၅၀၀,၀၀၀
၈.	လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် လုံခြုံရေး	စက်ရုံနှင့် ပတ်သက်သည့် မတော်တဆမှုကိစ္စများ စက်ရုံရှိ ကျန်းမာရေး အခြေအနေ လုပ်သမားများ၏ နာမကျန်းဖြစ်ပွားမှု	စီမံကိန်းဧရိယာအတွင်း		အပတ်စဉ်	တည်ဆောက်ရေးကန်ထရိုက်တာနှင့် HAGL ၏ လုပ်ငန်းခွင် ဘေးအန္တရာယ်ကင်းရှင်းမှုအဖွဲ့	၂,၀၀၀,၀၀၀

ဇယား ၂၂ စီမံကိန်းလည်ပတ်စဉ် ကာလအတွင်း ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်များ

စဉ်	စောင့်ကြပ်ကြည့်ရှုမည့်အရာ	ပါရာမီတာ	နေရာ	ကိုဩဒိနိတ်အမှတ်	အကြိမ်အရေ	တာဝန်ယူမည့်အဖွဲ့	Annual Estimated Cost (MMK)
၁.	လေအရည်အသွေး	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC	A1, စီမံကိန်း တည်နေရာ	၁၆°၄၉'၃၅.၄၃"N ၉၆° ၉'၂၂.၁၇"E	ခြောက်လလျှင် တစ်ကြိမ်	HAGL၏ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအဖွဲ့	၆,၀၀၀,၀၀၀
			A2, မင်္ဂလာဧယျှိ ကျောင်း တိုက်	၁၆°၄၉'၅၀.၅၉"N ၉၆° ၉'၃၇.၀၇"E			
			A3, နိဗ္ဗာန်ကျောင်းတိုက်	၁၆°၄၉'၂၀.၀၀"N ၉၆° ၉'၄၄.၆၇"E			
၂.	ရေအရည်အသွေး	pH, Temperature, TDS, Conductivity, Salinity	W1, ကျိုးဖြူရေလှောင်ကန်	၁၆°၄၉'၃၆.၉၉"N ၉၆°၉'၂၅.၇၉" E	ခြောက်လလျှင် တစ်ကြိမ်	HAGL၏ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအဖွဲ့	၄,၀၀၀,၀၀၀
		pH, Temperature, TDS, Conductivity, Salinity, BOD, COD, Phosphate, Hg, Cr 6, Pb, Total Nitrogen, Oil and grease	W2, စွန့်ပစ်ရေ	၁၆° ၄၉' ၃၆.၉၉" N ၉၆° ၉' ၂၁.၅" E			
၃.	ဆူညံသံ	နေ့အချိန်နှင့် ညအချိန် ဆူညံသံ	N1, စီမံကိန်း တည်နေရာ	၁၆°၄၉'၃၅.၄၃"N ၉၆° ၉'၂၂.၁၇"E	ခြောက်လလျှင် တစ်ကြိမ်	တည်ဆောက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၁,၈၀၀,၀၀၀
			N2, မင်္ဂလာဧယျှိ ကျောင်းတိုက်	၁၆°၄၉'၅၀.၅၉"N ၉၆° ၉'၃၇.၀၇"E			
			N3, နိဗ္ဗာန်ကျောင်းတိုက်	၁၆°၄၉'၂၀.၀၀"N ၉၆° ၉'၄၄.၆၇"E			
၄.	တုန်ခါမှု	Peak particle velocity	V1, စီမံကိန်း တည်နေရာ	၁၆°၄၉'၃၅.၄၃"N ၉၆° ၉'၂၂.၁၇"E	ခြောက်လလျှင် တစ်ကြိမ်	HAGL၏ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအဖွဲ့	၃,၀၀၀,၀၀၀
			V2, မင်္ဂလာဧယျှိ ကျောင်း တိုက်	၁၆°၄၉'၅၀.၅၉"N ၉၆° ၉'၃၇.၀၇"E			

စဉ်	စောင့်ကြပ်ကြည့်ရှုမည့်အရာ	ပါရာမီတာ	နေရာ	ကိုဩဒိနိတ်အမှတ်	အကြိမ်အရေ	တာဝန်ယူမည့်အဖွဲ့	Annual Estimated Cost (MMK)
			V3, နိဗ္ဗာန်ကျောင်းတိုက်	၁၆°၄၉'၂၀.၀၀"N ၉၆° ၉'၄၄.၆၇"E			
၅.	အန္တရာယ်မရှိ အမှိုက်	အမှိုက်ပမာဏနှင့် အမျိုးအစား စွန့်ပစ်မှုပုံစံ	အမှိုက်ပုံးများ၊ ယာယီအမှိုက်သိုလှောင်ကန်နှင့် စီမံကိန်းဧရိယာအတွင်း		အပတ်စဉ်	HAGL ၏ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအဖွဲ့	၂၀၀,၀၀၀
၆.	အန္တရာယ်ရှိအမှိုက်	အမှိုက်ပမာဏနှင့် အမျိုးအစား စွန့်ပစ်မှုပုံစံ	အမှိုက်ပုံးများ၊ ယာယီအမှိုက်သိုလှောင်ကန်နှင့် စီမံကိန်းဧရိယာအတွင်း		အပတ်စဉ်	HAGL၏ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအဖွဲ့	၃၀၀,၀၀၀
၇.	ယာဉ်ကြော အခြေအနေ	ယာဉ်ကြီးအရေအတွက် တိုးပွားလာခြင်း ယာဉ်လမ်းကြော အခြေအနေ	အဓိက သယ်ယူပို့ဆောင်ရေးလမ်းမနှင့် စီမံကိန်းဧရိယာ ဝန်းကျင်		အပတ်စဉ်	HAGL၏ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအဖွဲ့	၃၀၀,၀၀၀
၈.	လုပ်ငန်းခွင်ကျန်းမာရေး နှင့် လုံခြုံရေး	စက်ရုံနှင့် ပတ်သက်သည့် မတော်တဆမှုကိစ္စများ စက်ရုံရှိ ကျန်းမာရေး အခြေအနေ လုပ်သမားများ၏ နာမကျန်းဖြစ်ပွားမှု	စီမံကိန်းဧရိယာအတွင်း		အပတ်စဉ်	HAGL၏ လုပ်ငန်းခွင် ဘေးအန္တရာယ် ကင်းရှင်းမှုအဖွဲ့	၅၀၀,၀၀၀

ဇယား ၂၃ စီမံကိန်း ဖျက်သိမ်းစဉ် ကာလအတွင်း ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်များ

စဉ်	စောင့်ကြပ်ကြည့်ရှုမည့်အရာ	ပါရာမီတာ	နေရာ	ကိုဩဒိနိတ်အမှတ်	အကြိမ်အရေ	တာဝန်ယူမည့်အဖွဲ့	Annual Estimated Cost (MMK)
၁.	လေအရည်အသွေး	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC	A1, စီမံကိန်းတည်နေရာ	16°49'35.43"N 96° 9'22.17"E	ဖျက်သိမ်းစဉ် တစ်ကြိမ်	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၅,၀၀၀,၀၀၀
			A2, မင်္ဂလာဧယျှု ကျောင်းတိုက်	၁၆°၄၉'၅၀.၅၉"N ၉၆° ၉'၃၇.၀၇"E			
			A3, နိဗ္ဗာန်ကျောင်းတိုက်	၁၆°၄၉'၂၀.၀၀"N ၉၆° ၉'၄၄.၆၇"E			
			A4, မိုးညှင်းဝိပဿနာ ဘုန်းတော်ကျောင်း	၁၆°၄၈'၂၆.၉၆"N ၉၆° ၈'၅၅.၀၀"E			
			A5 လူနေဧရိယာ	၁၆°၄၉'၃၃.၅၆"N ၉၆°၁၀'၄၆.၉၄"E			
၂.	ရေအရည်အသွေး	pH, Temperature, TDS, Conductivity, Salinity	W1, ဂျိုးဖြူရေလှောင်ကန်	၁၆°၄၉'၃၆.၉၉"N ၉၆°၉'၂၅.၇၉" E	ဖျက်သိမ်းစဉ် တစ်ကြိမ်	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၀၀၀,၀၀၀
		pH, Temperature, TDS, Conductivity, Salinity, BOD, COD, Phosphate, Hg, Cr 6, Pb, Total Nitrogen, Oil and grease	W2, စွန့်ပစ်ရေ	၁၆° ၄၉' ၃၆.၉၉" N ၉၆° ၉' ၂၁.၅" E			
၃.	ဆူညံသံ	နေ့အချိန်နှင့် ညအချိန် ဆူညံသံ	N1, စီမံကိန်းတည်နေရာ	၁၆°၄၉'၃၅.၄၃"N ၉၆° ၉'၂၂.၁၇"E	ဖျက်သိမ်းစဉ် တစ်ကြိမ်	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၁,၅၀၀,၀၀၀
			N2, မင်္ဂလာဧယျှု ကျောင်းတိုက်	၁၆°၄၉'၅၀.၅၉"N ၉၆° ၉'၃၇.၀၇"E			

စဉ်	စောင့်ကြပ်ကြည့်ရှုမည့်အရာ	ပါရာမီတာ	နေရာ	ကိုဩဒိနိတ်အမှတ်	အကြိမ်အရေ	တာဝန်ယူမည့်အဖွဲ့	Annual Estimated Cost (MMK)
			N3, နိဗ္ဗာန်ကျောင်းတိုက်	၁၆°၄၉'၂၀.၀၀"N ၉၆° ၉'၄၄.၆၇"E			
			N4, မိုးညှင်းဝိပဿနာဘုန်းတော်ကျောင်း	၁၆°၄၈'၂၆.၉၆"N ၉၆° ၈'၅၅.၀၀"E			
			N5, လူနေဧရိယာ	၁၆°၄၉'၃၃.၅၆"N ၉၆°၁၀'၄၆.၉၄"E			
၄.	တုန်ခါမှု	Peak particle velocity	V1, စီမံကိန်းတည်နေရာ	၁၆°၄၉'၃၅.၄၃"N ၉၆° ၉'၂၂.၁၇"E	ဖျက်သိမ်းစဉ် တစ်ကြိမ်	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၅၀၀,၀၀၀
			V2, မင်္ဂလာဧယျံ ကျောင်းတိုက်	၁၆°၄၉'၅၀.၅၉"N ၉၆° ၉'၃၇.၀၇"E			
			V3, နိဗ္ဗာန်ကျောင်းတိုက်	၁၆°၄၉'၂၀.၀၀"N ၉၆° ၉'၄၄.၆၇"E			
			V4, မိုးညှင်းဝိပဿနာဘုန်းတော်ကျောင်း	၁၆°၄၈'၂၆.၉၆"N ၉၆° ၈'၅၅.၀၀"E			
			V5, လူနေဧရိယာ	၁၆°၄၉'၃၃.၅၆"N ၉၆°၁၀'၄၆.၉၄"E			
၅.	အန္တရာယ်မရှိ အမှိုက်	အမှိုက်ပမာဏနှင့် အမျိုးအစား	အမှိုက်ပုံးများ၊ ယာယီအမှိုက်သိုလှောင်ကန်နှင့် စီမံကိန်းဧရိယာအတွင်း		အပတ်စဉ်	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၅၀၀,၀၀၀
		စွန့်ပစ်မှုပုံစံ					
၆.	အန္တရာယ်ရှိအမှိုက်	အမှိုက်ပမာဏနှင့် အမျိုးအစား	အမှိုက်ပုံးများ၊ ယာယီအမှိုက်သိုလှောင်ကန်နှင့် စီမံကိန်းဧရိယာအတွင်း		အပတ်စဉ်	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၂,၅၀၀,၀၀၀
		စွန့်ပစ်မှုပုံစံ					

စဉ်	စောင့်ကြပ်ကြည့်ရှုမည့်အရာ	ပါရာမီတာ	နေရာ	ကိုးကားဒိုနိတ်အမှတ်	အကြိမ်အရေ	တာဝန်ယူမည့်အဖွဲ့	Annual Estimated Cost (MMK)
၇.	ယာဉ်ကြော အခြေအနေ	ယာဉ်ကြီးအရေအတွက် တိုးပွားလာခြင်း ယာဉ်လမ်းကြော အခြေအနေ	အဓိက သယ်ယူပို့ဆောင်ရေးလမ်းမနှင့် စီမံကိန်းဧရိယာ ဝန်းကျင်		အပတ်စဉ်	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအဖွဲ့	၁,၅၀၀,၀၀၀
၈.	လုပ်ငန်းခွင်ကျန်းမာရေး နှင့် လုံခြုံရေး	စက်ရုံနှင့် ပတ်သက်သည့် မတော်တဆမှုကိစ္စများ စက်ရုံရှိ ကျန်းမာရေး အခြေအနေ လုပ်သမားများ၏ နာမကျန်းဖြစ်ပွားမှု	စီမံကိန်းဧရိယာအတွင်း		အပတ်စဉ်	ဖြိုဖျက်ရေး ကန်ထရိုက်တာနှင့် HAGL ၏ လုပ်ငန်းခွင် ဘေးအန္တရာယ် ကင်းရှင်းမှုအဖွဲ့	၂,၀၀၀,၀၀၀

၈. အများပြည်သူလူထုနှင့် တွေ့ဆုံဆွေးနွေးတိုင်ပင်ခြင်း။

HAGL Myanamar Co. Ltd ၏ HAGL Myanmar Centre စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေး စီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့် အစီရင်ခံစာအတွက် အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အခမ်းအနားကို ဒီဇင်ဘာလ ၂၃ ရက် ၂၀၂၅ခုနှစ်တွင် Myanmar Centre ရှိ ၁၀ထပ်တွင် မနက် ၁၀ နာရီမှ ၁၂ နာရီအထိ ကျင်းပပြုလုပ် ခဲ့ပါသည်။ ထို လူထုတွေ့ဆုံပွဲသို့ ရန်ကုန်တိုင်း ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာနမှလည်းကောင်း၊ ပြည့်သူ့ကျန်းမာရေးဌာန၊ စမ်းချောင်းမြို့နယ် မီးသတ်ဌာန၊ စက်မှုကြီးကြပ်ရေးနှင့် စစ်ဆေးရေးဦးစီးဌာနတို့အပြင် ဖိတ်ကြားထားသည့် သက်ဆိုင်ရာ ဌာနများမှ အသီးသီးတက်ရောက်ခဲ့ပြီး အနီးဝန်းကျင်မှ ဒေသခံများလည်း ပူးပေါင်းတက်ရောက်ခဲ့ပါသည်။ ၎င်းအစီအစဉ်သို့ တက်ရောက်လာသည့် ဌာနဆိုင်ရာ၊ ဒေသခံများ၊ အစီရင်ခံစာဆိုင်ရာ ရှင်းလင်းတင်ပြချက်များနှင့် အကြံပြုချက်ဆွေးနွေးများကို အခန်း ၈ တွင် မှတ်တမ်းဓာတ်ပုံများနှင့်တကွ အသေးစိတ် ဖော်ပြထားပါသည်။

၉. နိဂုံးချုပ်နှင့် အကြံပြုခြင်း

၉.၁. နိဂုံးချုပ်

ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာသည် အဆိုပြုစီမံကိန်း၏ တည်ဆောက်စဉ်၊ လုပ်ငန်းလည်ပတ်စဉ်နှင့် ပိတ်သိမ်းစဉ်ကာလများတွင် ဖြစ်ပေါ်နိုင်သော ပတ်ဝန်းကျင်၊ လူမှုရေးနှင့် ကျန်းမာရေးဆိုင်ရာ သက်ရောက်မှုများကို အကဲဖြတ်ဆန်းစစ်ခြင်းများ ဆောင်ရွက်ထားပါသည်။ လေ့လာချက်များကို စီမံကိန်းအကြောင်းအရာ၊ သက်ဆိုင်ရာ အရင်းအမြစ်မျိုးစုံမှ သတင်းအချက်အလက်များ၊ စီမံကိန်းဧရိယာရှိ ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားဆိုင်ရာ ကွင်းဆင်းဖော်ပြချက်များ၊ စီမံကိန်းအတွင်းနှင့် အနီးနားရှိ အစိုးရကဏ္ဍများနှင့် အဖွဲ့အစည်းများတွင် ပါဝင်သော ဆက်စပ်ပတ်သက်သူများနှင့် ဆွေးနွေးတင်ပြချက်များနှင့် အဆိုပြုစီမံကိန်းနှင့် ပတ်သက်သော ပတ်ဝန်းကျင်နှင့် နည်းပညာဆိုင်ရာ အတွေ့အကြုံရှိသော အကြံပေးပုဂ္ဂိုလ်များအပေါ် အခြေခံ၍ ပြင်ဆင်ရေးဆွဲထားပါသည်။ ရရှိလာသော လေ့လာချက်များအရ အဓိကကျသော အကြောင်းအရာများကို အခန်းလိုက်အကျဉ်းချုပ်ကို အခန်း ၉ အပိုဒ်ခွဲ ၉.၃ တွင် သေးစိတ်ဖော်ပြ ထားပါသည်။

၉.၂. အကြံပြုချက်များ

ဤပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းလေ့လာခြင်းသည် ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ပြဿနာများ၊ လျှော့ချရေးနည်းလမ်းများနှင့် စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်များကို ရှင်းလင်းစွာ ဖော်ပြထားပါသည်။ စီမံကိန်းအဆိုပြုသူသည် ဤအစီရင်ခံစာတွင် ဖော်ပြထားသော လျှော့ချရေးအစီအစဉ်များ၊ စီမံခန့်ခွဲမှုအစီအစဉ်များနှင့် စောင့်ကြပ်ကြည့်ရှုရေးအစီအစဉ်များအားလုံးကို အကောင်အထည်ဖော် ဆောင်ရွက်ရမည်ဖြစ်သည်။ ထို့အပြင် စီမံကိန်းအကောင်အထည် ဖော်ဆောင်သူသည် ပတ်ဝန်းကျင်ဆိုင်ရာ လမ်းညွှန်ချက်များ၊ ဥပဒေအတိုင်း ရေးဆွဲရန်လိုအပ်သော လျှော့ချရေးနည်းလမ်း ဆောင်ရွက်ခြင်းနှင့် အခြားသော သက်ဆိုင်ရာ လိုအပ်ချက်များကို အစဉ်မပြတ်လိုက်နာရမည်ဖြစ်သည်။ အသေးစိတ် အကြံပြုချက်များကို အခန်း ၉ အပိုဒ်ခွဲ ၉.၄ တွင် သေးစိတ်ဖော်ပြ ထားပါသည်။

EXECUTIVE SUMMARY

1. Context of the Project

Hoang Anh Gia Lai Myanmar Co., Ltd. (HAGL Myanmar) is the single-largest 100% Vietnam invested project in Myanmar and owns the first integrated and international standard, mixed-use development located at No.192 Kabar Aye Pagoda Road, Bahan Township, Yangon. This Environmental and Social Impact Assessment (ESIA) report mainly focuses on the development of Myanmar Centre Project Phase-2: that consists of residential units block B1, B2, and B3, the commercial center and serviced apartment A3 and A4, serviced apartment A1 and A2. The total land area of the project is 37,816.55 square meter. The location of the project site is shown in Figure 1.

The purposes for the development of the project are as follows:

- To join in the economic reform process of the country;
- To offer comfortable life style to Myanmar people;
- To create a brighter future for younger generation;

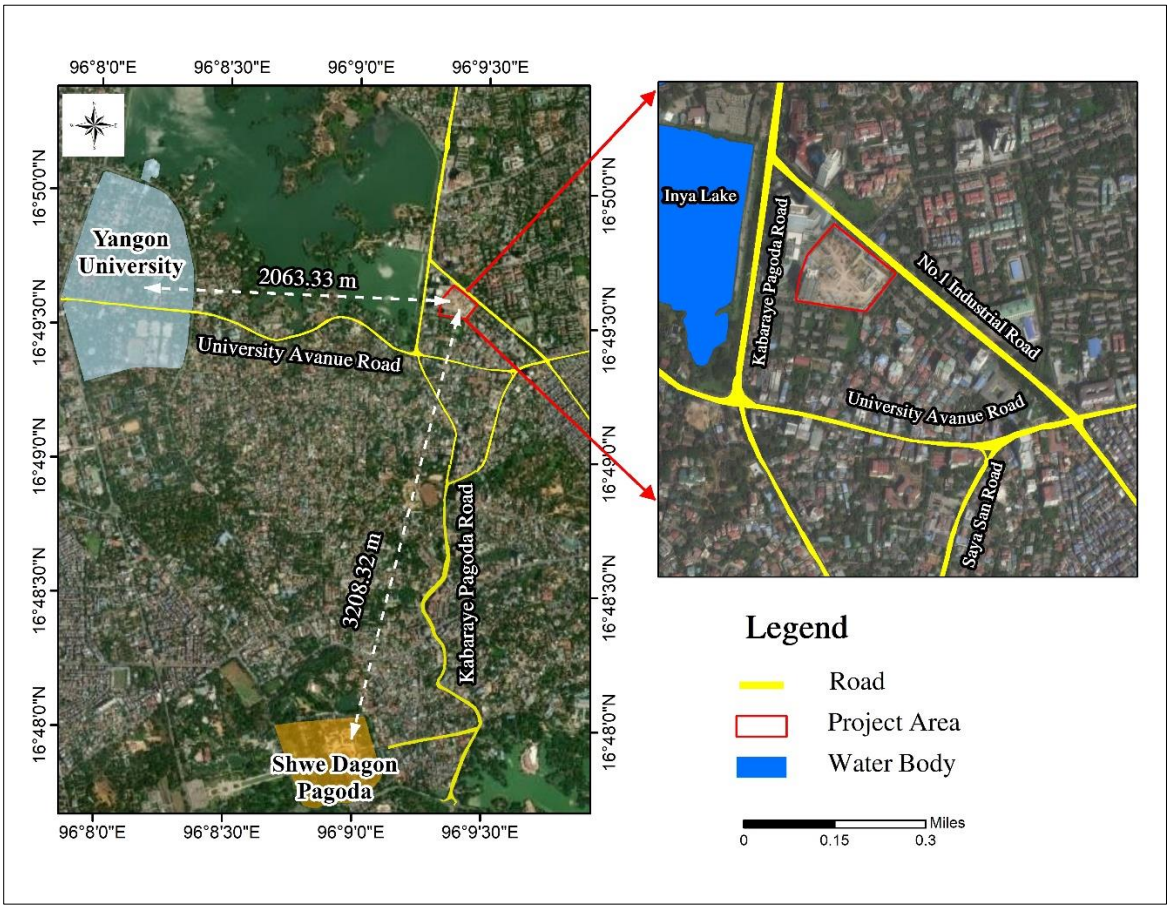


Figure 1 Location Map of the Project Area

1.1. Project Proponent

The contact of the representative of the proponent regarding this ESIA is mentioned in Table 1 and the organization chart of the project proponent is shown in Chapter 1.

Table 1 Contact of Project Proponent

Name	Mr. Nguyen Van Kha
Designation	Director
Address	No. 192, Kabaraye Pagoda Road, Bahan Township, Yangon.
Tel	09-250900244

Table 2 Contact of Project Proponent's Representative

Name	Mr. Ye Myint Aung
Designation	Project Development Executive
Address	No. 192, Corner of Kabaraye Pagoda Road and No.1 Industrial Road, Bahan Township, Yangon.
Tel	09-250900244
e-mail	ye.aung@thiso.vn

2. OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

The activities carried out under the Project are subject to these legal requirements. Summarized relevant laws and regulations for the project are expressed in Table 3. It is sure that the project proponent will comply with all the following laws and regulations.

Table 3 Relevant Myanmar Laws and Regulations

No.	Name of Laws and Regulations	Year
Environmental Conservation		
1.	Environmental Conservation Law	2012
2.	Environmental Conservation Rules	2014
3.	Environmental Impact Assessment Procedure	2015
4.	National Environmental Policy of Myanmar	2019
Pollution Control and Health		
5.	National Environmental Quality (Emission) Guidelines	2015
6.	National Drinking Water Quality Standards	2019
7.	National Surface Water Quality Standards	2024
8.	Public Health Law	1972
9.	The Prevention and Control of Communicable Diseases Law	1995 (amended in 2011)
10.	The Control of Smoking and Consumption of Tobacco Product Law	2006
11.	Occupational Safety and Health Law	2019
12.	National Waste Management Strategy and Master Plan for Myanmar	2018-2030
Biodiversity and Resource Conservation		

No.	Name of Laws and Regulations	Year
13.	Conservation of Biodiversity and Natural Protected Area Law	2018
14.	The Law relating to Aquaculture	1989
15.	Conservation of Water Resources and River Law	2006 (amended in 2017)
16.	Conservation of Water Resources and River Rules	2013
17.	Undergound Water Act	1930
18.	Forest Law	2018
Land Acquisition		
19.	The Land Acquisition Act	1894
20.	Farmland Law	2012
21.	Farmland Rules	2012
22.	Vacant, Fallow and Virgin Land Management Law	2018
23.	Registration of Deeds Law	2019
24.	The Demarcation of Boundaries Law	2019
Urban Development and Management		
25.	Development Committee Law	2013
26.	Yangon City Municipal Law	2018
27.	Myanmar Engineering Council Law	2013
28.	Condominium Law	2016
29.	The Electricity Law	2014
Human Rights		
30.	The Ethnic Rights Protection Law	2015
31.	The Ethnic Rights Protection Rules	2019
32.	Rights of the Persons with Disabilities Law	2015
Cultural Heritages		
33.	The Protection and Preservation of Cultural Heritage Regions Law	2019
34.	The Protection and Preservation Antique Objects Law	2015
35.	The Protection and Preservation of Ancient Monuments Law	2015
Labour		
36.	Labour Organization Law	2011
37.	The Employment and Skill Development Law	2013
38.	The Minimum Wage Law	2013
39.	Payment of Wage Law	2016
40.	Workers' Compensation Act	1923
41.	The Settlement of Labour Dispute Law	2012
42.	Social Security Law	2012, amended in 2020
Motor Vehicles		
43.	The Road Safety and Motor Vehicle Management Law	2020

No.	Name of Laws and Regulations	Year
44.	The Road Safety and Motor Vehicle Management Rules	2022
Fire Management		
45.	The Petroleum and Petroleum Product Law	2017
46.	Myanmar Fire Brigade Law	2015
Company Administration		
47.	Myanmar Insurance Law	1993, amende in 1996
48.	Myanmar Insurance Rules	2017
49.	Myanmar Investment Law	2016, amended in 2019
50.	Myanmar Investment Rules	2017
51.	The Union Tax Law	2019
52.	The Export and Import Law	2012
High-rise Building		
53.	Guidelines for High-Rise Building Construction Projects from Committee for Quality Control of High-Rise Building Construction Projects (CQHP)	-
54.	Myanmar National Building Code	2025
Natural Disaster and Climate Change		
55.	Natural Disaster Management Law	2013
56.	Climate Change Policy	2019
57.	Green Building Chapter in Myanmar National Building Code	2020
58.	Myanmar Climate change strategy and Master Plan (2018-2030)	
Myanmar Government Institutional Framework		
59.	Arrangement at National and Sector Level	
60.	Arrangement at the EIA Report	
International Guidelines and Conventions		
61.	IFC's Standards and Guidelines	
62.	World Bank's Pollution Prevention and Abatement Handbook (1988)	
63.	Vienna Convention for the Protection of the Ozone Layer (1985)	
64.	Montreal Protocol on Substances that Deplete the Ozone Layer (1987)	
65.	Kyoto Protocol	
66.	United Nations Framework Convention on Climate Change (UNFCCC)	

3. PROJECT DESCRIPTION AND ALTERNATIVES

3.1. Location of the Project

The Project site is located at No. 192, Kabaraye Pagoda Road, Bahan Township, Yangon. At the opposite side of the project, Inya Lake is located along the Kabaraye Pagoda Road. The University Avenue Road across Kabaraye Pagoda Road at the south-west side of the project and continues through the No.1 Industrial Road at the south-east side of the project. The location map of the project site is presented in Figure 1.

3.2. Project Alternative

HAGL Myanmar project aims to strengthen the bilateral relationship between the governmets of Vietnam and Myanmar. The project is being implemented by Directorate of Hotels and Tourism, Ministry of Hotels and Tourism, in term of Build-Operate-Transfer (BOT) contract at No. 192, Kabaraye Pagoda Road, Bahan Township. It is a foreign direct investment project which pays for land lease to Myanmar government regularly since 2012.

Looking for the land to accommodate the scale and size of the project and completing official transaction on it may take a long period. In addition, it is not a guarantee that such land would be available. It is also worth noting that the proposed project is already underway in terms of seeking developmental approvals in various government departments.

The project proponent spent long period of time and cost on design and approvals of the plans by the relevant government departments before the stage of implementation. It may also take a long time to get commissions on its designs and process for the project Phase 2. Currently, the construction phase is completed 60 % and the project Phase 1 is being operated. This would also lead to a situation like No Action Alternative.

In consideration of the above concerns and assessment of the current proposed site, relocation is not a viable option.

3.3. Description of Project

3.3.1. Site Description

HAGL Myanmar Project (Phase 2) is developing on a total land plot of 37,816.55 square meter. Currently, Phase 1 is finished and underway in the operation stage, therefore, only Phase 2 will be constructed in the development area. Building coverage ratio for project site is 51.72% of the area. In Figure 2, the master plan for the project demonstrates the area of the land plot, which was used for landscape, substantial green areas, respective buildings, and circulation of routes planned in project sites.

Figure 2 Master Layout Plan of Project (Phase 2)

3.3.2. Compounds Adjacent to Project

The existing land use around 500 meters adjacent to the project site is composed of a mix of residential areas, religious places, hospitals, commercial areas, offices, and schools. Location map of buildings, houses, roads, and offices adjacent to 500 m of the project site is presented in Figure 3. The existing features of compound adjacent areas are also shown in Chapter 3.

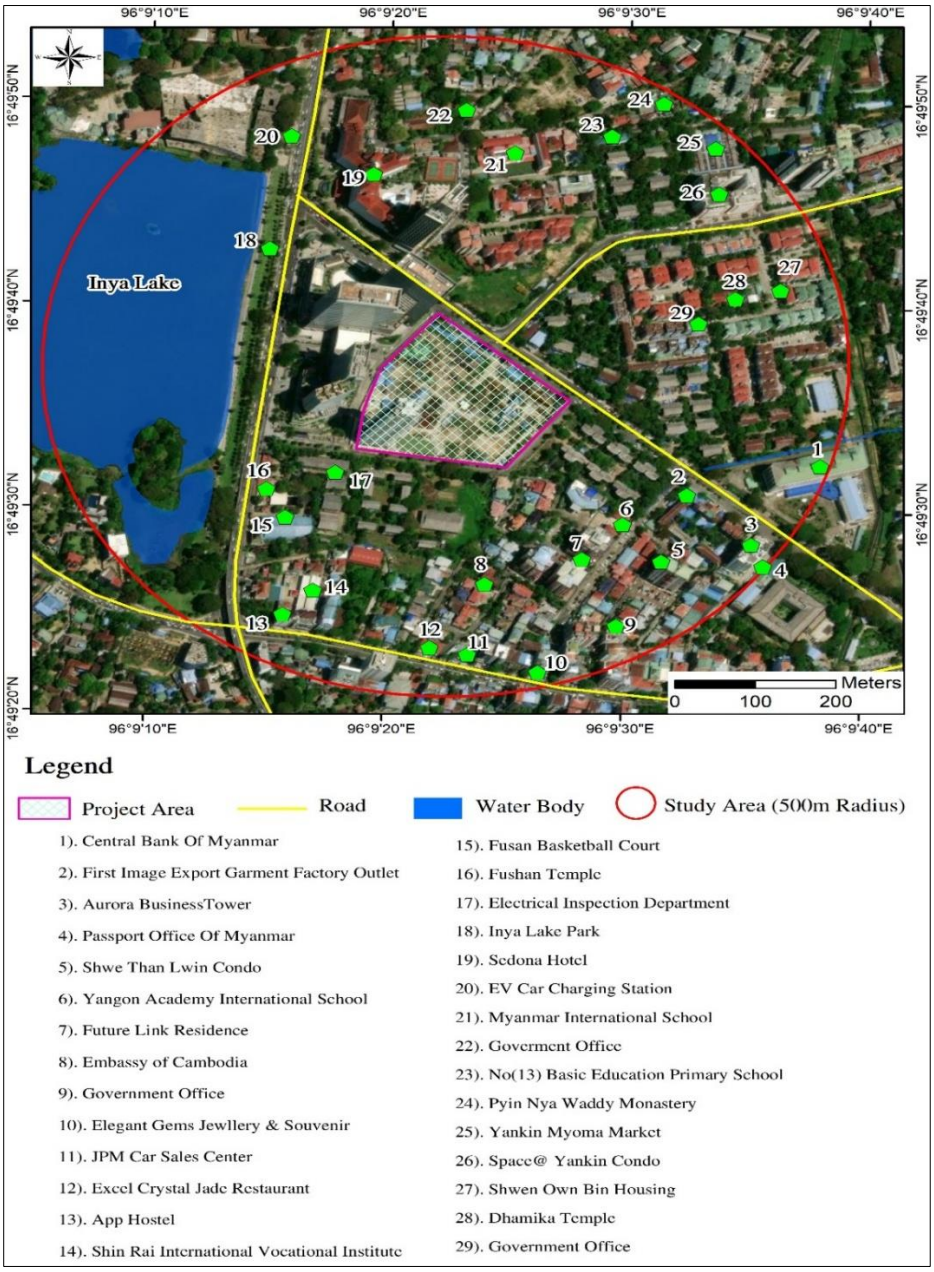


Figure 3 Location of Adjacent Features within 500 m to the Project Site

3.4. Project Components

3.4.1. Type of Building and Function Area

In Phase 2, there are commercial centre, serviced apartment A3, A4, serviced apartment A1, serviced apartment A2, residential apartment B1, residential apartment B2, and residential apartment B3. In Phase 2, there are car parking area in B1 (2 basement floors) and the rest of the Phase 2 consists of 4 basement floors. In addition, 6 stories of the commercial centre No.2 will attach with commercial centre No.1 from Phase 1.

3.5. Infrastructure and Facilities of Condominium

3.5.1. Project Development

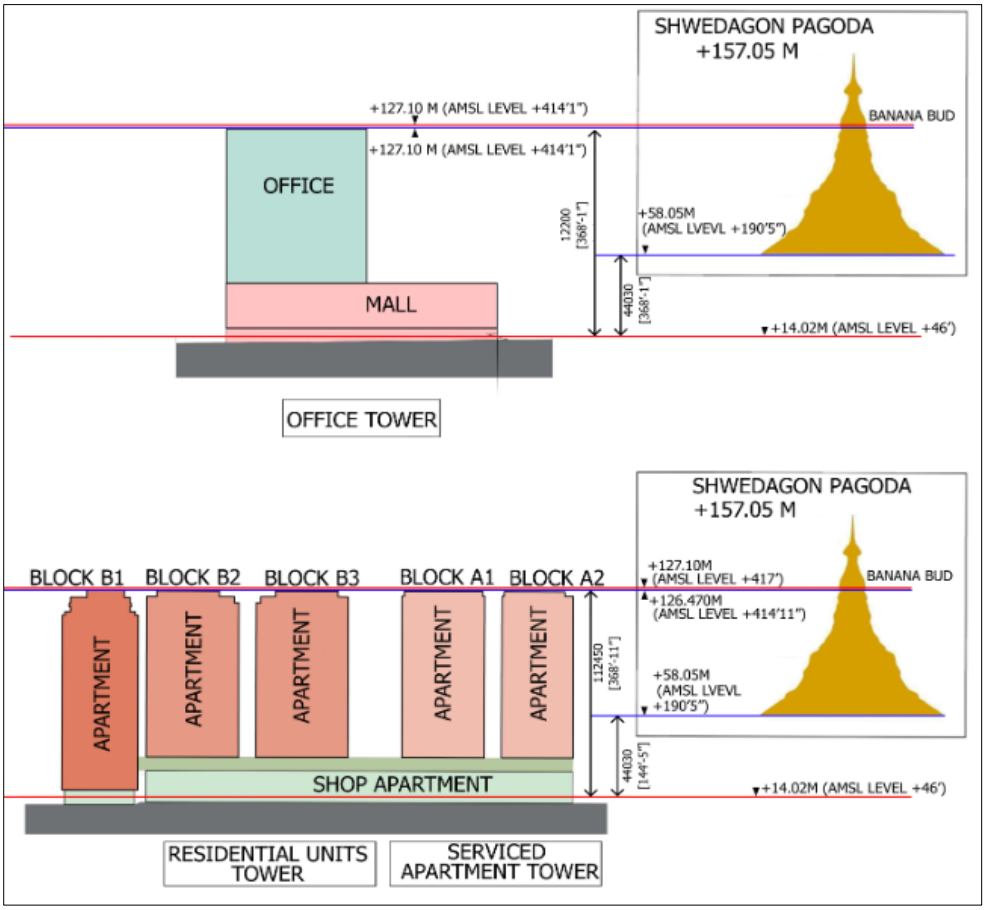
The proposed HAGL Myanmar Centre project phase 2 development consists of low to high-rise residential and commercial building; the proposed usage areas as follows:

- Residential Block (B1) – 33 Storey
- Residential Block (B2, B3) – 30 Storey
- Serviced Apartment (A1, A2) – 30 Storey
- High-Rise Serviced Apartment (A3, A4) and
- Commercial Centre No.2 (30 Storeys)
- Green Area
- Car Parking Lots

3.5.2. Land Use Prescription

The total project site area for Phase 2 is 37,816.55 square meter. Green area over the roof of buildings is 3,736.34square meter whereas the green area outside of buildings is 11,478.52 square meter. Building height for residential and serviced buildings above Mean Sea Level (MSL) is 126.87 meter and above MSL. The detailed information for the land use prescription of the project is shown in Chapter 3.

In addition, all buildings are planned and processing under the Height Restriction Policies of Yangon Region, and the distance between the Shwedagon Pagoda and project site is over 2.8 kilometer. The maximum heights of all proposed buildings are 126.87 meter while that of Shwedagon Pagoda – Lower Banana Bulb is around 127.10 meter. Therefore, it is not expected to cause any visual impact due to this project. Height comparison with Shwedagon Pagoda is shown in Figure 4.



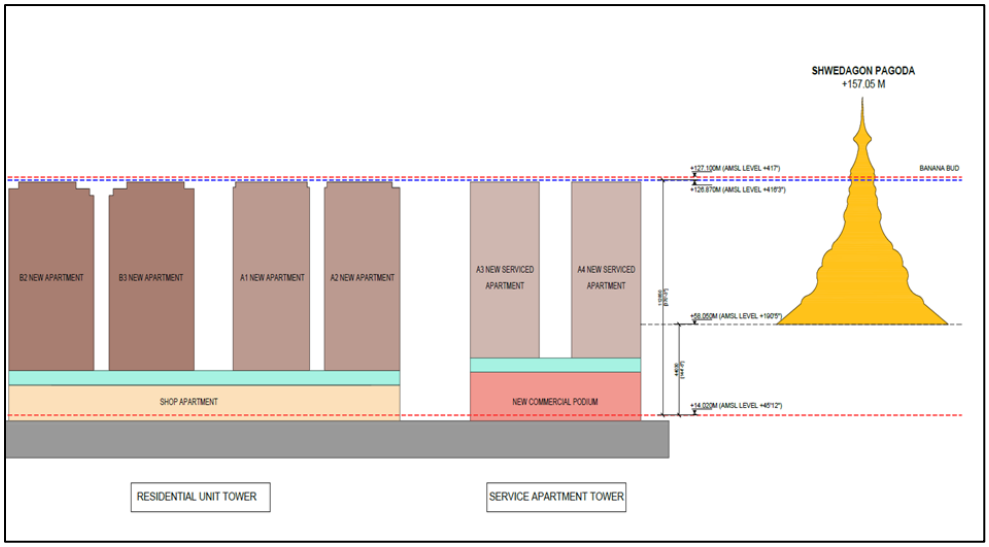


Figure 4 Height Comparison with Shwe Dagon Pagoda

3.5.3. Traffic System

3.5.3.1. Entrance, Exit and Internal Road

The project entails six main entrances into the project area. Two entrances are located on No.1 Industrial Road and mainly aimed for incoming and outgoing of visitor cars to the commercial centre. On the other side of the project, four main entrances are located on the internal road connecting Kabaraye Pagoda Road and No.1 Industrial Road. These three outlets mainly focus on decent entering and exiting of residents and guests. The spare roads also included in the traffic flow plan, so the project area is accessible for both

residents and visitors to readily drop off and pick up. Four basement floors will be constructed for sufficient car parking for the whole area. Relevant traffic flow plan of the project site is shown in Figure 5.

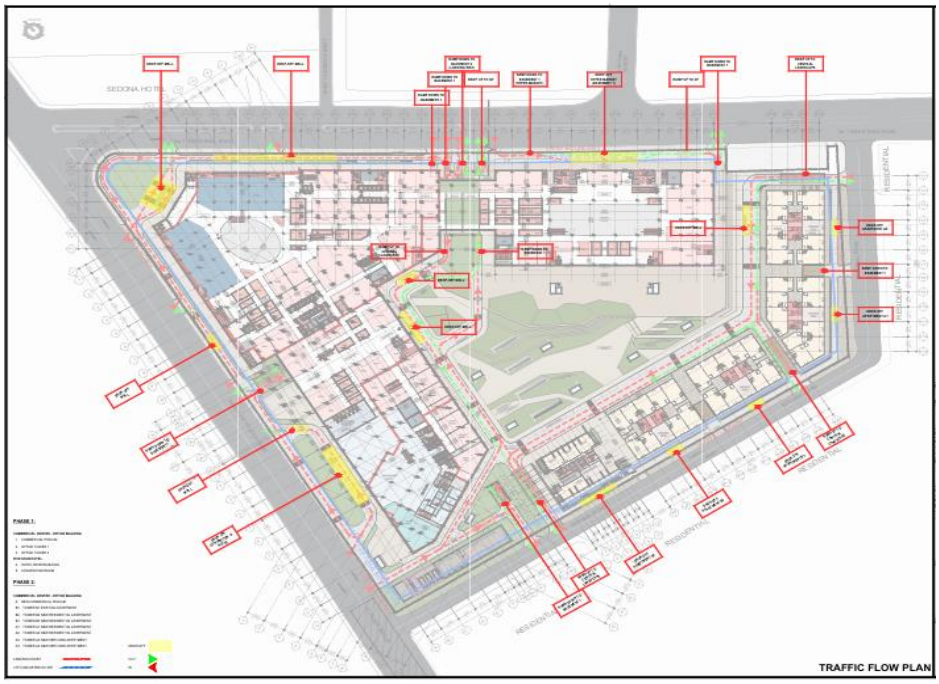


Figure 5 Traffic Flow Plan

3.5.3.2. Parking Lots

Regarding the parking lots, four basement floors of each building in Phase 2 will be constructed for sufficient car parking for the whole area. According to the submission drawing, the calculation results of the total parking lots required for the proposed development project is 2,783 numbers. Total parking lots area is calculated based on building's Net Lettable Area (NLA) complied with YCDC law. Moreover, it is also added additional 20% of parking lots for future developments.

3.5.4. Water Supply System for Domestic Use

3.5.4.1. Water Source

The Phase 2 involves 3 residential buildings, 2 serviced apartments and a commercial centre attaching with 2 serviced apartment. Each of the respective buildings consists of shop apartments, lobby apartments, and a basement car park. Water supply system is mainly provided from Yankin YCDC water supply and all the system will be followed Government Rules and Regulations. Tube wells could not apply in project area as a backup water supply. Water supply system is connected to each building and an immense water storage tank will be providing water supply for the project.

3.5.4.2. Quantity of Water Demand

For Phase 2, 1,875 cubic meter capacity of water tank located at third and fourth basement floors will distribute water to the whole project. The estimated amount of water consumption during the construction phase is from 64 cubic meter per day to 95 cubic meter per day.

The firefighting water tank will be installed at second and fourth basement of serviced apartment-residential units (Phase 2) which capacity is 1,000 cubic meter and the

pipe system from it is mainly connected with YCDC water supply. The details water system is presented in Figure 6.

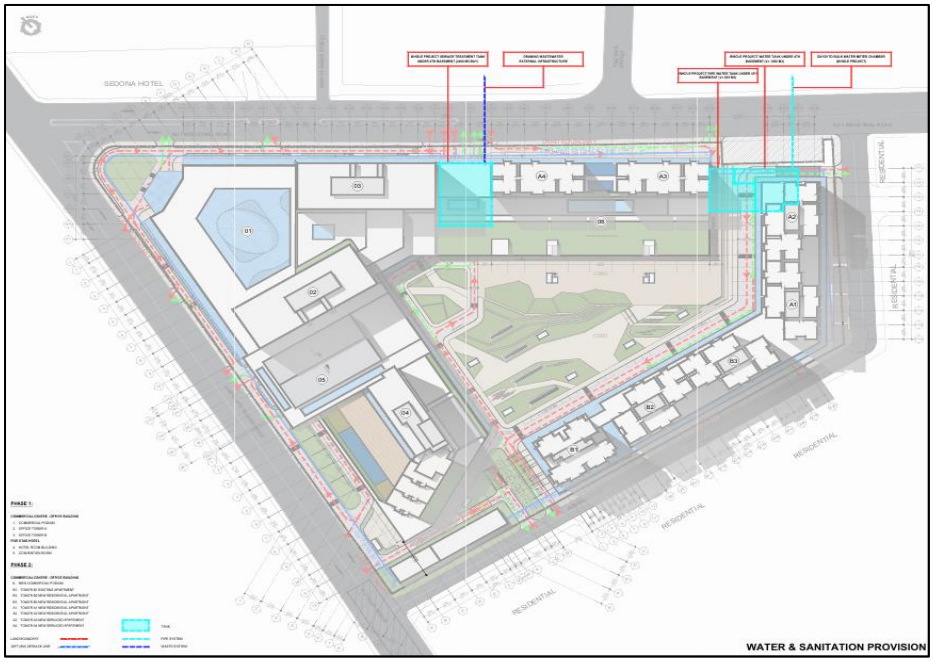


Figure 6 Water and Sanitation System

3.5.4.3. Quantity of Water Consumption

The water volume in the storage tank to supply the project is 1,875 cubic meter and the water consumption for current construction in Phase 2 is 64.5 to 95 cubic meter per day. For the operation phase, the estimated amount of water consumption for all buildings in Phase 2 is approximately 1,800 cubic meter per day. Estimated water consumption for swimming pools B-2 and A-1 are around 55.2 cubic meter per day and 36.6 cubic meter per day respectively.

3.5.4.4. Volume of wastewater and Drainage System

The estimated total volume of wastewater generated during the construction phase is 210 cubic meter per day. The outside pipes are main channels to YCDC. The sub-channels expanded from the drainage system of landscape and the surrounded sub-channels of the buildings are directly connected to the main channel.

Dimension 900x900 (millimeter) of sewer pipes are at the outside of Phase 1 which follow through into the Phase 2 with a dimension of 1200x1200 (millimeter) sewer pipe. From residential, serviced apartments and central landscape, 400 millimeter and 200 millimeter in diameters of sewer pipes carry out drainage into the main channel (1200x1200 millimeter). Diameters of 200 millimeter sewer pipes are connecting with main channel (900x900 millimeter) to drain from landscape and buildings. Drainage system of the project is presented in Figure 7.

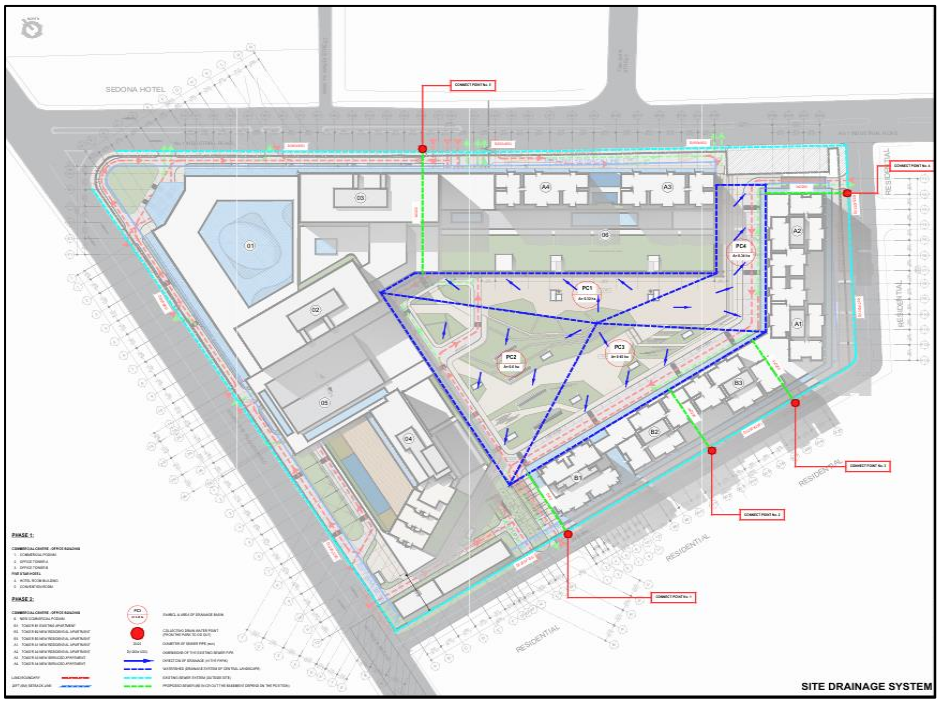


Figure 7 Drainage System of Project

3.5.4.5. Wastewater and Sewage Collection System within the Building

All types of wastewater from all buildings will be transferred into the sewage treatment system. The volume of the tank in treatement system is 2,400 cubic meter per day and discharge wastewater with targeted BOD value. It is planned to place at the fourth basement floor between the Serviced Apartment A3, A4 building and serviced apartment A2. The project is currently in Phase 2 and it has its wastewater treatment system to treat the wastewater from the construction.

Wastewater treatment including an anoxic tank, aeration tank, and MBR tank are implementing for sewage and wastewater disposal system. However, the final disposal system will be designed to meet the regulations of YCDC.

3.5.4.6. Wastewater and Sewage Treatment Plant

There is a wastewater treatment plant (WWTP) which using equalization, anoxic and aeration tank for the treatment process of wastewater from the project site. This wastewater treatment plant is designed to make treatment process for both project site and domestic wastewater. The wastewater storage tank capacity is 718 cubic meter and the capacity of treatment is 1,250 cubic meter per day. The capacity of treated wastewater tank is 205.78 cubic meter.

3.5.5. Rainwater Drainage System

In Phase 2, rain water drainage system is implemented with rainwater points along the pipes outside of buildings in. There are 5 main points to collect rainwater from the park and building units. All these points are mainly discharged into the outlet of YCDC. The location of rainwater points is shown in Figure 9.

3.5.6. Solid Waste Management

3.5.6.1. Solid Waste Disposed System

There are two garbage rooms in the second basement floor with the dimension of 130 square meter and 135 square meter respectively. There will be sufficient garbage bins in the project site and these solid wastes will be systematically collected and discharged at final disposal site according to the guideline of YCDC.

3.5.6.2. Waste Quantity

According to the IGES (2016)1, the estimated amount of waste generation from each person is 0.4 kilogram per person per day. There are 392 workers during construction phase, the waste generation is approximately 156.8 kilogram per day. The estimated generation of waste quantity during operation is 210 cubic meter day. The project is implemented as residential apartment, hotel and shopping center therefore, it cannot be possible to estimate the types of wastes and amount of waste generation in the operation phase.

3.5.7. Power Supply

For electricity supply, there are 10 transformers with the capacities of 1,600-5,000 KVA. The project is mainly operated by the supply of Government electricity. There are 3 sub-stations for electricity such as sub-station mall-office, sub-station block B1, B2 and B3, and sub-station block B2, B3, A1 and A2. The detailed information is shown in Chapter 3.

3.6. Project Implementation

Future plan of all other buildings in project site: Residential Units Block B2 and B3 is estimated to reach completion stage in Quarter 4, 2030, Serviced Apartment A1 and A2 are estimated to complete in Quarter 4, 2036 and also the completion timeline of Commercial and Serviced Apartment A3 and A4 is Quarter 4, 2033. However, it depends on the current situation of the COVID-19 and current economic situations in Myanmar, project implementation plan could be varied from time to time.

4. Description of Surrounding Environment

The surrounding environment were conducted the condition of natural environment, socio-economic environment, environmental baseline survey and biological environment in the study area as presented in Table 4.

[1] IGES (June, 2016), Quick Study On Waste Management in Myanmar

Table 4 Current Environmental and Social Condition in the Study Area

No.	Item	Description
Natural Environment		
1.	Climate	This data was provided from GAD (2023), Bahan and Yankin Township. During the course of a year, the average maximum temperature is 40.2 °C for Bahan and 42.2 for Yankin. In winer, the same average minimum temperature is observed in two studied townships with 11.5 °C.
2.	Topography	Bahan Township is situated about 14.02 meter of MSL. The flat low land is located east of the Bahan Township. It is located at the southern end of the Bago Yoma, so there are many terrain and canyons. Yangon River is located west of the project site. The project site is located low land area and terrain is located south of the project site.
3.	Geology, soil and seismicity	Project area of Bahan Township is located in Yangon Region which geology is underlain by alluvial deposits (Pleistocene to recent), the non- marine fluvial-tile sediments of Irrawaddy formation (Pliocene) and hard, massive sandstone of Pegu series (early-late Miocene). The soil type of the proposed project site is lateritic soil. Generally, lateritic soil is rich in iron and aluminum while poor in lime, potassium and magnesium. It is commonly considered to have formed in hot and tropical area. Nearly all lateritic soil is rusty-red color due to high iron oxide content in soil. According to the seismic zone map, the Yangon is located in the strong and moderate zone. Therefore, earthquake resistant design should be evaluated. Moreover, systematic ground improvement methods should be designed. Based on the seismicity records, Yangon can be assumed as low to medium seismicity region.
4.	Hydrology	Project site is located in Bahan Township in which a few rivers and creeks are existing. The creek near the project site is the Nga Moe Nyeik creek which is located approximately 3.61 kilometer east of the project site. Inya Lake which is located approximately 242 meter west of the project site.
Socio-economic environment		
5.	Land use	The study area consists of around 3 kilometer radius of the project. It is characterized by ten land use types such as industrial, bare land, public area, road, religious area, water body, commercial area, government building, cemetery, and residential area. As a result of the study, residential area is the largest portion within 3 kilometer marginal area where cemetery area occupies the smallest portion.
6.	Population and Age group	The project site is closely situated to the Bahan and Yankin Township, which have over 15,696 houses and the total population is 140,594. The female group is slightly higher for all of under 18 years and above 18 years.
7.	Ethnicity and Religious	Bamar people mainly live in project townships. Bamar is about 124,872 and second largest group is Rakine, 3,308. Ka Yin overweigh other few ethnicities and reach 2,641 people. Majority people in the Bahan and Yankin are Buddhist. The remaining population is composed of Christian and Hindu, Muslim and others are few.

No.	Item	Description
8.	Education	There are many education centers in project Townships such as 26 primary schools, 4 pre-primary schools, 5 high schools and 10 middle schools.
9.	Livelihood (employment, income, health, infrastructure and electricity)	There are many occupations in study townships. Other workers (not specified in list) are highest population followed by government staffs in project townships. Industrial/handicraft and trading are almost the same in the list. Main source of in-come was from the wage workers who work in private companies and government offices. The common case is tuberculosis and, followed by HIV/AIDS where diarrhea is very rare of mortality in the study area. There are some social infrastructures especially many shops and grocery stores in study townships. In addition, societies such as NGO and social organizations are found within the study townships. Various religious places such as monastery, nunnery and religious hall are situated in the study townships because majority people are Buddhist. There are Government electricity grids to study townships in Yangon region. Moreover, water supply is provided by YCDC.
10.	Transportation	There are good access road for transportation in the study townships.
Environmental Baseline Survey		
11.	Air Quality	Two-time measurements were conducted for air quality monitoring such as CO_2, CO, NO_2, SO_2, CH_4, VOC, O_3, PM_{10} and $PM_{2.5}$ Temperature, Humidity at 5 stations around project site of Bahan township. During first measurement, all air parameter results are within the NEQEG (2015) except the value of SO_2 result which is higher than the NEQEG (2015) due to construction activities and traffic flow. Moreover, O_3 result is higher than the NEQEG (2015) in station A2 due to the many traffic and near car road. During second measurement, all air parameter results are relatively within the guideline standard.
12.	Wind speed and Direction	77.8% of wind are calm and 99.9% of the average velocity of wind in 24 hours is lower than 1.5 meter per second. The wind blows mostly to the Northeast direction. According to the field survey results, the nearest receptor (residential area) is located near the project while the wind speed within the project site is around 1.06 meter per second with Northeast (NE) prevailing wind direction for first time measurement.
13.	Noise Level	During first measurement, the results of daytime and nighttime LAeq are slightly over the NEQEG (2015) in Station N1. However, the results from other 4 stations are within the guideline. The noise levels of second measurement at all stations are well below the industrial and commercial standards of NEQEG (2015), but slightly higher than the residential, institutional and education standards due to high traffic congestion, widespread use of loudspeakers in vendors, ongoing construction sites and a dense concentration of commercial and human activities.
14.	Vibration	Vibration measurement was conducted 5 stations and all results are compared with the German Standard DIN 4150-3. According to the field survey results, evaluation results of vibration level for all stations for first and second measurements are within the standard.

No.	Item	Description
15.	Water Quality	The surface water and wastewater quality were conducted within 3 kilometer of the project. The water quality data was compared with NEQEG (2015), National Surface Water Quality Standards (2024) and Myanmar National Drinking Water Quality Guideline (MNDWQS) (2019). Surface water parameters are within in the guideline and not vary significantly among stations. In wastewater parameters, the result of pH was above the limit and other parameters are within the NEQEG (2015).
16.	Traffic Counting	Traffic counting for weekday and weekend were collected at 2 stations (TC-2 and TC-3) in the study area. The results for weekday and weekends are reasonably free flow traffic condition in first measurement but second measurement cannot be conducted due to temporarily closure and restriction for public traffic in Industrial (1) Road. During the first survey period, TC-2 has approaching unstable flow for weekday and stable flow for weekend, TC-3 has reasonably free flow for weekday and weekend. However, during second measurement, the traffic pattern of TC-2 show approaching unstable flow for all days and TC-3 has stable flow.
Biological Environmental		
17.	Floral survey	A total of 31 flora species were identified during the survey. (14) species of least concern, (1) Data Deficient, (1) Endangered and (15) species of Not Evaluated on the IUCN Red List.
18.	Fauna survey	A total of 3 mammal species 2 family were recorded in survey sites, during the survey period. Base on globally threatened status of IUCN Red List, all species were least concerned (LC). There was no threatened species in survey area. A total of 7 herpetology species 5 families were recorded in survey sites during the survey period. Base on globally threatened status of IUCN Red List, there was no threatened species and no endangered species in this area. A total of 9 butterfly species with 5 families were recorded and a total of 21 bird species recorded in the proposed project area.

5. Potential Environmental Impact and Mitigation Measurement

5.1. Impact Analysis

According to National Environmental Policy Act (1969), an environmental impact analysis is generally conducted to assess the potential impact of a proposed project on the natural and social environment. This may include an assessment of both the short-term and long-term effects on the physical environment, such as air, water and noise pollution; as well as effects on local services, living and health standards, and aesthetics.

The impact analysis is the identification or assessing of potential positive and negative impacts on the environment (physical, socio-economic, biodiversity, health, etc.) based on the project activities. Project activities and requirements consume environmental resources and produce nuisances to the surrounding environment. They are the sources, or root causes of environmental impacts, if not adequately controlled or managed, certainly cause significant changes to the environmental components.

5.2. Probability of the Impact

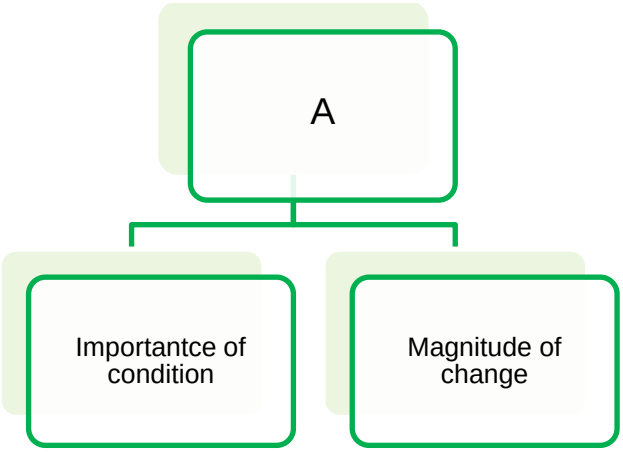


Table 5 Significant Impact Assessment

Criteria/Group	Category	Scale	Description
A	A_1	4	International importance
		3	National importance
		2	Outside (near) of local condition
		1	Local condition
		0	Not important
	A_2	+3	Major importance benefit/ Major positive benefit
		+2	Meaningful benefit of the quo status/ Significant improvement
		+1	Improvement in 'status quo'/ Benefit of the status quo
		0	No change/ 'Status quo'/Lack of change/ No influence
		-1	Negative change of 'status quo'/
		-2	Significant negative effect/ Significant negative changes
		-3	Major negative effect/ Major disadvantages or changes

5.3. The Assessment of Probability

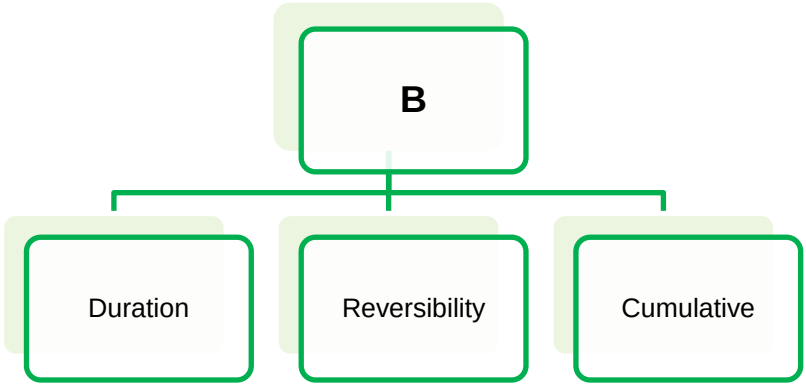


Table 6 Assessment of Probability

Criteria/Group	Category	Scale	Description
B	B_1	1	No changes/ No applicable
		2	Temporary
		3	Permanent
	B_2	1	No changes/ Not applicable
		2	Reversible
		3	Irreversible
	B_3	1	No changes/ Not applicable
		2	Non-cumulative/Unique/Single
		3	Cumulative/ Synergetic

5.4. Environmental Score

Environmental Score (ES) = Significant Imact (Gropup A) x Probability (Group B)

The potential impacts can be classified as no changes, less negative impact, moderate and significant then the scores are assigned the based on impact categories. The score of potential environmental impacts is mentioned in Table 6. The evaluation of potential impacts of three stages (construction, operation and decommission) are described in Table 7, 8 and 9, receptively.

Table 7 The Conversion of the Environmental Scores in Categories

Environmental Score	Class	Class (Numerical)	Description of the Category
108 to 72	+E	+5	Major positive change/impact
36 to 71	+D	+4	Significant positive change/impact
19 to 35	+C	+3	Moderately positive impact
10 to 18	+B	+2	Less positive impact
1 to 9	+A	+1	Reduced positive impact
0	N	0	No alteration/changes
-1 to -9	-A	-1	Reduced negative impact
-10 to -18	-B	-2	Less negative impact
-19 to -35	-C	-3	Moderately negatively impact
-36 to -71	-D	-4	Significantly negative impact
-72 to -108	-E	-5	Extremely negative impact

Table 8 Evaluation and Prediction of Significant Impact for Construction Phase

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description	Mitigation Summary
1.	Air	Earth works	Dust and PMs	-4	8	-32	-3	Moderately negative impact	Keep the excavated soil systematically, installation the springlers, maintain the vehicles regularly
		Heavy duty machines	CO_2, NO_x, PMs, VOCs, CO and CH_4, C_6H_6 and CH_2O						
		Transportation vehicles	CO_2, PM_{10}, $PM_{2.5}$, CO2, SO_x, NO_x, CO and GHG						
		Diesel generator	NO_x, SO_2, CO_2, PM, HC, etc.						
2.	Noise Vibration	Heavy duty machines	High intensity of noise and vibration	-4	7	-28	-3	Moderately negative impact	Install the insulator, and dampers, maintain the vehicles regularly
		Diesel generator							
		Rock blasting and piling							
3.	Water	Dewatering excavation	Silt and sand	-4	8	-32	-3	Moderately negative impact	Fence, construct the drainage channels
		Chemical spilling and leakage	A compound of hazardous substances						
		Sewer from temporary labour camp							

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description	Mitigation Summary
4.	General Waste	Construction wastes	Masonry, sand, stone, slab, aliminium frame, iron/ wood/ steel, PVC	-1	6	-6	-1	Reduced negative impact	Segregate the construction wastes and dispose to YCDC
		Domestic waste	Kitchen waste, food waste, plastic and so on						
5.	Hazardous Material	Construction wastes	Cement waste, paints, thinner, vanish removers, etc	-4	7	-28	-3	Moderately negative impact	Compliance with government regualtions
6.	Soil	Soil distrubance	Loss of topsoil, lack of the microorganism and low the nutrients	-4	8	-28	-3	Moderately negative impact	Construct the drainage channels to prevent soil erosion
7.	The Strength of Road	Throughout the construction work	Lack in compaction and uniformity, weak aggregate strength	-2	7	-14	-2	Less negative impact	Avoid the overload the vehicles
	Traffic Congestion		Pressure on a daily commutes, minor to major accidents	-4	7	-28	-3	Moderately negative impact	

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description	Mitigation Summary
8.	Ecosystem	Construction work	Loss of ecosystem	-4	8	-28	-3	Moderately negative impact	Use fuels and chemical systematically without leakage
9.	Socio-economic	Construction work	Job opportunities (temporarily)	2	7	17	+2	Less positive impact	-

Table 9 Evaluation and Prediction of Significant Impact for Operation Phase

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description	Mitigation Summary
1.	Air	Houses and buildings, using electricity	CO_2	-4	7	-28	-3	Moderately negative impact	Grows the hanging plants, install solar panels
		Disel generators	CO_2, NO_x, PMs, VOCs, CO and CH_4, C_6H_6 and CH_2O						
		Cooking activities	CO_2, and VOCs						
2.	Noise Vibration	Disel generators, Interior decoration and renovation (performed periodically or occasionally)	Medium to low level of noise and vibration	-4	7	-28	-3	Moderately negative impact	Install insulation room
3.	Water	Household wastewater	BOD, COD and nutrient rich compounds	-4	8	-32	-3	Moderately negative impact	Construct the drain lines, wastewater treatment system
4.	General Waste	General household solid wastes	Kitchen waste, food waste, plastic and so on	-1	6	-6	-1	Reduced negative impact	Provides waste bins within residential compound

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description	Mitigation Summary
5.	Hazardous Material	Damaged electric appliances, lightings and batteries	Leakage of heavy metals and released the chemical to the environment	-1	7	-7	-1	Reduced negative impact	Dispose the waste separately
6.	Soil Health	Implementation the gardening space within residential compound	Moderately improved soil health and native plant restoration	+2	8	+16	+2	Less positive impact	Having garden, conserve soil health
7.	Ecosystem	Landscaping in residential compound	Slightly enhance the ecosystem services	+1	8	+8	+1	Reduced positive impact	-
8.	Socio-economic	Commercial areas (company offices and shops) can be included within the residential copmpound	Job opportunities (long-term)	+4	7	+28	+3	Moderately positive impact	-

Table 10 Evaluation and Prediction of Significant Impacts for Demolition Stage

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description	Mitigation Summary
1.	Air	Demolition the structure	Dust and PMs	-4	8	-32	-3	Moderately negative impact	Keep the excavated soil systematically, installation the springlers, maintain the vehicles regularly
		Heavy duty machines	CO_2, NO_x, PMs, VOCs, CO and CH_4, C_6H_6 and CH_2O						
		Transportation vehicles	CO_2, PM_{10}, $PM_{2.5}$, CO_2, SO_x, NO_x, CO and GHG						
		Diesel generator	NO_x, SO_2, CO_2, PM, HC, etc.						
2.	Noise Vibration	Heavy duty machines	High intensity of noise and vibration	-4	7	-28	-3	Moderately negative impact	Install the insulator, and dampers, maintain the vehicles regularly
		Diesel generator							
3.	Water	Demolition the structure, cement-contained rubbles	Silty runoff, fluctuate the pH level	-4	8	-32	-3	Moderately negative impact	Fence, construct the drainage channels

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description	Mitigation Summary
4.	General Waste	Demolition the structure	Aggregate, wood, metal, PVC, and glass	-2	6	-12	-2	Less negative impact	Segregate the demolition wastes and dispose to YCDC
		Domestic waste	Kitchen waste, food waste, plastic and so on						
5.	Hazardous Material	All demolition works	Electrical waste, cables and concrete						Compliance with government regualtions
6.	Soil	All demolition works	Soil compaction, spilled or leaked fuels and oils	-4	7	-28	-3	Moderately negative impact	Construct the drainage channels to prevent soil erosion
7.	Rehabilitation	After demolition works	Restoration the native species (flora and fauna)	6	8	48	+4	Significant positive change	-

5.5. Risk Assessment

Methodology

Risk assessment methodology is adopted by International Civil Aviation Organization-ICAO (2013)[2]. Environmental risk assessment is the process of evaluating the likelihood of adverse effects on, or transmission through, the natural environment, as well as the hazards associated with human activities. The risk assessment will be evaluated based on hazard identification, risk analysis probability, risk analysis severity, risk assessment and tolerability. The risk assessment of metal smeilting and refinery is performed based on the potential hazards happened in construction, and operation activities. The risk assessment and management process will be performed as shown in Figure 8.

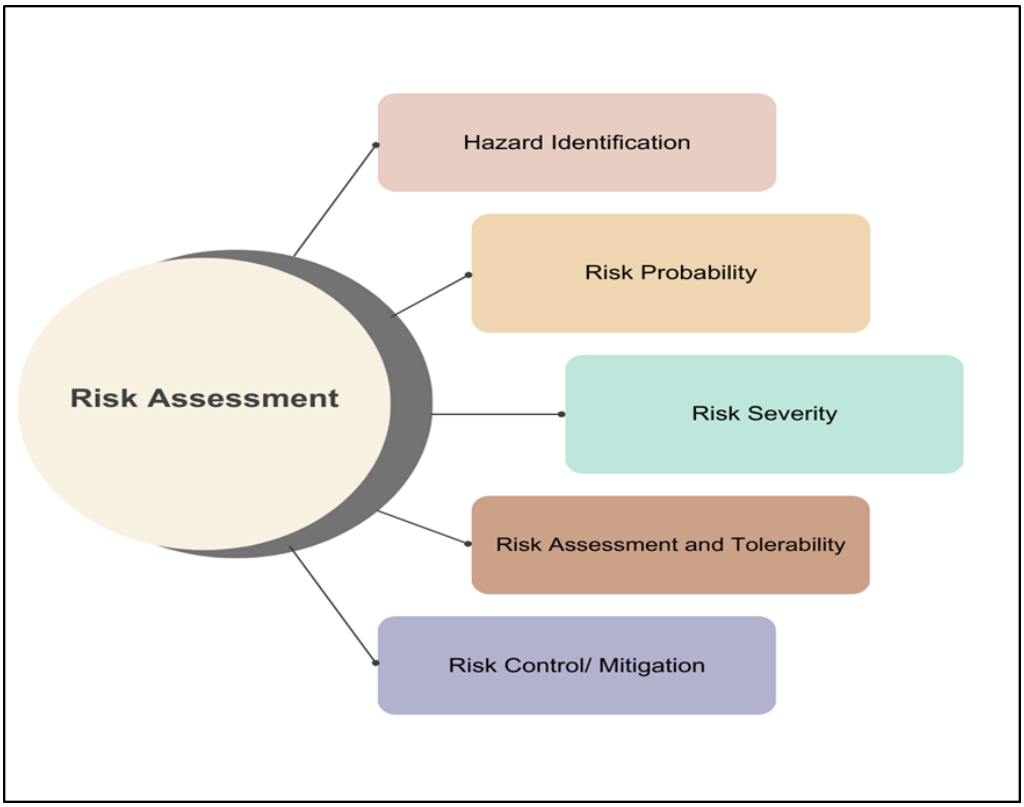


Figure 8 Risk Assessment and Management Process

6. Cumulative Impact Assessment

6.1. The Role of Cumulative Impact Assessment (CIA)

[2] International Civil Aviation Organization (ICAO) (3rd edition, 2013), Safety Management Manual

Cumulative impact analysis provides examining multiple chemicals, multiple sources, public health, environmental effects, and characteristics of the population that influence health outcomes. It means exposures, public health or environmental effects from the combined emissions and discharges, in a geographic area, including environmental pollution from all sources, whether single or multimedia, routinely, accidentally, or otherwise released. This impact assessment reveals significant changes in social and environmental factors not only for the proposed project but also for the individual activities. It can be deduced that CIA plays critical component for tracking the root cause of the problems as well as decision making for suitable environmental management in the EIA stage.

6.2. Stages of Cumulative Impact Assessment (CIA)

The following steps are typically involved in conducting the CIA, in Figure 9.

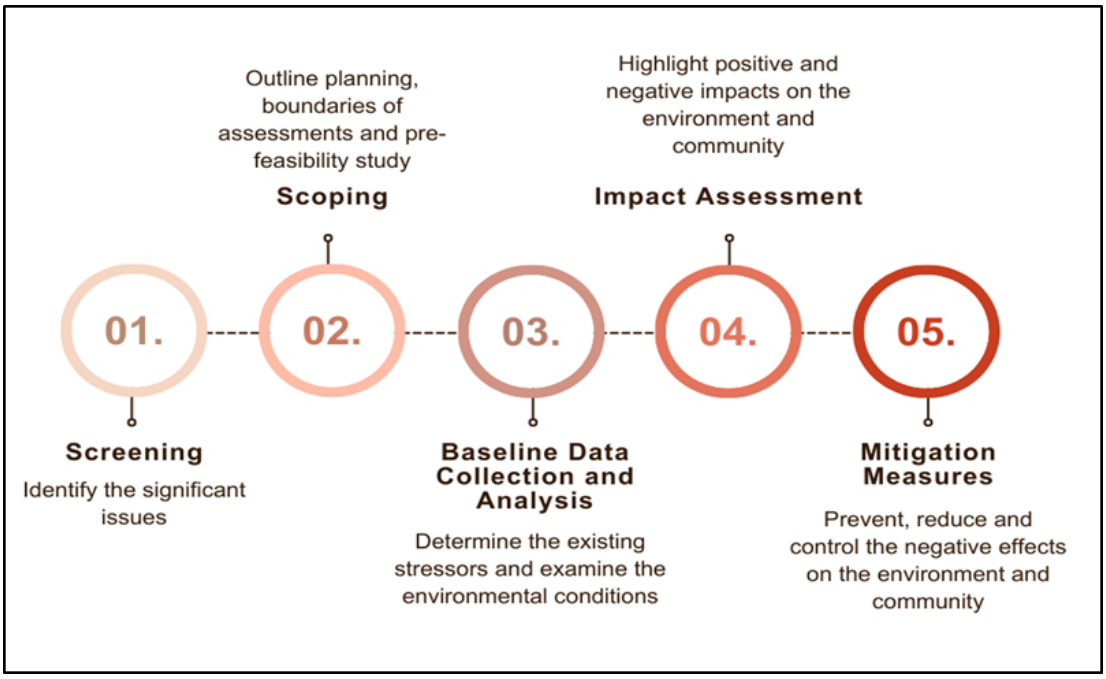


Figure 9 Workflow Diagram of the Cumulative Impact Assessment (CIA)

6.2.1. Screening

Screening is one of the most powerful tools for the CIA because of serving as a critical initial gateway to decide on the level of assessment. Professionals with extensive experience, knowledge as well as engaging with the local communities can implement the screening method even with insufficient data and information. It can highlight the key issues of the cumulative impacts, allow for the identification of potential areas of concern and communities, alongside saving the time-consuming process. As a consequence, the impact assessment can be completed more straightforwardly by excluding time-consuming processes, charges and focusing on more precise, specific environmental impacts.

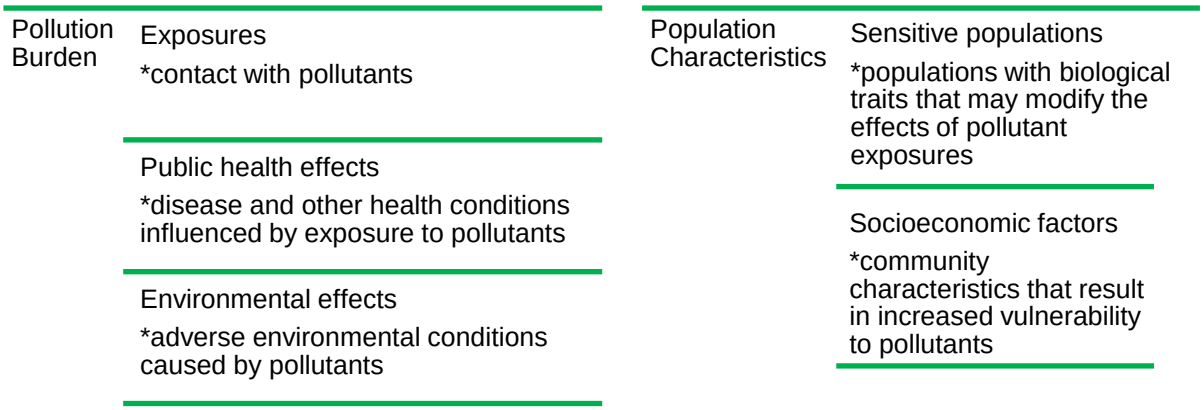


Figure 10 Five Components of Cumulative Impact

The core of the methodology reflects the community well-beings and environmental health through the two main factors (pollution burden and population characteristics, mentioned in figure 10). The final score for a census tract is calculated by multiplying these two components:

Cumulative Impact Score = (Pollution Burden Score) x (Population Characteristics Score)

A range of possible scores is assigned to each component, as shown in Table 11. The overall cumulative impact score ranges from 6–120, a range is large enough to distinguish impacts among communities.

Table 11 Range of Scores Assigned for Each Component

Criteria	Component	Range of Possible Scores
Pollution Burden	Exposures	1-10
	Public Health Effects	1-5
	Environmental Effects	1-5
Population Characteristics	Sensitive Population	1-3
	Socioeconomic Factors	1-3
	Cumulative Impact	6-120

6.2.1.1. Assessing Cumulative Impact Using Screening Method

The result of assessing cumulative impact using screening method is shown in Table 15.

Table 15 Result of Screening Method during Construction and Decommissioning Phases

Townships	Bahan Township	Yankin Township	
Wards	**Sayar San**	**5**	**6**
Population **No. of houses** **Household**	4,210 348 1,003	3,756 312 934	2,597 209 650
Exposure	6	7	
Public health effects	2	3	
Environmental effects	3	4	
Pollution Burden	**11**	**14**	
Sensitive population	1	2	
Socioeconomic factors	1	1	
Population Characteristics	**2**	**3**	
Cumulative Impact Scores	**22**	**42**	

6.2.2. Cumulative Impact Assessment

The cumulative impact assessment is mentioned in Table 12.

Table 12 Cumulative Impact Assessment

Type of Impact	Activities and Source	Exposure Routes	Components	Group A A1 x A2	Group B B1+B2+B3	Environmental Score	Class	Description
Exposure	Traffic congestion	Air	Dust, PMs, CO_2, NO_x, CO and etc.,	-4	7	-28	-3	Moderately negatively impact
	Hazardoues waste dumping site	Surface water pollution during the heavy rain Heavy metals seep and infiltrate	Cement waste, paints, thinner, vanish removers, etc from construction Damage electric	-3	7	-21	-3	Moderately negatively impact

Type of Impact	Activities and Source	Exposure Routes	Components	Group A A1 x A2	Group B B1+B2+B3	Environmental Score	Class	Description
		into the groundwater	appliances and lights from household					
	Solid waste disposal area	Surface water pollution during the heavy rain	Food scraps, containers from construction's workers	-2	7	-14	-2	Less negative impact
		Breeding ground for insects and bacteria, and so on	Vegetable wastes, kitchen waste, food waste and scrape from local markets and household					

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7. Enviornmental Management Plan

The objective of the environmental management plan is to manage potential environmental issues by implementing proper mitigation measures and monitoring plan in compliance with the relevant laws and regulations stipulated by national authorities. Environmental management plan based on the basic principles of management is known as the P.D.C.A cycle (see Figure 11). Environmental management plan consists of four related tasks as described below:

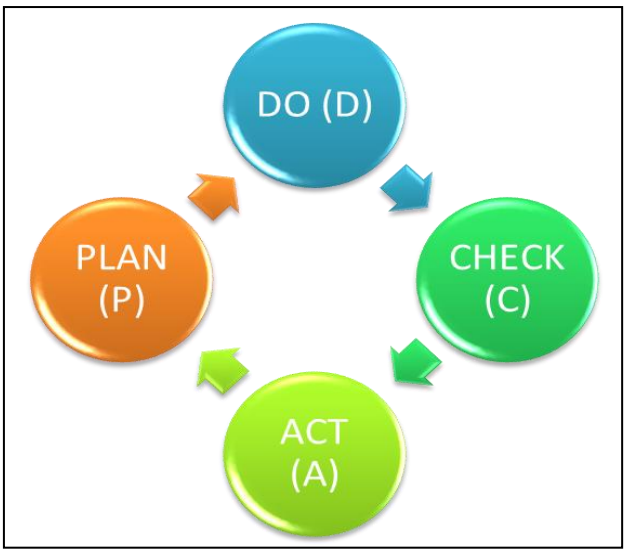


Figure 11 P.D.C.A. Cycle

- **Plan (P):What need to be done**

The planning phase includes reviewing applicable environmental policies (see Chapter 2), identifying the project activities that can cause adverse effects on the environment (see Chapter 5), implementing mitigation measures to manage the impacts of those activities and designing effective programs of proper environmental management plan.

- **Do (D):Implement the plan**

HAGL as described in this chapter will implement the monitoring measures based on the mitigation plan and environmental management plan for the potential environmental impacts appropriately.

- **Check (C):Monitor and evaluate the results of implementation**

The effectiveness of the mitigation measures will be monitored, evaluated and documented.

- **Act (A):Taking corrective actions to improve the results, if found inadequate**

If nonconformities or weakness in the environmental management plan were benchmarked, corrective actions are needed to plan for mitigating the existing environmental impacts.

7.1. Enviornmental Impact Mitigation Measures

The possible environmental impact mitigation measures for construction/ decommission and operation phase is shown in Table 13, Table 14 and Table 15.

Table 13 Environmental Impact Mitigation Measures during Construction Phase

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
1. .	**Air Quality** Emission of air pollutant such as particulate matter ($PM_{2.5}$ & PM_{10}), SO_2, CO_2, NOx, CO and VOCs to the atmosphere.	Before starting the construction process, the risk hazard areas are set up and declared by the notice signs and barriers. The water sprays are employed to minimize the airborne particulate matter during process. (Aviod the overwatering to the surrounding, which causes muddy ground) Adopting the sustainable manners by recycling materials from construction wastes, such as concrete and metal after examination of their strength. Prohibiting to heap the raw materials in the open space. Using the safety nets and shelters while transporting and piling of lightweight materials. Using efficient machines with low emission technologies for the ones that burn clean fossil fuels, eg. Unleaded and de-sulphurized fuels. Controlling the speed and operation of construction vehicles. Conducting regular maintenance and services of machines and engines. Educate and raise awareness of construction workers on emission reduction techniques.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget
2.	**Noise and vibration** Noise exposure to the surrounding environment Occupational hazards and structural damage due to virbration exposure	Substitute with the modern machines with low sound level and vibration proof system. Ensuring the well maintained equipments, which produce the less noise and vibration. Using the mat and fences or walls to absorb the vibration and noise level at point source. Placing the noise sources (generators) away from the residential area, with noise barriers. Arranging the shifted work schedules and PPEs (earplugs) for workers in nosiy area.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Using the sound proof generators and engines if possible. Aviod unnecessary revving of the engine. Making the construction schedules and informing nearby residents and businesses; provision of bill boards notifying of construction activities and timings.		
3.	**Water Quality** The surface runoff and storm water can carry the sediment particles, chemicals and debris from construction site, declining the water quality and negatively impacts on aquatic animals and plants	Prohibiting the piling of building materials on the open space, placing with shelters and cover. During construction, the design (of the drainage system) should ensure that surface flow is drained suitably into the public drains provided to control flooding within the site. The drainage should have suitable gradient and appropriate erosion control measures eg silt fences. The channels should be covered with gratings or other suitable and approved materials to prevent occurrence of accidents and entry dirt that would compromise flow of run-off. Storm water generated from roof catchments should be harvested, stored and made us in various household activities such as general cleaning to reduce run-off reaching the drainage channels. Providing the hygienic toilet or restroom with adequate septic tanks. Regular removing of sludges from septic tanks and making sercure not to cause the leakage.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget
4.	**Soil Quality** Changes in soil characteristics due to construction activities	Installing the temporary silt fence at the water spraying area. Ensuring proper handling and storing the fossil fuel, lubricant oil and grease. Removing the polluted soil immediately after spillage of oil. Collecting the used engine oil and lubricants with safty containers and disposed as per their SOP. Preventing pollution from construction wastes by having specific sites for collection, sorting and transport of wastes.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Ensuring there is enough space for normal percolation of water Installing cascades to break the impact of water flowing into the drains. Controlling the earthworks and ensuring the management of excavation activities by providing soil erosion control structures and controlling activities, especially on the steeper areaas of the site during the rainy season.		
5.	**Solid Waste** Generating the non-hazardous and hazardous wastes from construction activities.	**Non-hazardous Construction Wastes** Before starting, planning and anlayzing the type and quantity of waste generated during the process. Segregating the waste types (eg. Wood, concrete, metal) at pollution sources and heaping as per composition materials. Encouraging the reusable materials to reuse in the project site or resell to the local buyers. Disposing the waste that cannot be recycled or reused in accordance with local regulations and environmental guidelines. Forbidding the open burning of wastes. Ensuring all wastes are dumped in their designated areas and through legally acceptable methods Ensuring all dust bins with the covers are regularly cleaned and disinfected not to release offensive odor and leachate.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget
		Hazardous Construction Wastes Separating the hazardous and e-wastes from the usable waste, storing and disposing in accord with regional guidelines. Allocating responsibilities for waste management and identifying all sources of wastes, and ensuring wastes are handled by personnel licensed to do so. Ensuring the environmentally safe area to temporarily store the hazardous waste where should be impermeable flooring and protecting rain and other weather hazards.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
6.	**Land Use and Utilization of Local Resources** Changes in land use type and increased pressure on utilities	Site clearing will be minimized with sustainable design and planning. Employing water conservation techniques and only using the required amounts of water to prevent wastage. Employing power saving techniques such as switching off equipment when not in use, using natural light whenever possible. Using machines with power saving technologies i.e. high efficiency equipment.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget
7.	**Traffic Condition** Increased the heavy traffic and traffic jam on the main road.	Placing signs around the site notifying other vehicles about the heavy traffic and to set the speed limit around the site. Ensuring all drivers for the project comply to speed regulations. Making sure the construction doesn't occupy the road reserves and complying to traffic and land demarcation obligations. Ensuring all vehicles used for the project are in good working condition both legally and commensurate to their intended use. Adequate parking lots will be constructed inside the compound in order to avoid parking beside the roads. Bus cars will be arranged for the workers in order to reduce the numbers of vehicles on the road.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget
8.	**Occupational Health and Safety** Causing the workplace accidents such as physical injuries, occupational diseases, etc	Providing the workplace safety training programme to ensure the safe handling and operation of heavy mechines and emergency equipments. Ensuring all potential hazards such as movable machine parts are labelled. Raising awareness and educating workers on risks from equipment and ensuring they receive adequate training on the use of the equipment. Providing the workers with adequate PPEs and monitoring regularly to ensure they are replaced on time when they wear out.	Construction Constructor and Occupational Health and Safety Team of HAGL	Included in Construction Budget

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Ensuring there is security in and around the site to control the movement of people. Providing fire fighting equipment and in easily accessible areas as well as ensuring site personnel are well trained to use them as well as maintaining them regularly. Labelling chemicals and material according to the risks they possess. Creating safe and adequate fire and emergency assembly points and making sure they are well labelled. Establishing emergency procedures against hazards and ensuring the workers stay aware/educated on following them and commensurate to the magnitude and type of emergency, by conducting regular drills and involving the neighbours.		

Table 14 Environmental Impact Mitigation Measures during Operation Phase

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
1. .	**Air Quality** Increasing the concentration of carbon and particulate matters in ambient air quality due to livelihoods of residents.	Using the renewable clean energy, environmental friendly refrigerants and mechines. Adopting the de-sulphurized and unleaded fuel in vehicles. Banning the burning of wastes and other materials at the site. Keeping the green space and green belts to absorb the carbon emitted from the residents.	Environmental Management Team of HAGL	5,000,000
2.	**Noise and vibration** Emitting the noise and vibration from the activities of daily living.	Erecting signs and notifying other users of noisy activities. Conducting all noisy activites during the day when permissible levels are higher. Controlling the noise through the design and layout of rooms and buildings. Identifying the acceptable noise and vibration level within the building and ensuring to be followed by all residents. Adopting the fine and penalties process if necessary. Creating the “No Honking” zones within the residential area, especially between 11:30 pm and 6:00 am. Getting the permission from building’s management committee when operating the renovation activities. Adopting the environmentally sound manners (using quieter equipments and anti-vibration mat) to minimize the noise and vibration during renovations.	Environmental Management Team of HAGL	5,000,000
3.	**Water Quality** Generating the domestic wastewater and grey water.	Installing the wastewater treatment system for all wastewater before discharging to the municipal drainage. Regularly investigating the performance of treatment system and carried out the required maintenance activities as per its SOP. Landscaping to ensure there are areas where water will percolate underground.	Environmental Management Team of HAGL	5,000,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Constructing proper drains and monitoring them to ensure there are no blockages. This also includes ensuring the size of the drains can accommodate storm flows during the rainy season.		
4.	**Soil Quality** During operation phase, the potential hazard for soil pollution is really limited, causing the insignificant impact on soil characteristics and quality.	Keeping the soil with vegetative covers to minimize the weather erosion. Using the organic soil amendments like compost, aged manure and shredded leaves instead of chemical fertilizers in landscaping process to improve the soil quality. Carefully handling and storing of oil and grease in line with their SOP. Promptly removing of polluted soil when occurring the unexpected spillage or leakage.	Environmental Management Team of HAGL	5,000,000
5.	**Solid Waste** The domestic wastes are mainly generated.	**Non-hazardous Wastes** The garbage disposal system is designed to meet the YCDC guidelines. The segregated dust bins that are clearly labelled and marked with color are provided within the buildings. All bins are regularly cleaned and disinfected not to emit the leachate and offensive odor. Creating the regular waste collection system and waste disposing method in collaboration with Township Municipal. Ensuring all wastes are dumped in their designated areas and through legally acceptable methods. Making available suitable facilities for the collection, segregation and safe disposal of the wastes. Encouraging the reusable materials to reuse or resell to the local buyers. Ensuring waste bins are protected from rain and animals.	Environmental Management Team of HAGL	2,500,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Hazardous Wastes The main hazardous wastes are batteries, fluorescent ligh bulb and containers of pesticides emitted from housing. All hazardous wastes are collected and disposed separately by responsible personnel or organization in line with YCDC. Carefully handling with appropriate gloves not to contact with bare skin. For sharp objects, the safety containers should be used.	Environmental Management Team of HAGL	2,500,000
6.	**Land Use and Utilization of Natural Resources** Changes in land use type and increased pressure on utilities	Aligning the project's objectives with those of national lanuse policies and development plan. Implementing water conservation techniques such as having faucets with automatic senser. Creating awareness through signs of conservation of water and electricity. Using natural light during the day for lighting purposes. Using machines and equipment with a high level of power efficiency in the offices and residential houses and servicing them as often as required to maintain their efficiency.	Environmental Management Team of HAGL	3,000,000
7.	**Traffic Condition** Increased the transportation vehicles and traffic jam on the main road.	Erecting visible and clear signs to control the movement of vehicles in and out of the proposed area. Having alternative entrances and exits for emergency operations. Arising knowlegles of traffic regulations to all drivers. Adequate parking lots will be constructed inside the compound in order to avoid parking beside the roads. Smart parking solutions that provide real-time information about parking availability to drivers will be developed in order to reduce the time spent searching for parking spaces, which contributes to traffic congestion.	Environmental Management Team of HAGL	3,000,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
8.	**Health and Safety** Impact on health and safety of residents due to improper building's management and security system.	Employing of security guards/competent security firm at the project area and searching all vehicles and people entering the project. Use of CCTV cameras to monitor security within the project area. Collaborating with the national police on security matters. Placing alarms around the project and establishing emergency preparedness and response procedures. Developing and promoting public hygiene to reduce community-base infections and epidemis through raising the awareness, implementing strong waste management systems and encouraging reusing and recycling.	Health and Safety Team of HAGL	5,000,000

Table 15 Environmental Impact Mitigation Measures during Decommission Phase

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
1. .	**Air Quality** Emission of air pollutant such as particulate matter ($PM_{2.5}$ & PM_{10}), SO_2, CO_2, NOx, CO and VOCs to the atmosphere.	Declaring the demolition areas with notice signs and temporary fencing, along with dust containment barriers to protect public safety and dispersion of dust. Spraying the water mist during the demolition processes, where the large amount of water is prohibited, causing the muddy soil. Using the safety nets and appropriate covers while transporting the demolition wastes. Carefully dismantling a structure to salvage reusable materials, reducing dust emission and preserving valuable resources. Adopting the sustainable manners by recycling materials from demolition wastes, such as concrete and metal after examination of their strength. Prohibiting to heap the raw materials in the open space.	Demolition contractor and HAGL	3,000,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Using efficient equipment and machines with efficient engines meaning low emission. Providing workers with Personal Protective Equipment such as face mask when operating heavy machinery in a dusty environment. Provision of bill boards at the site gates notifying people of the activities and timings.		
2.	**Noise and vibration** Noise exposure to the surrounding environment Occupational hazards and structural damage due to virbration exposure	Carrying out the decommissioning works only during 10:00 AM to 3:00 PM where permissible levels of noise are high Machineries should be maintained regularly to reduce noise resulting from friction. Providing workers with Personal Protective Equipment such as earmuffs when operating noisy machinery and when in a noisy environment. Provision of bill boards at the site gates notifying people of the activities and timings. Shielding the area to reduce noise propagation. Substituting with the modern machines with low sound level and vibration proof system. Adopting the demolition techniques and actions, producing the less noise and vibration such as mitimizing the drop heights when unloading material. Using the sound proof generators and engines if possible.	Demolition contractor and HAGL	3,000,000
3.	**Water Quality** Generating the domestic wastewater and grey water. The surface runoff and storm water can carry the sediment particles, chemicals and debris, declining the	Prohibiting the heaping the demolition materials and debris on the open space without having shelters and covers. Conducting the suitable gradient of drainage channels to completely drain into the public drainage. Adopting the effective drainage system, embedding the erosion control measures such as silt fences.	Demolition contractor and HAGL	3,000,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
	water quality and negatively impact on aquatic animals and plants.	Ensuring the workers to use the oil absorbent pads while occurring the unexpected spillage of hydraulic oil, motor oil, brake fluid and other oil and greased in wastewater. Providing the hygienic toilet or restroom with adequate septic tanks. Regular removing of sludges from septic tanks and making sercure not to cause the leakage.		
4.	**Soil Quality** Declining the soil fertility and changes in soil characteristics due to the demolition activities.	Installing the temporary silt fence at the water spraying area. Ensuring proper handling and storing the fossil fuel, lubricant oil and grease. Removing the polluted soil immediately after spillage of oil. Performing the site preparation after demolition processes by creating vegetative covers for soil stabilization, reduced erosion and then restoration of ecological functions.	Demolition contractor and HAGL	3,000,000
5.	**Solid Waste** The demolition wastes and domestic wastes from staffs are mainly generated.	**Non-hazardous Demolition Wastes** Segregating the waste types (eg. Wood, concrete, metal) at pollution sources and heaping as per composition materials. Encouraging the reusable materials to reuse in the project site or resell to the local buyers. Disposing the waste that cannot be recycled or reused in accordance with local regulations and environmental guidelines. Adopting the regular collection and disposal of domestic wastes from working staffs by providing dust pins throughout site area. Setting up the temporary waste storage area where has impermeable floor and protective shelters to avoid the animals and seasonal disturbance. Forbidding the open buring of wastes.	Demolition contractor and HAGL	2,500,000
		Hazardous Demolition Wastes	Demolition contractor and HAGL	2,500,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Segregating the hazardous wastes (such as lead-based paint, mecury, sharp objects and other chemicals remained in building) at pollution sources. Training the workers for proper identification and handling of hazardous wastes. Allocating the responsibilites for waste disposal to local municipal or the licensed waste management company. Providing the appropriate PPE and making available suitable facilities for collection, segregation and safe disposal of wastes.		
6.	**Traffic Condition** Increased the heavy vehicles.	Placing signs around the site notifying other vehicles about the heavy traffic and to set the speed limit around the site. Ensuring all drivers for the project comply to speed regulations. Making sure the demolition doesn't occupy the road reserves and complying to traffic and land demarcation obligations. Ensuring all vehicles used for the project are in good working condition both legally and commensurate to their intended use.	Demolition contractor and HAGL	2,000,000
7.	**Occupational Health and Safety** Causing the workplace accidents such as physical injuries, occupational diseases, etc	Providing the workplace safety training programme to ensure the safe handling and operation of heavy mechines and emergency equipments. Ensuring all potential hazards such as movable machine parts are labelled. Raising awareness and educating workers on risks from equipment and ensuring they receive adequate training on the use of the equipment. Providing the workers with adequate PPEs and monitoring regularly to ensure they are replaced on time when they wear out. Ensuring there is security in and around the site to control the movement of people.	Demolition contractor and Occupational Health and Safety Team of HAGL	3,000,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Providing fire fighting equipment and in easily accessible areas as well as ensuring site personnel are well trained to use them as well as maintaining them regularly. Labelling chemicals and material according to the risks they possess. Creating safe and adequate fire and emergency assembly points and making sure they are well labelled. Establishing emergency procedures against hazards and ensuring the workers stay aware/educated on following them and commensurate to the magnitude and type of emergency, by conducting regular drills and involving the neighbours.		

7.1. Environmental Monitoring Plan

The summary of environmental monitoring plans for construction/ decommission and operation phase are shown in Table 16, Table 17 and Table 18.

Table 16 Environmental Monitoring Plan for Construction Phase

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
1.	Air Quality	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC	A1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Construction Phase	Construction Contractor and Environmental Management Team of HAGL	5,000,000
			A2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			A3, (Neik Ban Monastery),	16°49'20.00"N 96° 9'44.67"E			
			A4 (Moe Nyin Wei Partthanar Monastery)	16°48'26.96"N 96° 8'55.00"E			
			A5 (Residential Area),	16°49'33.56"N 96°10'46.94"E			
2.	Water Quality	pH, Temperature, TDS, Conductivity, Salinity	W1 (Water from Gyobyu Reservoir)	16°49'36.99"N 96°9'25.79" E	Once in Construction Phase	Construction Contractor and Environmental Management Team of HAGL	2,000,000
		pH, Temperature, TDS, Conductivity, Salinity, BOD, COD, Phosphate, Hg, Cr 6, Pb, Total Nitrogen, Oil and grease	W2, (Wastewater)	16° 49' 36.99" N 96° 9' 21.5" E			
3.	Noise Level	Day time and night time noise level	N1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Construction Phase	Construction Contractor and Environmental	1,500,000
			N2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
			N3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E		Management Team of HAGL	
			N4, Moe Nyin Wei Partthanar Monestery	16°48'26.96"N 96° 8'55.00"E			
			N5, Residential Area	16°49'33.56"N 96°10'46.94"E			
4.	Vibration Level	Peak particle velocity for vibration	V1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Construction Phase	Construction Contractor and Environmental Management Team of HAGL	2,500,000
			V2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			V3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
			V4, Moe Nyin Wei Partthanar Monestery	16°48'26.96"N 96° 8'55.00"E			
			V5, Residential Area	16°49'33.56"N 96°10'46.94"E			
5.	Non-Hazardous Waste	Amount and type of non-hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Construction Contractor and Environmental Management Team of HAGL	2,500,000
6.	Hazardous Waste	Amount and type of hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Construction Contractor and Environmental Management Team of HAGL	2,500,000

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
7.	Traffic Management	Increasing the number of heavy traffic Condition of traffic	Main transportation roads and around the project area		Weekly	Construction Contractor and Environmental Management Team of HAGL	1,500,000
8.	Occupational Health and Safety	All accident cases related to the factory. Health condition of communities in the factory All sickness related to work in the factory	Within the Project Compound		Weekly	Construction Contractor and Occupational Safety and Health Team of HAGL	2,000,000

Table 17 Environmental Monitoring Paln for Operation Phase

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
1.	Air Quality	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC	A1, Project Site	16°49'35.43"N 96° 9'22.17"E	Twice a year (dry and wet seasons)	Environmental Management Team of HAGL	6,000,000
			A2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			A3, (Neik Ban Monestery),	16°49'20.00"N 96° 9'44.67"E			
2.	Water Quality	pH, Temperature, TDS, Conductivity, Salinity	W1 (Water from Gyobyu Reservoir)	16°49'36.99"N 96°9'25.79" E	Twice a year (dry and wet seasons)	Environmental Management Team of HAGL	4,000,000
		pH, Temperature, TDS, Conductivity, Salinity, BOD, COD, Phosphorous, Iron, Lead, Total Nitrogen, Oil and grease	W2, (Wastewater)	16° 49' 36.99" N 96° 9' 21.5" E			
3.	Noise Level	Day time and night time noise level	N1, Project Site	16°49'35.43"N 96° 9'22.17"E	Twice a year (dry and wet seasons)	Environmental Management Team of HAGL	1,800,000
			N2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			N3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
4.	Vibration Level	Peak particle velocity for vibration	V1, Project Site	16°49'35.43"N 96° 9'22.17"E	Twice a year (dry and wet seasons)	Environmental Management Team of HAGL	3,000,000
			V2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			V3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
5.	Non-Hazardous Waste	Amount and type of non-hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Environmental Management Team of HAGL	200,000
6.	Hazardous Waste	Amount and type of hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Environmental Management Team of HAGL	300,000

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
7.	Traffic Management	Increasing the number of heavy traffic Condition of traffic	Main transportation roads and around the project area		Weekly	Environmental Management Team of HAGL	300,000
8.	Occupational Health and Safety	All accident cases related to the factory. Health condition of communities in the factory All sickness related to work in the factory	Within the Project Compound		Weekly	Occupational Safety and Health Team of HAGL	500,000

Table 18 Environmental Monitoring Plan for Decommission Phase

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
1.	Air Quality	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC	A1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Demolition Phase	Demolition Contractor and Environmental Management Team of HAGL	5,000,000
			A2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			A3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
			A4 Moe Nyin Wei Partthanar Monestery	16°48'26.96"N 96° 8'55.00"E			
			A5 Residential Area	16°49'33.56"N 96°10'46.94"E			
2.	Water Quality	pH, Temperature, TDS, Conductivity, Salinity	W1 (Water from Gyobyu Reservoir)	16°49'36.99"N 96°9'25.79" E	Once in Demolition Phase	Demolition Contractor and Environmental Management Team of HAGL	2,000,000
		pH, Temperature, TDS, Conductivity, Salinity, BOD, COD, Phosphate, Hg, Cr 6, Pb Total Nitrogen, Oil and grease	W2, (Wastewater)	16° 49' 36.99" N 96° 9' 21.5" E			
3.	Noise Level	Day time and night time noise level	N1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Demolition Phase	Demolition Contractor and Environmental Management Team of HAGL	1,500,000
			N2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			N3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
			N4, Moe Nyin Wei Partthanar Monestery	16°48'26.96"N 96° 8'55.00"E			
			N5, Residential Area	16°49'33.56"N 96°10'46.94"E			
4.	Vibration Level	Peak particle velocity for vibration	V1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Demolition Phase	Demolition Contractor and Environmental	2,500,000
			V2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
			V3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E		Management Team of HAGL	
			V4, Moe Nyin Wei Partthanar Monestery	16°48'26.96"N 96° 8'55.00"E			
			V5, Residential Area	16°49'33.56"N 96°10'46.94"E			
5.	Non-Hazardous Waste	Amount and type of non-hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Demolition Contractor and Environmental Management Team of HAGL	2,500,000
6.	Hazardous Waste	Amount and type of hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Demolition Contractor and Environmental Management Team of HAGL	2,500,000
7.	Traffic Management	Increasing the number of heavy traffic Condition of traffic	Main transportation roads and around the project area		Weekly	Demolition Contractor and Environmental Management Team of HAGL	1,500,000
8.	Occupational Health and Safety	All accident cases related to the factory. Health condition of communities in the factory All sickness related to work in the factory	Within the Project Compound		Weekly	Demolition Contractor and Occupational Safety and Health Team of HAGL	2,000,000

8. Public Consultation

The public consultation meeting for the Environmental Impact Assessment (EIA) stage of the HAGL Myanmar Centre construction project phase 2 was held on the 10th floor of Myanmar Centre on December 23, 2025, from 10 a.m. to 12 p.m. the government organizations such as Enviornmental Conservation Department (ECD), Public Health Department, Fire Department (Sanchaung Township), Directorate of Industrial Supervision and Inspection Department, etc., and local residents attended the event. The photo documents of participants, presentation about EIA Report as well as the suggestions were mentioned in Chapter 8.

9. Conclusions and Recommendations

9.1. Conclusions

This EIA report has provided an assessment of the potential environmental, social and health impact associated with the construction, operation and decommissioning phases of the proposed project. This study was prepared on the basis of the project information, relevant information from various sources, surveys of environmental and socio-economic setting of the project area, rounds of consultations with stakeholders in the government sector and communities in and around the vicinity of the project site, and experiences of the consultant in technical and environmental aspects of the proposed projects. Based on the study results, the major factors are concluded as shown in Section 9.1 for each chapter and EIA Report summary is mentioned in Section 9.3 as well.

9.2. Recommendations

This EIA study has clearly identified the environmental and social issues, mitigation measures and monitoring plan. It is recommended that the project proponent must implement all the mitigation measures, management plan and monitoring plan described in this report. In addition, the project proponent must continuously follow the requirements of the environmental guidelines, applying mitigation measures to ensure the compliance with the legal requirements and other relevant recommended criteria. Far more detailed is described in Section 9.4 of Chapter 9.

ABBREVIATIONS

°C	-	Celsius
ADB	-	Asia Development Bank
BCR	-	Building Coverage Ratio
BOD_5	-	Biochemical Oxygen Demand
BOT		Build-Operate-Transfer
CH_4	-	Methane
CO	-	Carbon Monoxide
CO_2	-	Carbon Dioxide
COD	-	Chemical Oxygen Demand
COVID-19	-	Coronavirus Disease 2019
CQHP	-	Committee for Quality Control of High-Rise Building Construction Projects
CSR	-	Corporate Social Responsibility
dB	-	Decibels
ECC	-	Environmental Compliance Certificate
ECD	-	Environmental Conservation Department
EHS	-	Environmental, Health, and Safety
EIA	-	Environnemental Impact Assessment
EMP	-	Environmental Management Plan
EMS	-	Environmental Management System
ESIA	-	Environmental and Social Impact Assessment
ESMMP	-	Environmental and Social Management and Monitoring Plan
FAR	-	Floor Area Ratio
GAD	-	General Administration Department
GFA	-	Gross Floor Area
GPS	-	Global Positioning System
HAGL	-	Hoang Anh Gia Lai Myanmar Co., Ltd
IEE	-	Initial Environmental Examination
IFC	-	International Finance Corporation
IGES	-	Institute of Global Environmental Strategies
IUCN	-	International Union for Conservation of Nature
LOS	-	Level of Service
Lux	-	Light Intensity
MIMU	-	Myanmar Information Management Unit
MNBC	-	Myanmar National Building Code
MNDWQS	-	Myanmar National Drinking Water Quality Standards
MOECAF	-	Ministry of Environmental Conservation and Forestry
MONREC	-	Ministry of Natural Resources and Environmental Conservation
MSL	-	Mean Sea Level
NECC	-	National Environmental Conservation Committee

NEQEG	-	National Environmental Quality (Emission) Guideline
NLA	-	Net Lettable Area
NO_2	-	Nitrogen Dioxide
NO_x	-	Nitrogen Oxide
OHS	-	Occupational Health and Safety
PAPs	-	Project Affected Persons
PCD	-	Passenger Car Equivalents
PCU	-	Passenger Car Unit
PDCA	-	Plan-Do-Check-Act
PM	-	Particulate Matter
PPAH	-	Pollution Prevention and Abatement Handbook
PPE	-	Personal Protective Equipment
PPV	-	Peak Particle Velocity
SO_2	-	Sulfur Dioxide
TBS	-	Total Business Solution Co., Ltd.
TC	-	Traffic Counting
TDS	-	Total Dissolved Solids
ToR	-	Terms of Reference
TSP	-	Total Suspended Particle
TSS	-	Total Suspended Solid
USEPA	-	United States Environmental Protection Agency
V	-	Traffic Volume
VOC	-	Volatile Organic Compound
WB	-	World Bank
WHO	-	World Health Organization
WWTP	-	Wastewater Treatment Plant
YCDC	-	Yangon City Development Committee

CHAPTER 1
INTRODUCTION

Hoang Anh Gia Lai Myanmar Co., Ltd. (HAGL Myanmar) is the single-largest 100% Vietnam invested project in Myanmar and owns first integrated and international standard, mixed-use development located at No.192, Kabar Aye Pagoda Road, Bahan Township, Yangon. This Environmental and Social Impact Assessment (ESIA) report mainly focuses on the development of Myanmar Centre Project Phase-2: that consists of commercial center and serviced apartment A3 and A4, serviced apartment A1 and A2, and residential apartment B1, B2, and B3. The total land area of the project is 37,816.55 square meter. The location of the project site is shown in Figure 1-1.

The purposes for the development of the project are as follows:

- To join in the economic reform process of the country;
- To offer comfortable life style to Myanmar people;
- To create a brighter future for younger generation;

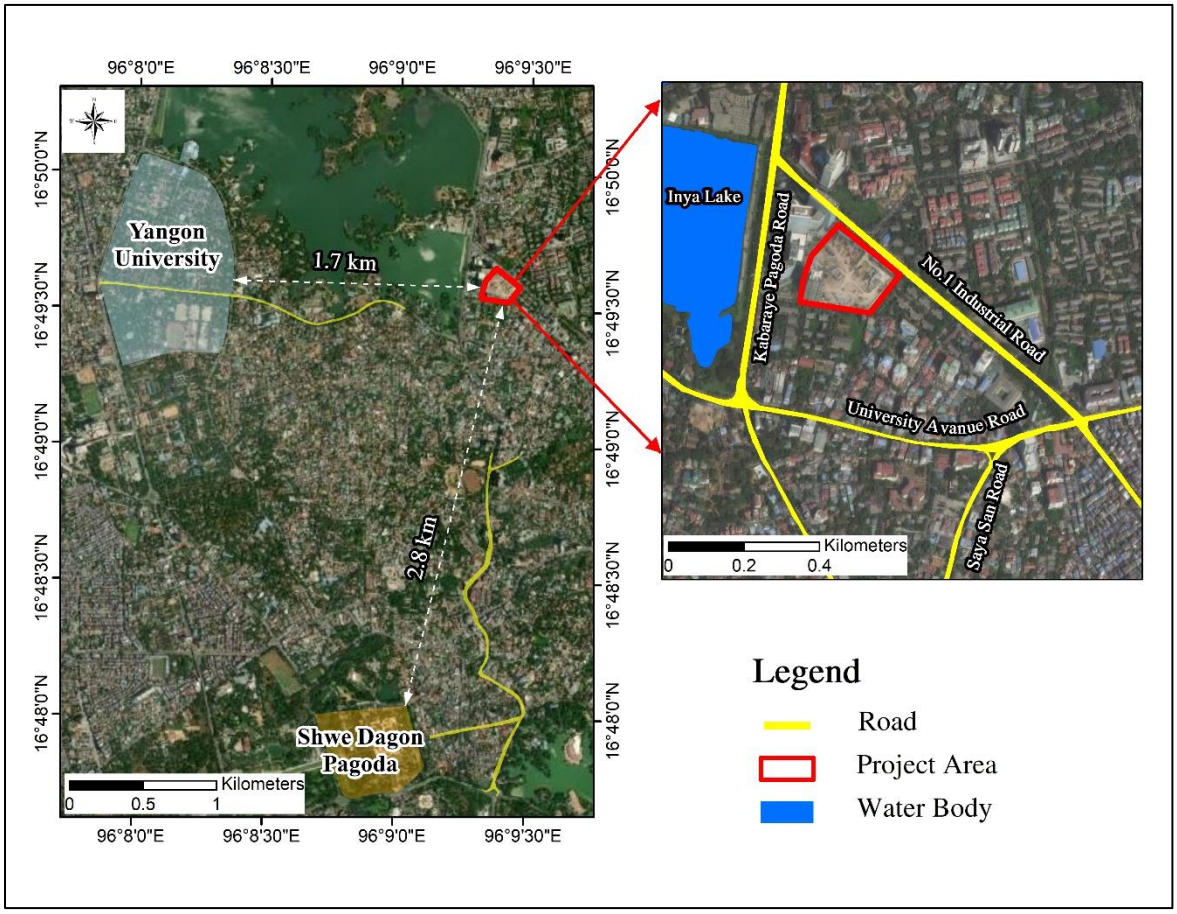


Figure 1-1 Location Map of the Project Site

1.1. PROJECT PROPONENT

The contact of representative of the project proponent regarding to this ESIA is mentioned in Table 1-1 and Table 1-2, the organization chart of the project proponent is shown in Figure 1-2.

Table 1-1 Contact of Project Proponent

Name	Mr. Nguyen Van Kha
Designation	Director
Address	No. 192, Kabaraye Pagoda Road, Bahan Township, Yangon.
Tel	09-250900244

Table 1-2 Contact of Project Proponent's Representative

Name	Mr. Ye Myint Aung
Designation	Project Development Executive
Address	No. 192, Kabaraye Pagoda Road, Bahan Township, Yangon.
Tel	09-250900244
e-mail	ye.aung@thiso.vn

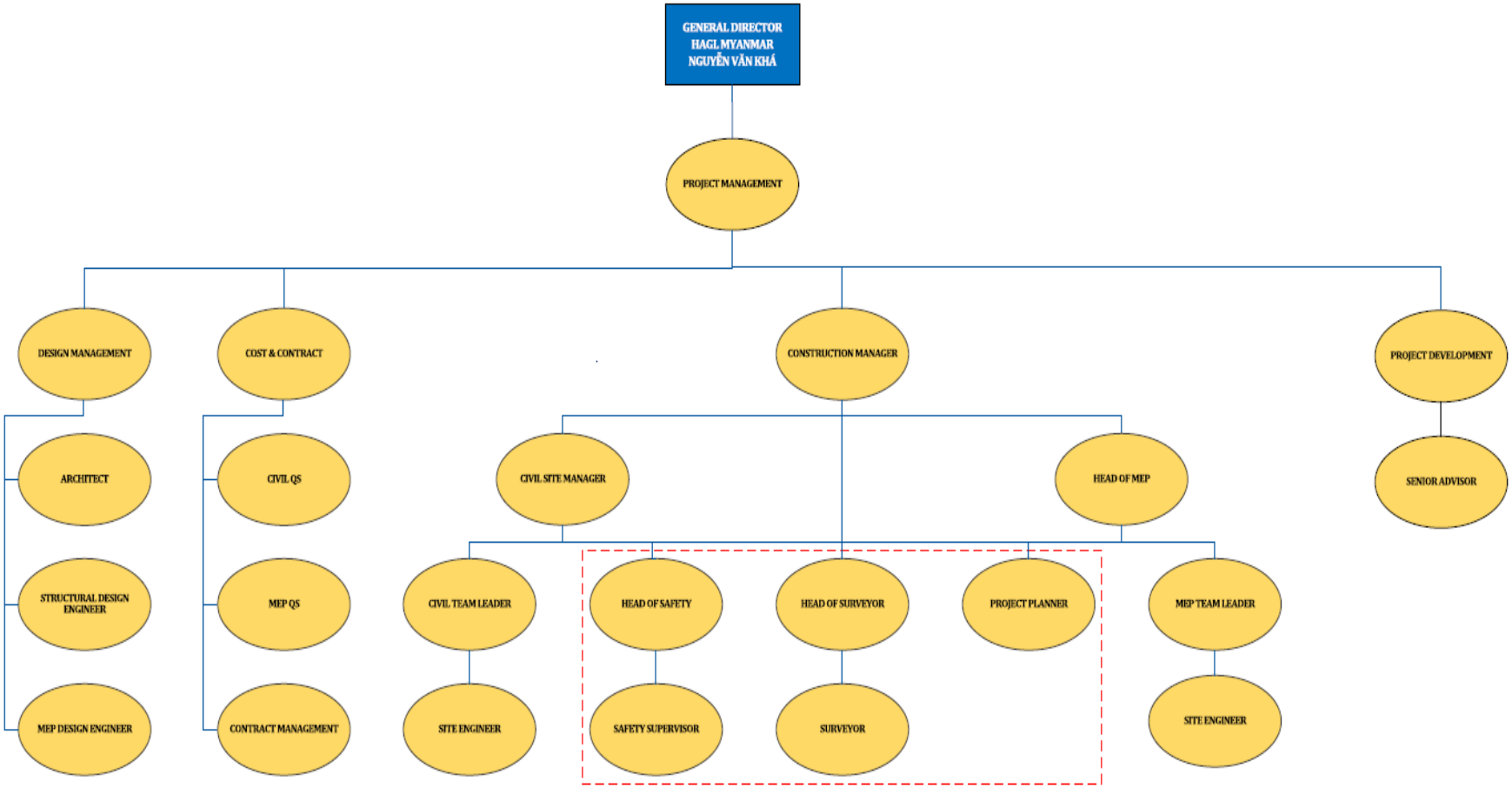


Figure 1-2 Organization Chart of HAGL Myanmar

1.2. EIA SCOPING REPORT CONSULTANT

Total Business Solution Co., Ltd. (TBS) is a locally own company which provides engineering and environmental services to private and public sectors in Myanmar. Since its inception in 2012, TBS, in collaboration with TEAM Consulting Engineering Management Co., Ltd of Thailand, has worked on various projects such as port and industrial estate development, power transmission, flood control, drainage and sewerage system, Environmental Impact Assessment (EIA), Initial Environmental Examination (IEE) and Environmental Management Plan (EMP).

TBS has been engaged to prepare the EIA for HAGL Myanmar (Phase-2) project. The study team consists of qualified and experienced professionals in various technical areas relevant to major environmental and social impacts of the project identified in the report**.** The organizational structure for conducting and managing the EIA scoping stage is shown in Table 1-3.

Table 1-3 EIA (Scoping Stage) Study Team by TBS

No.	Name	Education	Experience	Responsiblities
1.	Dr. Soe Moe Kyaw Win Managing Director Principal of Geotechnical and Geo environmental Engineer	Ph.D. (Geotechnical Engineering) M.Sc. (Geotechnical Engineering) B.Sc. (Geology)	30-year experiences in the areas of environmental assessment, geotechnical and geological engineering in Southeast Asian, U.S.A and Canada. Environmental assessments, mine waste management, site investigation, instrumentation, ground improvement, land reclamation and landslide investigation.	Final review of the report
2.	Mr. Wai Soe General Manager/ Project Manager	B.Sc. (Geology)	10-year experiences in the areas of geotechnical instrumentation and monitoring in Myanmar and Singapore 5 years' experiences in managing technical teams for site investigation and instrumentation in landslide investigation, mine design, mine waste management, hydrographic and topographic survey	Coach of Monitoring Site Survey, Environmental Quality Analysis and Modelling Expert
3.	Ms. Thet Htar Myint Social Impacts Assessment Specialist	M.Sc. (Gender and Development) M.Sc. (Zoology) B.Sc. (Hons) (Zoology)	Over 17-year experiences in environmental, gender and social development fields. Experience included environmental impact assessment, gender and social development studies, social impacts assessment, safeguards and	Social Impact Assessment (Gender, Social and Economic)

No.	Name	Education	Experience	Responsiblities
			development of resettlement plans, Capacity Building of community and Administrative works.	
4.	Ms. Hnin Lai Win Environmental Manager	M.Sc. (Environmental Engineering and Management) B.Pharm. (Pharmacy)	5-year experiences in management and marketing and training of junior staff in medical field Over 4-year experiences in land use planning, environmental impact assessment and managing environmental projects. Environmental management plan, environmental monitoring, environmental risk assessment, facilitated the public consulting meetings, marketing, coordination with government organizations and local community.	Project Description, Environmental Risk Assessment, Environmental Management Plan, Impact Mitigation Measure
5.	Dr. Aung Aung	Ph.D. (Zoology) M.Sc. (Zoology) B.Sc. (Zoology)	Over 19-year experiences in teaching, researcher in Zoology field and biodiversity conservation.	Environmental impact assessment and Biodiversity conservation focus on mammalogy and ecology.
6.	Dr. Pyone Pyone Myint	Ph.D. (Zoology) M.Sc. (Zoology) B.Sc. (Zoology)	Over 19-year experiences in teaching and field research in Zoology field and Biodiversity observation.	Environmental impact assessment and biodiversity observation mainly in anatomy, behavior, ecology, evolution, physiology, conservation, or other aspects of bird biology.
7.	Dr. Thant Zaw Win	Ph.D. (Taxonomy) M.Sc. (Botany) B.Sc. (Botany)	Over 9-year experiences in teaching and field research in Botany field and biodiversity observation.	Environmental impact assessment and phytochemical analysis, wetland management, specialist in plant biology.
8.	Dr. Than Than Myint	Ph.D. (Zoology) M.Sc. (Zoology) B.Sc. (Zoology)	Over 16-year experiences in teaching and field research in Zoology field and marine biology observation.	Environmental impact assessment and marine biodiversity observation mainly in fish biology.
9.	Mr. Thein Tun Oo Electrical Engineer	A.G.T.I (Electrical Engineering Power)	20-year working experiences in Marine Electrical Engineering in Singapore, Malaysia, Thailand and China. 3-year experience in environmental quality monitoring, land use observation, marketing,	Environmental Quality Monitoring on site Leader

No.	Name	Education	Experience	Responsiblities
			conducting public consultation meetings, coordination with government organizations and local community	
10.	Ms. Su Myat Kyaw Environmental Scientist	M.E (Environmental Engineering and Management) B.E (Materials and Metallurgy)	3-year experiences in environmental field Environmental impact assessment and management plan, environmental reporting, coordination with government offices and local community.	Legal Analysis Environmental Quality Analysis
11.	Mr. Htun Lin Kyaw Environmental Geologist	M.Sc (Structural Geology) B.Sc (Hons) Geology	3-year experiences in topography, road and construction survey. 5-year experiences in environmental management plan, managing environmental projects and environmental monitoring instruments installation. Air and noise monitoring, water sampling, land use observation, marketing, conducting public consultation meetings, coordination with government organizations and local community.	Coordination with government organizations and local community, Social Survey
12.	Ms. Thandar Kyaw Environmental Geologist	M.Sc. (Petroleum Geology) B.Sc. (Hons)Geology	2-year experiences in geotechnical laboratory testing and environmental management plan. 3-year experience in environmental survey, socio- economic survey, environmental impacts monitoring, conducting public consultation meetings, marketing, coordination with government organizations and local community and documentation in environmental management projects.	Social data Analysis, Social Impact Assessment Assistant
13.	Ms. Eaindra Oo Water Resources Engineer	M.Sc. (Water Engineering and Management) B.Sc. (Civil and Infrastructure Engineering)	3-year experiences in Hydropower engineering, catchment and river management, flood monitoring, hydrology survey and modeling and climate condition study.	Waste and Water Management Environmental Quality Modeling Assistant

No.	Name	Education	Experience	Responsiblities
			Hydropower designing, planning and estimation. Geotechnical data processing, data analysis and report preparation. GIS mapping and reporting environmental management plan for environmental projects.	
14.	Mr. Htet Thiha Phone Myint Environmental Geologist	B.Sc. (Geology)	7-year experiences in geological field, soil analysis, environmental management land use observation Environmental site survey, impacts monitoring (air, noise, water sampling), coordination with government organizations and local community, socioeconomic survey and documentation in environmental management projects.	Coordination with government organizations and local community, Social Survey, Social data Analysis
15.	Mr. Phyo Thu Kyaw Auto CAD Drafter	B.E. (Mechatronic)	3-year experiences in project coordination, documentation, Auto CAD drafter and graphic design and IT technician. Over 4-year experiences in environmental monitoring such as air and noise monitoring, water sampling and installing, maintaining and repair of computer system and office equipment.	Coordinator and Drafter
16.	Mr. Aung Chit Moe Geologist	B.Sc (Hons) Geology	Over 3-year working experiences in geological and geotechnical engineering.	Geotechnical, GIS, Mapping and Drone Data Processing Environmental Quality Modeling Assistant
17.	Mr. Wai Phyo Aung Surveyor	B.Sc (Geology)	7-year working experiences in geological and geotechnical engineering. 5 years experiences as a team leader in survey team.	Environmental Quality Monitoring Survey Drone Survey
18.	Ms. May Khaing Zin Hein Junior Engineer	B.E (Civil)	2-year experience in data Processing for geo-studio soil stability and starter logging, GIS Mapping, report comment editing	Social data entry, Mapping and Data Processing

No.	Name	Education	Experience	Responsiblities
19.	Mr. Chan Nyein Aung Environmental Geologist	B.Sc (Geology)	2-year experience in environmental monitoring processes and conducting site survey	Environmental Quality Monitoring Survey, Drone Survey
20.	Mr. Zaw Myo Hein Environmental Geologist	B.Sc (Geology)	2-year experience in environmental monitoring processes and conducting site survey	Environmental Quality Monitoring Survey, Drone Survey
21.	Ms. Phoo Pwint Khine Environmental Engineer	M.E (Environmental Engineering and Management) B.E (Civil)	1-year experience as a site engineer in construction project. 6 months experience as a QC/QS at building estimate team. 2-year experiences in environmental field	Project Description Wastewater Management Hazardous Waste Management Environmental Quality Analysis
22.	Ms. Aye Mon Aung Environmental Engineer	M.E (Environmental Engineering and Management) B.E (Materials and Metallurgy)	2-year experiences in environmental field	Water Resources Management Water Pollution Control Environmental Management Plan

1.3. EIA CONSULTANT

The Environmental Compliance Consultancy Co. Ltd (EnvCC) is a third party organization that has obtained the Organization License Type (A) for Third Party Individuals or Organizations conducting Initial Environmental Assessments (IEE) and Environmental Impact Assessments (EIA) - License No. **EIA-CO (A) 005/2024** and is a consulting organization that conducts environmental impact assessments in accordance with national and international environmental impact assessment guidelines and procedures, and related laws, rules and regulations.

The contact details for Environmental Compliance Consultancy Co., Ltd. responsible for this report are as follows:

Name: Daw Myat Mon Swe

Position: Principal Consultant

Address: No. 20, Nibhinda Road, Nanthakone Ward, Insein Township,

Yangon, Myanmar

Telephone: +95 9 420111902, +95 9 768211919

Email: myatmonswe@envccmyanmar.com

myatmonswe@gmail.com

Website: www.envccmyanmar.com

EnvCC endorses and confirms to the Environmental Conservation Department, Ministry of Natural Resource and Environmental Conservation the following:

- The accuracy and completeness of the Scoping Report;
- The Scoping Report has been prepared in compliance with applicable Environmental Conservation Law, Rules and Procedures; and
- That all the information contained in the scoping report is accurate and a truthful representation of all findings as relating to the project and prepared in compliance with the respective Laws and Regulations.

The responsibilities of each EnvCC's consultants with their expertise to conduct for the EIA study and Chapters of the writing in this report is listed in Table 1-4. The detailed information is mentioned in Appendix B.

Table 1-4 EnvCC's EIA Study Team Members and Responsibilities of the Report

No.	Area of expertise and responsibilities	Key Consultant	License No.	Responsibilities of chapters of report writing
Group (1) Air Impact Assessment				
1.	(a) Air Pollution Monitoring (b) Air Pollution Prevention and Control	U Ye Myat Phone Hlaing	EIA-AC 008/2023	▪ Chapter 4. Existing Environmental and Social Condition (Air Quality) ▪ Chapter 5. Potential Environmental Impacts and Mitigation Measures (Air Quality, Air Pollution Prevention and Control)
2.	(c) Meteorology, Air Quality Assessment and Forecast	Dr. Phyo Thu Aung	EIA-AC 018/2023	▪ Chapter 4. Existing Environmental and Social Condition (Climate Change Trend and Metrology) ▪ Chapter 5. Potential Environmental Impacts and Mitigation Measures (Air Quality)
Group (2) Water Impact Assessment				
3.	(a) Water Pollution Prevention, Control, Monitoring and Prediction (b) Hydrology, Surface Water and Ground Water Conservation	Daw Thandar Tun	EIA-AC 067/2024	▪ Chapter 4. Existing Environmental and Social Condition (Hydrology and Water Source) ▪ Chapter 5. Potential Environmental Impacts and Mitigation Measures (Hydrology and Water Quality)
Group (3) Soil Impact Assessment				
4.	(a) Geological Assessment (b) Soil Conservation (c) Land Use (d) Noise and Vibration	U Aung Nyein Myat	EIA-AC 013/2023	▪ Chapter 4. Existing Environmental and Social Condition (Soil Conservation, Land Usem, Hydrology and Geology) ▪ Chapter 5. Potential Environmental Impacts and Mitigation Measures (Soil Conservation, Land Use, Hydrology and Geology) ▪ Chapter 9. Public Consultation and Disclosure
Group (4) Ecology and Biodiversity Impact Assessment				
5.	▪ Ecology and Biodiversity	Daw Than Than Htay	EIA-C 045/2023	▪ Chapter 4. Existing Environmental and Social Condition (Ecology and Biodiversity) ▪ Chapter 5. Potential Environmental Impacts and Mitigation Measures (Ecology and Biodiversity)
Group (5) Socio-economic Impact Assessment				

No.	Area of expertise and responsibilities	Key Consultant	License No.	Responsibilities of chapters of report writing
6.	(a) Social Study and Analysis (b) Legal Study and Analysis (c) General Environmental Management	Daw Myat Mon Swe	EIA-C 018/2023	▪ Executive Summary ▪ Chapter 1. Introduction ▪ Chapter 2. Overview of the Policy, Legal and Institutional Framework (Legal Study and Analysis) ▪ Chapter 3. Project Description and Alternatives ▪ Chapter 4. Existing Environmental and Social Condition ▪ Chapter 5. Potential Impacts and Mitigation Measures ▪ Chapter 6. Cumulative Impact Assessment ▪ Chapter 7. Environmental Management Plan and Monitoring ▪ Chapter 8. Public Consultation and Disclosure ▪ Chapter 9. Conclusion and Recommendation
7.	(d)Health	Dr. Hein Lin Aung	EIA-AC 052/2023	▪ Chapter 4. Existing Environmental and Social Condition (Health) ▪ Chapter 5. Potential Environmental Impacts and Mitigation Measures (Occupational Health and Safety)
8.	(e) Archeology and Cultural Heritage	U Than Htut	EIA-AC 104/2024	▪ Chapter 4. Existing Environmental and Social Condition (Cultural Heritage)
Group (6) Waste Impact Assessment				
9.	(a) Risk Assessment and Hazard Management (b) Solid Waste and Hazardous Waste Management	Daw Soe Moe Nwe	EIA-C 030/2023	▪ Chapter 5. Potential Environmental Impacts and Mitigation Measures (Solid Waste and Hazardous Waste Management,Risk Assessment and Hazard Management- Noise and Vibration)
Supporting Members				
10.	(a) Legal Study and Analysis	Daw Kay Khaing Wint	▪ BA (Law) ▪ Dip.of Business Law ▪ Dip. Of International Business Law	▪ Executive Summary ▪ Chapter 2. Overview of the Policy, Legal and Institutional Framework (Legal Study and Analysis)

No.	Area of expertise and responsibilities	Key Consultant	License No.	Responsibilities of chapters of report writing
11.	(a) Risk Assessment and Hazard Management	Daw Hsutyi Mon	▪ BE (Civil) ▪ Dip (Business Management) ▪ Internal Auditing, ISO14001 & 45001 ▪ Certificate of EIA Report Writing, IAIA Certificate of Fundamental of EIA, IAIA	▪ Executive Summary ▪ Chapter 1. Introduction ▪ Chapter 5. Potential Environmental Impacts and Mitigation Measures (Risk and Hazard Assessment)

1.4. THE EIA REQUIREMENT

According to the Myanmar Environmental Conservation Law (2012) and the EIA Procedure (2015), the construction projects with various types of building need to undergo an EIA study. The project follows this EIA requirement.

In May 19, 2020, the project proponent engaged TBS Co., Ltd (the Consultant) to conduct the ESIA for the project. Its contents will follow all relevant guidelines and procedures of the Environmental Conservation Department (ECD), particularly those prescribed in the EIA Procedure (2015).

With reference to Section 47 of the EIA Procedure (2015) of the Union Government dated 29 December 2015, an ESIA Scoping Report will be required for determining the scope of the ESIA (i.e., the data that need to be collected and analyzed to assess the potential adverse impacts of a project) and producing a Terms of Reference (ToR) for preparation of an EIA Report. The scoping report will be submitted to the Ministry of Natural Resources and Environmental Conservation (MONREC) for review and approval before commencing the EIA investigation.

1.5. TERM OF REFERENCE OF EIA

This section outlines ToR for the consultant to undertake detailed EIA. ToR comprise are shown in below, but not be limited to.

- Executive Summary
- Introduction
- Overview of the Policy, Legal and Institutional Framework
- Project Description and Alternative
- Existing Environmental and Social Condition
- Potential Environmental Impact and Mitigation Measurement
- Risk Assessment
- Cumulative Impact Assessment
- Environmental Management Plan
- Public Consultation and Disclosure
- Conclusion and Recommendation
- Reference

1.6. THE EIA SCOPE AND REPORT

The EIA will be conducted as a comprehensive planning study of environmental and social impact issues associated with the construction and operations of Project facilities.

In addition to the issues directly related to the Project construction, operation, and decommission, the EIA will also cover issues related to health and safety of workers and, people in the Project area, and the Project's support to community development. The EIA will present the study results in a final EIA report following outline prescribed in MONREC's EIA guidelines

CHAPTER 2
OVERVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This chapter contains information on relevant policies, legislations and institutional framework of Myanmar that are relevant to the environmental and socio-economic aspects of the project. The activities carried out under the project are subject to these legal requirements.

The project proponent will formulate an environmental management policy to guide its environmental management during construction/decommission phase and operation phases of project. Such a policy will support the following activities:

- Development a comprehensive Environmental, Health and Safety (EHS) management system for implementing the environmental management plan (EMP);
- Implementing EMP during the construction phase, nominate project contractors will be required to prepare and implement contract specific EHS measures for construction phase of the proposed condominium;
- During the operation phase, EHS management will be an integral part of the operational management of the proposed condominium;
- Encourage public participation in EHS management related to surrounding communities and
- Maintain information generated in EHS management and prepare EHS performance reports as required by the corporate management and the relevant authorities of the Government,

The project proponent will establish and activate EHS Management system at the commencement of construction.

2.1. RELEVANT MYANMAR LAWS AND REGULATIONS

Policies, legislation and guidelines in Myanmar that are of relevance to the project are listed in Table 2-1. The project proponent will comply with all the following laws and regulations.

Table 2-1 Relevant Laws and Regulations

No.	Name of Laws and Regulations	Year
Environmental Conservation		
1.	Environmental Conservation Law	2012
2.	Environmental Conservation Rules	2014
3.	Environmental Impact Assessment Procedure	2015
4.	National Environmental Policy of Myanmar	2019
Pollution Control and Health		
5.	National Environmental Quality (Emission) Guidelines	2015
6.	National Drinking Water Quality Standards	2019
7.	National Surface Water Quality Standards	2024
8.	Public Health Law	1972
9.	The Prevention and Control of Communicable Diseases Law	1995 (amended in 2011)
10.	The Control of Smoking and Consumption of Tobacco Product Law	2006
11.	Occupational Safety and Health Law	2019
12.	National Waste Management Strategy and Master Plan for Myanmar	2018-2030
Biodiversity and Resource Conservation		
13.	Conservation of Biodiversity and Natural Protected Area Law	2018
14.	The Law relating to Aquaculture	1989
15.	Conservation of Water Resources and River Law	2006 (amended in 2017)
16.	Conservation of Water Resources and River Rules	2013
17.	Undergound Water Act	1930
18.	Forest Law	2018
Land Acquisition		
19.	The Land Acquisition Act	1894
20.	Farmland Law	2012
21.	Farmland Rules	2012
22.	Vacant, Fallow and Virgin Land Management Law	2018
23.	Registration of Deeds Law	2019
24.	The Demarcation of Boundaries Law	2019
Urban Development and Management		
25.	Development Committee Law	2013
26.	Yangon City Municipal Law	2018
27.	Myanmar Engineering Council Law	2013
28.	Condominium Law	2016
29.	The Electricity Law	2014
Human Rights		
30.	The Ethnic Rights Protection Law	2015

No.	Name of Laws and Regulations	Year
31.	The Ethnic Rights Protection Rules	2019
32.	Rights of the Persons with Disabilities Law	2015
Cultural Heritages		
33.	The Protection and Preservation of Cultural Heritage Regions Law	2019
34.	The Protection and Preservation Antique Objects Law	2015
35.	The Protection and Preservation of Ancient Monuments Law	2015
Labour		
36.	Labour Organization Law	2011
37.	The Employment and Skill Development Law	2013
38.	The Minimum Wage Law	2013
39.	Payment of Wage Law	2016
40.	Workers' Compensation Act	1923
41.	The Settlement of Labour Dispute Law	2012
42.	Social Security Law	2012, amended in 2020
Motor Vehicles		
43.	The Road Safety and Motor Vehicle Management Law	2020
44.	The Road Safety and Motor Vehicle Management Rules	2022
Fire Management		
45.	The Petroleum and Petroleum Product Law	2017
46.	Myanmar Fire Brigade Law	2015
Company Administration		
47.	Myanmar Insurance Law	1993, amende in 1996
48.	Myanmar Insurance Rules	2017
49.	Myanmar Investment Law	2016, amended in 2019
50.	Myanmar Investment Rules	2017
51.	The Union Tax Law	2019
52.	The Export and Import Law	2012
High-rise Building		
53.	Guidelines for High-Rise Building Construction Projects from Committee for Quality Control of High-Rise Building Construction Projects (CQHP)	-
54.	Myanmar National Building Code	2025
Natural Disaster and Climate Change		
55.	Natural Disaster Management Law	2013
56.	Climate Change Policy	2019
57.	Green Building Chapter in Myanmar National Building Code	2020
58.	Myanmar Climate change strategy and Master Plan (2018-2030)	
Myanmar Government Institutional Framework		

No.	Name of Laws and Regulations	Year
59.	Arrangement at National and Sector Level	
60.	Arrangement at the EIA report	
International Guidelines and Conventions		
61.	IFC's Standards and Guidelines	
62.	World Bank's Pollution Prevention and Abatement Handbook (1988)	
63.	Vienna Convention for the Protection of the Ozone Layer (1985)	
64.	Montreal Protocol on Substances that Deplete the Ozone Layer (1987)	
65.	Kyoto Protocol	
66.	United Nations Framework Convention on Climate Change (UNFCCC)	

2.2. ENVIRONMENTAL CONSERVATION

2.2.1. Environmental Conservation Law (2012)

The project proponent commits to compensate for environmental impact when causing the environmental contamination, stated under the Section 7 (o) of Enviromental Conservation Law (2012).

The project proponent commits to treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards, under the Section 14 of Environmental Conservation Law (2012).

The project proponent commits to install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution while causing a point source of pollution, if not practicable, it shall be arranged to dispose the wastes in accord with environmentally sound methods, stated under the Section 15 of Environmental Conservation Law (2012).

The project proponent commits to carry out by contributing the stipulated cash or kind in the relevant combined scheme for the environmental conservation including the management and treatment of waste, under the Section 16 (a) of Environmental Conservation Law (2012).

The project proponent commits to contribute the stipulated users charges or management fees for the environmental conservation according to the relevant industrial estate, special economic zone and business organization, under the Section 16 (b) of Environmental Conservation Law (2012).

The project proponent commits to comply with the directives issued for environmental conservation according to the relevant industrial estate, special economic zone or busiess, under the Section 16 (c) of Environmental Conservation Law (2012).

The project proponent commits not to violate any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law, according to the Section 29 of Environmental Conservation Law (2012).

2.2.2. Environmental Conservation Rules (2014)

The project proponent commits not to emit, ask to emit, dispose, ask to dispose, pile and ask to pile, by any means, hazardous waste or hazardous substances stipulated by notification according to any rules in this rule at any place which may affect the public directly or indirectly, according to Rule 69 (a) of Environmental Conservation Rules (2014).

The project proponent commits not to carry out any activity which can damage the ecosystem and the natural environment which is affected due to such system, except for the permission of the Ministry for the interests of the people, under Rule 69 (b) of Environmental Conservation Rules (2014).

2.2.3. Environmental Impact Assessment Procedure (2015)

The project proponent commits to bear full legal and financial responsibility for: (a) all of the Project Proponent's actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the Project acting for or on behalf of the Project, in carrying out work on the Project; and (b) Project Affected Persons (PAPs) until they have achieved socio-economic stability at a level not lower than that in effect prior to the commencement of the Project, and shall support programs for livelihood restoration and resettlement in consultation with the PAPs, related government agencies, and organizations and other concerned persons for all Adverse Impacts, under the Article 102 of Environmental Impact Assessment Procedure (2015).

The project proponent commits to fully implement the Environmental Management Plan (EMP), all Project commitments, and conditions, and is liable to ensure that all contractors and subcontractors 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, under the Article 103 of Environmental Impact Assessment Procedure (2015).

The project proponent commits to fully and effectively implement, all requirements set forth in the Environmental Compliance Certificate (ECC), applicable Laws, the Rules, this Procedure and standards, under the Article 104 of Environmental Impact Assessment Procedure (2015).

The project proponent commits to timely notify and identify in writing to the Ministry, providing detailed information as to the proposed Project's potential Adverse Impacts, under the Article 105 of Environmental Impact Assessment Procedure (2015).

The project proponent commits to, during all phases of the Project (pre-construction, construction, operation, decommissioning, closure and post-closure), engage in continuous, proactive and comprehensive self-monitoring of the Project and activities related thereto, all Adverse Impacts, and compliance with applicable laws, the Rules, this Procedure, standards, the ECC, and the EMP, under the Article 106 of Environmental Impact Assessment Procedure (2015).

The project proponent commits to notify and identify in writing to the Ministry any breaches of its obligations or other performance failures or violations of the ECC and the EMP as soon as reasonably possible and in any event, in respect of any breach which would have a serious impact or where the urgent attention of the Ministry is or may be required, within not later than twenty-four (24) hours, and in all other cases within seven (7) days of the Project

Proponent becoming aware of such incident, under the Article 107 of Environmental Impact Assessment Procedure (2015).

The project proponent commits to submit monitoring reports to the Ministry not less frequently than every six (6) months, as provided in a schedule in the EMP, or periodically as prescribed by the Ministry, under the Article 108 of Environmental Impact Assessment Procedure (2015).

The project proponent commits to include the following descriptions in the monitoring report, according to Article 109 of Environmental Impact Assessment Procedure (2015);

- documentation of compliance with all conditions;
- progress made to date on implementation of the EMP against the submitted implementation schedule;
- difficulties encountered in implementing the EMP and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar future difficulties;
- number and type of non-compliance with the EMP and proposed remedial measures and timelines for completion of remediation;
- accidents or incidents relating to the occupational and community health and safety, and the environment; and
- monitoring data of environmental parameters and conditions as committed in the EMP or otherwise required.

The project proponent commits to make such report (except as may relate to National Security concerns) publicly available on the Project's website, at public meeting places (e.g. libraries, community halls) and at the Project offices, within ten (10) days of completing a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, the Project Proponent shall make such report (except as may relate to National Security concerns) publicly available on the Project's website, at public meeting places (e.g. libraries, community halls) and at the Project offices. In addition, he must submit a digital copy via email or as may otherwise be agreed upon with the requestor when any organization or person may request a digital copy of a monitoring report, under the Article 110 of Environmental Impact Assessment Procedure (2015).

The project proponent commits to (a) grant to access the Ministry and/or its representatives, at any time during normal working hours, and (b) grant the Ministry access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed when the Ministry may reasonably require, under the Article 113 of Environmental Impact Assessment Procedure (2015).

The project proponent commits to grant full and immediate access to the Ministry at any time as may be required by the Ministry in the event of an emergency, or where, in the opinion of the Ministry, there is or may exist a violation or risk of violation of the compliance by the Project with all applicable environmental and social requirements, under the Article 115 of Environmental Impact Assessment Procedure (2015).

The project proponent commits to ensure that the Ministry's rights of access hereunder shall extend to access by the Ministry to the Project's contractors and subcontractors, under the Article 117 of Environmental Impact Assessment Procedure (2015).

2.2.4. National Environmental Policy (2019)

National Environmental Policy of Myanmar was enacted by the Republic of the Union of Myanmar in 2019. In this policy, Section 8 states that the Government of the Republic of the Union of Myanmar is committed to putting this National Environmental Policy into action through a Strategic Framework and a series of master plans. The Strategic Framework applies the National Environmental Policy principles to priority thematic areas and sectors. It also provides environmental governance requirements for effective implementation, including institutional strengthening, monitoring and enforcement, public participation, dispute resolution and financing. The Strategic Framework provides guidance for preparing master plans for States and Regions and for the priority thematic areas and sectors. The master plans will contain specific activities, timeframes, budgets and performance targets for achieving the Strategic Framework objectives and, ultimately, the National Environmental Policy vision. The linkages between the National Environmental Policy, Strategic Framework, and Master Plans are depicted in Figure 2-1.

Figure 2-1 National Environmental Policy Myanmar

2.3. POLLUTION CONTROL AND HEALTH

2.3.1. National Environmental Quality (Emission) Guidelines (2015)

According to the NEQEG (2015), all projects subject to the EIA Procedure (2015) have to comply with and refer to applicable national guidelines/standards or international standards adopted by MONREC. In addition, project proponents shall be responsible for monitoring their compliance with general and applicable industry-specific guidelines as specified in the EMP and ECC. In addition, the project proponent is responsible for monitoring the environmental quality based on developed EMP as specified in the following sections.

2.3.1.1. Air Quality

Ambient Standards

The NEQEG requires that "emissions do not result in concentrations that reach or exceed national ambient quality guidelines and standards, or in their absence current World Health Organization (WHO) Air Quality Guidelines". As national ambient quality guidelines and standards have not been established as of November 2016, the standards required to be met in Myanmar is equivalent to the values set in WHO Air Quality Guidelines. NEQEG also require that contribution concentration of emissions from each project does not exceed 25 percent of the applicable air quality standards[3]. Table 2-2 shows the ambient standards concerning air quality applicable to the project.

Table 2-2 General Guideline Values for Air Quality

Parameters	Unit	Averaging Period	NEQEG
Nitrogen dioxide	µg/m^3	1-year	40
		1-hour	200
Ozone	µg/m^3	8-hour daily maximum	100
Particulate Matter PM_{10}	µg/m^3	1-year	20
		24-hour	50
Particulate Matter $PM_{2.5}$	µg/m^3	1-year	10
		24-hour	25
Sulfur dioxide	µg/m^3	24-hour	20
		10-minute	500

Source: NEQEG (2015)

[3] During the EIA preparation, the predicted contribution concentration will be calculated with a simulation model and the obtained results will be compared with the amount equivaling 25 percent of the applicable air quality standard

2.3.1.2. Water Quality

The site runoff and wastewater discharges during construction phase is shown in Table 2-3. The general guideline for operation phase is shown in Table 2-4.

Table 2-3 Site Runoff and Wastewater Discharges (Construction Phase)

Parameter	Unit	Guideline Value[a]
Biological oxygen demand	mg / L	30
Chemical oxygen demand	mg / L	125
Oil and grease	mg / L	10
pH	S.U[a]	6-9
Total coliform bacteria4	100 mL	400
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50

Source: NEQEG (2015)

Table 2-4 National Guidelines for (Wastewater, Storm Water Runoff, Effluent and Sanity Discharges (General Application))[5] Operation phase

Parameter	Unit	Guideline Value [a]
5-day Biochemical oxygen demand	mg/l	50
Ammonia	mg/l	10
Arsenic	mg /l	0.1
Cadmium	mg/l	0.1
Chemical oxygen demand	mg/l	250
Chlorine (total residual)	mg/l	0.2
Chromium (hexavalent)	mg/l	0.1
Chromium (total)	mg/l	0.5
Copper	mg/l	0.5
Cyanide (free)	mg/l	0.1
Cyanide (total)	mg/l	1
Fluoride	mg/l	20
Heavy metals (total)	mg/l	10

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

[5] Pollution prevention and abatement handbook (1998). Toward cleaner production. World Bank Group in collaboration with United Nations Environment Programme and the United Nations Industrial Development Organization.

Parameter	Unit	Guideline Value [a]
Iron	mg/l	3.5
Lead	mg/l	0.1
Mercury	mg/l	0.01
Nickel	mg/l	0.5
Oil and grease	mg/l	10
pH	S.U.[a]	6-9
Phenols	mg/l	0.5
Selenium	mg/l	0.1
Silver	mg/l	0.5
Sulphide	mg/l	1
Temperature increase	mg/l	<3[b]
Total coliform bacteria	mg/l	400
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50
Zinc	mg/l	2

Source: NEQEG (2015)

a Standard Unit

b At the edge of scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity; when the zone is not defined, use 100 meters from the point of discharge

2.3.1.3. Waste (Wastewater Treatment Facility)

Sludge generated at the waste water treatment facility is dehydrated and landfilled or incinerated. Sludge is regulated by the effluent standards shown in Table 2-5.

Table 2-5 Effluent Standards for Sludge

Parameter	Unit	National standard*
Arsenic	mg/kg	75
Cadmium	mg/kg	85
Chromium (total)	mg/kg	3,000
Copper	mg/kg	4,300
Lead	mg/kg	840
Mercury	mg/kg	57
Molybdenum	mg/kg	75
Nickel	mg/kg	420
Selenium	mg/kg	100
Total coliform bacteria	g	1,000
Zinc	mg/l	7,500

* NEQEG (2015) （Refer to “Use and disposal of sewage sludge. 2006. 40CFR Part 503, USEPA”）

2.3.1.4. Solid Waste Management Facilities

The leachate generated from landfill of general waste and industrial waste is regulated by the effluent standards shown in Table 2-6.

Table 2-6 Effluent Standard for Leachate from Landfill of General Waste

Parameter	Unit	Hazardous Waste Landfills		Municipal Solid Waste Landfills	
		Daily max	Monthly average	Daily max.	Monthly average
5-day Biochemical oxygen demand	mg/l	220	56	140	37
Ammonia	mg/l	10	4.9	10	4.9
Aniline	mg/l	0.024	0.015	-	-
Arsenic	mg/l	1.1	0.54	-	-
α-Terpineol	mg/l	0.042	0.019	0.033	0.016
Benzoic acid	mg/l	0.119	0.073	0.12	0.071
Chromium (total)	mg/l	1.1	0.46	-	-
Naphthalene	mg/l	0.059	0.022	-	-
p-Cresol	mg/l	0.024	0.015	0.025	0.014
pH	-	6-9	6-9	6-9	6-9
Phenol	mg/l	0.048	0.029	0.026	0.015
Pyridine	mg/l	0.072	0.025	-	-
Total suspended solids	mg/l	88	27	88	27
Zinc	mg/l	0.535	0.296	0.2	0.11

* NEQEG （2015)

2.3.1.5. Noise and Vibration

The noise level is regulated by the NEQEG for each receptor as shown Table 2-7. The vibration result is compared with German Standard from DIN 4150. The German Standard Guidelines are shown in Table 2-8.

Table 2-7 General Guideline Values for Noise Level

Receptor	Unit	National Guideline Values (NEQEG)		IFC/WB EHS Guidelines	
		Daytime 7:00-22:00 (10:00-22:00 for Public holidays)	Nighttime 22:00-7:00 (10:00-22:00 for public holidays)	Daytime 7:00-22:00	Night time 22:00-7:00
Residential/ Institutional/ Educational	dBA	55	45	55	45
Industrial/ Commercial	dBA	70	70	70	70

Source: NEQEG (2015), IFC General EHS Guidelines (2007)

Table 2-8 Guideline Value for Vibration (German standard DIN 4150-3)

Structure Type	Peak Particle Velocity (mm/s)		
	4-8 Hz	8-30 Hz	30-100 Hz
Commercial	20	20-40	40-50
Residential	5	5-15	15-20
Very sensitive	3	3-8	8-10

2.3.1.6. Odor

General guideline values for odor are described in Table 2-9. According to NEQEG, odor level in the populated areas should not exceed 5 to 10 odorant units.

Table 2-9 General Guideline Values for Odor

Parameter	National Guideline Values (NEQEG)
Odor Level	should not exceed 5 to 10 odorant units at the edge of populated areas in the vicinity of a project

Source: NEQEG (2015), IFC General EHS Guidelines (2007)

2.3.2. National Drinking Water Quality Standards (2019)

The project proponent will be responsible to adopt the National Drinking Water Quality Standards (2019). The values required under MNDWQS (2019) are shown below Table 2-10.

Table 2-10 National Drinking Water Quality Standards

Parameters	Unit	Standard Values*	WHO Guideline Values[6]
Total Coliforms	Acceptable/No Obtionationable	3	None specified (recommended median value – 0 per 100 ml)
Faecal Coliforms	Acceptable/No Obtionationable	0	Must not be detectable in any 100 ml sample (recommended median value – 0 per 100 ml)
Taste	acceptable/no objectionable taste		Non set (recommended median value –3 DN)
Odor	acceptable/no objectionable odor		Non set (recommended median value –3 DN)
Color	True Color Unit (TCU)	15	None set (recommended median value – 15)
Turbidity	Nephelometric Turbidity Unit (NTU)	5	Non set (recommended median value – 5)
Arsenic	mg/L	0.05	0.01 mg/l
Lead	mg/L	0.01	0.01 mg/l
Nitrate	mg/L	50	50 mg/l
Manganese	mg/L	0.4	0.4 mg/l
Chloride	mg/L	250	Non set (recommended median value- 250)
Hardness	mg/L as CaCO3	500	Non set (recommended median value-500)
Iron	mg/L	1	None set (recommended median value- 0.3)
pH	-	6.5 to 8.5	None set (recommended median value- 6.5 - 8.5)
Sulphate	mg/L	250	None set (recommended median value- 250)
Total Dissolved Solids (TDS)	mg/L	1,000	None set (recommended median value- 1,000)

Source: *MNDWQS (2019)

[6] World Health Organization (WHO), 2018. A Global Overview of National Regulations and standards for Drinking-Water Quality

2.3.3. National Surface Water Quality Standards (2024)

To assess the surface water quality in study area, National Surface Water Quality (2024) should be adopted, in which priority waterbodies shall be classified from Class I to Class V based on its intended water use. Table 2-11 sets out the corresponding water use in the respective water class. Different standards shall apply to different water classes. Different standards shall apply to different water classes. The Residential Units of Block B1 (Basement 2 + 33 storey) are already complete, and construction for Phase 2 is about 12% finished.

Table 2-11 Classification and Use of Surface Water

Water Class	Water use
Class I	(1) Conservation of the natural environment (2) Water supply Grade 1 (conventional treatment) (3) Water uses listed in Class II to V
Class II	Water Supply Grade 2 (pre-treatment snd conventional treatement) Fisheries Grade 1 Bathing and Swimming Water Uses Listed in Class III to V
Class III	(1) Water Supply Grade 3 (advance treatment) (2) Fisheries Grade 2 (3) Industrial Water Grade 1 (4) Agricultural Water Grade 1 (5) Water Uses Listed in Class IV to V
Class IV	(1) Industrial Water Grade 2 (2) Agricultural Water Grade 2 (3) Water Uses Listed in Class V
Class V	(1) Navigation / Transportation (2) Environmental Conservation

2.3.3.1. Parameters for Environmental Conservation

Parameters mainly important for the conservation of the aquatic ecosystem and the living environment are grouped as parameters for environmental conservation. Different standard values are applied to respective water classes, taking into account desirable levels of surface water quality according to the intended use of the waterbodies. The standard values of respective parameters are given in Table 2-12.

Table 2-12 Standard Values of Parameters for Environmental Conservation

Parameter	Unit	Class I	Class II	Class III	Class IV	Class V
Physical Parameter						
Total Suspended solids	mg/L	25	50	75	100	150
Chemical Parameter						
BOD	mg/L	2	3	8	25	30
COD	mg/L	5	8	13	50	100
DO	mg/L	>6	>5	>4	>3	>2
pH	S.U	6.5-	6.5-8.5	6-9	5-9	-
Ammonium nitrogen	mg/L	0.2	0.3	0.5	0.8	0.9
Organics						
Oil and grease		No noticeably seen				
Biological Parameter						
Escherichia coli (E. coli)	MPN/100ml (or) CFU/100ml	20	300	1000	1000	-
Heavy Metals						
Copper	mg/L	0.1	0.3	0.5	-	-

2.3.4. Public Health Law (1972)

The project proponent commits to follow the law in Section 3 of describes about the protection of public health. There are six Sections under Chapter 2. Those Sections describe that the government was working to improve the public health, to protect the public health and the following devices to perform for advices, inspection, supervision, repair, prohibition.

- environmental Health Services
- about the sell and produced food of the people
- about the usage of household and cosmetic products
- about the infectious diseases
- about the private hospital
- about the usage of medicine for the people health and the following devices to perform for advices, inspection, supervision, repair, prohibition.

Project Proponent commits to comply that Organizations formed under this law, those assigned by these groups, Government departments and subordinate agencies assigned under this law, Issues related to environmental health, Food issues, Matters relating to home appliances and cosmetics for the general public, Issues related to infectious diseases, Matters related to private clinic, For matters relating to medicines used by the working people,

factories, business departments, shops, the fronts of the building have the right to inspect and instruct the buildings at any time under Section 5 of The Union Myanmar Public Health Law, 1972.

2.3.5. The Prevention and Control of Communicable Diseases Law (1995, amended in 2011)

Project Propenent commits to comply with the requirement:

(a) That the Department of Health will carry out immunizations and health education activities related to communicable diseases under Section 3 (a) of The Prevention and Control of Communicable Diseases Law, 2011.

(i) immunization of children by injection or orally;
(ii) immunization of those who have attained majority, by injection or orally, when necessary;
(iii) carrying out health educative activities relating to Communicable Disease.
(iv) carrying out the activities of surveillance, prevention and control concerning communicable disease;
(v) carrying out the activities of medical examination for prevention of communicable disease in crossborder entrance and exit of the country, international airport, seaport, other necessary airport, seaport and bus terminal;
(vi) prohibition or restriction of movements at home, hotel, motel and guest house;
(vii) isolation of infected person of communicable disease or suspect of being infected therewith;
(viii) carrying out the activities of spraying, immunization by injection or orally and environmental sanitation necessary for prevention and control according to communicable diseases;
(ix) giving advice to and coordinating with relevant Government departments, organizations and nongovernmental organizations for construction of healthy housing, obtaining safe drinking water and fresh water for use, proper waste disposal in order to prevent occurrence of communicable disease for workers who are carrying out activities of social and economic development;
(x) carrying out other functions prescribed by the Ministry of Health, from time to time.

The project proponent shall comply with the measures undertaken by the Ministry of Health and the Department of Health under section 3 (mentioned above) in respect of prevention of the occurrence and spread of communicable disease and control thereof under Section 4 of The Prevention and Control of Communicable Diseases Law, 2011.

The project proponent shall obey the following, under the Section 9 of The Prevention and Control of Communicable Diseases Law, 2011.

(a) rat fall;

(b) outbreaks appear to be exacerbated during pregnancy and in children.

(c) outbreak of a communicable disease.

The project proponent abide by the following, under the Section 11 of The Prevention and Control of Communicable Diseases Law, 2011.

- investigation of a patient or any other person required;
- medical examination;

- causing laboratory investigation of stool, urine, sputum and blood samples to be carried out;
- carrying out other necessary investigations;
- prohibition of the right of movement of the vehicle carrying animal or animal product suspected of having epidemic disease.

2.3.6. The Control of Smoking and Consumption of Tobacco Product Law (2006)

Project Proponent commits to comply with the requirement, under Section 9 (a to d) of The Control of Smoking and Consumption of Tobacco Product Law, 2006.

That the person-in-charge shall

(a) keep the caption and mark referring that it is a non-smoking area at the place mentioned in Section 6 in accordance with the stipulations;

(b) arrange the specific place where smoking is allowed;

(c) supervise and carry out measures so that no one shall smoke at the non-smoking area; and;

(d) accept inspection when the supervisory body comes to the place for which he is responsible

2.3.7. Occupational Safety and Health Law (2019)

The project proponent commits to apply to the Department for registration to enable to conduct Occupational Safety and Health matters, in accordance with the stipulations, under Section 8 (a) of Occupational Safety and Health Law (2019).

The project proponent commits to notify the Department for the purpose of Occupational Safety and Health, when conducting the following condition;

(a) Building, extending or demolishing a factory or building or

(b) Placing, installing, extending or changing the use of machines in accordance with the process.

The Project Proponent commits to follow the following condition that are described under Section 12 of Occupational Safety and Health Law (2019).

(a) In accordance with the stipulations of the Ministry, the person in charge of occupational safety and health shall be appointed to closely monitor the safety and health of the workers according to the type of work.

(b) The same number of employers according to the type of business in the business not less than the number of workers prescribed by the Ministry to make the workplace safe and healthy; Each occupational safety and health committee, consisting of workers' representatives, shall be formed in accordance with the provisions of the Ministry. This should take into account the occupational safety and health of women due to the nature of the workplace.

The Project Proponent commits to comply with this law and rules, orders, directives and procedures issued under this law to be safe and healthy workplace under Section 14 of of Occupational Safety and Health Law (2019).

The Project Proponent commits to perform the following action under Section 26 of Occupational Safety and Health Law (2019).

(a) workplace Procedures and risk assessments of the equipment and equipment used in them shall be made as necessary.

(b) work environment needs to be measured and evaluated as necessary.

(c) arrange for the workers to be examined by a certified physician in accordance with the requirements for occupational diseases.

(d) sub-section (a); based on the findings under (b) and (c), arrangements shall be made to ensure that the workplace is safe and healthy.

(e) appropriate personal protective clothing prescribed by the Department for the workers; Provide adequate supplies and equipment free of charge.

(f) preventive measures and measures to be taken in case of emergency.

(g) having clinics in the business, not less than the number of workers prescribed by the Ministry; Appointing registered doctors and nurses; provide necessary medicine and supplies.

(h) managers of the relevant type of business or department, including himself; Workers Members of the Occupational Safety and Health Committee shall attend safety and health training prescribed by the Ministry.

(i) arrangements should be made as soon as possible to report any incident to the Occupational Safety and Health Officer or Manager if an employee encounters an occupational injury or life-threatening situation.

(j) equipment used in the workplace or process; Care must be taken to ensure the safety and health of those in the workplace due to equipment or waste.

(k) terminating the process immediately in the event of an imminent situation of workplace injury; relocate workers and make necessary life saving and rescue arrangements. Where possible, workers may be relocated to other suitable safe workplaces.

(l) occupational safety and health directives; Danger warning signs; Milk Posters and directional signs must be posted in accordance with the regulations.

(m) arrangements shall be made to comply with the advance warnings when entering or leaving the restricted work area, which may cause danger.

(n) knowledge; technology, disseminate or disseminate the Occupational Safety and Health Handbook and Guidelines issued by the relevant Ministries for the acquisition of skills to workers as well as those related to the workplace

(o) rehearsing a fire safety plan; Training on proper use of firefighting equipment.

(p) the Chief Inspector and the inspection officers entered the work site; inquiry Documents Requesting evidence or confiscation of evidence must be permitted.

(q) if he is employed in hazardous work and work place, he shall be allowed to work only within the specified working hours.

(r) Be responsible for occupational safety and health costs.

The Project Proponent commits not to dismiss or demote an employee for any of the following reasons under Section 27 of Occupational Safety and Health Law (2019).

(a) medical examination record of the registered doctor for injuries in the workplace; Prior to obtaining a medical record from a physician recognized for occupational disease;

(b) complaining about a case that is unsafe or dangerous to health;

(c) carrying out the duties of the Occupational Safety and Health Committee;

(d) failure to continue working in situations where there is a risk of occupational injury or occupational disease.

The Project Proponent commits to be responsible for the following matters, under Section 34 of Occupational Safety and Health Law (2019).

(a) Inform the Department in case of an occupational accidient, dangerous occurrence and major accident;

(b) Submit the report with the medical report of the certified doctor to the Department, in case of any worker contracted any of the prescribed occupational diseases or being or likely to be occupational poisoning due to any material or process.

The Project Proponent commits not to remove, destroy, add or alter the whole or part of material, machinery, equipment, layouts, and documents related to the occupational accidents, dangerous occurrences, occupational diseases and occupational poisoning.without the permission of the chief inspector, under Section 36 (b) of Occupational Safety and Health Law (2019).

(c) .

2.3.8. National Waste Management Strategy and Master Plan for Myanmar (2018-2030)

By committing to comply with the National Waste Management Strategy and Master Plan (NWMSMP) (2018-2030), a project proponent (HAGL) will adopt with the identified guiding principles, national goals and implementation measures to achieve a zero waste, resource-efficient and sustainable society by 2030. Eight guiding principles stated in NWMSMP as the foundation on which to build the actions that will be used to shift current solid waste management practices in Myanmar, are as follow;

Zero Waste	• Zero waste refers to waste management and planning approaches, which emphasize waste prevention as opposed to end-of-pipe waste management.
Waste Hierarchy	• The waste hierarchy is a strategic tool, which prioritizes actions for waste management.
Resource Conservation	• Entails promoting the most efficient use of resources, including resource recovery and waste avoidance.
Polluter-pays Principle	• A principle that holds that those responsible for causing pollution or generating solid waste should pay the cost for dealing with the pollution, or managing the solid waste (collection and disposal) in order to maintain ecological health and diversity.
Precautionary Principle	• A principle that dictates that a lack of scientific data/ information certainty should not be used as a reason for not acting to prevent serious or irreversible environmental damage or degradation.
Proximity Principle	• A principle that maintains that waste should be dealt with as close to the source of generation as possible. This reduces transportation costs, as well as risks of contamination of the environment during transport.
Consultation Principle	• A principle that conveys the importance of all levels of Government consulting and working with people and organizations throughout the development and implementation of waste management strategies and action plans.
Shared Responsibility	• In this context, Zero Waste is a shared responsibility and requires partnerships and collaborations between all sectors of government, industry, research institutions, NGOs, and the general community.

2.4. BIODIVERSITY AND RESOURCES CONSERVATION

2.4.1. Conservation of Biodiversity and Natural Protected Area Law (2018)

The Administrator shall be in charge of the conservation area or an administrative order may impose a fine of not less than 30,000 kyats to a maximum of 100,000 kyats on the perpetrator of any of the following acts, either in a zoo or botanical park run or managed by the government:

(a) entering a place which is strictly prohibited;

(b) digging on the land, cultivating or carrying out any acitivity;

(c) extracting a natural plant or a cultivated plant; Collect or destroy in any way.

The Proponent commits to the mentioned above laws, under Section 35 (a, c and d) of the Conservation of Biodiversity and Protected Areas Law (2018).

Project Proponent commits not to commercially breeding protected endangered wild fauna without permission under the Section 39 (c) of the Conservation of Biodiversity and Protected Areas Law (2018).

Project Proponent commits not to intentionally pollute soil, water or air, damaging a water course or poisoning water or electrifying water, or using chemical or explosive materials in the water within the protected area and if perform, be punished with imprisonment for a term not exceeding 3 years or with a fine from a minimum of kyats 200,000 to a maximum of kyats

500,000 or with both under Section 39 (d) of the Conservation of Biodiversity and Protected Areas Law (2018).

2.4.2. The Law relating to Aquaculture (1989)

According to Section (29b) of this law, project proponents shall not obstruct navigation and water flow or polluted water within fisheries waters or abet such acts.

2.4.3. Conservation of Water Resources and River Law (2006, amended in 2017)

The Project Proponent commits not to carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks., under Section 8 (a) of Conservation of Water Resources and Rivers Law, 2017.

The Project Proponent commits not to conduct the following statement, under Section 11 of Conservation of Water Resources and Rivers Law (2017);

(a) dispose of engine oil, chemical, poisonous material and other materials, which may cause environmental damage, or dispose of explosives from the bank or from a vessel, which is plying, vessel, which has berthed, anchored, stranded or sunk.

(b) catch aquatic creatures within river-creek boundary, bank boundary or waterfront boundary with poisonous materials or explosives.

(c) dispose of disposal soil and other materials from panning for gold, gold mineral dredging or resource production in the river and creek, into the river and creek or into the water outlet gully, which can flow into the river and creek.

The Project Proponent commits not to dispose of any substance into the river-creek that may cause damage to waterway or change of watercourse from the bank or vessel, which is plying, vessel which has berthed, anchored, stranded or sunk, under Section 19 of Conservation of Water Resources and Rivers Law (2017).

The Project Proponent commits not to drill well or pond or dig earth without the permission of the Directorate, under Section 21 (b) of Conservation of Water Resources and Rivers Law, 2017.

The Project Proponent commits not to pile sand, shingle and other heavy materials for business purposes in the bank area and waterfront area without the permission of the directorate under Section 22 of Conservation of Water Resources and Rivers Law (2017).

The Project Proponent commits not to shall violate the conditions prescribed by the Directorate so as not to cause water pollution and change of watercourse in rivers and creeks under Section 24 (b) of Conservation of Water Resources and Rivers Law (2017).

The Project Proponent commits to carry out the desirous of constructing drainage, utilizing river water intake, constructing bridges spanning rivers, connecting underground pipe, connecting underground electric power cable, connecting underground telecom cable or digging in rivers and creeks, bank boundary and waterfront boundary, under the requirement of work, shall in order not to adversely affect the water resources and rivers and creeks after obtaining the approval of the Ministry of Transport under Section 30 of Conservation of Water Resources and Rivers Law (2017).

2.4.4. Conservation of Water Resources and River Rules (2013)

The Project Proponent commits to construct the toilets far away from the river bank and sewage discharge to septic tank, under rule 8 (c) of Conservation of Water Resources and Rivers Rules, 2013.

The Project Proponent commits to avoid discharging sewage, engine oil, chemical, poisonous material, hazardous materials and other materials which may cause water pollution, under rule 8 (d) of Conservation of Water Resources and Rivers Rules, 2013.

The Project Proponent commits to pay to prevent water pollution and to conserve the environment if water pollution and environmental impact is generated as a result of the project , under rule 9 of Conservation of Water Resources and Rivers Rules, 2013.

2.4.5. Underground Water Act (1930)

Project Proponent commits not to sink a tube for the purpose of obtaining underground water expect under and in accordance with the terms of a license granted by the water officers, under Section 3 of The Underground Water Act, 1930.

- Every person owning a tube which was in existence before the extension of this Act to the local area concerned shall apply to the water officer for a licence for the said tube, and such licence shall be granted free of charge.

Project Proponent commits to obtain or attempt to obtain underground water shall supply the water officer with such information as the Governor may by rule prescribe, under Section 5 of The Underground Water Act, 1930.

- Power to make rules.

2.4.6. Forest Law (2018)

The Project Proponent commits to obtain prior approval of the Ministry if wishes to carry out any development work or economic scheme within the forest land and forest covered land at the disposal of the Government; under section 12 (a) of the Forest Law, 2018.

The project proponent commits to obtain the permit to extract the forest product. If the extraction of a forest product is for personal use such as domestic, agricultural or piscatorial use not on a commercial scale, it may be extracted without obtaining a permit in an amount not exceeding the quantity specified by the Ministry, under Section 17 of the Forest Law, 2018.

2.5. LAND ACQUISITION

2.5.1. The Land Acquisition Act (1894)

The project proponent commits to obey that where there are several persons interested, if such persons agree in the apportionment of the compensation, the particulars of such apportionment shall be specified in the award, and as between such persons the award shall be conclusive evidence of the correctness of the apportionment, under Section 29 of Land Acquistion Act (1894).

2.5.2. Farmland Law (2012)

In accordance with Section 12 of Farmland Law (2012), the project proponent commits to complied with the terms and conditions of farmland, described in the following;

(a) shall carry out the farmland as prescribed in this law

(b) shall pay land revenue and other taxes levied by the Ministry relating to the farmland;

(c) shall register in the relevant Township Department by paying the stamp duty and registration fees for the contract stipulated by the Department in carrying out sale, mortgage, lease, exchange and gift of the right to use the farmland;

(d) shall register in the relevant Township Department in accord with the stipulations when the right to use the farmland is obtained by inheritance in accord with the existing law;

(e) shall have the right to mortgage the right to use the farmland only for the purpose of investment for cultivation and shall mortgage it in the Government Bank or the Bank recognized by the Government;

(f) shall not trespass and carry out without being granted by the relevant Administrative Body of the Farmland;

(g) shall not use the farmland by other means without permission.

(h) shall not change the originally cultivated crop with other kind of crop, without permission;

(i) shall not be fallow the farmland without sufficient reason;

(j) shall not sell, mortgage, lease, exchange or gift the farmland during the period before having the right to use the farmland or during the period the dispute arises relating to the right to use the farmland;

In accordance with the Section 14 of Farmland Law (2012), the project proponent who has the right to use the farmland commits not to sell, mortgage, lease, exchange or gift on the whole or part of the right to use the farmland without permission of the Government to any foreigner or any organization in which the foreigner is included.

2.5.3. Farmland Rules (2012)

In accordance with Rule 56 of Farmland Rules (2012), the project proponent commits to follow that if a person get the right to use other means on the form land, not to be starting to use the farm land as designated within six months of receiving permit certificate or not to be completing work within 37 of farm land law, the township farm land management committee shall submit to central farm land management committee through district and NayPyiTaw Council or region/state farm land management committee for confiscating the concerned farm land.

2.5.4. Vacant, Fallow and Virgin Land Management Law (2018)

In accordance with the Section (16) of the Vacant, Fallow and Virgin Land Management Law (2018), the project proponent commits to follow the following terms and conditions to be complied by the person who has the right to cultivate or utilize vacant, fallow and virgin lands;

(a) carry out only the type of business permitted and affiliated economic enterprises.

(b) reclaim and carry out the permitted land until the completion of business according to the stipulation within 4 years starting from the day of permission. For the lapse of the prescribed period due to natural disasters or unstable situation, central committee may revise the stipulated term.

(c) not mortgage, gift, sell, lease or transfer by other means or divide the permitted Vacant, Fallow and Virgin Lands without the permission of the Union Government.

(d) pay up the land revenue for vacant, fallow and virgin lands, which he has the right to cultivate or utilize.

(e) comply with the conditions relating to the right to cultivate or utilize the vacant, fallow and virgin lands prescribed by the Central Committee.

(f) not extract other natural resources above or below the ground except the permitted business.

(g) when acquiring the required land area from the land permitted in the event of finding the natural resources within the permitted land and the Government is desirous to extract commercially, shall return as directed by the Union Government.

In accordance with Section 22 (a) of the Vacant, Fallow and Virgin Land Management Law (2018), the project proponent who obtain the right to cultivate and utilize under the permit of the Central Committee for the Management of Vacant, Fallow and Virgin Land before the enactment of this Law:

i. shall submit to the Central Committee the records describing the areas of permitted vacant, fallow and virgin land, the date of issue and the letter number of the permit together with sound evidence of the areas which have been actually reclaimed, cultivated and utilized and the remaining areas with photos;

ii. shall comply with and carry out in accordance with this Law relating to vacant, fallow and virgin land which has been reclaimed, cultivated and utilized;

iii. shall acknowledge that the State has confiscated the permitted vacant, fallow and virgin land which are not reclaimed, cultivated and utilized over four years from the date of issue of permit;

iv. shall acknowledge that insurance premium will be confiscated and the right to cultivate and utilize vacant, fallow and virgin land will be revoked if they fail to do business on permitted land in accordance with the prescribed stipulations within four years from the date of issue of permit, or violate terms and conditions.

2.5.5. Registration of Deeds Law (2019)

In accordance with Section (21) of Registration of Deeds Law (2019), the project proponent commits to present for registration of any other documents (other than a will executed within the Union) within 120 days from the date of its execution or from the date of the court decree or order. However, where the court decree or order is appealed, the date for the document to be presented for registration shall be counted from the date on which it becomes final.

2.5.6. The Demarcation of Boundaries Law (2019)

The project proponent commits to erect the necessary survey-marks or boundary-marks along the boundary after demarcating it by the demarcation officer, under Section 10 of the Demarcation of Boundaries Law (2019).

The project proponent commits to report about it to the township administrator for repairing or re-erecting boundary-marks or survey-marks if the boundary-marks or survey-marks are damaged, lost or required repairs due to weather, natural disaster or other causes.

The project proponent commits to undertake with the permission of the relevant land management department or the head of the civil serviced organization when re-demarcation of the demarcated boundaries of land.

2.6. URBAN DEVELOPMENT AND MANAGEMENT

2.6.1. Development Committee Law (2013)

Development Committees of the major cities mean the organizations formed to carry out development works within a specified time limit in respective regions and states except for Yangon City and Mandalay City where specific laws exist. That includes development committees either for a township or for additional townships collectively for the purpose of development works. Development Committees' duties and functions include among others:

2.6.2. Yangon City Municipal Law (2018)

In accordance with Section 72 of Yangon City Municipal Law (2018), the project proponent commits to perform the precautions and a safeguard against accidents and distrubent of local commuters when constructing the new infrastructure, renovation of old buiding and demolition activites, carried out in public area.

In accordance with Section 74 of Yangon City Municipal Law (2018), the project proponent commits to obey the statement of committee for amendment when a building or a component of building in City boundary will negatively impact on city image or will be dangerous in the future.

In accordance with Section 75 (a) of Yangon City Municipal Law (2018), if a building except temporary hut, timber house and three-storey building is constructed, the project proponent commits to hire the licensed constructor certified by committee.

In accordance with Section 77 of Yangon City Municipal Law (2018), the project proponent commits to submit the construction completion report to the committee within 30 days after construction. In submission of completion report, it is arranged all requirements in building to be investigated.

In accordance with Section 150 of Yangon City Municipal Law (2018), the project proponent commits to discharge the rainwater from building and within the compound into the municipal drainage systematically.

In accordance with Section 151 of Yangon City Municipal Law (2018), the project proponent commits to inform to committee if required to connect the private drainage into the municipal drainage.

2.6.3. Myanmar Engineering Council Law (2013)

The Project Proponent commits to follow that any person who has obtained a registration certificate shall comply with any provision of this Law; Rules and regulations issued under this law under Section 34 of Myanmar Engineering Council Law, 2013. Any prohibition, including orders and directives; The Executive Committee may impose one of the following administrative penalties:

(a) giving a warning,

(b) ordering the payment of appropriate fines,

(c) revocation of registration certificate for a limited period,

(d) cancellation of registration certificate.

According to Section 37, the project proponent commits to restrict that any person without the registered certificate issued by the Council, except for engineering civil service personnel appointed by the government departments and government organizations carrying out public works, shall not practice engineering and technical works which may endanger public safety and which are stipulated under the rules made in this law.

2.6.4. Condominium Law (2016)

In accordance with Section 9 of Condominium Law (2016), the project proponent commits to construct a Condominium only on the common land registered at the relevant office of the Registry of Deed.

In accordance with Section 15 of Condominium Law (2016), the project proponent commits to

(a) construct the Condominium on the common land registered at the relevant Office of the Registry of Deed in accordance with stipulations, receiving the permit issued under section 14;

(b) establish the Condominium with the approval of the Union Government on the state-owned land or any land preserved by the government department or government organization or development committee or development organization on behalf of the State in accordance with this Law.

(c) have the right to sell not more than forty percent of the Condominium units to foreigners in accordance with this Law;

In accordance with Section 25 of Condominium Law (2016), the project proponent commits to obey the following duties of developer stated in this law;

(a) constructing the Condominium only on the common land registered at the relevant Office of the Registry of Deed;

(b) applying to the relevant Administrative Committee to obtain the business licence in accordance with the stipulations, having the specified minimum amount of paid up capital;

(c) carrying out for the extension of the validity of business licence in accordance with the stipulations;

(d) registering the common land at the relevant Office of the Registry of Deed and the deed of establishment of Condominium to the relevant registrar;

(e) if he establishes Condominium, applying to the relevant Administrative Committee to obtain the permit in accordance with the stipulations, attached layout plan of the land and building, common properties and fundamental par share value together with documents necessary to be the Common Land and the Condominium;

(f) constructing the Condominium on the registered common land in accordance with the stipulations after receiving the permit;

(g) registering the deeds and the documents of the establishment of the Condominium to the registrar when the construction of the Condominium is completed and resident permit is obtained in accordance with the existing Laws;

(h) informing the particulars of the joint developer to the Administrative Committee;

(i) informing the relevant registrar at the time of selling the unit to the foreigner;

(j) selling unit to the foreigner only with the foreign currency legally transferred from abroad;

(k) ensuring to conform with the stipulated standard of Condominium and completely contain the stipulated Condominium facilities;

(l) paying stamp duty for registering the deed of the common land and the Condominium in accordance with the existing Laws;

In accordance with Section 18 of Condominium Law (2016), the project proponent commits to carry out the reconstruction by resolution of seventy-five percent of the members in a plenary or a special plenary session of the members of the association if it is desirous of reconstruction of a new after demolition of the whole or any part of condominium.

2.6.5. The Electricity Law (2014)

The Project Proponent commits to abide by the rules, regulations, bye-laws, notifications, orders, directives and procedures issued by the Ministry in carrying out the electrical business contained in the permit in accordance with Section 20 of the Electricity Law, 2014.

The Project Proponent commits to compensate for causing damages and losses to any person and entity for failing to abide by this laws, rules, procedures, regulations, bye-laws, order and directives and failing to abide by the prescribed qualities and standardization, be liable according to Section 21 (a) of the Electricity Law, 2014.

The Project Proponent commits to be that if damages or losses arise to any other electric power user or any electrical business due to negligence of any electric power user, the calculated compensation in accord with the method prescribed by the Ministry for the value of damage or loss shall be paid accordance with Section 24 of the Electricity Law, 2014.

The Project Proponent commits to inform in the event of electricity hazard occurs in respect of generation, transmission, distribution and utilization of electric power, the permit holder and the electrical authorized person shall report to the Chief Inspector and in charge of the relevant department as soon as possible as Section 27 of the Electricity Law, 2014.

The Project Proponent commits to inspect by the ministry, the specification of quality and standardizations in respect of the factories, equipments installed to them, business buildings, and electrical equipment which are manufactured, imported and sold from the local and foreign country performed with Section 29 of the Electricity Law, 2014.

The Project Proponent commits to allow the inspection by the chief inspector, inspectors and presons conferred duty by them have the right to enter and inspect any place or building to perform their duties in accord with stipulations as Section 33 of the Electricity Law, 2014.

The Project Proponent commits to permit holders shall carry out in accord with the rules, standardizations and procedures issued by the Ministry and shall be subjected to necessary inspection of relevant Government department and organization, work under Section 40 of the Electricity Law, 2014.

The Project Proponent commits to compensate if a person shall is injured or disabled or killed by the electric shock or outbreak of fire due to negligence or default of the permit holder or the person designated by him, the aggrieved person shall have the right to claim for compensation from the permit holder as follows;

(a) If the aggrieved person is applied to the existing Workmen's Compensation Act, the compensation prescribed under such law;

(b) If the aggrieved person is not applied to the existing Workermen's Compensation Act, the compensation prescribed by the rules issued under this law;

which work under Section 68 of the Electricity Law, 2014.

2.7. HUMAN RIGHTS

2.7.1. The Ethnic Rights Protection Law (2015)

The Project Proponent commits to inform, coordinate and perform the matters of project with the relevant local ethnic groups in the case of development works, major projects, businesses and extraction of natural resources will be implemented within the area of ethnic groups under Section 5 of the Ethnic Rights Protection Law, 2015.

2.7.2. The Ethnic Rights Protection Rules (2019)

The Project Proponent commits to the following statement related to the project within the ethnic groups under Rule 20 of the Ethnic Rights Protection Rules, 2019.

(a) in order to understand the benefits and harms of the project to the local ethnic groups in the area where the project will be implemented, the language and methods that they can understand must be fully and accurately explained in advance.

(b) the policy directions of Myanmar's sustainable and balanced development plan; strategies; It must be done according to the process.

(c) in order to find out whether there is any impact on the environment and socio-economic life in the area, the environmental impact analysis and the impact analysis on the socio-economic development must be carried out in accordance with the guidelines of the relevant department.

(d) at all stages of the environmental impact assessment and socio-economic development impact assessment process, dialogue and negotiation with local ethnic groups must be carried out in an open and transparent way.

The project proponent commits the following statements under Rule 21 of the Ethnic Rights Protection Rules, 2019.

a. according to rule 20, the project proponent must report all compliance to the Ministry and receive their comments and feedbacks before implementation of project.

b. after project implementation, the pre arranged activities and completion conditions must be submitted to the Ministry.

2.7.3. Rights of the Persons with Disabilities Law (2015)

This law aims to protect and respect the rights of persons with disabilities in Myanmar in a way that is recognized internationally under the UN Convention.

With regards to mobility and accessibility, according to Article 28, the project proponent commits to participate in the Natonal Committee's negotiation and implementation for easy accessibility and mobility for persons with disabilities by cooperating with relevant Union Ministries, Municipal Committee (or Township Development Committee), States and Regional Governments, NGO and Private Organizations and entities which work on disability.

2.8. CULTURAL HERITAGES

2.8.1. The Protection and Preservation of Cultural Heritage Region Law (2019)

The project proponent commits not to construct a building which is not in conformity with the conditions prescribed region wise by the Ministry of Culture in the cultural heritage region, under Section 22 of The Protection and Preservation of Cultural Heritage Regions Law (2019).

2.8.2. The Protection and Preservation of Antique Object Law (2015)

The Project Proponent commits to comply with any object which has no owner or custodian, needs to inform the relevant Ward or village-tract administrator if he knows or it seems reasonable to assume that the said object is an antique object as Section 12 of the Protection and Preservation of Antique Objects Law, 2015.

2.8.3. The Protection and Preservation of Ancient Monuments Law (2015)

The Project Proponent commits to comply with the ancient buildings over 100 years on the ground or under the ground or on the water or under the water to the owner or without maintained person that buildings may be known or assumed the ancient buildings must inform early to the respective ward administrator or village administrator according to Section 12 of the Protection and Preservation of Ancient Monuments Law, 2015.

The Project Proponent commits to make the following things in the regarded area of the ancient buildings should apply to the department in advance allowance;

(a) extension of villages, wards and towns;

(b) the new building construction or extensions or preparation or fencing or annexes including hotels, factories, residential buildings;

(c) oil and gas, gem or digging for mineral exploration, connecting to oil and gas pipe line, connection to grid lines, construction of communication tower, road construction, bridge construction, airport construction, dam like the construction or extension of principle buildings;

(d) connection of electric line in the ground, connection to communication and other underground workings;

(e) digging or extension of well, lake, channel, husbandry pond;

(f) surface damaging like gold bars, excavation, making bricks, digging of well, pond, creek, drain, chasm, valley, landfills, adjusting ground, mine explosion, mining, gravel, sand extraction, demolition of hill and mountain;

(g) fencing or installation of the private area or community;

(h) construction of unfix discipline building regarded by the ministry in each regionally near the ancient buildings and environmental view;

according to Section 15 of the Protection and Preservation of Ancient Monuments Law, 2015.

The Project Proponent commits to discard chemical substance and rubbish which can affect an ancient monument and the environment according to Section 20 (f) of the Protection and Preservation of Ancient Monuments Law, 2015.

2.9. LABOUR

2.9.1. Labour Organization Law (2011)

The Project Proponent commits to follow that the labour organization has the right to demand the relevant employer to re-appoint a worker if the employer dismisses such worker and if there is cause to believe that the reasons of such dismissal were based on labour organization membership or activities, or were not in conformity with the labour laws under Section 18 of The Labour Organization Law, 2011.

The Project Proponent commits to follow that the labour organizations have the right to send representatives to the Conciliation Body in settling a dispute between the employer and the worker. Similarly, they have the right to send representatives to the Conciliation Tribunals formed with the representatives from the various levels of labour organizations under Section 19 of Labour Organization Law, 2011.

The Project Proponent commits to discuss with the government, the employer and the complaining workers in respect of worker's rights or interests contained in the labour laws, the representatives of the labour organization also have the right to participate and discuss, under Section 20 of Labour Organization Law, 2011.

The Project Proponent commits to follow that the labour organizations have the right to participate in solving the collective bargains of the workers in accord with the labour laws, under Section 21 of Labour Organization Law, 2011.

The Project Proponent commits to follow that the labour organizations shall carry out peacefully in carrying out holding of meetings, going on strike and carrying out other collective activities in accord with their procedures, regulations, by-laws and any directives prescribed by the relevant Labour Federation, under Section 22 of Labour Organization Law, 2011.

2.9.2. The Employment and Skill Development Law (2013)

Project Proponent commits to comply with the requirement:

(a) For the agreement, training and probation period as in

(1) If the employer has appointed the employee to work for an employment, the employment agreement shall be made within 30 days. But it shall not be related with government department and organization for a permanent employment.

(2) If pre training period and probation period are stipulated before the appointment the said trainee shall not be related with the stipulation of sub-section (1).

(b) For particulars to be included in the employment agreement:

(1) the type of employment;

(2) the probation period;

(3) wage, salary;

(4) location of the employment;

(5) the term of the agreement;

(6) working hour;

(7) day off, holiday and leave;

(8) overtime;

(9) meal arrangement during the work hour;

(10) accommodation;

(11) medical treatment;

(12) ferry arrangement to worksite and travelling;

(13) regulations to be followed by the employees;

(14) if the employee is sent to attend the training, the limited time agreed by the employee to continue to work after attending the training;

(15) resigning and termination of service;

(16) termination of agreement;

(17) the obligations in accord with the stipulation of the agreement;

(18) the cancellation of employment agreement mutually made between employer and employee;

(19) other matters;

(20) specifying the regulation of the agreement, amending and supplementing;

(21)Miscellaneous.

(c) For the worksite regulations contained in the employment agreement to be in compliance with any existing law and the benefits of the employee not to be less than those of the any existing law.

(d) For the employment agreement, the Ministry shall issue the notification for paying the stipulated compensation to the employee by the employer, if the work is completed earlier than the stipulated period or the whole work or any part of it have to be terminated due to unexpected condition or the work has to be terminated due to various conditions.

(e) For the employment agreement made under sub-section (a) to be related with daily wage workers, piece rate workers who are appointed temporarily in the government department and organization.

(f) For the worksite regulations and benefits contained in the employment agreement mutually made between the employer and employee or among the employees to be amended as necessary, in accord with the existing law.

(g) For the employer to send a copy of the employment agreement made between the employer and employee, to the relevant employment and labor exchange office within the stipulated period and to get the approval of it.

(h) For the employment agreement made before the enforcement of this law has be confirmed up to the end of the term of the original agreement.

The employer shall carry out training programmes for increasing employment skill of the workers who are intended to appoint or who are working presently in his work in accord with the policy of the Skill Development Body according to the requirement of the work.

The Skill Development Body:

(a) May determine, in respect of the contribution to be paid to the fund by the employer under sub-section (a) of section 30, depend on the sector of work, category of work, volume of work and number of workers;

(b) May exempt any employer from paying contribution to the fund if the sufficient cause submits under section 5 of the Employment and Skill Development Law, 2013.

Project Proponent commits to carry out training programmes for increasing employment skill of the workers who are intended to appoint or who are working presently in his work in accord with the policy of the Skill Development Body according to the requirement of the work under section 14 of the Employment and Skill Development Law, 2013.

Project Proponent commits to comply with the requirements:

(a) The employer of the industry and service shall pay money not less below 0.5% of salary, total wages paid to the level of worker supervisor and the workers below such level in such work monthly without fail as the contribution to the fund.

(b) The contribution paid under sub-section (a) shall not be deducted from the wage or salary of the workers

under section 30 of the Employment and Skill Development Law, 2013.

2.9.3. The Minimum Wage Law (2013)

The Project Proponent commits to follow the following duties under Section 12 of The Minimum Wage Law, 2013.

(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 commerce, production business and service in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash in accord with the stipulations or jointly in some cash and in some produce prescribed in local price according to the desire of the worker;

(e) may pay jointly in some cash and some produce prescribed in local price according to the local custom or desire of the majority of workers or collective agreement in paying the minimum wage to the workers and working in the agriculture and livestock breeding business. 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.

The Project Proponent commits to follow the following duties under Section 13 of The Minimum Wage Law, 2013.

(a) shall inform the workers the rates of minimum wage 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 record the lists, schedules, documents and wages of the workers correctly in accord with the stipulation;

(c) shall report the lists, schedules and documents recorded under sub-section (b) to the relevant department in accord with the stipulations;

(d) shall accept the inspection when summoned by the inspection. Moreover, he shall produce the said lists and documents when so required;

(e) shall allow the entry and inspection of the inspector workplaces of commerce, production and service, agriculture and livestock breeding and give necessary assistances;

(f) shall give them holiday for medical treatment in accord with the stipulations if the workers cannot work due to sickness;

(g) shall give holiday without deducting from the minimum wage, in accord with the stipulations if the funeral matter of the family of worker or his parent occurs.

2.9.4. Payment of Wage Law (2016)

Project Proponent commits to comply with the following statements under Section 3 of The Payment of Wages Law, 2016.

(a) pay in local currency or foreign currency recognized by the Central Bank of Myanmar. This may be in cash, check or deposit into the bank account of Employee.

(b) pay can be in the form of:

(i) in cash or half in cash and half in things set according to the local price to those employees working in trade, manufacturing and service sectors.

(ii) in cash or half in cash and half in things set as local price according to local traditions or common agreement to those working in agriculture and livestock sectors.

Project Proponent commits to pay the following description under Section 4 of The Payment of Wages Law, 2016.

(a) part-time, daily, weekly or other part-time job, temporary or piecework when the work is done or at the agreed time.

(b) according to the Article (a), the period shall not exceed one month.

(c) wages for the permanent work must pay per monthly basis.

(d) must pay at the end of the payment period when there are not more than 100 workers.

(e) if there are 100 workers and above, pay must not be administered later than 5 days after the end of the payment period.

(f) upon termination, wages must be paid within 2 days from the date of termination.

(g) if a resignation letter is submitted, wages must be paid at the ending day of the payment period.

(h) if an employee dies, wages must be paid to the legally recognized heir within 2 working days after the day he/she has died.

(i) all wages must be paid during the working day.

The Project Proponent commits that the employwer may be subject to unforeseen circumstances, including natural disasters. If it is difficult to pay in accordance with the provision of sub-section (c), it shall be submitted to the Department with good reason as to when the wages will be changed with the consent of the workers, under Section 5 of The Payment of Wages Law, 2016.

The Project Proponent commits to support the following right to enjoy overtime wages stipulated by the law if he works over time, under Section 14 of The Payment of Wages Law, 2016.

The Project Proponent commits to comply with the following description under Chapter (3), Section 7 of The Payment of Wages Law, 2016.

(a) can deduct from the fee for the period of non-working time except for paid leave and public holidays according to the relevant law.

(b) accommodation and transportation expenses arranged by the employer not included in the fee; food expenses; electricity price, water tax and income tax to be paid by the worker; wrong and overpayments can be deducted.

(c) advance payment at the request of the worker; cash out; savings or legal contributions for workers can be deducted from wages.

(d) may deduct from the employee's wages as decided by the court or the arbitral tribunal or the arbitral tribunal.

The Project Proponent commits not to deduct for any purpose except deduction from wages in accordance with the provisions of section 7 and section 11 under Chapter (3), Section 8 of The Payment of Wages Law, 2016.

The Project Proponent commits not to deduct more than 50% of the total wages deducted from the wages, except for deductions for the employee's failure to perform his duties when deducted from wages mentioned in section 7 under Chapter (3), Section (9) of The Payment of Wages Law, 2016.

The Project Proponent commits to comply with the following description under Chapter (3), Section (10) of The Payment of Wages Law, 2016.

(a) before the deduction from the fee shall be determined as, a fine to be paid under section 11 and the deduction shall be obtained with the prior approval of the Department.

(b) the permission in sub-section (a) shall be given to the relevant workshop; It should be posted in a public place in the office.

(c) the deductible indemnity shall not exceed the value of the damage or loss due to the work or failure of the worker.

(d) in deducting from the fee under section 11:

    (1) the wage shall not be deducted from the work without giving the worker any right to settle.

    (2) no more than 5% per month shall be deducted from the employee's monthly salary.

(e) the fine shall not be deducted from the worker under 16 years of age as a fine.

(f) the period for payment of the prescribed fine may be carried out in accordance with the agreement between the employer and the employee.

(g) the deductible for loss of property shall be deducted within the prescribed period within the prescribed period by the negotiation agreement with the township mediation body formed by law.

(h) the money deducted from the fee shall be recorded in the record and kept systematically.

(i) the monthly report shall be submitted to the Department in respect of the amount deducted from the fee.

(j) Section 11; The fines deducted under sub-section (b) shall be used for the benefit of the workers in consultation with the officially registered labor organization at the factory.

The Project Proponent commits to impose a impose a penalty for compensation for the following actions or omissions of the employee, Chapter (3), Section (11) of The Payment of Wages Law, 2016.

(a) Deliberate negligence of the worker whether due to negligence or not. damage to property or money that the employer has explicitly entrusted to the care of the worker, whether due to dishonesty or misconduct, is a direct consequence of the employee's negligence and misconduct.

(b) violation of any of the workplace conditions prescribed by a fine in the employment contract.

The Project Proponent commits to comply with the following description, under Chapter (3), Section 12 of The Payment of Wages Law, 2016.

(a) in case of the following circumstances; by a legally registered labor organization; you can ask the employer to resolve the matter by the factory coordination committee:

i. Being deducted from the receivables without good cause;

ii. Failure to pay fees beyond the due date.

(b) if the request is made under sub-section (a) but the employer does not resolve it, it may submit to the inspecting officer within six months from the date of deduction or failure to pay.

The Project Proponent commits to (a) state that the inspecting officer shall comply with section 12; The submission under sub-section (b) be scrutinized and, if necessary, the relevant persons may be examined and an appropriate order may be issued (c)if the employer or employee is not satisfied with the order made under sub-section (a), he may appeal to the Chief Inspector within 30 days (d) the Chief Inspector may examine the appeal under sub-section (b), hear the employer and the employee and make an appropriate order and (e) the order issued by the Chief Inspector is final under Chapter (3) Section (13) of The Payment of Wages Law, 2016.

2.9.5. Workers' Compensation Act (1923)

The Project Proponent commits to follow that If personal injury is caused to a workman by accident arising out of and in the course of his employment, his employer shall be liable to pay compensation in accordance with the provisions of the Chapter (2) under The Workmen Compensation Act, 1923.

The proponent will also abide by the following, according to the The Workers' Compensation Act, 1923.

A. where death results from the injury-

(i) in the case of an adult, a sum equal to 36 times the worker's monthly wages calculated in accordance with this Act:

Provided that the minimum and the maximum payment in such a case shall be the amount of compensation prescribed by notification made by the Ministry of Labour with the approval of the Government respectively, and

(ii) in the case of a minor- the amount of compensation prescribed by notification made by the Ministry of Labour with the approval of the Government;

B. where permanent total disablement results from the injury-

(i) in the case of an adult, a sum equal to 36 times 140 per cent of the worker's monthly wages calculated in accordance with this Act:

Provided that the minimum and the maximum payment in such a case shall be the amount of compensation prescribed by notification made by the Ministry of Labour with the approval of the Government respectively, and

(ii) in the case of a minor- the amount of compensation prescribed by notification made by the Ministry of Labour with the approval of the Government;

C. where permanent partial disablement results from the injury-

(i) in the case of an injury specified in Schedule I, such percentage of the compensation which would have been payable in the case of permanent total disablement as is specified therein as being the percentage of the loss of earning capacity caused by that injury, and

(ii) in the case of an injury not specified in Schedule I, such percentage of the compensation payable in the case of permanent total disablement as is proportionate to the loss of earning capacity permanently caused by the injury.

2.9.6. The Settlement of Labour Dispute Law (2012)

Project Proponent commits not to negotiate and coordinate in respect of the complaint within the prescribed period without sufficient cause under Section 38 of the Settlement of Labour Dispute Law, 2012.

(a) no employer or employee shall fail to form a coordinating committee in accordance with the provisions of section. Failure to do so shall not be repeated within 60 days from the date of conviction by the relevant court.

Project Proponent commits not to alter the conditions of service relating to workers concerned in such dispute at the consecutive period before commencing the dispute within the period under investigation of the dispute before the Arbitration Body or Tribunal, to affect the interest of such workers immediately under Section 39 of the Settlement of Labour Dispute Law, 2012.

Project Proponent commits to follow that no party shall proceed to lock-out or strike without accepting negotiation, conciliation and arbitration by Arbitration Body in accord with this law in respect of a dispute under Section 40 of the Settlement of Labour Dispute Law, 2012.

Project Proponent commits to comply with the requirements, under Section 51 of the Settlement of Labour Dispute Law, 2012.

- If any employer, in the course of settlement of dispute, commits any act or omission, without sufficient cause, which by causing a reduction in production resulting so as to reduce the workers' benefits shall be liable to pay full compensation in the amount determined by the Arbitration Body or Tribunal. Such money shall be recovered as the arrear of land revenue.

2.9.7. Social Security Law (2012, amended in 2020)

Project Proponent commits to follow the following establishments shall be applied with the provisions for compulsory registration for social security system and benefits contained in this Law if they employ minimum number of workers and above determined by the Ministry of Labour in co-ordination with the Social Security Board, under Section 11 (a) of Social Security Law, 2012.

i. industries which carry out business whether or not they utilize mechanical power or a certain kind of power, businesses of manufacturing, repairing and servicing, or engineering businesses, factories, warehouses and establishments;

ii. government departments, Government organizations and regional administrative organizations which carry out business;

iii. development organizations;

iv. financial organizations;

v. companies, associations, organizations, and their subordinate departments and branch offices which carry out business;

vi. shops, commercial establishments, public entertaining establishments;

vii. government departments and Government organizations which carry out business or transport businesses owned by regional administrative body, and transport businesses carried out with the permission of such department, body or in joint venture with such department or body;

viii. constructions carried out for a period of one year and above under employment agreement;

ix. businesses carried out with foreign investment or citizen investment or joint ventured businesses;

x. businesses relating to mining and gem contained in any existing law;

xi. businesses relating to petroleum and natural gas contained in any existing law;

xii. ports and out-ports contained in any existing law;

xiii. businesses and organizations carried out with freight handling workers;

xiv. Ministry of Labour and its subordinate departments and organizations;

xv. establishments determined by the Ministry of Labour, from time to time, that they shall be applied

Project Proponent commits to arrange the following funds for social security, under the Section 15 (a) of Social Security Law, 2012.

i. health and social care fund;

ii. family assistance fund;

iii. invalidity benefit, superannuation benefit, and survivors' benefit fund;

iv. unemployment benefit fund;

v. other social security fund for social security system of compulsory registration and contribution stipulated by the Ministry of Labour, in co-ordination with the Social Security Board, under clause (ii) of sub-section (e) of section 13;

vi. other social security fund stipulated that contribution may be paid after voluntary registration under clause (ii) of sub-section (e) of section 13;

vii. Social Security Housing Plan fund.

Project Proponent commits to pay contributions after effecting compulsory registration to the fund contained in clauses (i), (iii), (iv) and (v) of sub-section (a), under Section 15 (b) of Social Security Law, 2012.

Project Proponent commits to deduct contributions to be paid by worker from his wages together with contribution to be paid by him and pay to the social security fund. The employer shall also incur the expense for such contribution, under Section 18 (b) of Social Security Law, 2012.

Project Proponent commits to effect insurance by registering voluntarily for the workers who are not applied to provisions of compulsory registration for employment injury benefit insurance system and by paying stipulated contribution to employment injury benefit insurance fund, under Section 48 (b) of Social Security Law, 2012.

Project Proponent commits to prepare and keep the following records and lists correctly and submit to the relevant township social security office in accord with the stipulations under Section 75 of Social Security Law, 2012.

(a) shall prepare and keep the following

(i) records and lists of workers' daily attendance;

(ii) records on appointment of new workers, employing worker by changing of work, termination, dismissal and resignation;

(iii) records on promotion and paying remuneration;

(iv) records and lists of employer, manager, and administrator and records on change of them;

(b) shall inform the relevant township social security office if the following matters arise:

(i) changes in number of workers and address of establishment;

(ii) change of employer, change of business, suspension of work, and close-down of work;

(iii) employment injury, decease and contracting diseases;

(c) shall submit records of work and lists if requested by inspectorate or official assigned by the Social Security Head Office and various levels of Regional Social Security Office under this Law.

2.10. MOTOR VEHICLES

2.10.1. The Road Safety and Motor Vehicle Management Law (2020)

The Project Proponent commits to follow the determining and restricting the areas where domestic vehicles are allowed to travel under Section 9 (a) of The Road Safety and Motor Vehicle Management Law, 2020.

The Project Proponent commits to follow the safety and environmental protection regulations in relation to the initial registration of motor vehicles; Standards and criteria which are approved and published under Section 12 (c) of the Road Safety and Motor Vehicle Management Law, 2020.

The Project Proponent commits to follow the limited speed for the safe movement of vehicles traveling on public roads which are setted by the department under Section 14 (r) of the Road Safety and Motor Vehicle Management Law, 2020.

The Project Proponent commits to maintain and repair the vehicle in accordance with the standards set by the Department in order to drive it safely under Section 18 (a) of the Road Safety and Motor Vehicle Management Law, 2020.

The Project Proponent commits not to load or transport in a vehicle without complying with the requirements under Section 81 (G) of the Road Safety and Motor Vehicle Management Law, 2020.

2.10.2. The Road Safety and Motor Vehicle Management Rules (2022)

The Project Proponent commits to follow that any motor vehicle which are not registered as rental vehicle and also not gained the relevant business licence issued according to road transport business law that shall not be used as commercial motor vehicle under Rule 252 of the Road Safety and Motor Vehicle Management Rules, 2022.

The Project Proponent commits to follow that the commercial vehicles shall not carry more than the number of passengers or the weight of goods that can be carried as determined by the Department under Rule 253 of The Road Safety and Motor Vehicle Management Rules, 2022.

The Project Proponent commits to comply with the following points under Rule 254 of The Road Safety and Motor Vehicle Management Rules, 2022.

(a) Land transportation businesses must only operate according to the conditions contained in the relevant business license issued by law.

(b) Passenger boarding for passenger vehicles, the place to get off and the place to stop, a place to unload cargo and a parking place for trucks, the waiting area and parking area for taxi vehicles must be used as specified by the relevant Nay Pyi Taw Council, Regional or Staate Governments, Governmental Departments and Governmental Organizations.

(c) A passenger vehicle driven by a tour must have a tour sign installed on the front and rear of the vehicle so that passengers can see it.

(d) The passenger vehicle must stop on the side of the road so that passengers can get on and off at the designated stop. Do not block the traffic of other vehicles.

(e) If there is a passenger vehicle stopped at the stop, the following vehicle must stop no less than four feet (1.22 meters) behind the preceding vehicle.

(f) Do not stop side-by-side with a passenger vehicle standing at a stop.

The Project Proponent commits to follow that the names and license numbers of the driver or of both the driver and the assistant in the case of trucks (heavy), passenger vehicles and taxis must be displayed prominently in the driver's compartment under Rule 255 of the Road Safety and Motor Vehicle Management Rules, 2022.

The Project Proponent commits to follow the following factors under the Rule 261 of the Road Safety and Motor Vehicle Management Rules, 2022.

(a) In a truck, goods must be loaded inside the vehicle. Do not hang items on the exterior front, the back or sides of the vehicles.

(b) Goods carried in trucks shall not be spilled onto public roads.

(c) Rule 262 states that a vehicle that will transport dangerous good;

The Project Proponent commits to follow the following factors under the Rule 262 of the Road Safety and Motor Vehicle Management Rules, 2022.

a. It must comply with the provisions of the Chemical Substances and Related Materials Hazard Prevention Law and rules.

b. Proof of valid rental vehicle registration and relevant business license issued under the Land Transportation Law, as well as endorsements issued by the relevant government department for the transportation of dangerous goods must be complete.

c. To make obvious that the vehicle is carrying dangerous goods, vehicle markings, container markings, and tank markings, packaging, labelling, loading and unloading must be installed as specified by the Department.

d. Measures to be taken in the event of an accident while transporting dangerous goods, the necessary safety equipment must be fully prepared as specified by the Department.

The Project Proponent commits to follow that the Department may specify and issue instructions for vehicles that will transport dangerous goods by road and for the goods, as well as for the drivers and assistants of the vehicles under Rule 263 of the Road Safety and Motor Vehicle Management Rules, 2022.

The Project Proponent commits to have a ready to use spare wheel repair kit, a fire extinguisher, an emergency exist, a glass breaker, a crowbar, a parking triangle and a first aid kit under Rule 269 of the Road Safety and Motor Vehicle Management Rules, 2022.

The Project Proponent commits to follow that if a commercial vehicle registration number or address is to be changed, the vehicle owner must apply to the relevant regional registration officer and the regional or state or union territory or district or township department that issues business licenses under the road transport business law under Rule 271 of the Road Safety and Motor Vehicle Management Rules, 2022.

2.11. FIRE MANAGEMENT

2.11.1. The Petroleum and Petroleum Product Law (2017)

Project Proponent commits to comply the licences issued by the ministry of electric power relating to refining, transit, transpot by pipeline, sale and distribution, inspection, and testing; issuing joint licence or compound licence for carrying out more than a type of business activities; under the Section 8 (a) of the Petroleum and Petroleum Product Law, 2017.

Project Proponent commits to comply the procedures and conditons determined by the ministry of electric power to be abided by in carrying out transport business except transport by pipeline; under the Section 8 (c) of the Petroleum and Petroleum Product Law, 2017.

Project Proponent commits to comply that the Ministry of Natural Resources and Environmental Conservation shall issue license for the right to store for the storage tanks and warehouses, under Section 10 (a) (b) (d) (e) of the Petroleum and Petroleum Product Law, 2017.

Project Proponent commits to comply that the Ministry of Natural Resources and Environmental Conservation shall transport permit for the vehicles, vessels and barges that shall carry any petroleum and petroleum product; under Section 10 (a) of the Petroleum and Petroleum Product Law, 2017.

Project Proponent commits to comply that the Ministry of Natural Resources and Environmental Conservation shall transport permit for the vehicles, vessels and barges that shall carry any petroleum and petroleum product; under Section 10 (b) of the Petroleum and Petroleum Product Law, 2017.

Project Proponent commits to comply that the Ministry of Natural Resources and Environmental Conservation shall take the action, if it occurs environmental impacts in carrying out petroleum and petroleum product business activities, as necessary, in accordance with the existing laws of on-site inspection under Section 10 (d) of the Petroleum and Petroleum Product Law, 2017.

Project Proponent commits to comply that the Ministry of Natural Resources and Environmental Conservation shall determine, in coordination with ministries concerned, procedures and conditions relating to standard and quality of storage tanks and warehouse, and tanks of vehicles, vessels and barges that carry any petroleum and petroleum product.under Section 10 (e) of the Petroleum and Petroleum Product Law, 2017.

Project Proponent commits to comply with on all receptacles containing any dangerous petroleum and petroleum product, the warning sign of danger by stamping, embossing, painting, printing or any other means shall be expressed. If it is impossible to express as such, similar warning signs of the nature of danger of gasoline, spirit or petroleum shall be expressed in writing at the sensible place in salient words or signs near the receptacle under Section 11 of the Petroleum and Petroleum Product Law, 2017.

2.11.2. Myanmar Fire Brigade Law (2015)

Project Proponent commits to comply with the requirements of the owner or manager of the factory, workshop, bus terminal, airport, port, hotel, motel, lodgings, condominium, market, department, organization or business exposed to fire hazard shall, in accord with the directive of the Department of Fire Services:

(a) not fail to form the Reserve Fire Brigade
(b) not fail to provide fire safety equipment

in accordance with Section 25 of The Myanmar Fire Brigade Law, 2015.

2.12. COMPANY ADMINISTRATION

2.12.1. Myanmar Insurance Law (1993, amended in 1996)

The project Proponent commits to make an insurance for motor vehicles shall affect compulsory Third Party Liability Insurance with the Myanmar Insurance according to Section 15 of Myanmar Insurance Law, 1996.

The project Proponent commits to operate an enterprise which may cause loss to State-owned property or which may cause damage to the life and property of the public or which may cause pollution to the environment shall affect compulsory General Liability Insurance with the Myanmar Insurance under this law according to Section 16 of Myanmar Insurance Law, 1996.

2.12.2. Myanmar Insurance Rules (2017)

The project proponent commits to appoint a foreigner as senior management, technician expert or consultant regulated in rule 51 according to rule 206.

According to rule 73, the project proponent commits to holds the permit or tax incentives must have taken out the relevant insurance out of the following types of insurance at any insurance business that holds the license in the Union based on the nature of the business: (a) Property and Business Interruption Insurance; (b) Engineering Insurance; (c) Professional Liability Insurance; (d) Professional Accident Insurance; (e) Marine Insurance; and, (f) Workmen Compensation Insurance.

2.12.3. Myanmar Investment Law (2016, amended in 2019)

The Project Proponent commits to have the right to obtain a long-term lease of land or building from the owner if it is private land or building, or from the relevant government departsments or government organizations after obtaining permit or endorsement in accordance with the stipulations in order to do investment, under Section 50 (a) of Myanmar Investment Law (2016);

If the Project Proponent is foreign investor, he commits to lease land or building either from the government or government organizations or from owners of private land or building from commencing on the date of receipt of the permit or endorsement of the Commission up to an initial period of (50) year in accordance with the stipulation, under Section 50 (b) of Myanmar Investment Law (2016);

The Project Proponent commits that after the expiry of the term of the right to use land or building or the period of right to lease of land or building permitted under subsection (b), a consecutive period of (10) year and a further consecutive period of (10) year extension to such period of lease of land or building may be obtained with the approval of the Commission, under Section 50 (c) of Myanmar Investment Law (2016);

The Project Proponent commits to register the land lease contract at the Office of Registry of Deeds in accordance with the Registration Act, under Section 50 (d) of Myanmar Investment Law (2016);

The Project Proponent commits that the Government may grant more favorable terms and conditions for the lease of land and the use of land by Myanmar citizen investors, under Section 50 (e) of Myanmar Investment Law (2016);

The Project Proponent complies with the Employment of staffs and workers as appoint any citizen who is qualified person as senior manager, technical and operational experts, and advisor in his investment within the Union in accordance with the Laws; replace them after providing for capacity building programs in order to be able to appoint citizens to different level positions of manager, technical and operational experts, and advisors; appoint only citizens for works which does not require skill; appoint skilled citizen and foreign workers, technicians, and staffs by signing an employment contract between employer and employee in accordance with the labor laws and rules; ensure to obtain the entitlements and rights in the labor law and rules, including minimum wages and salary, leave, holiday, overtime fee, damages, compensation of the workman, social welfare, and other insurance relating to workers in stipulating the rights and duties of employers and employees and the occupational terms and conditions in the employment contract; settle dispute arisen among employers,

among workers, between employers and workers and technicians or staff in the investment in accordance with Section 51 of Myanmar Investment Law, 2016.

The project proponent commits to repsect and comply with the customs, traditions and traditional culture of the ethnic groups in the Union; under Section 65 (e) of Myanmar Investment Law, 2016.

The project proponent commits to establish and register a company or sole proprietorship or legal entities or branches of such entities under the Laws in order to invest; under Section 65 (f) of Myanmar Investment Law, 2016.

The project proponent commits to abide by the terms and conditions, stipulations of a special license, permit, and business operation certificates issued to them, including the rules, notifications, orders and directives and procedures issued by this Law and the existing laws, terms and conditions of contract and tax obligations; under Section 65 (g) of Myanmar Investment Law, 2016.

The project proponent commits to carry out in accordance with the stipulations of the relevant department if it is, by the nature of business or by other need, required to obtain any license or permit from the relevant Union Ministries, government departments and government organizations, or to carry out registration; under Section 65 (h) of Myanmar Investment Law, 2016.

The project proponent commits to immediately inform to the Commission if it is found that natural mineral resources or antique objects and treasure trove are not related to the investment permitted above and under the land on which the investor is entitled to lease or use and not included in the original contracts. If the Commission allows, the investor shall continue to carry out the investment in such land, and if not allowed, the investor shall transfer and carry out, by obtaining the permission, at the substituted place which is selected and submitted by him; under Section 65 (i) of Myanmar Investment Law, 2016.

The project proponent commits not to make any significant alteration of topography or elevation of the land on which he is entitled to lease or to use, without the approval of the Commission; under Section 65 (j) of Myanmar Investment Law, 2016.

The project proponent commits to abide by the applicable laws, rules, procedures and best standards practiced internationally for this investment so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage; under Section 65 (k) of Myanmar Investment Law, 2016.

The project proponent commits to list and keep proper records in books of accounting and annual financial statements, and necessary financial matters relating to the investments performed by a Permit or an Endorsement in accordance with internationally and locally recognized accounting standards; under Section 65 (l) of Myanmar Investment Law, 2016.

The project proponent commits to close and discontinue the investment only after payment of compensation to employees in accordance with applicable laws for any breach of employment contracts, closure of investment, sale and transfer of investment, discontinuation of investment, or reduction of workforce; under Section 65 (m) of Myanmar Investment Law, 2016.

The project proponent commits to pay wages and salaries to employees in accordance with applicable laws, rules, procedures, directives and so forth during the period of suspension of investment for a credible reason; under Section 65 (n) of Myanmar Investment Law, 2016.

The project proponent commits to pay compensation and indemnification in accordance with applicable laws to the relevant employee or his successor for injury, disability, disease and death due to the work; under Section 65 (o) of Myanmar Investment Law, 2016.

The project proponent commits to supervise foreign experts, supervisors and their families, who employ in its investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar; under Section 65 (p) of Myanmar Investment Law, 2016.

The project proponent commits to respect and comply with the labor laws; under Section 65 (q) of Myanmar Investment Law, 2016.

The project proponent commits to pay effective compensation for loss incurred to the victim, if there is damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources, which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a Permit or an Endorsement, under Section 65 (r) of Myanmar Investment Law, 2016.

The project proponent commits to pay effective compensation for loss incurred to the victim, if there is damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources, which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a Permit or an Endorsement, under Section 65 (s) of Myanmar Investment Law, 2016.

The project proponent commits to allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment; under Section 65 (t) of Myanmar Investment Law, 2016.

The project proponent commits to take in advance permit or endorsement of the Commission for the investments which need to obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of the activities of the investments which obtained permit or endorsement of the commission, under Section 65 (u) of Myanmar Investment Law, 2016.

The Project Proponent commits to insure the types of insurance stipulated in the provision of the rules at any insurance enterprise which is entiled to carry out insurance business within the Union as described in Section 73 of Myanmar Investment Law, 2016.

2.12.4. Myanmar Investment Rules (2017)

The Project Proponent complies with all terms and conditions in the permit and other applicable laws when the investment is carried out based on Rule 202 of Myanmar Investment Rule, 2017.

The Project Proponent commits to assist the negotiating processes with the relevant government departments and government organizations for the affected persons due to investment plans in accord with Rule 203 Myanmar Investment Rule, 2017.

The Project Proponent commits to appoint expert foreigner as senior manager, technical and operational expert or advisor according to subsection(a) of the section 51 of the Law, he shall submit the application attached with passport, expertise evidence or degree certificate and summary of biography of such foreigner to the Commission and obtain the approval according to Rule 206 of Myanmar Investment Rule, 2017.

The Project Proponent commits to obtain the permit or tax exemption or relief insurance out of the following types of the insurance business entitled to carry out insurance business within the Union based on the nature of the business: (a) property and business interruption insurance; (b) engineering insurance; (c) professional liability insurance; (d) professional accident insurance; (e) marine insurance; and, (f) workmen compensation insurance, under the Rule 212 of Myanmar Investment Rule, 2017.

2.12.5. The Union Tax Law (2019)

The project proponent commits to , if he receives foreign currency from producing and selling any type of goods chargeable to the commercial tax, provide any service chargeable to the commercial tax and trading under this Law, pay the commercial tax in kyats on such sale proceeds or proceeds of service in foreign currency in accordance with the Commercial Tax Regulations calculated at the relevant tax rates in this Law, under Section 16 of the Union Tax Law (2019).

The project proponent commits to follow that if the income is earned in the foreign currency for other income heading except the heading of capital gains from assets, the income tax shall, in accordance with the provisions of regulation 8 of the Income Tax Regulations, be calculated, on such income and the income tax shall be charged in kyats on citizens and foreigners residing in the country and shall be charged in the type of currency earned on a non-resident foreigner, under Section 16 of the Union Tax Law (2019).

2.12.6. The Export and Import Law (2012)

The Project Proponent commits to comply with a person who obtained any license not to violate the conditions contained in the license performed with the Section 7 of the Import and Export Law, 2012.

2.13. HIGH-RISE BUILDING

2.13.1. Guidelines for High-Rise Building Construction Projects from Committee for Quality Control of High-Rise Building Construction Projects (CQHP)

The purpose of this committee guidelines are to provide and support for the systematic process of construction work and health, safety environment for every parameter.

The organized CQHP members are empowered to carry out the following responsibilities;

- Defining guidelines regarding the design of High-Rise Building in Myanmar.
- Drawing up guidelines for Quality control of the High-Rise Building Projects which must be duly observed by Project Supervisors and Site Engineer.
- Evaluating Proposed Project Designs, as submitted by designers, whether relevant guidelines and current international Codes of Practice are followed or not. Where correction, amendment or redress is required, appropriate advice shall be rendered.
- Conducting on-site inspection, either on a regular or need-to basis, of Construction projects to monitor whether relevant guidelines are observed or not. Advisory service on Quality Control shall be given when or where required.

- Collaborations with all concerned departments and organizations towards the achievement in constructing High-Rise Buildings of high-quality standard.

CQHP in Myanmar provides comprehensive guidelines for high-rise construction, ensuring safety, durability, and quality. All guidelines cover various aspects, including design, construction practices and inspection procedures. The proposed project is pledging to adhere the following guidelines throughout the construction period;

- Guidelines for High-rise Building Construction Projects (Mechanical)
- Guidelines for High-rise Building Construction Projects (Electrical Works)
- Guidelines for High-rise Building Construction Projects (Electrical installation)
- Guidelines for High-rise Building Construction Projects (Electrical Temporary Installation)
- Guidelines for High-rise Building Construction Projects (Testing of Electrical Wiring Installation)
- Guidelines for High-rise Building Construction Projects (Building Electrical Wiring Installation)
- Guidelines for High-rise Building Construction Projects (Guideline for Sanitary Works)
- Guidelines for High-rise Building Construction Projects (Guideline for Construction Projects)
- Guidelines for High-rise Building Construction Projects (Safety)
- Guidelines for High-rise Building Construction Projects (Architectural)

2.13.2. Myanmar National Building Code (MNBC 2025)

The Myanmar National Building Code (2025) is the comprehensive guidelines to guide the construction practices in Myanmar, was officially distributed by the Ministy of Construction.

The project proponent abides by a particular section of instructions;

Section 1 – Urban planning, building and urban environmental management

Section 2 - Architecture and Urban Design

Section 3 - Structural Design and

Section 4 - Soil and Foundation

Section 5 – Building services

Section 5(a) – Lighting

Section 5(b) - Electrical and related installations

Section 5(c) – Elevator and escalator installation

Section 5(d) – Water supply, sewerage and sanitation

Section 5(e) – Heating, ventilation and air conditioning

Section 5(f) – Fire safety, fire protection systems and emergency escape means

Section 6 – Building construction materials

The project proponent commits to enforce the Myanmar National Building Code (2020) for construction project to ensure the safety, quality and structural resilience of buildings, particularly in the face of potential future earthquakes and other natural hazards.

2.14. NATURAL DISASTER AND CLIMATE CHANGE

2.14.1. Natural Disaster Management Law (2013)

The Project Proponent commits to follow the prioritization of the natural disaster risk reduction by the National Committee and the local Body respectively; under Section 14 (a) of Natural Disaster Management Law, 2013.

The Project Proponent commits to carry out better improvement on early warming system of natural disaster; under Section 14 (b) of Natural Disaster Management Law, 2013.

The Project Proponent commits to apply knowledge and innovation to be a habit of safety and resilience at every level from the National Level to the ward or village tract level; under Section 14 (c) of Natural Disaster Management Law, 2013.

The Project Proponent commits to carry out together with the measures of natural disaster risk reduction in development plans of the Stateunder Section 14 (d) of Natural Disaster Management Law, 2013.

The Project Proponent commits to establish sound preparations to resolve the natural disaster at every level from the National Level to the ward or village tract level.under Section 14 (e) of Natural Disaster Management Law, 2013.

The Project Proponent commits to identify the area where is likely to strike natural disaster and preparing the natural disaster risk assessment and planning emergency management; under Section 15 (a) of Natural Disaster Management Law, 2013.

The Project Proponent commits to give the public awareness of knowledge of the natural disaster, keeping the early warning systems, training for search and rescue and making rehearsal; under Section 15 (b) of Natural Disaster Management Law, 2013.

The Project Proponent commits to enhance of the capacity of the public for emergence of a disaster resilient community in compatible with climate change for reduction of damage and lossess due to unforeseen disaster risk caused by climate change under Section 15 (c) of Natural Disaster Management Law, 2013.

The Project Proponent commits to follow the guidance, motivation and implementation of active participation from the community including volunteers in the community-based natural disaster magaement activities and disaster reduction activities by the National Committee and Local Body, under Section 15 (d) of Natural Disaster Management Law, 2013.

The Project Proponent commits to issue early warning information to the public to enable to evacuate in time and move their properties and cattle to the safety area; under Section 15 (e) of Natural Disaster Management Law, 2013.

The Project Proponent commits to stockpile to enable ready to provide the minimum requirement of food and relief items and rehabilitation materials according to the type of natural disaster;under Section 15 (f) of Natural Disaster Management Law, 2013.

The Project Proponent commits to take measures to enable to get assistance of the Defence Services, the Myanmar Police Force, the fire Brigade, the Red Cross, Volunteers or

organizations, civil societies and other non-government organizations for search, rescue and support functions expeditiously, under Section 15 (g) of Natural Disaster Management Law, 2013.

The Project Proponent commits to carry out the communications network for giving necessary assistance by foreign countries, international organizations and external regional organizations in case of serious damage and heavy losses caused by natural disaster; under Section 15 (h) of Natural Disaster Management Law, 2013.

The Project Proponent commits to take preparatory measures for rehabilitation and reconstruction activities of health, education, social and other sectors for improving better living standard after disaster; under Section 15 (i) of Natural Disaster Management Law, 2013.

The Project Proponent commits to perform other duties assigned by this law in respect of the preparatory measures.under Section 15 (j) of Natural Disaster Management Law, 2013.

The Project Proponent commits to follow the preventive measures to be carried out in the area where is likely to strike natural disaster before the natural disaster under Secton 16 of Natural Disaster Management Law, 2013, shown in 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 in 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.

The Project Proponent commits to carry out the emergency search and rescue of missing persons due to natural disaster when the natural disaster strikes, under Section 17 (a) of Natural Disaster Management Law, 2013.

The Project Proponent commits to carry out evacuation of the victims to the safety area and providing accommodation in temporary shelters when the natural disaster strikes, under Section 17 (b) of Natural Disaster Management Law, 2013.

The Project Proponent commits to carry out the emergency supporting of food and relief items when the natural disaster strikes, under Section 17 (c) of Natural Disaster Management Law, 2013.

The Project Proponent commits to carry out the clearance of damage and collecting preliminary data on losses and making examinations for necessaries to provide when the natural disaster strikes, under Section 17 (d) of Natural Disaster Management Law, 2013.

The Project Proponent commits to open an emergency management centre and closely supervised the natural disaster when the natural disaster strikes, under Section 17 (e) of Natural Disaster Management Law, 2013.

The Project Proponent commits to provide emergency health care to the local people and prevention of the outbreak of contagious diseases by forming mobile healthcare teams when the natural disaster strikes, under Section 17 (f) of Natural Disaster Management Law, 2013.

The Project Proponent commits to provide medical treatment to the injured and the sick by opening temporary clinics and hospitals;under Section 17 (g) of Natural Disaster Management Law, 2013.

The Project Proponent commits to conduct emergency responses including search and rescue according to the type of natural disaster;under Section 17 (h) of Natural Disaster Management Law, 2013.

The Project Proponent commits to take measures for the safety of the victims and rule of law in the disaster affected area; under Section 17 (i) of Natural Disaster Management Law, 2013.

The Project Proponent commits to carry out data collection and confirmation of damage and losses due to natural disaster; under section 18 (a) of Natural Disaster Management Law, 2013.

The Project Proponent commits to provide the continuation of sufficient food, relief and rehabilitation items, appropriate and financial assistance from the allotted funds to the victims;; under section 18 (b) of Natural Disaster Management Law, 2013.

The Project Proponent commits to lay down the plan for rehabilitation and reconstruction on the situation of damage and losses; under section 18 (c) of Natural Disaster Management Law, 2013.

The Project Proponent commits to reconstruct the buildings and houses damaged by the natural disaster in an appropriate area as disaster resilient buildings;; under section 18 (d) of Natural Disaster Management Law, 2013.

The Project Proponent commits to rehabilitate in order to restore agriculture, livestock breedings and other vocations required for victims; under section 18 (e) of Natural Disaster Management Law, 2013.

The Project Proponent commits to establish of reintegration into society by uplifting to the mental affected person due to natural disaster;under section 18 (f) of Natural Disaster Management Law, 2013.

The Project Proponent commits to provide medical treatment to the victims and taking preventive measures against the contagious disease that is likely to cause as supplementary; under section 18 (g) of Natural Disaster Management Law, 2013.

The Project Proponent commits to take measures for the continuation of students studies out of the victims and reconstruction of schools; under section 18 (h) of Natural Disaster Management Law, 2013.

The Project Proponent commits to take measures for the safety of the victims and rule of law in the disaster affected area; under section 18 (i) of Natural Disaster Management Law, 2013.

The Project Proponent commits to coordinate with the relevant body of the prevention against human trafficking for the prevention against human trafficking to the victims, under section 18 (j) of Natural Disaster Management Law, 2013.

The Project Proponent commits to perform other duties assigned by this law in respect of rehabilitation and reconstruction activities, under section 18 (k) of Natural Disaster Management Law, 2013.

2.14.2. Climate Change Policy (2019)

The vision of Climate Change Policy (2019) is to be a climate-resilient, low-carbon society that is sustainable, prosperous and inclusive, for the wellbeing of present and future generations. To achieve the purpose of this policy, the guiding principles are developed, which are (a) sustainable development, (b) precaution, (c) prevention, (d) environmental integrity, (e) shared responsibility and cooperation, (f) inclusiveness, (g) good governance, (h) climate justice and equity and (i) Gender equality and women's empowerment. The commitment of HAGL is to participate in implementing this policy to achieve its purpose through cooperation and partenership with all sectors and stakeholders, at all levels, in line with the guiding principles of this policy.

2.14.3. Green Building Chapter in Myanmar National Building Code (2020)

The criteria and basic requirements of green buildings for Myanmar has been introduced in the Section 2.12 GREEN BUILDING in Myanmar National Building Code (2020), which is the guideline for Myanmar Construction Industry. The purpose of this section is to provide the minimum design requirements that will promote all phases of design, materials selection and construction, efficient utilization of energy and water resources in buildings. There are 5 criteria for green building stated in Myanmar National Building Code (2020); namely, "Sustainable Site" to provide the favourable conditions for residents with minimum negative impacts on surrounding area, "Efficient consumption of Energy, Water and Natural Resources Management" for saving energy and natural resources usage in buildings to minimize the global warming, "Indoor Environment and Materials" to create safe, hygiene and comfortable to residents, "Innovative Architecture and Identity" for development of innovative architecture on the basis of the continuity and traditional values and "Social Sustainability and Humanities for Community" for the goals of establishing protecting and nurturing social environment and humanities towards stability and sustainability. HAGL commits to comply with the environmental sustainability standards and green building grading system demonstrated in this code. The specified building types must act in accordance with these standards for the design and construction method to enhance the building's performance of resource efficiency, occupants' wellbeing and environmental protection.

2.14.4. SunMyanmar Climate Change Strategy and Master Plan (2018-2030)

The proposed project HAGL committing to the Myanmar Climate Change Strategy and Master Plan (MCCSM) (2018-2030) indicates that HAGL will align the infrastructure project with the country's goals for climate resilience and low-carbon development. The long term goal of this strategy is : By 2030, Myanmar has achieved climate-resilience and pursued a low-carbon growth pathway to support inclusive and sustainable development. To achieve its goal, six priorities social, infrastructure and economic sectors were identified through setting up expected results for their sectoral outcomes and they are mentioned in the following;

- Climate-smart agriculture, fisheries and livestock for food security
- Sustainable management of natural resources for healthy ecosystem
- Resilient and low-carbon energy, transport and industrial systems for sustainable growth
- Resilient, inclusive and sustainable cities and towns where people can live and thrive

- Climate risk management for people's health and wellbeing
- Education, science and technology for a resilient society.

In line with the sectoral priorities above, the project (HAGL) will likely incorporate guiding measures of strategic master plan to reach its long-term desired goal of achieving climate-resilient development and pursuing a low-carbon development outcomes.

2.15. MYANMAR GOVERNMENT INSTITUTIONAL FRAMEWORK

2.15.1. Arrangement at National and Sector Level

At national Level, National Environmental Conservation Committee (NECC) serves as a mechanism for inter-ministerial coordination. Authorities and functions of NECC are prescribed in Articles 7 to 13 of the Environmental Conservation Rules of the Republic of the Union of Myanmar.

One of NECC's main functions related to this project is to oversee the management of the EIA process by Ministry of Environmental Conservation and Forestry (MOECAF) through ECD. ECD will serve as a coordinator among various departments in relevant sectors to ensure that the EIA and implementation of EMP will address environment and social issues of concerns by departments in relevant sectors.

The EIA process for this project will be administered by the central ECD in coordination with the regional ECD and varies governmental organizations at the regional, township, and district levels.

2.15.2. Arrangement at the EIA Report

The project proponent must ensure that the EIA investigation properly addresses all Adverse Impacts and is undertaken in accordance with the ToR as approved by the Department. In this EIA investigation, all biological, physical, social, economic, health, cultural and visual components of the study area are considered through conducting data collection, technical studies, modeling, field surveys, field sampling, laboratory analysis, engineering designs and calculations. It can comply with and refer to applicable national and international standards adopted by the Union Government and / or the Minitry or, in the absence of relevant national or adopted international standards, such standards as may be agreed with the Ministry.

As the part of EIA investigation, the consultation process is undertaken to consider the views, concerns and perceptions of stakeholders, communities and individuals that could be affected by the project or who otherwise have an interest in the project.

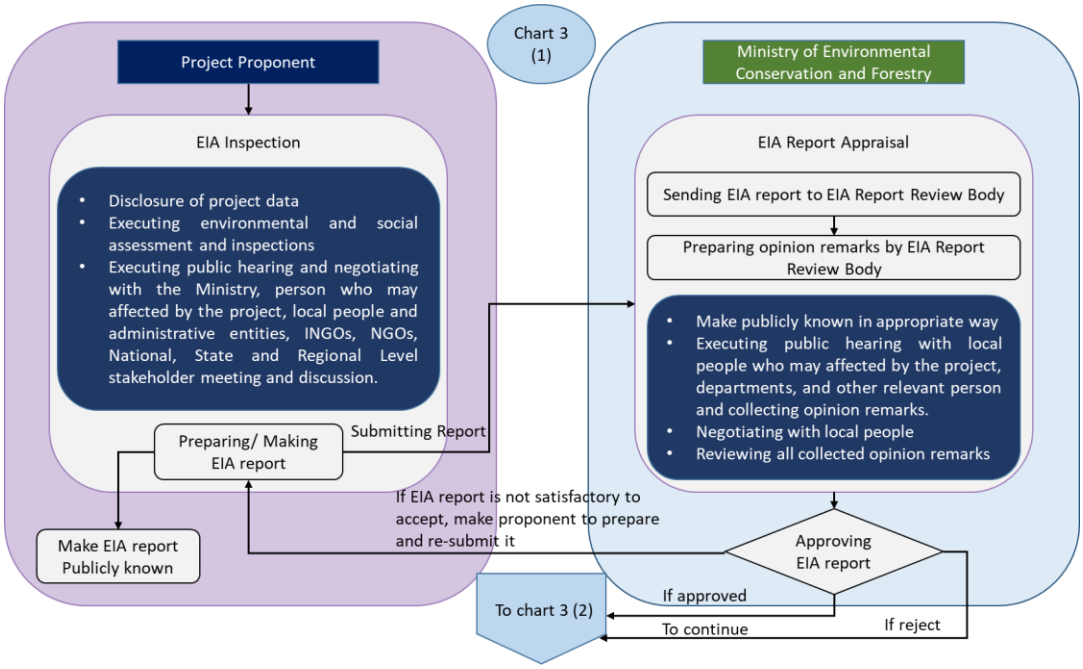


Figure 2-2 EIA Assessment and Appraisal Process Outline Diagram

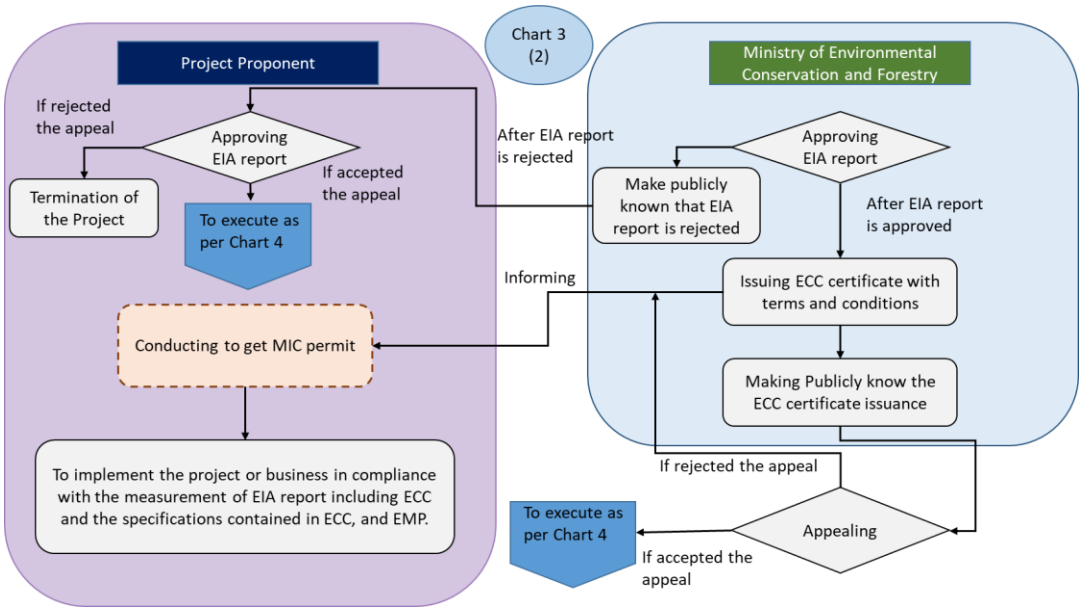


Figure 2-3 EIA Report Approving Process Outline Diagram

2.16. INTERNATIONAL GUIDELINES AND STANDARDS

International and national policies, guidelines and standards relevant to environmental and social impacts of projects that are referred to by most countries are those issued by World Health Organization (WHO), the United States Environmental Protection Agency (USEPA), the World Bank, and the International Finance Corporation (IFC). The policies, guidelines and standards of the WB and IFC are cross referenced and complementary as the IFC is an organization of the WB Group. They are also adopted by most development organizations such as the Asian Development Bank, and Japan Bank for International Cooperation. It should be noted that the guidelines and standards recommended by the WB and IFC, especially those related to environmental pollution, also provide due consideration to the guidelines and standards of USEPA and WHO.

Only those international policies, guidelines, and standards relevant to this Project are discussed.

2.16.1. IFC's Standards and Guidelines

IFC's standards and guidelines relevant to this project are described as follows;

- Performance Standards (PS) on Environmental and Social Sustainability (January 1, 2012)
- Environmental, Health and Safety-General Guidelines (April 30, 2007)

IFC describes eight PS on Environmental and Social Sustainability which Project proponent needs to comply throughout the IFC investment life. The eight PS are;

PS 1: Assessment and Management of Environmental and Social Risks and Impacts

PS 2: Labor and Working Conditions

PS 3: Resource Efficiency and Pollution Prevention

PS 4: Community Health, Safety, and Security

PS 5: Land Acquisition and Involuntary Resettlement

PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

PS 7: Indigenous Peoples

PS 8: Cultural Heritage

All the environmental and social aspects of development projects will be covered by the above eight PS.

2.16.2. World Bank's Pollution Prevention and Abatement Handbook (1988)

Toward Clear Production

The WB's Pollution Prevention and Abatement Handbook (PPAH) is a comprehensive document providing guidelines for industrial pollution control, and it recommends emission and ambient quality standards to be applied in environmental management. These recommends standards have taken into account the standards enforced by U.S.EPA and those recommended by WHO. They are referred to in the IFC's EHS Guidelines.

2.16.3. Vienna Convention for the Protection of the Ozone Layer (1985)

The Vienna Convention for the Protection of the Ozone Layer is a treaty on the framework for international cooperation concerning the protection of the ozone layer. This is a framework convention that lays out principles agreed upon by many parties. It does not require countries to take control actions to protect the ozone layer. This would come later in the form of the Montreal Protocol.

This Convention was adopted in 1985 following international discussion of scientific discoveries in the 1970s and 1980s highlighting the adverse effect of human activity on ozone levels in the stratosphere and the discovery of the 'ozone hole'. Its objectives are to promote cooperation on the adverse effects of human activities on the ozone layer.

Myanmar ratified Vienna Convention for the protection of Ozone Layer on 24 November, 1993. Country Programme preparation was approved in 1994.

Today, the Vienna Convention is still making progress. The countries involved meet once every three years to make decisions on important issues including on Research and Systematic observations as well as financial and administrative matters.

2.16.4. Montreal Protocol on Substances that Deplete the Ozone Layer (1987)

The Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol) is an international agreement made in 1987 and entered into force in 1989. It was designed to stop the production and import of ozone depleting substances and reduce their concentration in the atmosphere to help protect the earth's ozone layer. This Protocol sits under the Vienna Convention for the Protection of the Ozone Layer.

The parties to the Protocol meet once a year to make decisions aimed at ensuring the successful implementation of the agreement. These include adjusting or amending the Protocol, which has been done six times since its creation. The most recent amendment, the Kigali Amendment, called for the phase-down of hydrofluorocarbons (HFCs) in 2016. These HFCs were used as replacements for a batch of ozone-depleting substances eliminated by the original Montreal Protocol. Although they do not deplete the ozone layer, they are known to be powerful greenhouse gases and, thus, contributors to climate change.

Myanmar ratified the Montreal Protocol on 24 November, 1993. Country Programme preparation was approved in 1994.

The Montreal Protocol provided a set of practical, actionable tasks that were universally agreed on. The Protocol has successfully met its objectives thus far and continues to safeguard the ozone layer today. The ozone layer is well on its way to recovery because of the collaborative effort of nations around the world.

2.16.5. Kyoto Protocol

The Kyoto Protocol, also known as the Kyoto Accord, is an international treaty among industrialized nations that sets mandatory limits on greenhouse gas emissions.

The greenhouse effect is the warming effect of the sun on greenhouse gases, such as carbon dioxide, that act to trap this heat in our atmosphere. The more of these gases that exists, the more heat is prevented from escaping into space and, consequently, the more the earth heats.

Although the greenhouse effect is necessary for survival on earth, an overabundance of greenhouse gas emissions increases global warming beyond what is desirable. The purpose of the Kyoto Protocol is to stabilize human-generated emissions at a level that will not inflict further harm on the atmosphere.

The initial treaty was signed in Kyoto, Japan in 1997. That agreement outlined emissions targets. Implementation required participating members to create policies and measures to reduce and offset domestic emissions and increase absorption of greenhouse gases. Other specifications included requirements for accountability, compliance and reporting. That agreement expired at the end of 2012. Members agreed upon an extension of the protocol, effective from 2013 to 2020.

The Kyoto Protocol is overseen by the United Nations Framework Convention on Climate Change (UNFCCC). As of late 2013, all UN member states except for Andorra, Canada, South Sudan and the United States had signed and ratified the treaty. All 28 nations in the European Union have also signed the accord.

2.16.6. United Nations Framework Convention on Climate Change (UNFCCC)

Climate change is widely recognized as one of the greatest global threats that the planet faces today. In an effort to address this threat, the international community negotiated and adopted the United Nations Framework Convention on Climate Change (UNFCCC) on 9th May 1992 and it entered into force on 21st March 1994. UNFCCC was signed by Myanmar on 12th June 1992. Moreover, Myanmar ratified the UNFCCC on 25th November 1994 and it entered into force in Myanmar on 23rd February 1995.

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

The ultimate goal of the UNFCCC is to stabilize “greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”. Article 3 of the UNFCCC establishes a set of foundational principles that should guide Parties in achieving this goal. Notably for Myanmar, Article 3(1) states that the Parties “should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities”. Article 3(2) then states that “the specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration”. Accordingly, the UNFCCC divides countries into two separate groups – Annex I includes developed countries, and Annex II includes developing countries.

Solving the climate change problem is the responsibility of not only global but also the local governments, businesses, citizens and civil society. Therefore, it is necessary to coordinate and cooperate to achieve the purpose of this Convention and the relevant legal information in accordance with the relevant provisions.

CHAPTER 3
PROJECT DESCRIPTION AND ALTERNATIVE

3.1. BACKGROUND OF THE PROJECT

This chapter includes general information of HAGL Myanmar project, location of project site, layout plans of the whole project, land use plan, project facilities and implementation schedule. HAGL Myanmar is a developing the commercial building, serviced apartment and residential units merged with green areas, which tends to improve lifestyle by constructively address the problem of lagging in qualified habitation, and extensive shopping mall will provide facilities for many people in need. This project in current construction phase as well as in future is providing Corporate Social Responsibility (CSR) with miscellaneous job opportunities for local people around the project area. Most information of the project presented in this chapter is provided by HAGL Myanmar.

3.2. LOCATION OF THE PROJECT

The project site is situated at No. 192, Kabaraye Pagoda Road, Bahan Township, Yangon. It is located in Latitude 16°49’37.9” N and Longitude 96°09’18.7” E. At the opposite side of the project, Inya Lake is located along the Kabaraye Pagoda Road. The University Avenue Road across Kabaraye Pagoda Road at the south-west side of the project and continues through the No.1 Industrial Road at the south-east side of the project.

The project site in Bahan Township used about 37,816.55 square meter of the land area and the Gross Floor Area (GFA) excluding basement technical floor and roof floor are about 311,980.63 square meter. The land plot for the project site is trapezoidal shape and elevation of the project site is 14 meter above mean sea level. Yangon University is over 1.7 kilometer distance from the project site and Shwe Dagon Pagoda is over 2.8 kilometer far away from the project site. The location map of the project is shown in Figure 3-1.

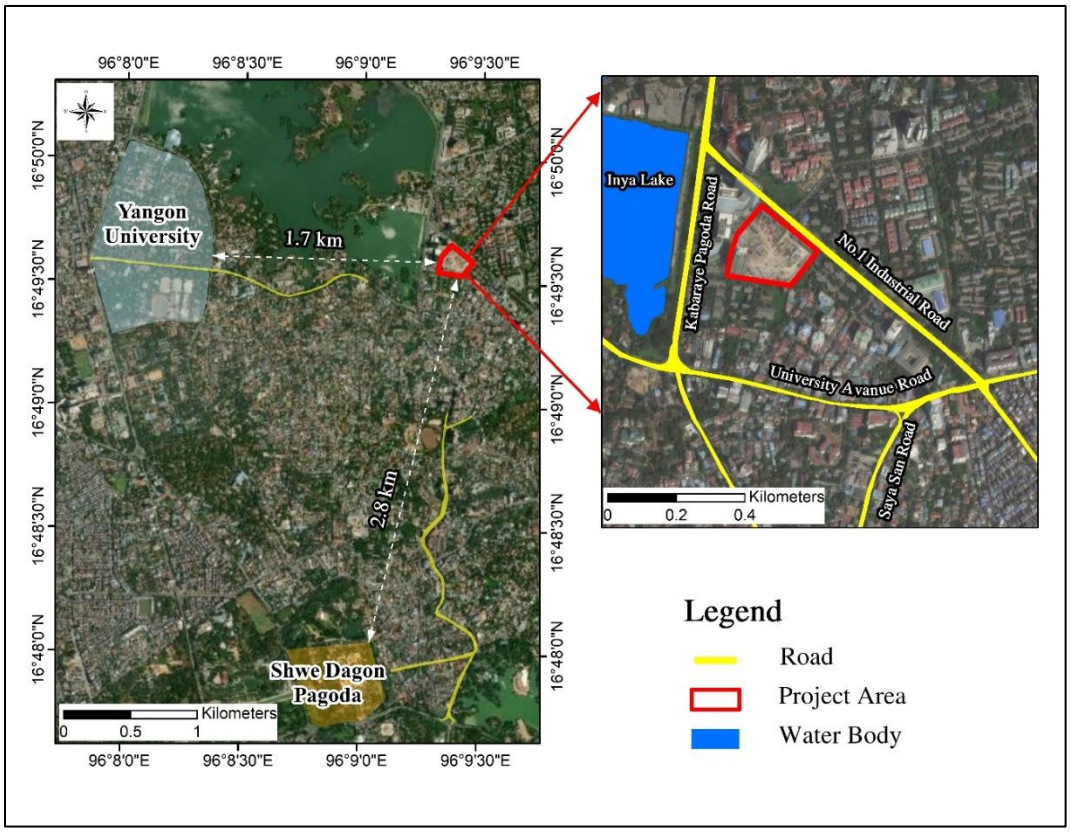


Figure 3-1 Location Map of the Project Site

3.3. PROJECT ALTERNATIVES

3.3.1. Relocation Alternative

Relocation option to a different site is an option available for the project implementation. This means that the proponent has to look for the land if relocation is necessary. Currently, there is no relocation alternative for the proposed development project.

HAGL Myanmar project aims to strengthen the bilateral relationship between the governments of Vietnam and Myanmar. The project is being implemented by Directorate of Hotels and Tourism, Ministry of Hotels and Tourism, in term of Build-Operate-Transfer (BOT) contract at No. 192, Kabaraye Pagoda Road, Bahan Township. It is a foreign direct investment project which pays for land lease to Myanmar government regularly since 2012.

Looking for the land to accommodate the scale and size of the project and completing official transaction on it may take a long period. In addition, it is not a guarantee that such land would be available. It is also worth noting that the proposed project is already underway in terms of seeking developmental approvals in various government departments.

The project proponent spent long period of time and cost on design and approvals of the plans by the relevant government departments before the stage of implementation. It may also take a long time to get commissions on its designs and process for the project Phase 2. Currently, the construction phase is completed 60 % and the project Phase 1 is being operated. This would also lead to a situation like No Action Alternative.

In consideration of the above concerns and assessment of the current proposed site, relocation is not a viable option.

3.3.2. The No Action Alternative

The No Action Alternative in respect to the proposed project implies that the status quo is maintained. This option is most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions.

3.4. DESCRIPTION OF PROJECT

3.4.1. Site Description

HAGL Myanmar Project (Phase 2) is developing on the total land plot of 37,816.55 square meter. Currently, Phase 1 is finished and underway in operation stage, therefore, only the Phase 2 will be constructed on the development area. Building coverage ratio for project site is 51.72% of the area. In Figure 3-2, the master plan for the project demonstrates the area of land plot, which was used for landscape, substantial green areas, respective buildings and circulation of routes planned in project sites.

For the purpose of earthquake resistance, the construction project is being implemented based on the Myanmar National Building Code 2025. During the construction phase, site preparation, piling work, excavation and foundation works, up to plinth level, superstructure work and fininshing work will be conducted.

Figure 3-2 Master Layout Plan of Project (Phase 2)

3.4.2. Compound Nearby Adjacent Project Site

The existing land use around 500 meters adjacent to the project site is composed of a mix of residential areas, religious places, commercial areas, government offices and schools. Location map of buildings, houses, roads and offices adjacent to 500 meter of the project site is presented in Figure 3-3.

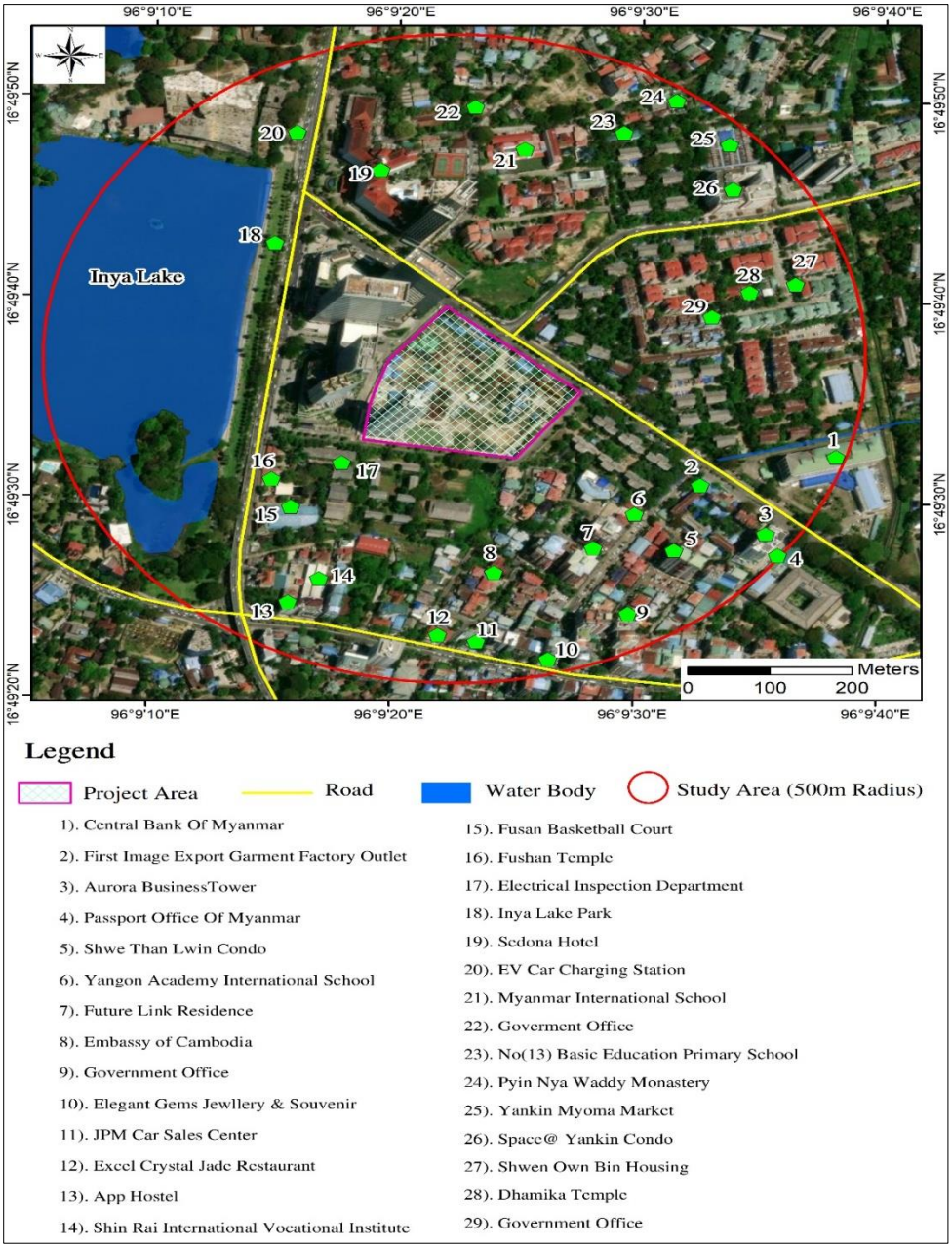


Figure 3-3 Location of Adjacent Features within 500 meter to the Project Site

3.5. PROJECT COMPONENTS

3.5.1. Type of Building and Function Area

In Phase 2, there are commercial centre, office building No.2, serviced apartment A1, serviced apartment A2, serviced apartment A3, serviced apartment A4, residential apartment B1, residential apartment B2 and residential apartment B3. There are car parking area in B1 (2 basement floors) and the rest of the Phase 2 consists of 4 basement floors. In addition, 30 stories of the commercial centre No.2 will attach with commercial centre No.1 from Phase 1.

3.6. INFRASTRUCTURE AND FACILITIES OF BUILDINGS

3.6.1. Project Development

The proposed HAGL Myanmar Centre project phase 2 project consists of low to high-rise residential and commercial building and the proposed usage area as follows:

- Residential Block (B1) – 33 Storey
- Residential Block (B2, B3) – 30 Storey
- Serviced Apartment (A1, A2) – 30 Storey
- High-Rise Serviced Apartment (A3, A4) and Commercial Centre No.2 (30 Storeys)
- Green Area
- Car Parking Lots

3.6.2. The Services of the Project

Residential Units Block B1, B2, B3 are intended for residential apartment whereas the serviced Apartment A1, A2 is for long-termed rental apartments. The commercial center no.2 as well as serviced apartment A3, A4 is served as shopping center and are designated for long-term rentals.

3.6.3. Land Uses Prescription

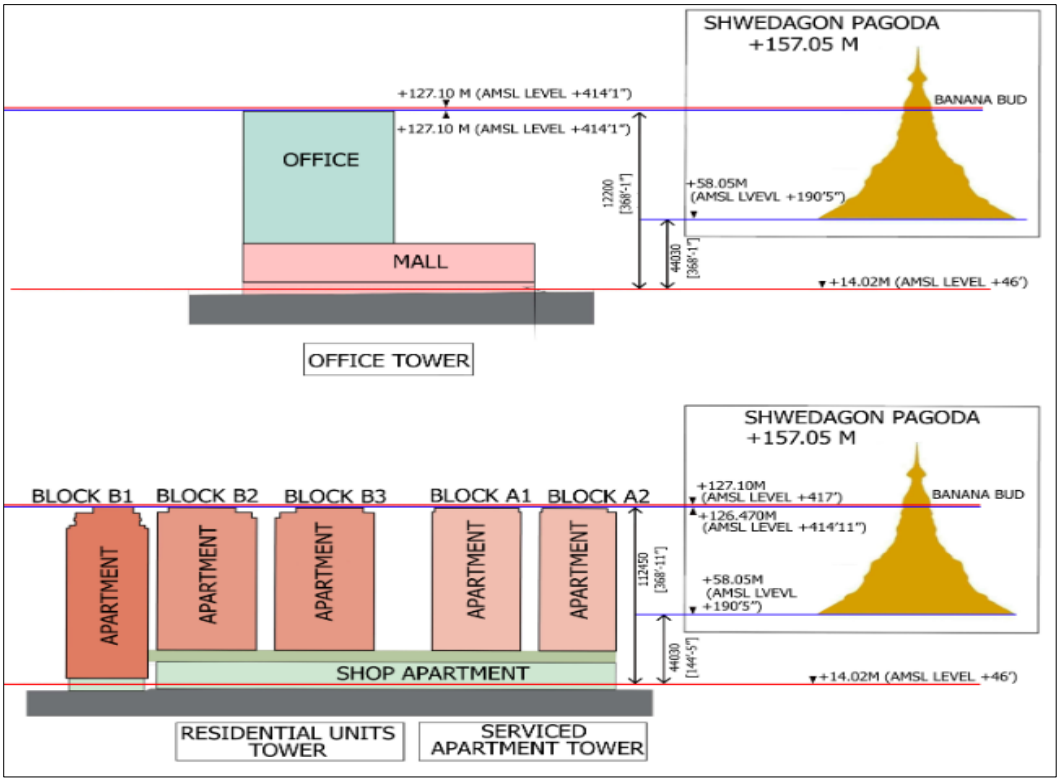
The total project site area for Phase 2 is 37,816.55 square meter. Building coverage area is 16,496.19 square meter and 6.51% floor area ratio (FAR). The green area outside of buildings is 14,833.30 square meter. Building height for residential and serviced buildings above Mean Sea Level (MSL) is 126.87%. Land use prescription of the project is shown in Table 3-1.

Table 3-1 Land Uses Prescription for Phase 2

No.	Particulars	Submission (12/2024)		Remark
		Unit	Dimension	
1.	Site/ Plot Area	m^2	37,816.55	Not Change
2.	Building Coverage Area		16,496.19	-
3.	Gross Floor Area		246,218.12	-
4.	Building Coverage Ratio		43.62%	-
5.	Floor Area Ratio		6.51%	-
6.	Permeable Area	m^2	15.36%	-
7.	Green Area		14,833.30	-
8.	Green Area Percentage		39.22%	-
9.	Building Height (Meter)-AMSL		126.47%	-
10.	Car Parking Provision based on YCDC guideline		2,783.00	-

In addition, all buildings are planned and processing under the Height Restriction Policies of Yangon Region. The distance between the Shwe Dagon Pagoda and project site is around 2.8 kilometer. The maximum heights of all proposed buildings are 126.87 meter while that of Shwe Dagon Pagoda's lower Banana Buld is around 127.1 meter above MSL.

Therefore, it is not expected to cause any visual impact due to this project. Height comparison is shown in Figure 3-4.



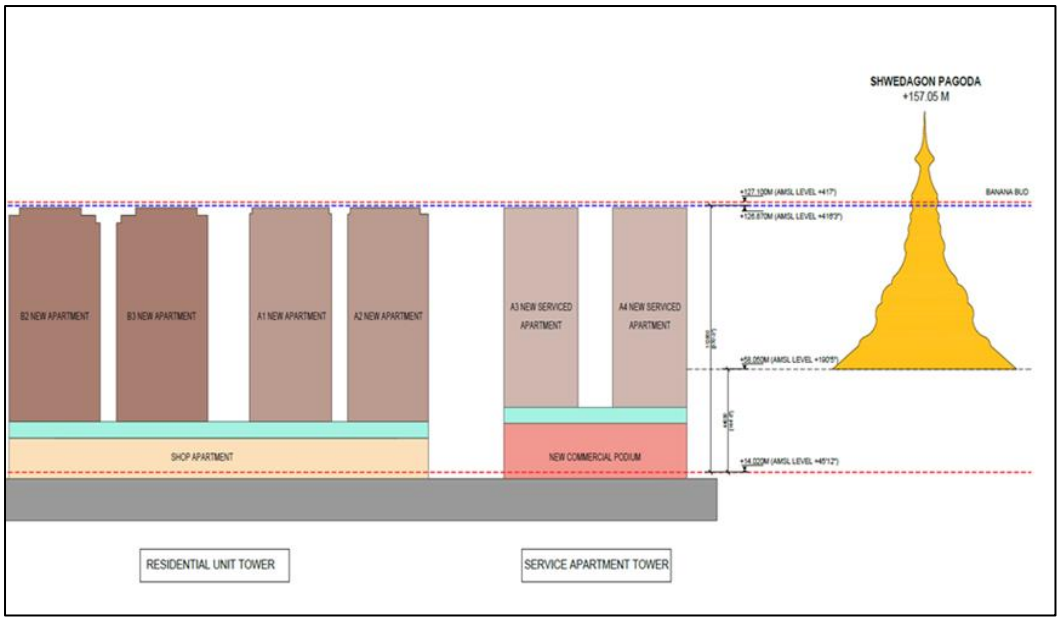


Figure 3-4 Height Comparison with Shwe Dagon Pagoda

3.6.4. Traffic System

3.6.4.1. Entrance, Exit and Internal Road

The project entails six main entrances into the project area. Two entrances are located on No.1 Industrial Road and mainly aimed for incoming and outgoing of visitor cars to the commercial centre. On the other side of the project, four main entrances are located on the internal road connecting Kabaraye Pagoda Road and No.1 Industrial Road. These three outlets mainly focus on decent entering and exiting of residents and guests. The spare roads also included in the traffic flow plan, so the project area is accessible for both residents and visitors to readily drop off and pick up. Four basement floors will be constructed for sufficient car parking for the whole area and only the fourth floor comprised the shopping mall area. Relevant traffic flow plan of the project site are shown in Figure 3-5.

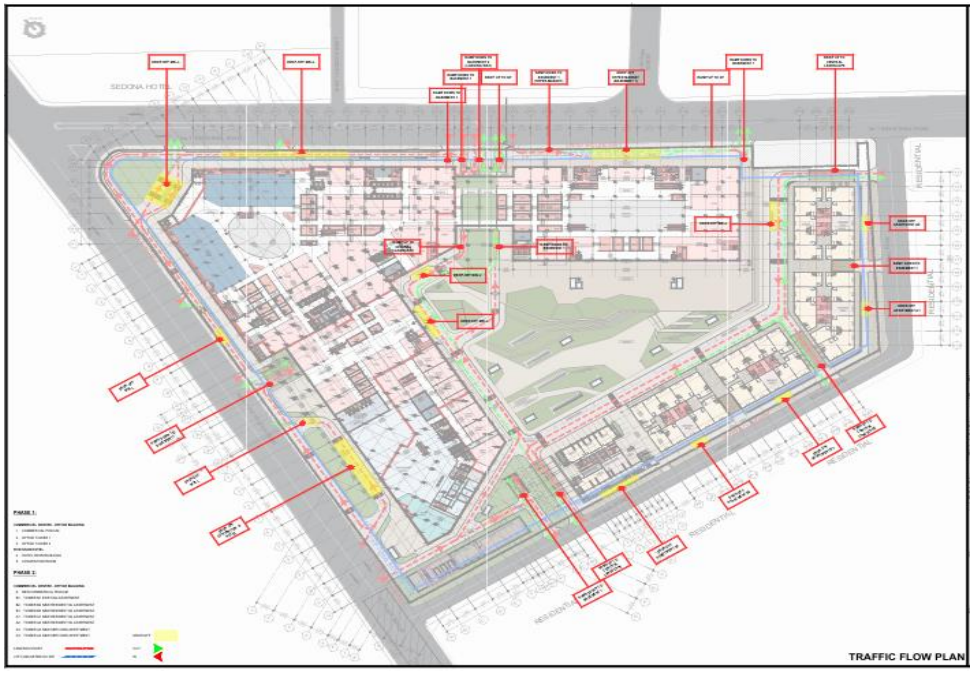


Figure 3-5 Traffic Flow Plan

3.6.4.2. Parking Lots

Regarding the parking lots, four basement floors of each building in Phase 2 will be constructed for sufficient car parking for the whole area. According to the submission drawing, the calculation results of the total parking lots required for the proposed development project is 2,783 numbers and shown in Table 3-2. Total parking lots area is calculated based on building's NLA complied with YCDC law. Moreover, it is also added additional 20% of parking lots for future developments.

Table 3-2 Calculation Results of the Total Parking Lots for Phase 2

No.	Particulars	YCDC Law	NLA 2024 (s.q.m)	Seats	Units	Parking Reqd: (MNBC 2020)	Remark
1.	Commercial Center	1 lot per 100 m^2	76326.39			763	No need to add 20% for futrue
2.	Office Tower (from 8-27)	1 lot per 100 m^2	63638.80			636	
3.	Melia Hotel	1 lot per 200 m^2	21587.70			130	Added 20% for futrue
4.	Cinema	1 lot per 10 Seats		600		72	
5.	Convention Center (Bet Melia & Myanmar Center)	1 lot per 10 Seats		1,158		139	
6.	Foodhall-Super Market	1 lot per 100 m^2	6325.93			63	No need to add 20% for futrue
7.	Restaurant	1 lot per 50 m^2	4556.8			109	Added 20% for futrue
8.	Auxilliary	1 lot per 200 m^2	5668.1			28	No need to add 20% for futrue
9.	Swimming	1 lot per 40 m^2	621.3			19	Adding 20% is not necessary
10.	Gym + Yoga + Spa	1 lot per 300 m^2	3299.5			13	
11.	Shop AP	1 lot per unit			40	48	
12.	Residential Units (B1)				232	278	
13.	Residential Units (B2 - B3)				486	583	
14.	Serviced Apartment (A1 - A2 - A3-A4)				780	936	
WHOLE PROJECT						**3819**	
Note							
_ Convention center parking calculation is referenced from Theater and halls							
_ The calculation area is calculated with building's NLA							

3.6.5. Water Supply System for Domestic Use

3.6.5.1. Water Source

The Phase 2 involves 3 residential buildings, 2 serviced apartments and a commercial centre attaching with office building. Each of the respective buildings consists of shop apartments, lobby apartments, and a basement carpark. Water supply system is mainly provided from YCDC water supply and all the system will be followed Government Rules and Regulations. Tube wells could not apply in project area as a back-up water supply. Water

supply system is connected to each building and an immense water storage tank will be providing water supply for the project.

3.6.5.2. Quantity of Water Demand

For Phase 2, 1,875 cubic meter capacity of watertank located at third and fourth basement floors will distribute water to the whole project. The estimated amount of water consumption during the construction phase is from 64 to 95 cubic meter per day. The firefighting water storage tank will be installed at second and third basement of serviced apartment-residential units (Phase 2) which capacity is 1,000 cubic meter and the pipe system from it is mainly connected with YCDC water supply. Water tank volume and its location is presented in Figure 3-6.

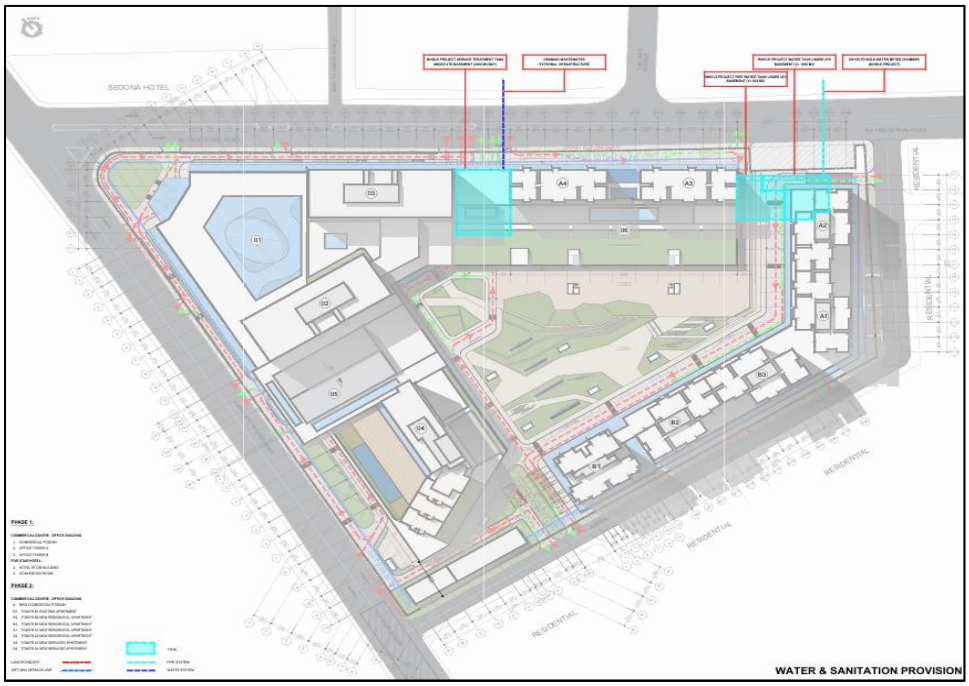


Figure 3-6 Water and Sanitation (sewage treatment tank) System

3.6.5.3. Quantity of Water Consumption

The water volume in the storage tank to supply the project is 1,875 cubic meter and the water consumption for current construction in Phase 2 is 64.5 to 95 cubic meter per day. For the operation phase, the estimated amount of water consumption for all buildings in Phase 2 is approximately 1,800 cubic meter per day. Estimated water consumption for swimming pools B-2 and A-1 are around 55.2 cubic meter per day and 36.6 cubic meter per day respectively.

3.6.5.4. Volume of wastewater and drainage system

Generally, wastewater is produced throughout the civil works ranging from site operations, material preparation as well as workforce sanitation. Concrete wash water, heavy equipment washing, dewatering operations, paints and sealants, and domestic wastewater from the worker camps can be considered as the primary source of the wastewater generation in the construction phase. The estimated total volume of wastewater generated during the construction phase is 210 cubic meter per day. The outside pipes are main channels to YCDC. The sub-channels expanded from the drainage system of landscape and the surrounded sub-

channels of the buildings are directly connected to the main channel. It is difficult to estimate the wastewater generation in the operation phase because it is a mixed-use building and are used for shopping centers (commercials) and residential purposes.

Dimension 900x900 (milimeter) of sewer pipes are at the outside of Phase 1 which follow through into the Phase 2 with a dimension of 1200x1200 (milimeter) sewer pipe. From residential, serviced apartments and central landscape, 400 milimeter and 200 milimeter in diameters of sewer pipes carry out drainage into the main channel (1200x1200 milimeter). Diameters of 200 milimeter sewer pipes are connecting with main channel (900x900 milimeter) to drain from landscape and buildings. Drainage system of the project is presented in Figure 3-7.

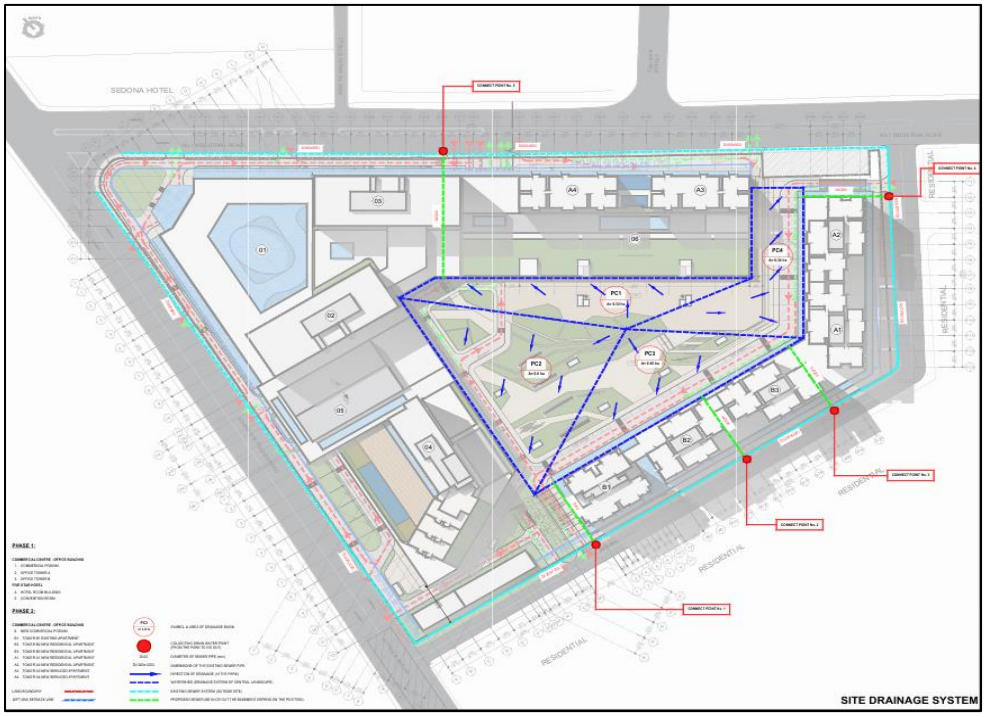


Figure 3-7 Drainage System of Project

3.6.5.5. Wastewater and Sewage Collection System within the Building

All types of wastewater from all buildings will be transferred into the sewage treatment system. The volume of the tank in treatement system is 2,400 cubic meter per day and discharge wastewater with targeted BOD value, all the physical and chemical parameters. It is planned to place at the fourth basement floor between the office building and serviced apartment A2. The project is currently in Phase 2 and it has its wastewater treatment system to treat the wastewater from the construction.

Wastewater treatment including an anoxic tank, aeration tank and MBR tank are implementing for sewage and wastewater disposal system. However, the final disposal system will be designed to meet the regulations of YCDC.

3.6.5.6. Wastewater and Sewage Treatment Plant

There is a wastewater treatment plant (WWTP) system which using equalization, anoxic and aeration tank, MBR tank, backwash water tank along with disinfection tank for the treatment process of wastewater from the project site. The treatment method will be aligned with the HPBC's instructed guideline and MNBC, 2025 guidelines. This wastewater treatment plant is designed to make treatment process for both project site and domestic wastewater, the treatment plant will be located in basement 4. The wastewater storage tank capacity is 718 cubic meter. The capacity of treatment plant is 1,250 cubic meter per day. The capacity of treated wastewater tank is 205.78 cubic meter. Therefore, the capacity of treatment plant is suitable for handling the 1,250 m3 of wastewater generation from the project operation. The location of septic tank and sewage treatment tank is shown in Figure 3-6. Thoroughtly treated wastewater will be discharged directly into the factory drainage channels, and then into the municipal drain lines.

3.6.6. Rain Water Drainage System

In Phase 2, rain water drainage system is implemented with rainwater points along the pipes outside of buildings in. There are 5 main points to collect rainwater from the park and building units. All these points are mainly discharged into the outlet of YCDC. The location of rainwater points are shown in Figure 3-7.

3.6.7. Solid Waste Management

3.6.7.1. Solid Waste Disposed System

There are two garbage rooms in the second basement floor with the dimension of 130 square meter and 135 square meter respectively. The location of garbage room are shown in Figure 3-8.There will be sufficient garbage bins in the project site and these solid wastes will be systematically collected and discharged at final disposal site according to the guideline of YCDC. After dehydrating the sludge from the WWTP, they will dispose to YCDC.

Figure 3-8 Location of Garbage Rooms in Second Basement Floor

3.6.7.2. Waste quantity

According to the IGES (2016)[7], the estimated amount of waste generation from each person is 0.4 kilogram per person per day. There are 392 workers during construction phase, the waste generation is approximately 156.8 kilogram per day. The estimated generation of waste quantity during operation is 210 cubic meter per day. However, hazardous waste and e-waste generation both from construction and from operation phases cannot be estimated. The separated garbage bins will be provided specially for the hazardous and electronic wastes while handling the project site temporaily. The final discharge point for those will follow the YCDC guidelines.

During the construction phase, both general and hazardous wastes can be seen. General wastes are from the workforce and hazardous are from the construction site. Mostly, domestic soild wastes are produced with a small volume of hazardous wastes from the project operation.

3.6.8. Power Supply

For electricity supply, there are 10 transformers with the capacities of 1,600-5,000 KVA. The project is mainly operated by the supply of Government electricity. There are 2 transformer rooms for electricity such as the first one is located at Mall, A3 and A4 alongside the second is B1, B2, B3, A1 and A2. The detail of their capacities and locations are shown in Figure 3-9. The project implementation is mainly depend on the public electricity supply system (YESC) for this reason there is no fuel consumption for projection operation. Sensor systems will be introduced with the purpose of energy effenicy and other resources.

[7] IGES (June, 2016), Quick Study On Waste Management in Myanmar

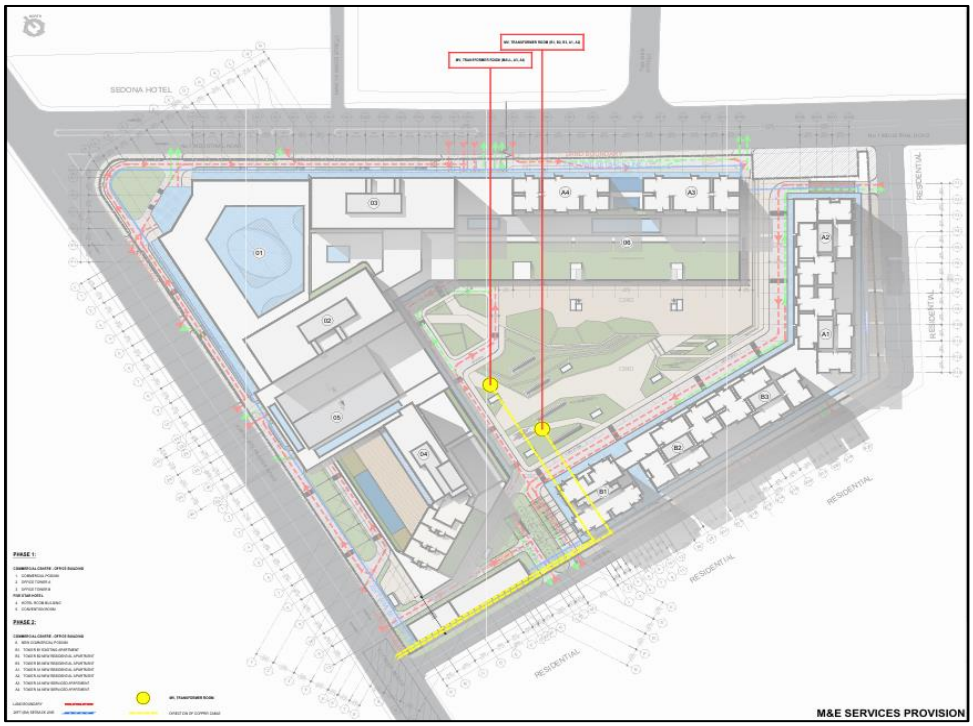


Figure 3-9 Capacities and Locations of Transformer Rooms

3.6.9. Lift System

Regarding the lift system, there will be altogether 24 numbers of lifts. The loading range of each lift is 1,150 - 2,000 kilogram with fire proof design.

3.6.10. Landscaping

After the construction and erection works are completed, the remaining exposed surfaces of the project site will be treated to landscaping plan. Landscaping plan will be developed by the contractor to provide effective screening of the project, shown in Figure 3-10.

Figure 3-10 Landscapping Plan of Project Area

3.6.11. Firefighting system

For firefighting system, the project achieved certificate for firefighting training, first aid training and so on. The fire protective system including emergency lighting, fire alarm, fire extinguisher, fire hose reel, smoke detector, first aid kit and water tank for fire protection will be installed for safe firefighting system. The water storage tank will be built at second and third basement floor for enough water supply to a whole project for firefighting. The capacity of the tank for B1, B2, B3 is 329 cubic meter, A1 and A2 is 350 cubic meter and commercial, office tower and basement is 550 cubic meter. The location of firefighting water tanks are shown in Figure 3-6.

3.7. PROJECT IMPLEMENTATION

The construction of the Residential Units Block B1 is officially launched in April 1, 2024. Future plan of all other buildings in project site: Residential Units Block B2 and B3 is estimated to reach completion stage in December, 2030. Serviced Apartment A1, A2, commercial and office building are estimated to complete in December, 2036. In addition, commercial and serviced apartment A3 and A4 building will be finished in December, 2033. However, it depends on the economics condition of Myanmar, project implementation plan could be varied from time to time.

In general, HAGL will be responsible for the overall management of project implementation, both construction and operation. Project implementation (construction) will be the responsibility of HAGL with the advice from a consulting firm.

3.7.1. Number of Construction Workers and Worker Campsite

The maximum number of construction staff and workers is approximately 392 workers during construction period. Total numbers of construction workers in each day will vary depend on the type of construction work and schedule.

3.7.2. Construction Schedule

Currently, the construction schedule of the HAGL project (Phase 2) is unpredictable, reliance on the economics developmThe Residential Units of Block B1 (Basement 2 + 33 storey) are already complete, and construction for Phase 2 is about 12% finished.ents in Myanamar; however, the estimated project completion target is mentioned in Table 3-3.

Table 3-3 Estimated Project Implementation Timeline

No.	Project Status	Timeline					
		2025 - 2026		Late 2027 - 2029	2030	2033	2036
1.	Vacant Land	Temporatory installation of solar panels					
2.	Construction phase			Estimated construction work will commence for B2 & B3	Estimated late 2030 will start for A3 & A4	Estimated late 2033 will start for A1, A2 commerci-al & office	
3.	Operation phase				Will be completed B2 & B3 blocks	Will be completed A3 & A4	Will be completed A1, A2 commerci-al & office

CHAPTER 4
EXISTING ENVIRONMENTAL AND SOCIAL CONDITION

4.1. SETTING THE STUDY LIMIT

In the EIA study, it is necessary to establish baseline information on the environmental and socio-economic settings of an area which could receive directly and/or indirectly impacts from the project construction and operation. The baseline information serves two purposes. Firstly, it uses in conjunction with the information on the project, for identification of potential impacts of the project and assessment of their significance. Secondly, it serves as the benchmark for evaluating environmental and social management performance of the project construction and operation.

As the EIA procedure does not define the study area for EIA study, the EIA study area for this project is roughly defined to be the area within a 3 kilometer radius of the center of the project site. This study area would be large enough to cover most potential environmental and social impact of the project construction and operation.

This chapter describes environmental and socio-economic settings of the study area based on available information collected during field survey and secondary data from Township General Administration Department (GAD, 2023).

4.2. GEOGRAPHICAL STUDY LIMIT

The geographical extent of the project's potential impacts on both environmental and social is assessed to define the Area of Influence (AOI) where baseline information were collected. The project is located at No. 192, corner of Kabaraye Pagoda Road and No.1 Industrial Road, Bahan Township, Yangon Region. The project site is approximately 37,816.55 square meter of the land area. The area of influence (AOI) of the project is shown in Figure 4-1. As shown in Figure, the project size of 1 km radius is defined as the potential direct impact influence zone in which the potential direct negative impact such as air pollution, noise, water pollution, and soil contamination, and their effect on human and ecosystem can occur. In addition, it is considered that the area between 1 km and 3 km is the potential indirect impact influence zone. The potential direct and indirect impact will be distinguished and included in EIA investigation report.

Regarding the AOI of proposed project area, the project area is surrounded by the high populated townships, namely Bahan, Yankin, Mayangone, Hlaing, Kamaryut, Sanchaung, Dagon, South Okkalapa, Thingangyun and Tamwe. As being the mixed use development project, the magnitube, extent and duration of potential environmental impacts is relatively limited. In direct impact zone (1 km radius), the Bahan and Yankin Townships are more likely to vulnerable area than Mayangone townships due to their topographic locations and high population density, meanwhile, surface water body of Inya lake are dominant in study area of Mayangone Township.

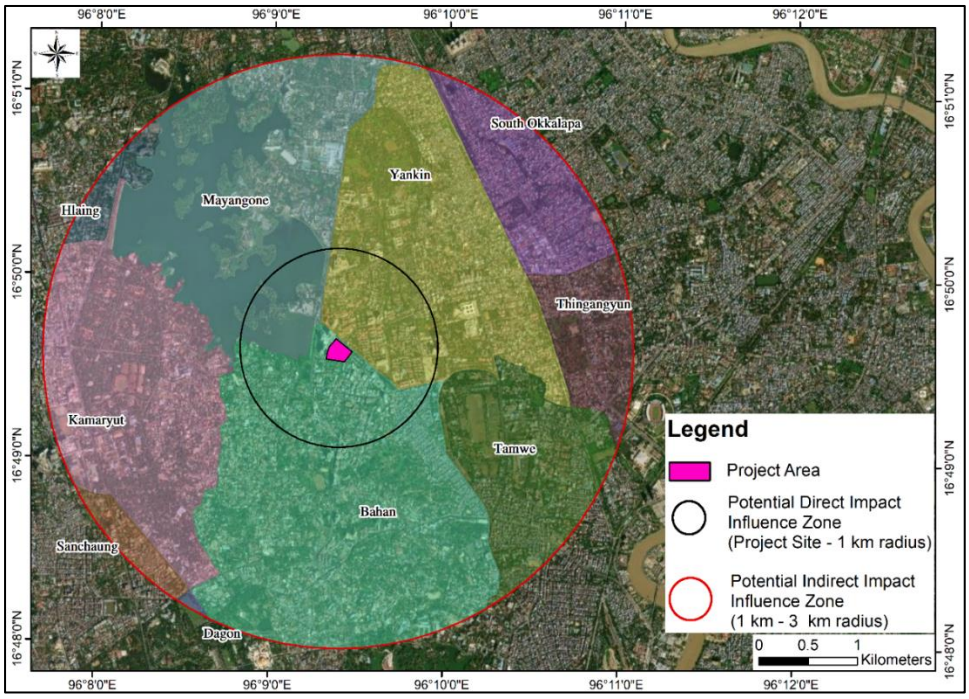


Figure 4-1 Area of Influence

4.2.1. Contextual Study Limit

The EIA guidelines have defined the contextual study limit for project surrounding environment to consist of five groups of components: (i) physical components, (ii) biological components, (iii) socio-economic components, (iv) cultural components and (v) visual characteristics.

i. Physical Component

- Overview of the study area
- Meteorology
- Geography/Topography
- Geology
- Seismology
- Soil
- Hydrology
- Surface water quality
- Groundwater quality
- Air quality
- Noise and Vibration
- Water Quality
- Traffic Survey

ii. Biological Components

- Terrestrial resources
  - Flora
  - Fauna
- Aquatic organism
  - Aquatic flora
  - Plankton
  - Benthos
  - Fish

iii. Socio-economic components
- Population and Demography
- Health condition
- Main economic activities
- Level of education
- Land use
- Infrastructure
  - Water supply
  - Electricity and energy consumption
  - Sanitary waste disposal system
  - Public transport service
  - Community and social organization
  - Cultural and Visual components
- Religions
- Ethnicity
- Tourist site, culture and religious properties

The following sections briefly describe each component with details in appendices as appropriate. The methods of information collection are also described as necessary.

4.3. DESCRIPTION OF THE PHYSICAL COMPONENT

4.3.1. Overview of the Study Area

4.3.1.1. Bahan Township

The proposed project site has occupied within the Bahan Township boundary and it is also adjacent to the Yankin Township, where is assumed as the potential direct impact influence zone of project implementation. The Bahan Township and Yankin Township cover about 3.413 square miles with 75,905 populations and 1.94 square miles with 64,689 residents respectively. The brief regional profiles are presented in Table 4-1.

Table 4-1 Bahan Township Brief Regional Data

Description	Bahan Township	Yankin Township
Number of wards	22	15
Total population	78,905	64,689
Area	3.413 square miles	1.94 square miles
Latitude	Between 16˚ 47’ 00’’N and 16˚ 08’ 00”E	Between 16˚ 09’ 00’’N and 16˚ 50’ 00’’N
Longitude	Between 96˚09’00”E and 96˚39’00”E	Between 96˚09’00”E and 96˚39’00”E
Ethnicities	Kachin, Kayar, Kayin, Chin, Mon, Burma, Rakhine, Shan	Kachin, Kayar, Kayin, Chin, Mon, Burma, Rakhine, Shan
Main economic activities	Service	Service

Source: General Administration Department, Bahan & Yankin Townships, 2023

4.3.2. Climate and Meteorology

4.3.2.1. Methodology for data Collection and Analysis

The description of climate conditions of the study area invariably has to be at provincial level using general climatic data recorded at Kabaraye meteorological station which is nearest station to the project area, about 16.41 kilometer. Meterological data such as humidity, temperature, rain fall and wind direction were collected from the Department of Meterology and Hydrology of Myanmar (2020).

4.3.2.2. Description of Climatic Conditions

The project area has tropical monsoon climate characterized by three seasons. The summer season normally begins in March and April. During this period, the weather is relatively warm and humid. During March and April, a transition period prevails during which the northeast monsoon begins to withdraw and the air mass movements bring warm air to the country from southeast directions. Some light rainfalls, known as the pre-monsoon rain, could be expected during this period.

The rainy season follows the summer season normally from May and lasts until the end of October. Intense rainfalls can be normally occurred in June, July, August and September as clearly indicated by the number of days with rainfalls and the monthly amount of rainfalls.

The winter season follows the rainy season and normally begins in November and lasts in February. During this period, the weather is relatively cold and dry due to the northeast monsoon. There is practically very little or no rain during this period. Climate classification map of Myanmar is shown in Figure 4-2.

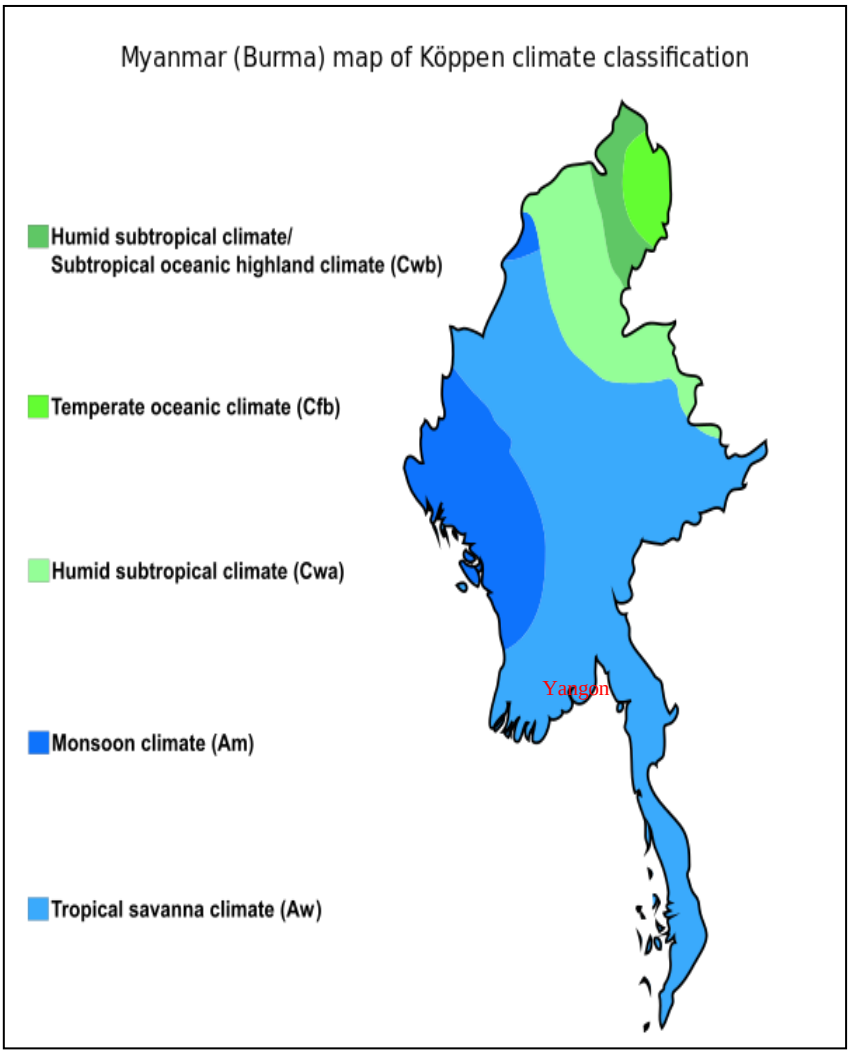


Figure 4-2 Koppen climate classification map of Myanmar

4.3.2.3. Climatic Conditions in the Project Township

The study area has a warm moist climate characterized by three seasons. The summer season normally begins in March to May. The rainy season normally begins in June to October. The winter season follows the rainy season, normally from November to February. Reference from 2016 to 2019 of yearly temperature and rainfall data are presented in Table 4-2. This data was provided from GAD (2019), Bahan Township. During the course of a year, the average maximum temperature is 40.2 °C and the average minimum temperature is 11.5 °C.

According to the data from Department of Meteorology and Hydrology (2020), the average of humidity in the summer, rainy and winter season are about 88%, 93% and 87% respectively. Moreover, the average maximum temperature of project township are 37°C, 31°C and 33 °C in summer, rainy and winter season. In addition to, the total annual rainfall is about 94.25 inches in a year. The wind direction was collected at 6:30 hrs M.S.T from Kaba Aye Station and the detailed results are shown in Appendix C. The results of meteorological data such as humidity, rainfall and temperature are presented in Appendix C.

Table 4-2 Temperature and Rainfall Data in Bahan Township

No.	Year	Rainfall		Temperature	
		Raining day	Total rainfall (Inches)	Summer season (Max °C)	Winter season (Min °C)
1.	2016	120	123.46	40.2	11.5
2.	2017	121	124.00	38.2	12.5
3.	2018	1100	123.46	40.2	11.5
4.	2019	104	110.00	37.2	11.5
5.	2020	123	46	40.2	11.5
6.	2021	123	40	38.3	11.5
7.	2022	123	40	40.1	11.5

Source: General Administration Department, Bahan Township, 2019 and 2023

Table 4-3 Temperature and Rainfall Data in Yankin Township

No.	Year	Rainfall		Temperature	
		Raining day	Total rainfall (Inches)	Summer season (Max °C)	Winter season (Min °C)
1.	2016	78	80	40	35
2.	2017	78	80	40	35
3.	2018	80	65	39	25
4.	2019	107	104.9	42.2	12.5
5.	2020	123	46	40.2	11.5
6.	2021	123	40	38.3	11.5
7.	2022	123	40	40.1	11.5

Source: General Administration Department, Yankin Township, 2019 and 2023

4.3.3. Topography

The project area is located within the Bahan Township and its elevation is about 14.02 meter of mean sea level. The flat low land is located east of the Bahan Township. It is located at the southern end of the Bago Yoma, so there are many terrain and canyons. Yangon River is located west of the project site. The project site is located low land area and terrain is located south of the project site. The topography map of Bahan Township is shown in Figure 4-3.

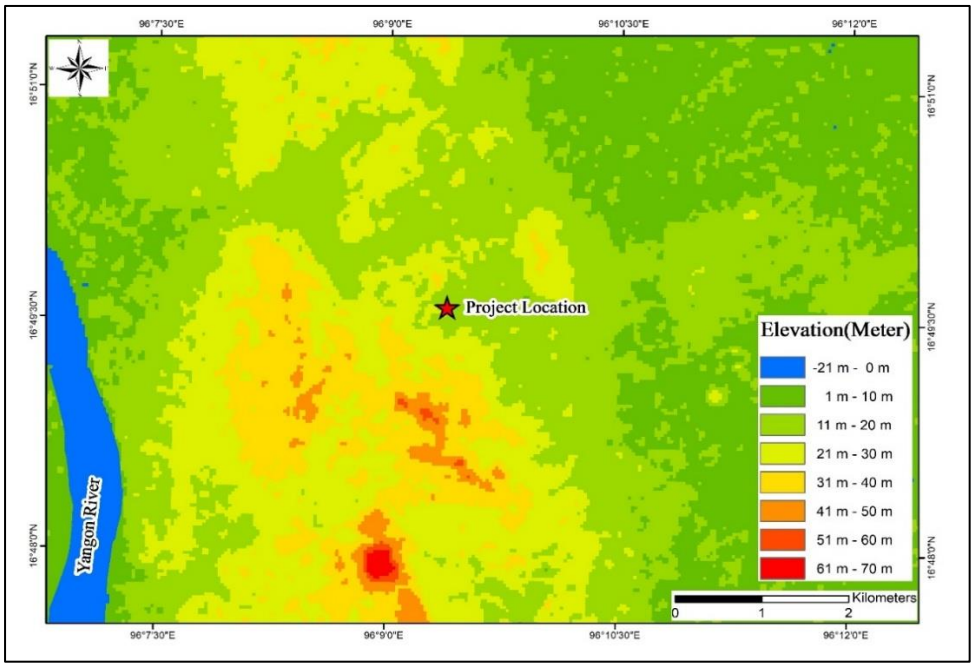


Figure 4-3 Topography Map

4.3.4. Geology

Project area of Bahan Township is located in Yangon Region which geology is underlain by alluvial deposits (Pleistocene to recent), the non- marine fluvial-tile sediments of Irrawaddy formation (Pliocene) and hard, massive sandstone of Pegu series (early-late Miocene). Alluvial deposits are composed of gravel, clay silts, sands and laterite which lie upon the eroded surface of Irrawaddy formation at 3-4.6 meter above sea level (Hla Hla Aung, 2010). The sandstone and shale of Pegu series can be found at the northwest corner of Hlawga Lake with NNW – SSE strike dipping to the east.

The Irrawaddy formation is composed of Danyingone clays and Arazanigon sandstones. The Danyingon clays consist mainly of clays; siltstone with interbedded sand rocks which exposed in Danyingon. The Arzarnigon sand contain admixture of silt, clay and fine gravel at various percentage. These sand rocks expose along Shwedagon and on the eastern bank of Hlawgar Lake. Geological map of proposed project site is shown in Figure 4-4.

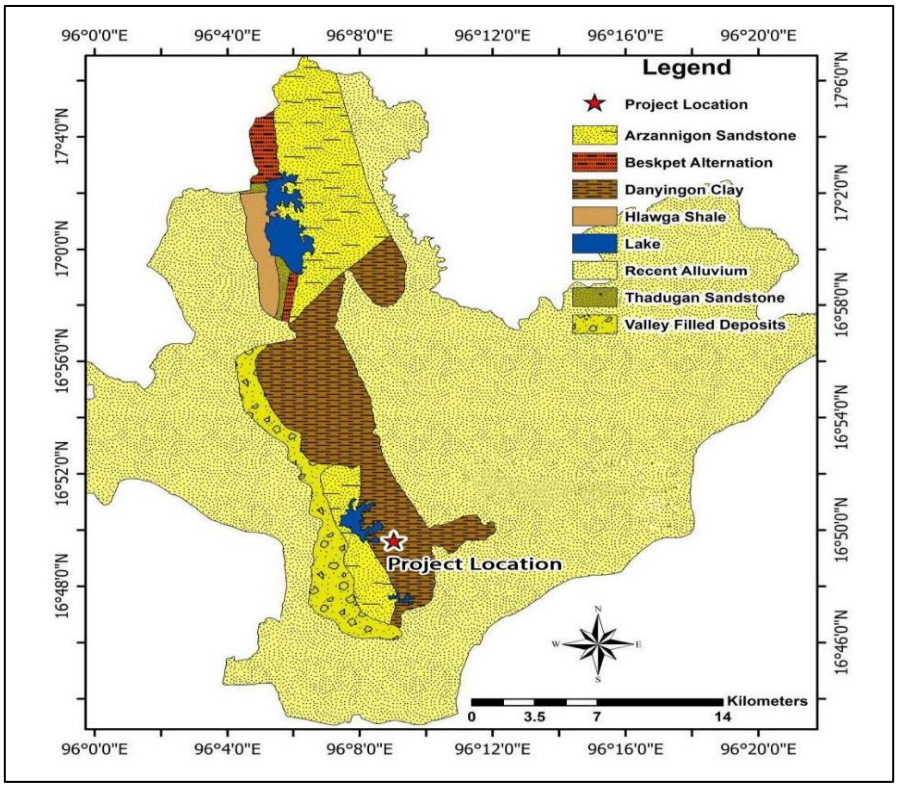


Figure 4-4 Geological Map of Proposed Project Site (Myanmar Geosciences Society, 2014)

4.3.5. Soil Condition

Project area of Bahan Township is located in Yangon Region. According to the information from Lwin, A., & Khaing, M.M. (2012)[8] soil condition of Yangon are meadow and meadow alluvial soils, gley and gley swampy soils, swampy soils, lateritic soils, yellow brown forest soils, dune forest and beach sand, mangrove forest soils and saline swampy meadow gley soils. The soil map of the Yangon region is shown in Figure 4-5.

According to the soil Map (Aung Lwin, Myint Myint Khaing, 2012), the soil type of the proposed project site is lateritic soil. Generally, lateritic soil is rich in iron and aluminum while poor in lime, potash and magnesium[9]. It is commonly considered to have formed in hot and tropical area. Nearly all lateritic soil is rusty-red color due to high iron oxide content in soil.

[8] Lwin, A., & Khaing, M. M. (2012). Yangon River Geomorphology Identification and its Environmental Impacts Analysis by Optical and Radar Sensing Techniques. ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XXXIX-B8, 175–179. https://doi.org/10.5194/isprsarchives-xxxix-b8-175-2012

[9] Abhishek Pandey, Laterite Soil, Mixed Soil and Soil Erosion (in Hindi), https://unacademy.com/lesson/laterite-soil-mixed-soil-and-soil-erosion-in-hindi/HMZO0RL2

Research from Hlaing Myo Nwee (2018)[10], the laterite and lateritic soils were altered from the underlying bedrock. Laterite is a porous, indurated, concretionary materials which is usually red to reddish brown color. Lateritic soils are finer grained materials than laterite. It is forms the uppermost part of the laterite cover. Lateritic soil is widely used as filled materials for various construction works in most tropical countries. Moreover, these soils are used as road making materials and cultivation.

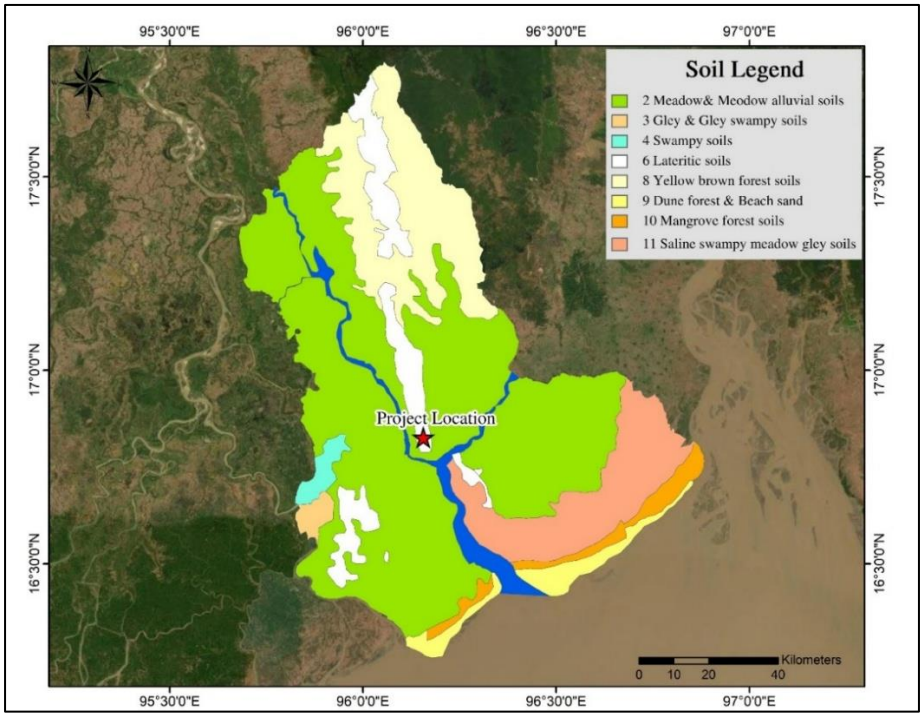


Figure 4-5 Soil Map of Yangon Region (Source: Land use division, Myanmar Agriculture Serviced (2002)

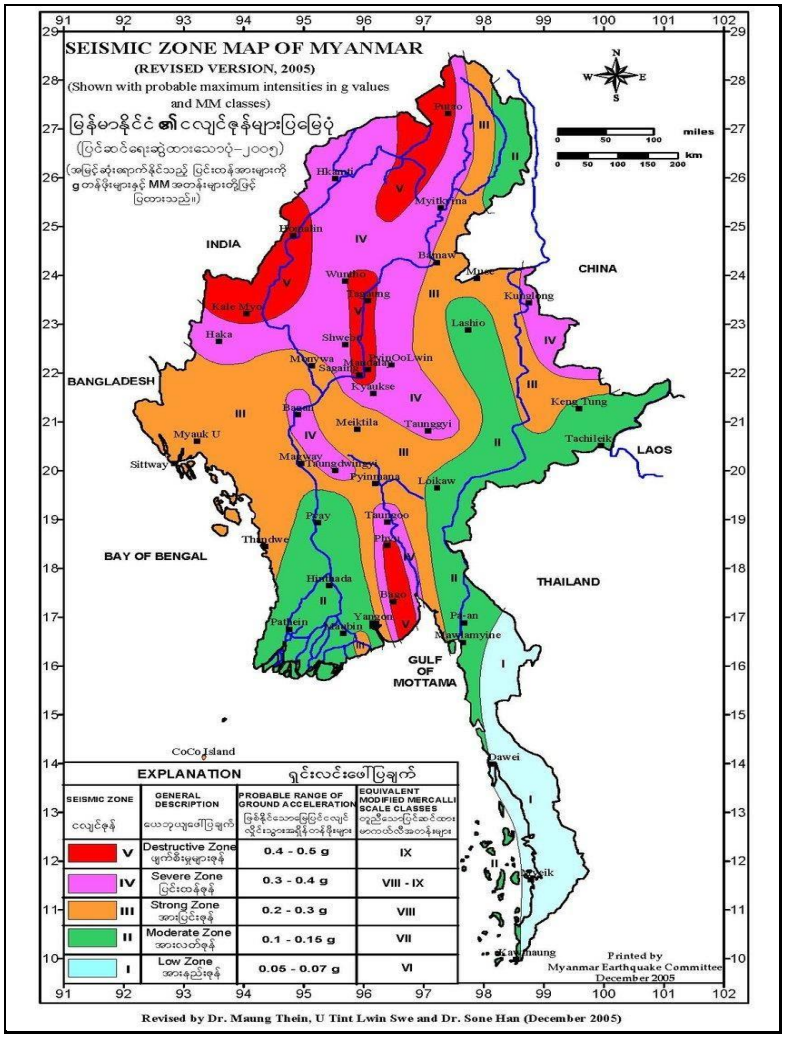
4.3.6. Seismology

In Myanmar, five seismic zones are demarcated and named (from low to high) Zone I (Low Zone), Zone II (Moderate Zone), Zone III (Strong Zone), Zone IV (Severe Zone), and Zone V (Destructive Zone), mainly following the nomenclature of the European Macro seismic Scale (EMS) 1992 (E.M.S. – 92) (Grunthal), source from hazard profile of Myanmar, July, 2009. For each zone, a probable range of ground acceleration in g values and equivalent Modified Mercalli (MM) Scale (Harry Wood and Frank Neumann, 1931) classes are given. The highest intensity zone designated for Myanmar is the Destructive Zone (with probable intensity range of 0.4 – 0.5 g) which is equivalent to MM class IX. There are four areas in that zone; namely, Bago-Phyu, Mandalay-Sagaing-Tagaung, Putao-Tanaing, and Kale Myo - Homalin areas. The latter two, however, would not have major earthquake hazards as they are only sparsely populated. Yangon straddles the boundary between Zone II and Zone III, with the old and new satellite towns in the eastern part in Zone III, and the original city in Zone II. A

[10] Haling Myo Nwee, 2018, Comparative study of Lateritic soil in Mingon Area, Hlegu Township, Yangon Region and Meyon Area, Kyaikhto Township, Mon State, Dagon University Research Journal 2018 Vol.8

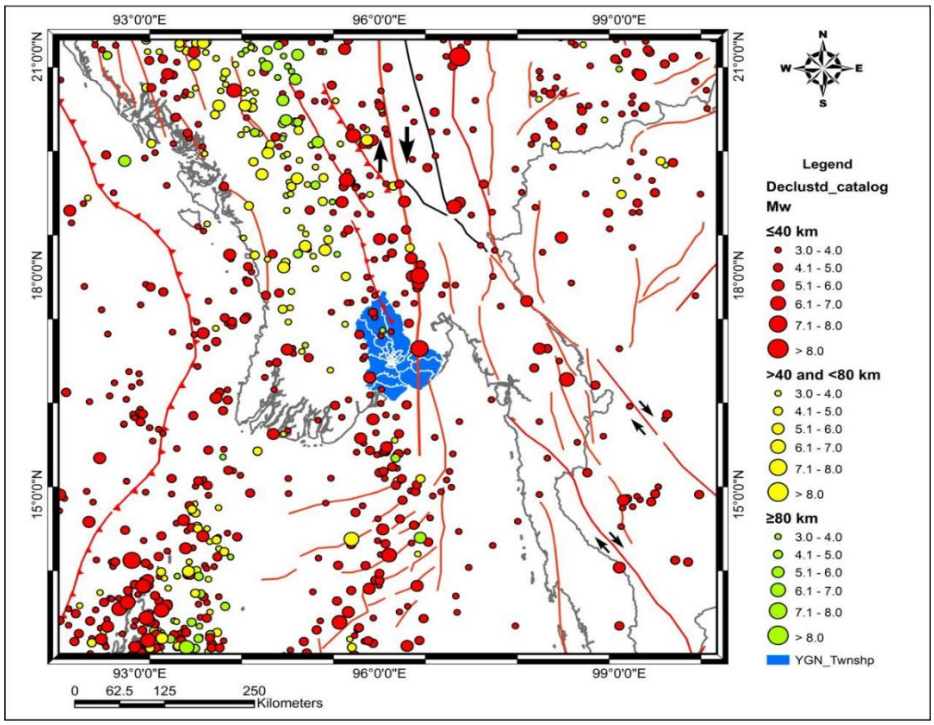
probable maximum range of ground acceleration in values and equivalent Modified Mercalli Scale classes are given for each zone.

The seismic zone map of Myanmar is presented in Figure 4-6. According to the seismic zone map, the Yangon is located in the strong and moderate zone. Therefore, earthquake resistant design should be evaluated. Moreover, systematic ground improvement methods should be designed. Based on the seismicity records, Yangon can be assumed as low to medium seismicity region. The Seismicity Map of Yangon Region is described in Figure 4-7.



Source: Meteorology and Hydrology Department, Yangon, Myanmar

Figure 4-6 Seismic Zone Map of Myanmar



Source: ANSS earthquake catalog, 1963- 2009

Figure 4-7 Seismicity Map of Yangon Region

4.3.7. Hydrology

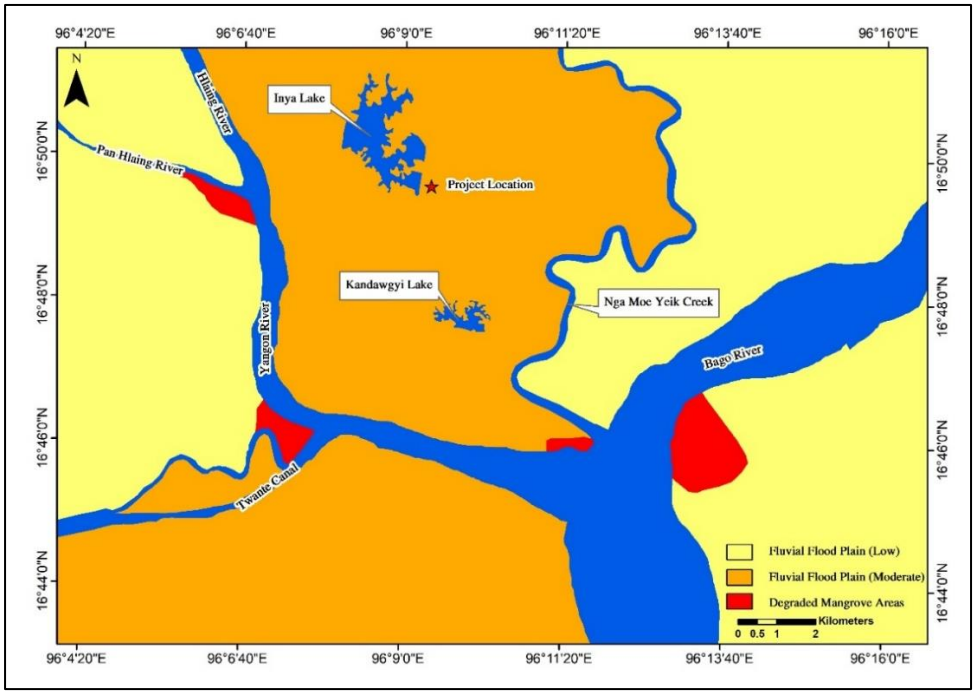
Project site is located in Bahan Township in which a few rivers and creeks are existing. The creek near the project site is the Nga Moe Nyeik creek which is located approximately 3.61 kilometer east of the project site. Inya Lake which is located approximately 242 meter west of the project site. The Yangon River (also known as the Rangoon River) arises by the confluence of the Hlaing and Pan Hlaing Rivers in Yangon region. It is about 40 kilometer long and runs from Yangon to the Gulf of Martaban of the Andaman Sea after joining with Bago river. The river plays a critical role for the economy of Myanmar since it is a navigable channel by ocean-going vessels. Water from Yangon River is also essential for agricultural and navigation purpose in Yangon region.

Catchment area of the study river is about 700 square kilometer and length is 12 kilometer long. There are several industrial zones developed along the bounded rivers and most of the wastewater discharge without proper treatment to the natural water body. Population density increase significantly due to the development of industrial zones and housing projects domestic wastewater and dumping of garbage into drains are also the source of pollution of it.

Freshwater and salinity water can be found in Yangon River due to freshwater from upstream rivers and sea water intrusion from lower Andaman Sea. According to the landform classification system based on geomorphologic principles by Lwin, A., & Khaing, M.M. (2012)[11], Ahlone Township area is in moderately fluvial flood plain. Therefore, the flood occurs

11 Lwin, A., & Khaing, M. M. (2012). Yangon River Geomorphology Identification and its Environmental Impacts Analysis by Optical and Radar Sensing Techniques. ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XXXIX-B8, 175–179. https://doi.org/10.5194/isprsarchives-xxxix-b8-175-2012

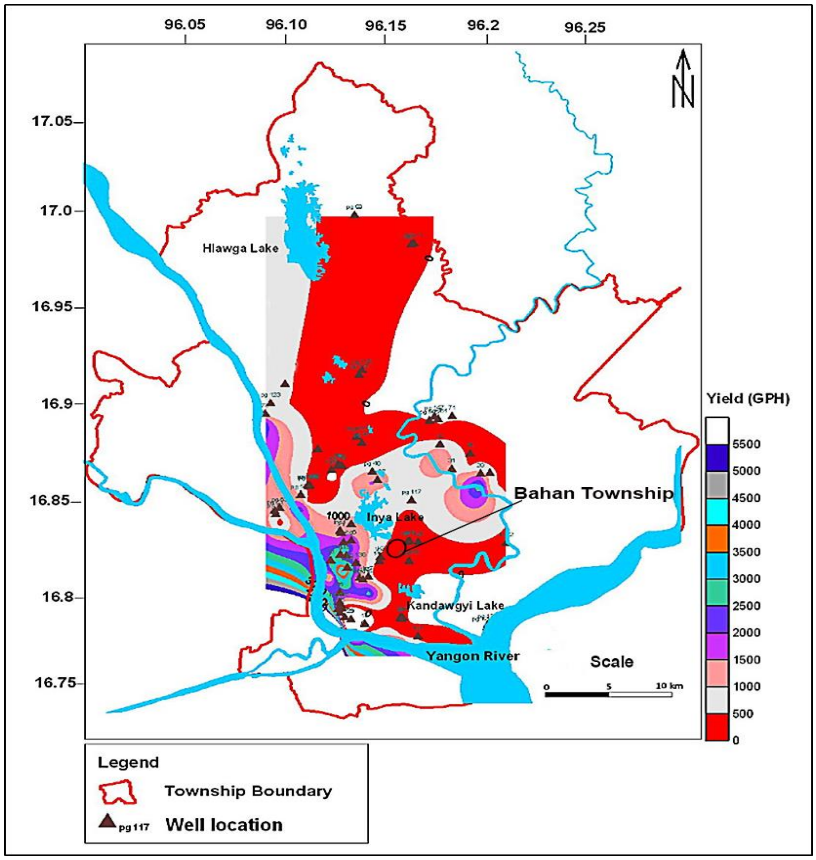
during rainy season and subjected to a minimum of dissection. The geomorphological map including water bodies nearby the project site is presented in Figure 4-8.



Source: Yangon river geomorphology identification and its environmental impacts analysis by optical and radar sensing technique (2012)

Figure 4-8 Geomorphological Map of Yangon City

As groundwater, Yangon is rich in groundwater resources covered by unconsolidated Tertiary - Quaternary deposits. In Yangon, groundwater is mostly extracted from Valley filled deposits and Ayeyarwaddy sandstones. Based on local geological considerations, potential groundwater source of Yangon can be roughly divided into two regions; the low potential area and high potential area. The project site is located in high potential of groundwater source and the groundwater yield is approximately 500 Gallons Per Hour (GPH) as shown in Figure 4-9.



Source: Assessment of Groundwater Vulnerability in Yangon City, Myanmar (2015)

Figure 4-9 Groundwater Yield Map of Yangon City12

Yangon is rich in groundwater resources conserved by unconsolidated Tertiary Quatenary deposits. In Yangon, groundwater is mostly extracted from Valley filled deposits and Ayeyarwady sandstones. Based on local geological considerations, potential groundwater source of Yangon can be roughly divided into two sub regions, namely the low potential area and high potential area. Low potential area covers approximately 15 percent of the Yangon city including project site. The hydrological condition of the study area can be seen in Figure 4-10.

12 Ref: Htun, W. W. (2015). Assessment of Groundwater Vulnerability in Yangon City, Myanmar. doi:https://www.slideshare.net/aung3/7-assessment-of-groundwater-vulnerability-in-yangon-city-wint-wint-htun-2

12 Lwin, A., & Khaing, M. M. (2012). Yangon River Geomorphology Identification and its Environmental Impacts Analysis by Optical and Radar Sensing Techniques. ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XXXIX-B8, 175–179. https://doi.org/10.5194/isprsarchives-xxxix-b8-175-2012.

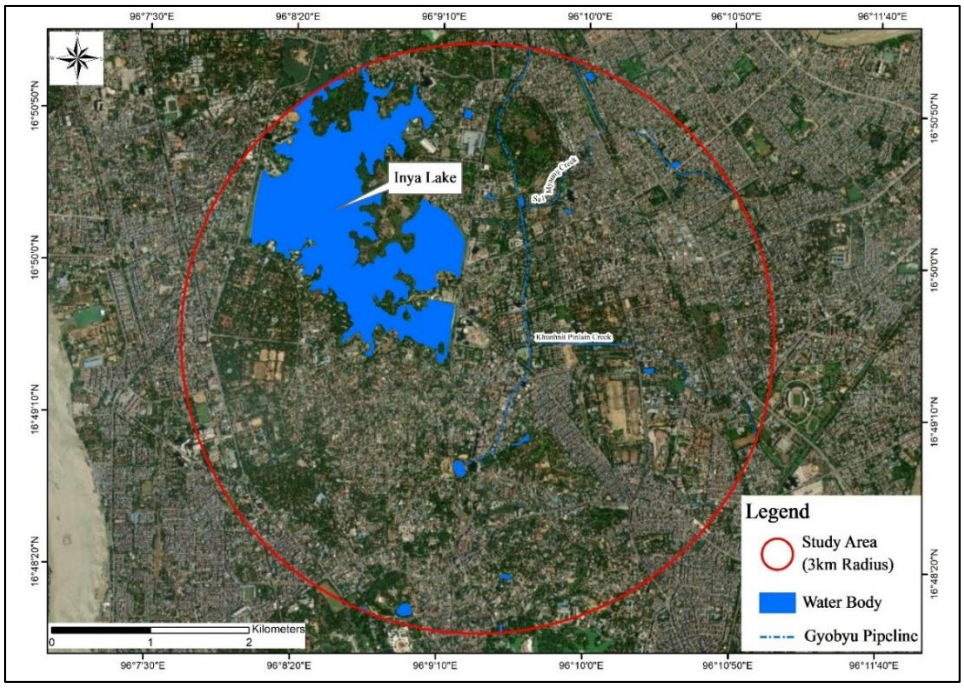


Figure 4-10 Hydrological Condition of Study Area

4.4. SOCIO-ECONOMIC ENVIRONMENT

The consultation approach is adopted with the aim of developing a socio-economic survey. The process started with a desk review of the existing Township reports of General Administration Department. This is was followed by the various consultation meetings with the regional authorities and local residents, implementation of key informant interview and household level interview to access their economic and livelihood situation. To identify the vulnerable receptors, 3 km radius of study area is subdivided into the different level of impact zones (direct impact influence zone and indirect impact influence zone) with assessing the potential impacts by considering the location, population, and environmental factors that could be affected by a contaminant or hazard. Locating in the downtown of Yangon city, the project area is surrounded by the populated residential townships, shown in Figure 4-11.Regarding the geographical impact zone, Bahan, Yankin and Mayangone are located within the direct impact fluence zone, causing a high potential to suffer the socio and environmental impacts induced by project implementation. Among them, the Bahan and Yankin Townships are more vulnerable than Mayagone Township due to high population density in 1 km radius of study zone, whereas the surface water body of Inya Lake exists as the dominant portion of Mayagone Township in the study area.

The socioeconomic survey was conducted not only in the Sayar San Ward at Bahan township on 19th August, 2025 but also (5) Ward and (6) Ward at Yankin townships on 1st October, 2025 by means of stratified random sampling approach. Before conducting the survey, the households in the each ward were numbered with using GIS data. Afterwards, the total of 30 interviewees (10 households in each ward) were selected randomly and all of them are interviewed by the similar questionaries. To validate the survey results, the key informant interviews were carried out by communicating with focal person at the township administration level.

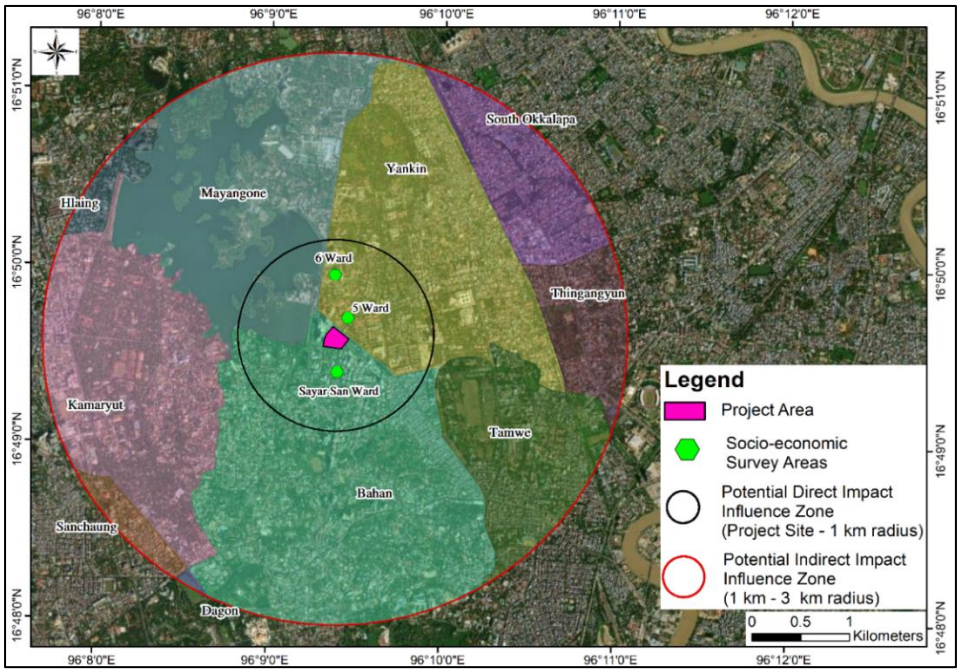


Figure 4-11 The Study of Socio-economic Condition of Proposed Project

Figure 4-12 Photo Record of Key Informat Interview

Figure 4-13 Photo Record of Household Level Interview

4.4.1. Land use

4.4.1.1. Methodology

Information about land use was collected from secondary sources in combination with primary data collection. The primary data collection helps to verify and fill gaps of the secondary information.

4.4.1.2. Secondary Data Collection

Secondary data on land use was complied from the following sources.

- Satellite image of Google earth Pro (http://earth.google.com)
- Geographic Information System (GIS) of Bahan

4.4.1.3. Primary Data Collection

Primary data collection about land use survey was conducted on January, 2021 and August, 2025 in the project site and 3 kilometer radius area of the project. This was used to verify the land use information in the initial land use maps. The results were used to recheck, revise and modify the accuracy of each type of land use on initial map. The final land use map was then generated which is shown in Figure 4-14.

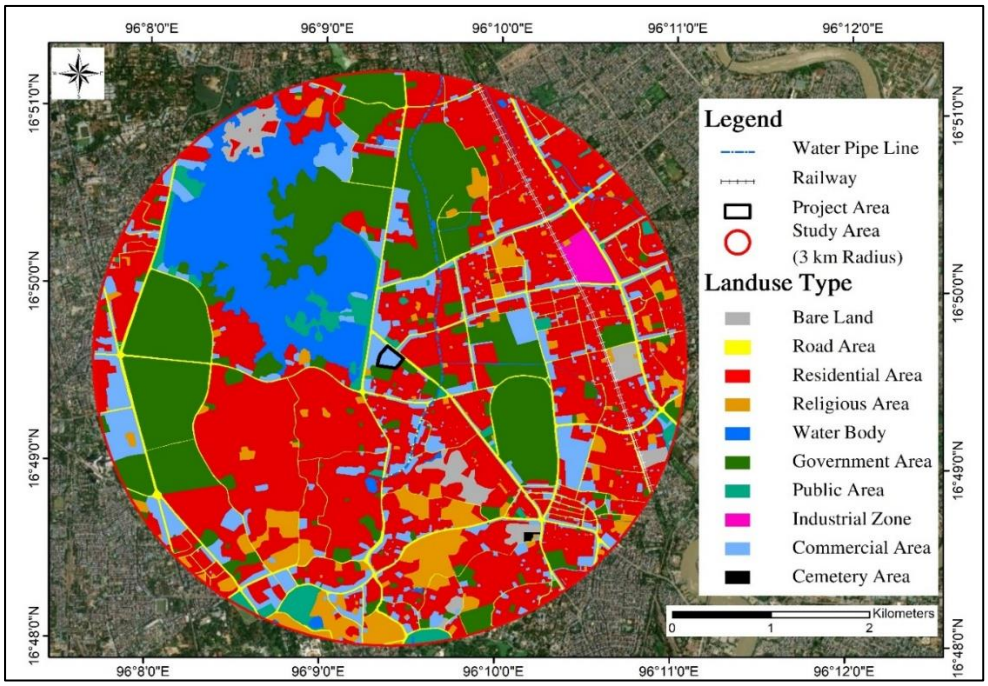
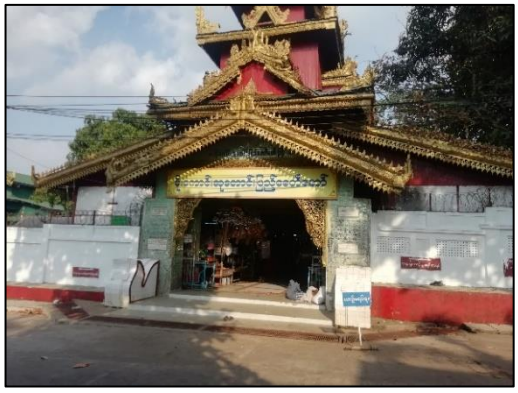


Figure 4-14 Land Use Map

4.4.1.4. Result of the Study

The study area consists of around 3 kilometer radius of the project. It is characterized by ten types of land use. As a result of the study, residential area is the largest portion within 3 kilometer marginal area where cemetery area occupies the smallest portion. The summary table for land use percentage and existing land use photos within the study area are shown in Table 4-4 and

Commercial Area	**Government Building**
	

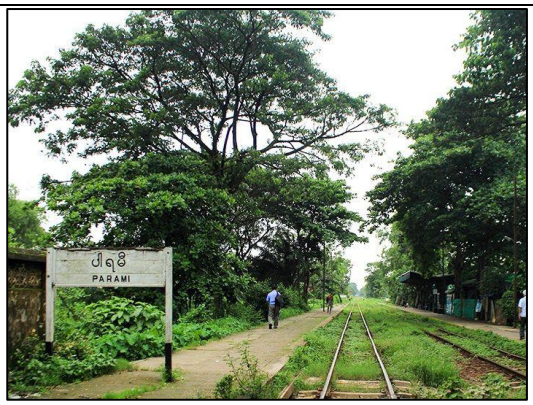
Public Area	Religious Area
	
Railway	**Residential Area**
Road	**Water Body**

Figure 4-15.

Table 4-4 Types and Percentages of Land Use

No.	Name	Area (Ha)	Percentage (%)
1.	Cemetery Area	0.99	0.03
2.	Industrial Area	19	0.67
3.	Bare Land Area	55.57	1.97
4.	Public Area	70.19	2.48
5.	Road Area	135.66	4.8
6.	Religious Area	162.01	5.73
7.	Water Body	286.48	10.14
8.	Commercial Area	286.52	10.14
9.	Government Building	586	20.74
10.	Residential Area	1,223.57	43.3
Total		2,826.00	100

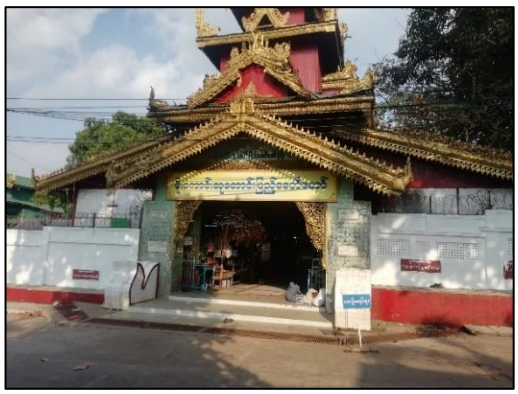
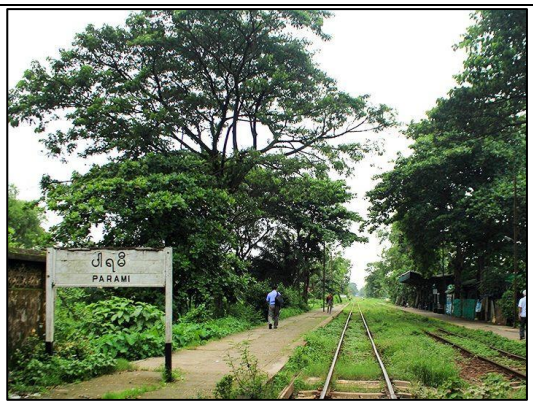
Commercial Area	**Government Building**
	
Public Area	**Religious Area**
	
Railway	**Residential Area**
Road	**Water Body**

Figure 4-15 Existing Land Use Photos within Study Area

4.4.2. Demography

Project area is bordered by Mingalar Taung Nyunt and Dagon Townships in south, Tarmwe Township in East, San Chaung and Kamaryut Townships in west and Mayangone and Yankin Townships in North.

4.4.2.1. Population

Population is mainly divided into two parts as rural and urban areas dwellers. However, this project is within the downtown of Yangon Region and all people are from urban civilization. Table 4-5 shows that the population in the project study area townships. It can be clearly seen that 37 wards from Bahan, and Yankin belong to over 15,696 houses and the total population of the project townships is 31,390.

Table 4-5 Population in the Project Townships

No.	Township	Type	House	Household	Ward
1.	Bahan	Urban	8,145	16,889	22
2.	Yankin	Urban	7,551	14,501	15
Total			15,696	31,390	37

Source: General Administration Department, Bahan and Yankin Townships, 2023

Based on the results of key-informant survey, Sayar San Ward has the largest population pointing out 348 houses with 4,210 population. Afterward, 5 ward and 6 ward stand at the second and third one. The total population of study area is about 10,563 with 2,587 households. The details of population in Sayar San Ward, (5) ward and 6 ward is shown in Table 4-6.

Table 4-6 Population in Sayar San, 5 and 6 Wards

No.	Township	Ward	House	Household	Population
1.	Bahan	Sayar San	348	1,003	4,210
2.	Yankin	5	312	934	3,756
3.		6	209	650	2,597
	Total		869	2,587	10,563

Source: Based on Key Informant Interview from Survey Team, 2025

4.4.2.2. Age group and Gender Issues

In Myanmar, population is disaggregated by age for election purposes (i.e. under and over 18 years old). Based on the data provided by GAD, there are two age groups such as under 18 years, above 18 years including over 85 years old. Population by age group in study area townships are shown in Table 4-7. The female group is slightly higher for all of under 18 years and above 18 years. As a result, it mentioned that female to male proportion is 1.24 for the entire study area.

For the gender issues, our Myanmar nation has equal gender rights for all of female and male, there may be no gender problems. Female has the right for heading the economics, social and political administration. In household levels, female and male can make equal decisions in children education, health and even cultural and religious practices. Male heads can make some important decisions but they respect to females. But in some cases, women's

rights are violence and they are allowed only in cooking, housekeeping and babysitting while men can lead in family business and governance.

Table 4-7 Population by Age Group and Gender Disaggregation in the Project Townships

No.	Township	Type	<18 Years		>18 Years		Population		Grand Total
			Male	Female	Male	Female	Male	Female	
1.	Bahan	Urban	6,491	6,721	27,171	35,522	33,662	42,243	75,905
2.	Yankin	Urban	7,116	7,418	22,094	28,061	29,210	35,479	64,689
Total			13,607	14,139	49,265	63,583	62,872	77,722	140,594

Source: General Administration Department, Bahan and Yankin Townships, 2023

According to the key informant interview, the population of 18 years above in each ward are relatively higher than that of below 18 years old, representing high proportion of workable personnel in wards. The classification of age group in study area is shown in Table 4-8.

Table 4-8 Age Group in Study Area

No.	Township	Ward	<18 years	>18 years	Total
1.	Bahan	Sayar San	579	3,361	4,210
2.	Yankin	5	459	3,266	3,756
3.		6	321	2,276	2,597
	Total		1,299	9,173	10,563

Source: Based on Key Informant Interview from Survey Team, 2025

Based on Household level interterview, the age group of 18 years above represents the highest pollutation, whiles the vulnerable group (above 60 years old) is observed in small number. The information about sampling households is shown in Table 4-9.

Table 4-9 Age Group in Sampling Households

No.	Township	Ward	Sampling Size		Age Group		
			Household	Household Numbers	<18 years	>18 years	>60 years
1.	Bahan	Sayar San	10	39	13	23	3
2.	Yankin	5	10	42	9	29	4
3.		6	10	35	11	22	2
	Total		30	116	33	74	9

Source: Based on Key Informant Interview from Survey Team, 2025

4.4.3. Ethnicity

According to secondary data from Township GAD, Bamar people mainly live in project townships. As Yangon Region is a place where varieties people meet, different ethnicities can be found in project Townships. Bamar is about 124,872 and Rakine remains as the second largest group with 3,308 number of people. Although Burmese is the most widely spoken language in project townships, ethnic groups have managed to retain individual languages. Moreover, the foreigners are widely found in the proposed townships, in which

Indian and Chinese community groups are dominant among others with population of 4,626 and 1.364 respectively. It was shown in Table 4-10 and Table 4-11.

Table 4-10 Ethnicity in the Project Townships

No.	Township	Ka Chin	Ka Yah	Ka Yin	Chin	Mon	Bamar	Rakine	Shan	Total
1.	Bahan	163	29	1,612	450	671	68,568	2,211	819	74,619
2.	Yankin	137	36	1,029	220	253	56,304	1,097	438	59,514
Total		300	65	2,641	670	924	124,872	3,308	1,257	134,133

Source: General Administration Department, Bahan and Yankin Townships, 2023

Table 4-11 Foreigner Population in the Project Townships

No.	Township	Chinese	India	Bangladesh	Pakistan	Others	Total
1.	Bahan	565	536	15	4	166	1,286
2.	Yankin	799	4,090	-	-	286	5,175
Total		1,364	4,626	15	4	452	6,461

Source: General Administration Department, Bahan and Yankin Townships, 2023

The various ethnic groups are observed in the study wards; they are Kachin, Kayin, Chin, Mon, Bamar, Rakhine and Shan. Among them, Bamar is the highest number of population. The ethnicity results of key informat interviews are shown in Table 4-12.

Table 4-12 The Ethnic Group in Study Area

No.	Township	Ward	Ethnic Groups
1.	Bahan	Sayar San	Kachin, Kayin, Chin, Mon, Bamar, Rakhine, Shan
2.	Yankin	5	Kachin, Chin, Mon, Bamar, Rakhine, Shan
3.		6	Kayin, Mon, Bamar, Rakhine, Shan

Source: Based on Key Informant Interview from Survey Team, 2025

Based on Household level interview, Bamar ethnic group are found as the dominant, while other ethnic groups, such as Kayah, Kayin, Mon, Rakine and Shan are observed with small numbers. Due to the presence of variety of ethnic backgrounds, the study area has the high ethnic diversity level. The household level survey is shown in Table 4-13.

Table 4-13 Ethnicity of Sampling Household

No.	Township	Ward	Ka Yah	Ka Yin	Mon	Bamar	Rakine	Shan	The inquired House-hold Number
1.	Bahan	Sayar San	-	1	-	9	-	-	10
2.	Yankin	5	1	-	-	7	1	1	10
3.		6	-	-	1	8	1	-	10
	Total		1	1	1	24	2	1	30

Source: Based on Key Informant Interview from Survey Team, 2025

4.4.4. Religious Information

Buddhism is the dominant religion in Project study area. Majority people in the Bahan, and Yankin are Buddhist. The Hindu remains as the second dominant religion. The remaining religions of Christian, Muslim and others are few and range from 1,500 to 3,000. It is presented in Table 4-14.

Table 4-14 Population by Religion in the Project Townships

No.	Township	Buddhism	Christian	Hindu	Muslim	Others	Total
1.	Bahan	73,430	1,296	521	389	306	75,905
2.	Yankin	58,836	1,279	3,519	978	77	64,689
Total		132,266	2,575	4,040	1,367	383	140,594

Source: General Administration Department, Bahan and Yankin Townships, 2023

According to Key Informant interview and household level interviews, Buddhism and Christian are dominant religion in study area. The status of religion of surrounding townships and sampling households are shown in Table 4-15.

Table 4-15 Religious Status of Study Area

No.	Township	Ward	Religious Status
1.	Bahan	Sayar San	Buddhism, Christian
2.	Yankin	5	Buddhism, Christian, Hindu
3.		6	Buddhism

Source: Based on Key Informant Interview from Survey Team, 2025

According to the household level survey, Buddhism are mostly observed in study ward. The Christian and hindu are also found with small quantities. The religion status of household level survey is shown in Table 4-16.

Table 4-16 Religious Status of Studied Group

No.	Township	Ward	Buddhism	Christian	Hindu	The inquired household number
1.	Bahan	Sayar San	10	-	-	10
2.	Yankin	5	9	1	-	10
3.		6	8	1	1	10
Total			17	2	1	30

Source: Based on Key Informant Interview from Survey Team, 2025

4.4.5. Education Infromation

4.4.5.1. Enrollment

According to township GAD information (2023), the primary school enrollment rate of Yankin is about 97.58%, however, Bahan is about 38.91%. The occurrence of international schools and private schools may be the major reason of significant reduction of enrollment rate in Bahan Township. It is presented in Table 4-17.

Table 4-17 Primary School Enrolment in the Project Townships

No.	Township	5 Years old Children			School Enrollment			Percentage
		Male	Female	Total	Male	Female	Total	
1.	Bahan	251	263	541	94	106	200	38.91%
2.	Yankin	283	290	573	283	290	573	97.58%

Source: General Administration Department, Bahan and Yankin Townships, 2023

4.4.5.2. Completion of Basic Education

In project Townships, for 2021-2022, high school of basic education level which is equivalence with matriculation examination completion percentage in average is about 62% in Bahan Township, and 55.22% in Yankin Township. The passed students' percentage in whole two townships is about 54.8%. Therefore, the rest about 45.2% of students not completed yet their schooling. It was shown in Table 4-18. On the other hand, students dropped out after primary and during middle school education.

Table 4-18 Completion of Basic Education in the Project Townships

No.	Township	2021 – 2022 year				2022 - 2023			
		Student	Sitting Exam	Passed	Percentage (%)	Student	Sitting Exam	Passed	Percentage (%)
1.	Bahan	613	563	353	62	347	304	-	-
2.	Yankin	352	317	176	55.22	234	189	-	-
Total		965	880	529	54.8	581	493	-	-

Source: General Administration Department, Bahan and Yankin Townships, 2023

4.4.5.3. Ratio

A few of them have even had higher education at the college and university level. Some elders received only informal rudimentary education from the monks at temples. Almost all residents have received basic education and are literate. Manpower of education sector of the project townships as described in Table 4-19. The average ratio of teacher and students is 1:19.

Table 4-19 Ratio of Teacher and Student in the Project Townships

No.	Township	Total Number of Teachers	Total Number of Students	Teacher to Student Ratio
1.	Bahan	227	3,719	1:16
2.	Yankin	288	6,947	1:24
Total		515	10,666	1:19

Source: General Administration Department, Bahan and Yankin Townships, 2023

4.4.5.4. Education Infrastructure

There are many education centers in project Townships such as 26 primary schools, 4 preprimary schools, 5 high schools and 10 middle schools. No specific higher education can be accessed to project townships except in Yankin Township. Only one practicing school and one education collage is in Yankin Township. Students who want to attend university (i.e. Technological university and Medical and so on.) have to go to other townships of Yangon Region. Education centers cover in the project Townships can be seen in Table 4-20.

Table 4-20 Education Centers in the Project Townships

No.	Township	Monastic School	Pre - B.E.P.S	B.E.P.S	Post B.E.P.S	B.E.M.S	B.E.M.S (Branch)	B.E.H.S	Collage	TTC
1.	Bahan	2	3	16	1	3	0	3	0	0
2.	Yankin	1	1	10	0	7	1	2	1	1
Total		3	4	26	1	10	1	5	1	1

Source: General Administration Department, Bahan and Yankin Townships, 2023

4.4.5.5. Literacy

According to the GAD (2023) data, the literacy rate for all males and females that are at least 15 years old is 100%, showing all population able to read and write. In contrast to others, Bahan and Yankin Townships are highest in literacy rate.

Table 4-21 Township Literacy Rate

No.	Township	Population	>15 years old	Educated people	Literacy Percentage
1.	Bahan	75,905	66,017	66,017	100%
2.	Yankin	64,689	47,281	47,281	100%
Total		140,594	113,298	113,298	100%

Source: General Administration Department, Bahan and Yankin Townships, 2023

According to the household interview results, approximately 85% of total people have completed the high school, middle school and primary school. Only few people have joined the higher education, which includes institutions like colleges and universities, after finishing the secondary education. Moreover, the Monastery education is observed in the smallest number within the study groups. The higher percentage of completing primary and secondary education demonstrates that all people can be accessed the provision of education facilities, such as resource personnel and supporting infrastructures in study area. The information about literacy of study group is shown in Table 4-22.

Table 4-22 The Education Level of Study Group

No.	Township	Ward	Sampling Size		Education Level					>5 years old
			Household	Household Numbers	Monastery	Primary School	Middle School	High School	Univer-sity	
1.	Bahan	Sayar San	10	39	2	8	13	12	1	3
2.	Yankin	5	10	42	1	4	14	18	3	2
3.		6	10	35	-	10	11	9	5	-
Total			30	116	3	22	38	39	9	5

Source: Based on Key Informant Interview from Survey Team, 2025

4.4.6. Main Economic Activities

4.4.6.1. Bahan Township

Bahan Township is one of the most commercially important townships in Yangon Region. Local people work formally in one large country industry, one private industry and 192 small-scale home factory but factories are allowed to process only in industrial zone. As Bahan Township is quite convenient in transportation, civilians change their careers in service fields and currently 43 hotels, 4 motels, 6 inns, 4 public hospitals, 58 private clinics, 15 car showrooms, 13 private banks and lots of company offices are developed. The workforce in township is 62,693 and workers in working spaces are 62,631. Therefore, unemployment rate is only 21.07%.

4.4.6.2. Yankin Township

Among 15 wards of Yankin Townships, ward no. 1, 2, 3, 4, 5 and 6 are dwells and residents under resident department and people in these residents are retired employees, public officers and company staffs. Public people in ward no. 7, 8, 14, 15 and 16 are detached house owners and do private business. People in ward no. 9, 11, 12 and 13 are manual workers.

4.4.7. Employment

Based on the information from GAD, there are many occupations in study townships. Other workers (not specified in list) are highest population followed by governmental staffs in project townships. Industrial/ Handicraft and trading are also popular occupation in study area, ranging from 10,000 to 150,000. It presented in

Table 4-23.

Table 4-23 Occupations in the Project Townships

No	Township	Government Staff	Service	Trading	Industrial/ Handicraft	Wage Worker	Other	Total
1.	Bahan	7,220	3,674	9,318	14,381	4,056	10,832	49,481
2.	Yankin	9,200	3,500	3,500	20	5,300	9,300	30,820
Total		16,420	7,174	12,818	14,401	9,356	20,132	80,301

Source: General Administration Department, Bahan and Yankin Townships, 2023

Based on the socio economic information of household level survey, the trading is the dominant business in study area, by selling goods, betal quid, textile, seasonal vegetation and fruits. Besides trading, the service workers, governmental staffs, industial workers and wage workers are relatively observed. The diverse occupational status make the proposed towships become commercial and provide the high job opportunities for workers. The occupation status is shown in Table 4-24.

Table 4-24 Occupational Status of Sayar San Ward, 5 Ward and 6 Ward

No.	Township	Ward	Government Staff	Service	Trading	Industrial/Handicraft	Wage Worker	Other	Sampling Household
1.	Bahan	Sayar San	2	3	4	-	-	1 (Retired, government staff	10
2.	Yankin	5	-	2	5	2	1	-	10
3.		6	3	1	2	2	2	-	10
Total			5	6	11	4	3	1	30

Source: Based on Key Informant Interview from Survey Team, 2025

4.4.7.1. Income and poverty

According to information from GAD, average in-come per capita of study townships significantly drop in 2021-2022 and then gradually raise to nearly 6 million kyats in 2022-23, which is relatively similar to that of 2020-2021. It was shown in Table 4-25. Main source of in-come was from the wageworkers who work in private companies and government offices.

Table 4-25 Annual In-come per Capita in the Project Townships

No.	Township	2020 - 2021	2021 - 2022	2022 - 2023
1.	Bahan	4,472,757	3,936,285	4,211,767
2.	Yankin	1,630,386	1,651,485	1,747,353
	Total	6,103,143	5,587,770	5,959,120

Source: General Administration Department, Bahan and Yankin Townships, 2023

Based on GAD information, when compare with their in-come and employment workforce, average in-come per capita is higher than other regions, average unemployment percentage in the project area is about 18.45% in Table 4-26.

Table 4-26 Work Force and Unemployment Population in the Project Townships

No.	Township	People able to Work	Working People	Unemployment People	Unemployment Percentage
1.	Bahan	62,693	49,481	13,212	21.07
2.	Yankin	35,775	30,820	4,995	13.85
Grand Total		98,468	80,301	18,167	18.45

Source: General Administration Department, Bahan and Yankin Townships, 2023

Based on household level information, the average monthly income rate of each family are ranging from 480,000 MMK to 540,000 MMK and the average expenditure is about from 350,000 MMK to 485,000 MMK. Most interviewees have adequate financial resources but some get the financial assistance from the private micro finance organization. The average income and expenditure status are shown in Table 4-27.

Table 4-27 The Status of Income and Expenditure in Proposed Ward

No.	Township	Ward	Average Monthly income per household (MMK)	Average Monthly expenditure per household (MMK)
1.	Bahan	Sayar San	526,000	485,000
2.	Yankin	5	480,000	350,000
3.		6	537,000	415,000

Source: Based on Key Informant Interview from Survey Team, 2025

4.4.8. Health

The latest data are provided by the GAD showing in Table 4-28 , there are many public health facilities in the project area including three healthcare centers by government. The common case is tuberculosis and, followed by HIV/AIDS where diarrhea is very rare of mortality. The public health facility and common diseases are shown in Table 4-29 respectively.

Table 4-28 Public Health Facility in the Project Townships

No.	Township	Hospital		Clinic		Health Care Department		Total
		Gov	Private	Gov	Private	Rural	Sub-Rural	
1.	Bahan	2	5	-	58	-	-	65
2.	Yankin	1	3	3	53	1	-	61
Total		3	8	3	111	1	-	126

Source: General Administration Department, Bahan and Yankin Townships, 2023

Table 4-29 Common Diseases in the Project Townships

No.	Township	Diarrhoea		Tuberculosis		HIV/AIDS	
		Occurrence	Mortality	Occurrence	Mortality	Occurrence	Mortality
1.	Bahan	4	-	115	3	-	-
2.	Yankin	4	-	247	2	5	1
Total		8	-	362	5	5	1

Source: General Administration Department, Bahan and Yankin Townships, 2023

According to the household level survey, there is no common diseases found in the study groups. Only health issues are muscle pain, asthma, diabetes, heart problem and seasonal fever with small quantities of occurance. The chronic health problem is mostly observed in over 40 years and few in children. As health-care facilities, the private clinics are found in the Sanyar San Ward, (5) Ward and (6) Ward. Moreover, Children Hospital is situated within the Yankin Township.

4.4.9. Infrastructure and Services

4.4.9.1. Public Infrastructures

There are some social infrastructures especially many shops and grocery stores in study townships. In addition, societies such as NGO and social organizations are found within the study townships. Various religious places such as monastery, nunnery and religious hall are situated in the study townships because majority people are Buddhist. Detail list of these social infrastructures and religious places in study townships were shown in Table 4-30, Table 4-31, Table 4-32, and Table 4-33.

Table 4-30 Social Infrastructure in the Project Townships

No.	Township	Bazaar	Grocery Store	Shopping Mall and commercial building	Company	Factory	Industrial	Bank	Hotel	Motel	Inn	Guest House
1.	Bahan	2	495	5	247	5	218	13	35	-	6	4
3.	Yankin	4	232	-	9	-	3	14	14	1	-	4
Total		6	727	5	256	5	221	27	49	1	6	8

Source: General Administration Department, Bahan and Yankin Townships, 2023

Table 4-31 Social Organizations in the Project Townships

No.	Township	INGO	Social Organization
1.	Bahan	52	62
2.	Yankin	12	21
Total		64	83

Source: General Administration Department, Bahan and Yankin Townships, 2023

Table 4-32 Religious Places in the Project Townships

No.	Township	Pagoda	Stupa	Monastery	Nunnery	Religious Hall
1.	Bahan	6	2	308	45	26
2.	Yankin	-	1	45	1	16
Total		6	3	353	46	42

Source: General Administration Department, Bahan and Yankin Townships, 2023

Table 4-33 Other Religious Places in the Project Townships

No.	Township	Church	Mosque	Hindu Temple	Chinese Temple
1.	Bahan	2	2	-	5
2.	Yankin	3	1	8	1
Total		5	3	8	6

Source: General Administration Department, Bahan and Yankin Townships, 2023

According to the result of primary data collection, as social infrastructures, grocery store, religious buildings and infrastructure are found within the study area. Yankin Market is the reliable marketplace for residents, offering a variety of goods including wet and dry items.

4.4.9.2. Electricity and Energy Consumption

There are Government electricity grids to study townships in Yangon region.

4.4.10. Transportation

4.4.10.1. Bahan Township

Only highway roads are accessible to connect one township to another such as Kabar Aye Pagoda road, Sayarsan road, Satmu-1 road, West Horse Race Course road, Kanbe road, Phoe Sein road, Thanlwin road and U Chit Maung road. There are 3 flyover in Bahan Township and motor vehicles are allowed to pass through.

4.4.10.2. Yankin Township

As there is no airport in Yankin Township, tourists cannot reach Mayangone directly by airways. It is also a hinterland and cannot go with boats. However, 3 railway stations are in Yankin township.

4.4.11. Energy Source

As the energy source, the electricity is the reliable resource for heating and lighting. Besides, the firewood is the another alternative source for cooking and heating. For lighting, candles is mainly used and some houses use generators, bacteries and solar system for lighting.

4.4.12. Water Source

(a) Domestic Water Resource

Based on the household level survey, the Joe Phyu water is the dominant source for domestic water in Sayar San Ward, (5) Ward and (6) Ward and some residents use the underground water from private tube wells as the reliable alternative source. Gyo Phyu reservoir is located about 64 kilometers (40 miles) north of Yangon. It has the capacity of 166,000 million gallons and has a dependable yield of 93,300 cubic meter per day and was completed in 1940. (Ref. MegaCities Yagon: Transformation Processes and Modern Development). Regarding the household survey, there is no heavy water shortage for all seasons but some diffulties of pumping water will be encountered especially in dry season, due to not only rising the water demends of residents, but also low water discharge rate of Joe Phyu reservoir.

(b) Drinking Water Resource

Regarding the drinking water, the purified drinking water bottles are mainly observed in the study area, whereas the conventional water treatment methods; including boiling or passing through the micro filter cloth are still used in some households in study area.

4.5. CULTURAL AND VISUAL CHARACTERISTICS

4.5.1. Tourist Site and Attractive Places

Bahan Township has several places of tourist interest. There are several pagodas, out of which the Ngahtatgyi Buddha Temple is the most renowned. A distinct five-tiered pagoda houses the original 6.2 meter high Buddha image was donated by Prince Minyedeippa in 1558.

Chaukhtatgyi Buddha Temple, houses one of the most revered reclining Buddha images, is a must-visit destination for tourists.

Apart from this, the museum, with its focus on General Aung San's adult life, is complementary to the Bogyoke Aung San Residence Museum in Natmauk, Magwe Division, which is dedicated to his childhood and family memorabilia. Also Martyrs' Mausoleum is dedicated to Aung San and other leaders of the pre-independence interim government, all of whom were assassinated on 19 July 1947. In public parks, Sayar San Park, Yadanar Park and Thiri Yadanar Park, people can rest and take a break from overloading daily life.

Mayangone township has no special tourist site. However, Maha Pasana Guha Cave Pagoda and Kabar Aye Pagoda are famous holy spots. Prime Minister, U Nu, built these two pagodas. Kabar Aye Pagoda is built with the aim of world peace.

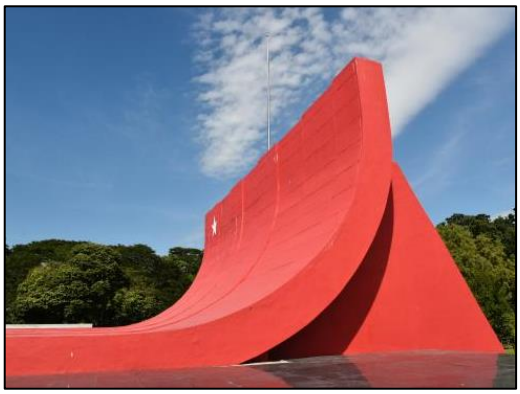
Moe Kaung Pagoda in Yankin is a leading tourist destination in Yangon, attracting Buddhists and enthusiasts from around the cities. Saya San Road is the main thoroughfare that runs through most of the important places in the township. In 2008, the National Library of Myanmar moved to a new site in Yankin Township.Photos of some tourist and attractive places in the study townships are described in Figure 4-16. The religious places are collected within the 1 kilometer radius of the project site. The lists and maps of pagoda and monastery are shown in and Table 4-34, Figure 4-18, and Table 4-35.

Ngahtatgyi Buddha Temple [13]	**Chaukhtatgyi Buddha Temple**[14]

13 Renow Travel, https://www.renown-travel.com/burma/yangon/ngahtatgyipagoda.html

14 Trip.com, Chaukhtatgyi Pagoda, https://www.trip.com/travel-guide/yangon/chaukhtatgyi-buddha-85458/

General AungSan Museum



Martyrs' Mousoleum

Maha Pasana Guha Cave Pagoda[15]

Kabar Aye Pagoda [16]

National Library of Myanmar[17]

Figure 4-16 Photos of Some Tourist Sites and Attractive Places in the Project Townships

Table 4-34 List of Pagodas in the Study Area

No.	Name	Latitude	Longitude
1.	Shwe Phone Taw Toe Pagoda	16°49'36.89"N	96° 8'55.12"E
2.	Eiksar Thaya Pagoda	16°49'50.71"N	96° 9'31.85"E

15 MM Myanmars.net, Myanmar Travel Guide and Reviews, 2020-2021, https://myanmars.net/yangon/maha-pasana-cave.html

16 Chatrium Hotel, https://www.chatrium.com/royallakeyangon/experience-yangon/kabar-aye-pagoda

17 National Library of Myanmar (Yangon), http://www.nlm.gov.mm/bhlib/information/5303

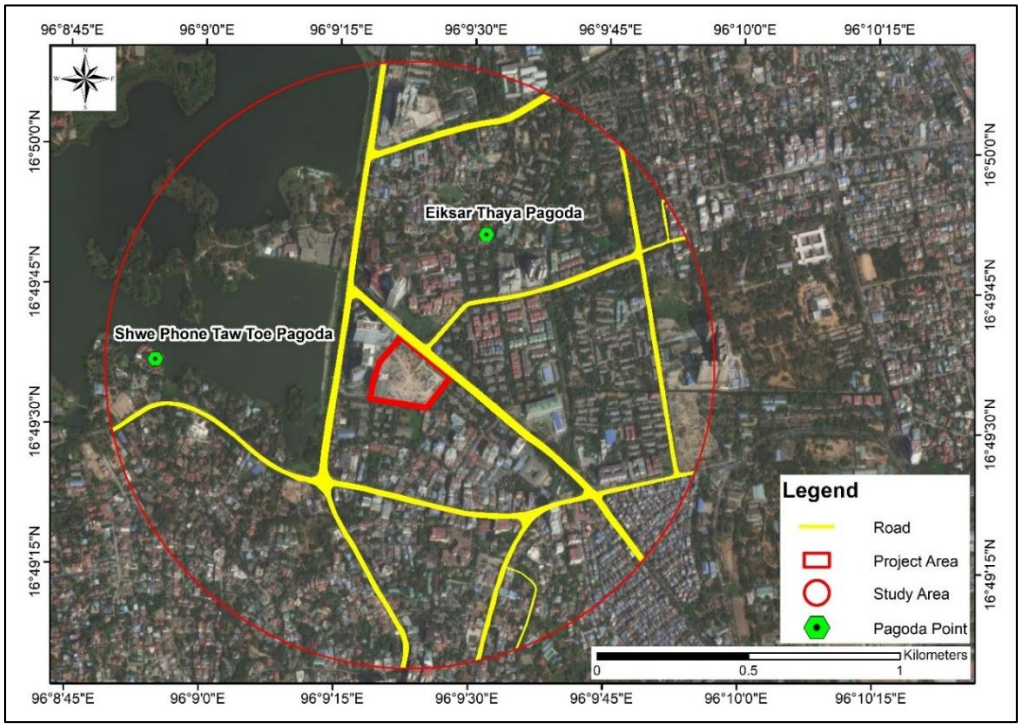


Figure 4-17 Location Map of Pagodas in the Study Area

Table 4-35 List of Monasteries in the Study Area

No.	Name	Latitude	Longitude
1.	Kanphyar Monastery	16°49'36.12"N	96° 8'53.80"E
2.	Taung Pu Lu Monastery	16°49'36.27"N	96° 8'55.25"E
3.	Wailuwun Monastery	16°49'33.31"N	96° 8'52.92"E
4.	Yan Kyi Aung Monastery	16°49'15.93"N	96° 9'2.37"E
5.	Tayzanedaryama Monastery	16°49'21.33"N	96° 9'13.02"E
6.	Myanmar Korean Church	16°49'5.27"N	96° 9'25.70"E
7.	Shwe Sat Taw Monastery	16°49'18.97"N	96° 9'43.05"E
8.	Independence Monastery	16°49'21.64"N	96° 9'42.03"E
9.	Za Ni Tar Yama Monastery	16°49'22.07"N	96° 9'31.71"E
10.	Fushan Temple	16°49'30.87"N	96° 9'15.62"E
11.	Pyin Nya Waddi Yeik Thar	16°49'50.04"N	96° 9'30.83"E
12.	Sagaing Shwe Hin Thar Monastery	16°49'52.25"N	96° 9'32.62"E
13.	Myos Ma Monastery	16°49'51.26"N	96° 9'36.26"E
14.	Ariya Maggin Monastery	16°49'46.77"N	96° 9'53.84"E

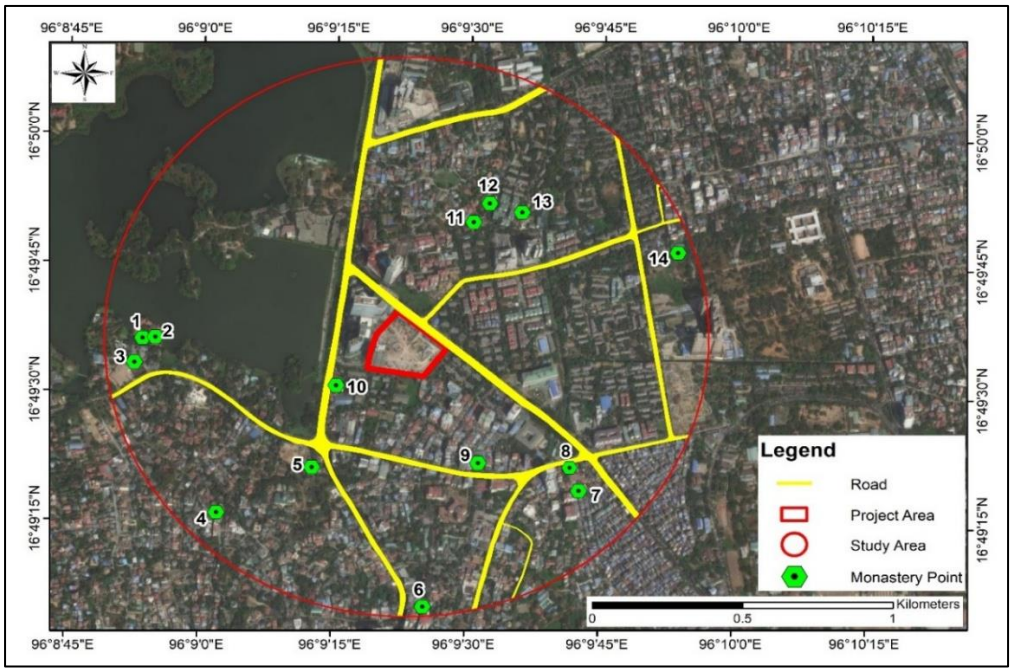


Figure 4-18 Location Map of Monasteries in the Study Area

4.6. ENVRIONMENTAL BASELINE SURVEY

4.6.1. Air Quality

4.6.1.1. Methodology

Air quality monitoring were conducted at 5 stations around project site of Bahan township. The air monitoring data was collected with Haz-Scanner and the method of air quality monitoring is shown in Table 4-36. To reveal the existing status of baseline air quality, the average air quality was compared with NEQEG (2015) guideline. Location map of the air monitoring points is shown in Figure 4-19. Summarized dates of air monitoring process are shown in Table 4-37. Air monitoring activities are shown in Figure 4-20.

Table 4-36 Air Quality Monitoring Analysis Methods

Items	Sampling/Analysis Method	Parameters	Sampling Period
HAZ-SCANNER	United State of Environmental Protection Agency (USEPA)	CO_2, CO, NO_2, SO_2, CH_4, VOC, Ozone, PM_{10} and $PM_{2.5}$ Temperature, Humidity, Wind Speed and Direction	24-hours

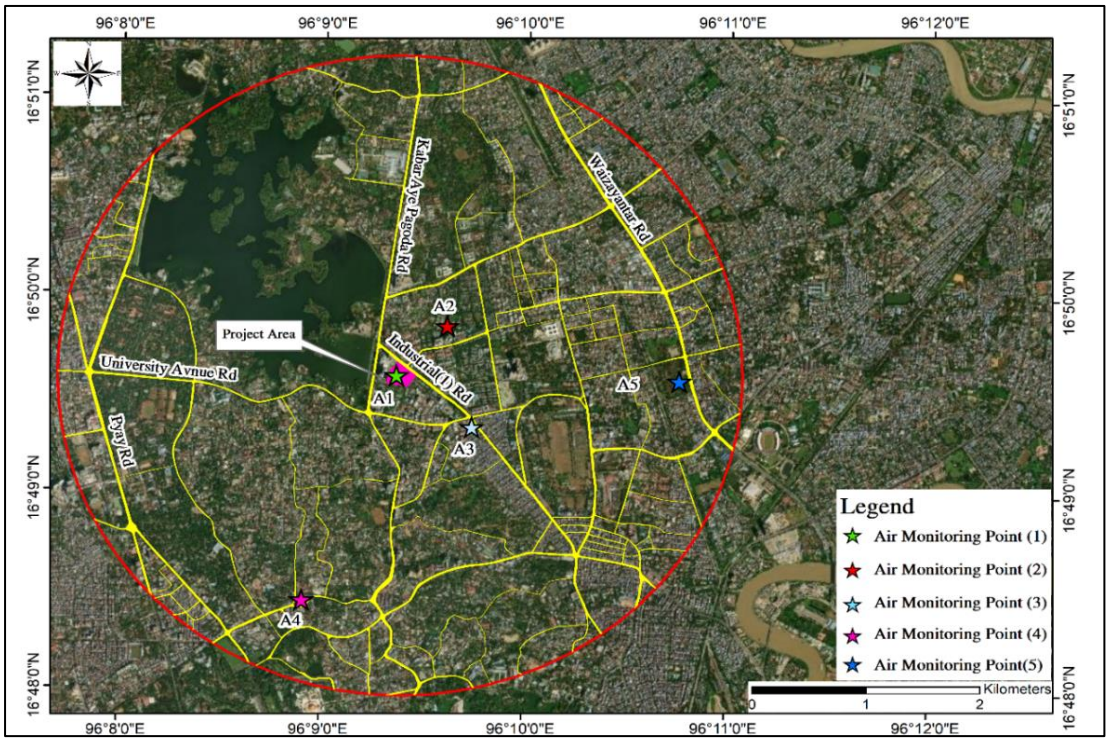


Figure 4-19 Location Map of Air Measurement Stations

Table 4-37 Air Quality Measurement Data

Station	Location	Reference Coordinate	Air Quality Measurement Date	
			First Measurement	Second Measurement
A1	Project Site	16°49'35.43"N 96° 9'22.17"E	25th – 26th August, 2020	Within the project site with different location point
		16°49'34.74"N 96° 9'21.01"E	-	27th -28th July, 2025
A2	Mya Kyun Thar Resort	16°49'55.34"N 96° 9'13.80"E	26th – 27th August, 2020	Monitoring is not permitted for this time
	Mingalar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E	-	10th -11th November, 2025
A3	Neik Ban Monastery	16°49'20.00"N 96° 9'44.67"E	27th – 28th August, 2020	28th – 29th July, 2025
A4	Moe Nyin Wei Partthanar Monastery	16°48'26.96"N 96° 8'55.00"E	20th–21st January, 2021	30th – 31th July, 2025
A5	Residential Area	16°49'33.56"N 96°10'46.94"E	21st – 22nd January, 2021	5th -6th August, 2025

First Time Measurement	Second Time Measurement
A1 (Project Site)	
A2 (Mya Kyun Thar Resort)	**A2 (Mingalar Zay Yone Monastery)**
A3 (Neik Ban Monastery)	

First Time Measurement	Second Time Measurement
A4 (Moe Nyin Wi Partthanar Monastery)	
A5 (Residential Area)	

Source: Field survey in 2020, 2021 and 2025

Figure 4-20 Information of Haz-Scanner Measurement Station

4.6.1.2. Result

During the first time measurement, the value of SO_2 for all stations are significantly higher than the NEQEG (2015) and O_3 results at Station 2 is slightly higher than the NEQEG (2015). Regarding the SO_2 value, the urban agglomeration is one of the potential reason since all monitoring points are located beside the urban road and downtown area, however, the SO_2 value in second time are absolutely within the guideline limit. Moreover, ground level ozone result is higher than the NEQEG (2015) in station A_2 due to the many traffic and movement of vehicles on the road. Moreover, the higher temperature will accelerate the chemical processes of ozone formation.

During the second time measurement, all air quality results are within the NEQEG (2015), shown in Table 4-38 . The details of measurement results are shown in Appendix D.

Table 4-38 Air Monitoring Results from Haz-Scanner

No.	Parameters	Unit	First Measurement Result					Second Measurement Result					*Guideline value	Average Period
			A1	A2	A3	A4	A5	A1	A2	A3	A4	A5		
1.	Carbon dioxide (CO2)	ppm	330.92	349.93	335.21	356.58	334.91	125	161.64	126.14	232.72	224.08	NG	-
2.	Carbon monoxide (CO)	ppm	0.06	0.15	0.06	0.25	0.26	0.17	0.18	0.21	0.10	0.20	NG	-
3.	Methane (CH4)	ppm	362.94	393.61	374.06	333.88	377.36	529.8	622.28	865.93	486.88	323.66	NG	-
4.	Nitrogen dioxide (NO2)	µg/m^3	-	-	-	-	-	-	-	-	-	-	40µg/m3	1-year
			23.9	3.8	18.42	35.8	1.9	54	116	34	33	126	200 µg/m3	1-hour
5.	Ozone (O3)	µg/m^3	27.7	126.2	68.4	26.9	40.3	87.81	72.96	92.39	60.85	91.98	100 µg/m3	8-hour daily max.
6.	Particulate Matter (PM10)	µg/m^3	22.10	34.93	28.57	45.41	31.88	16	14	12	17	10	50 µg/m3	24-hour
7.	Particulate Matter (PM2.5)	µg/m^3	10.51	24.88	18.71	22.64	19.03	7	4	3	7	4	25 µg/m3	24-hour
8.	Sulfur dioxide (SO_2)	µg/m^3	470.23	250.95	178.40	242.08	261.00	18.51	14.81	11.89	9.93	2.94	20 µg/m3	24-hour
9.	Volatile Organic Compound (VOC)	ppb	0.50	1.96	3.67	0.65	1.65	1.69	0.56	4.08	1.87	0.22	NG	-

Note: Due to conducting the renovation activities in Mya Kyun Thar Resort, the monitoring was not permitted, so Mingalar Zay Yone Monastery was a new location point instead of A2 in second time measurement (2025).

NG = No Guideline, * NEQEG (2015)

Source: Field survey in 2020, 2021 and 2025

4.6.2. Wind Speed and Direction

4.6.2.1. Methodology

Wind speed and direction are at 1.5 meter above ground level at also measured on same date and location as those selected for the air quality measurements.

4.6.2.2. Survey Results

Wind speed and wind direction are also measured at the same location of air quality measurement. The results of wind speed and wind direction are described in Table 4-39. The wind rose diagram and wind class frequency distribution are shown in Figure 4-21. 77.8% of wind are calm and 99.9% of the average velocity of wind in 24 hours is lower than 1.5 meter per second. The wind blows mostly to the Northeast direction.

The wind speed of over 6 meters per second may generates dust to the surrounding area[18]; however, all wind speed results within the project and nearby environment is lower than this value. As a result, it may reduce air pollution problems due to the construction or operation of the project to a certain level.

According to the field survey results, the nearest receptor (residential area) is located near the project while the wind speed within the project site is around 1.06 meter per second with Northeast (NE) prevailing wind direction.

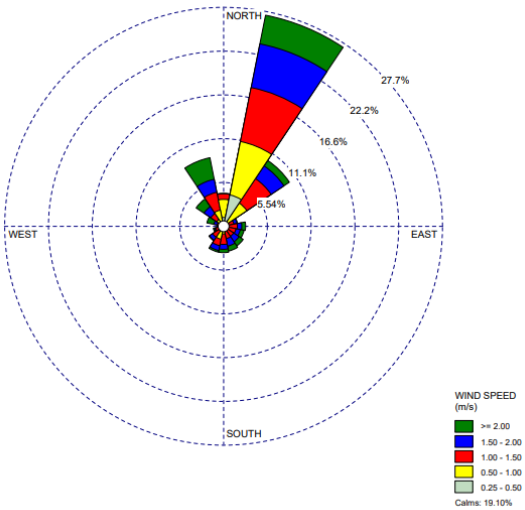
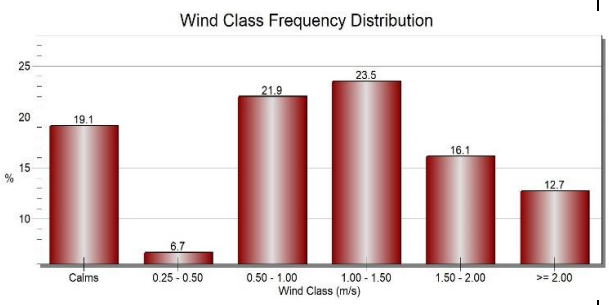
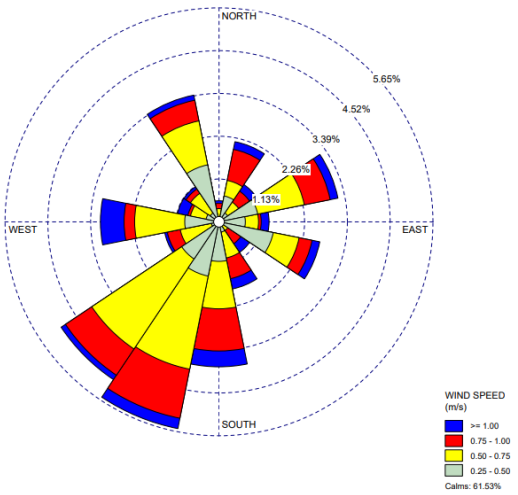
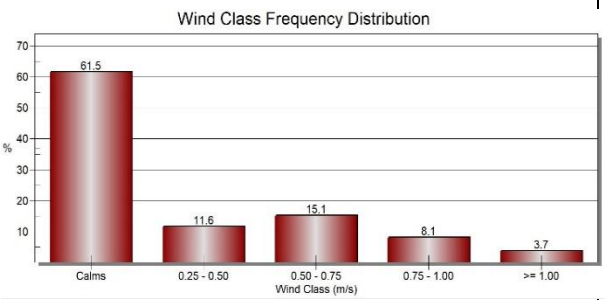
For the second time measurement of wind rose diagram and wind class frequency distribution are shown in Figure 4-22. No period of calm wind was recorded and 95% of the average velocity of wind in 24 hours is lower than 2.00 meter per second. The wind blows mostly to the Southwest direction. Dust emission to the neighbouring area can occur when the wind speed is above 6 meters per second. As a consequence, the project activities can slightly impact on the surrounding air quality.

Table 4-39 Results of Wind Speed and Direction Measurement

Station	Measurement Date	Distance from Project Site (m)	Wind Speed (m/s)	Prevailing Wind Direction
First Measurement Result				
A1	25th - 26th April 2020	Within the Project Site	0.00 – 2.00	NNE
A2	26th - 27th August 2020	Mya Kyun Thar Resort	0.00 – 1.00	SSW
A3	27th - 28th August 2020	Neik Ban Monastery	0.00 – 1.00	ESS
A4	20th – 21st January, 2021	Moe Nyin WI Partthanar Monastery	0.00 – 2.50	NE
A5	21st–22nd January, 2021	Residential Area	0.00 – 1.75	E
Second Measurement Result				
A1	27th -28th July, 2025	Within the Project Site	0.00 – 1.00	SSW

[18] https://tucson.ars.ag.gov/isco/isco12/VolumeIV/WindErosionProcesses.pdf

Station	Measurement Date	Distance from Project Site (m)	Wind Speed (m/s)	Prevailing Wind Direction
A2	10th -11th November, 2025	Mingalar Zay Yone Monastery	0.00 – 1.20	SSW
A3	28th – 29th July, 2025	Neik Ban Monastery	0.00 – 1.70	SW
A4	30th – 31th July, 2025	Moe Nyin WI Partthanar Monastery	0.00 – 0.80	SSE
A5	5th -6th August, 2025	Residential Area	0.00 – 0.90	SSW

Wind Speed and Direction	Wind Class Frequency Distribution
	
Station A1	
	
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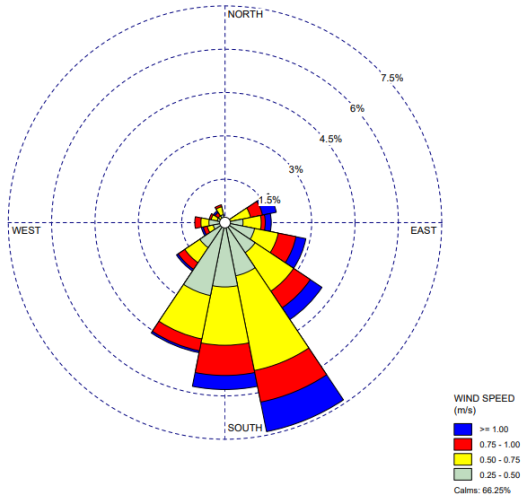

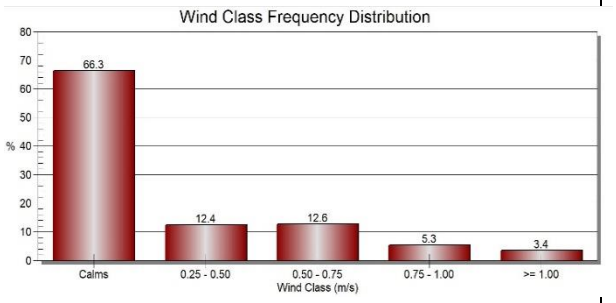

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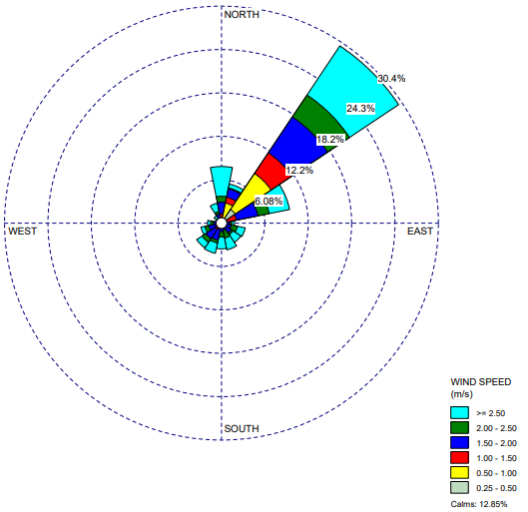

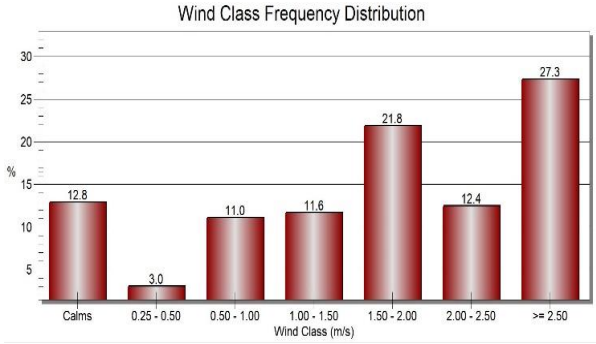

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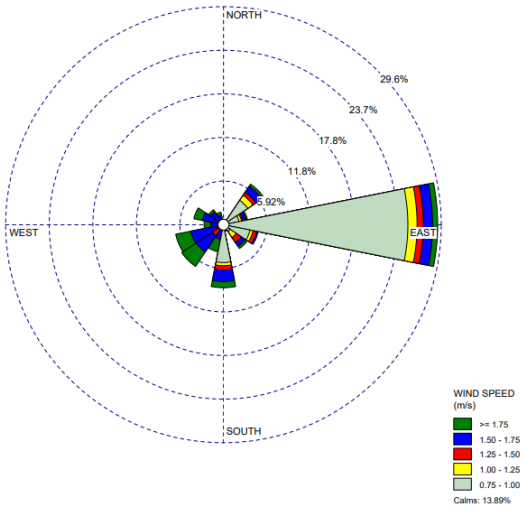
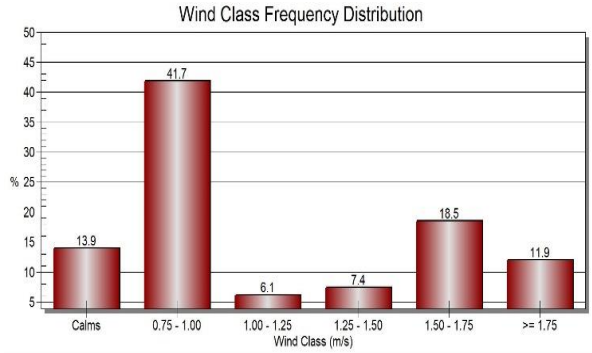
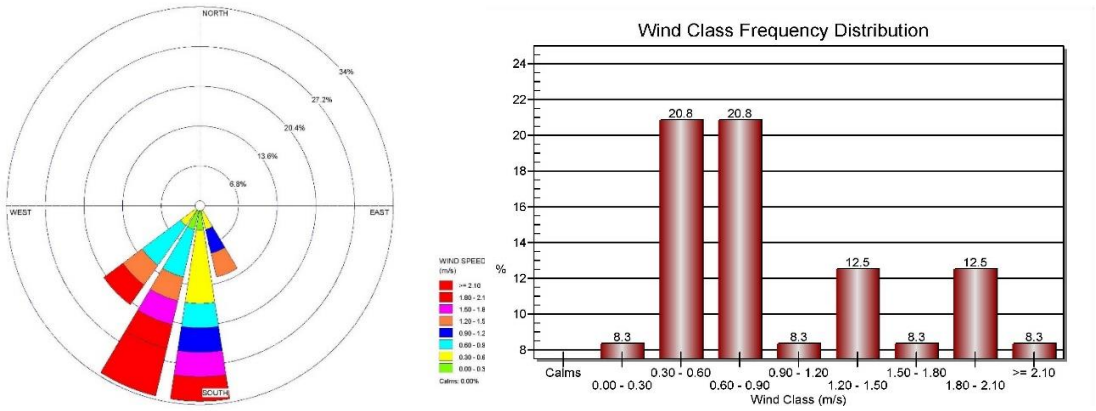




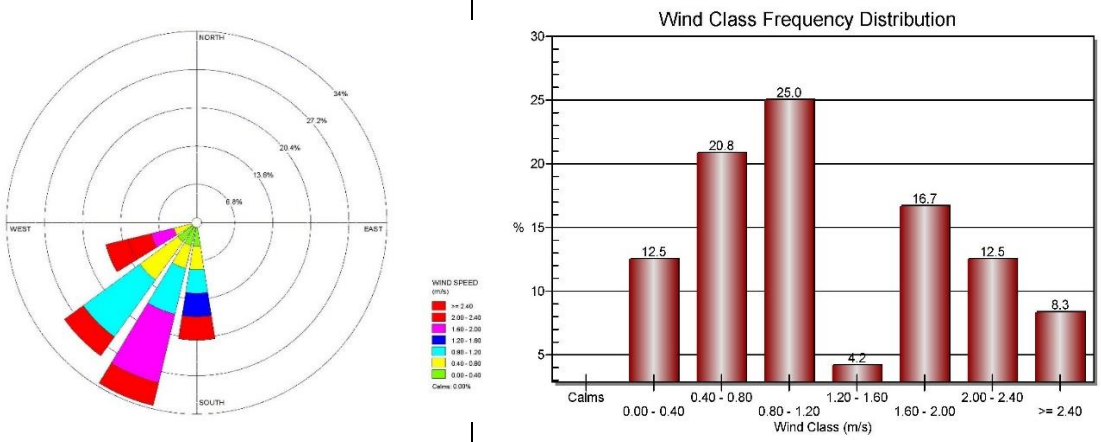
Station A5

Figure 4-21 Diagrams of Wind Speed and Direction for First Time Measurement

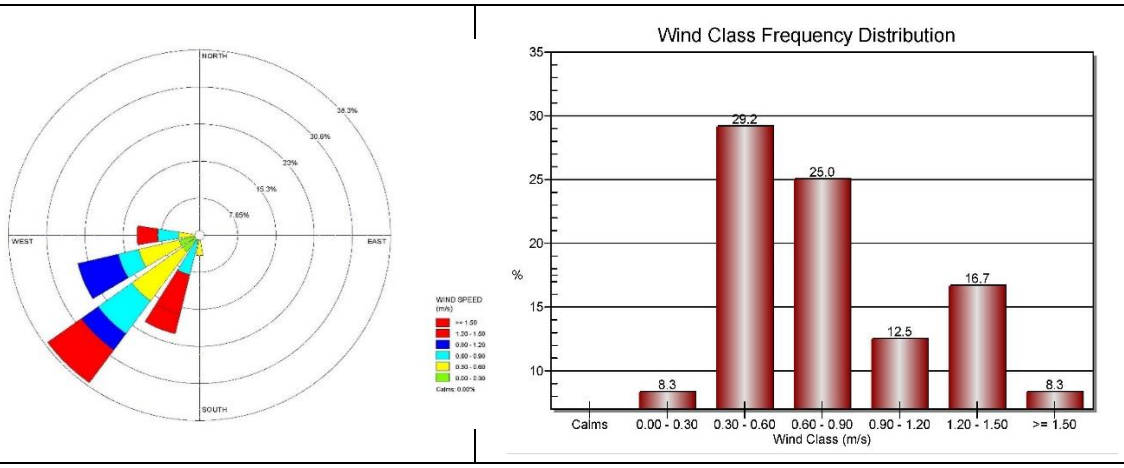
Wind Speed and Direction	Wind Class Frequency Distribution



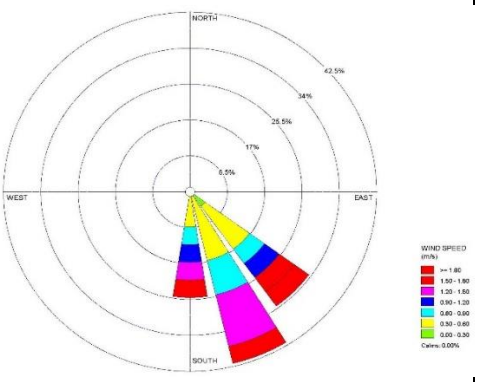
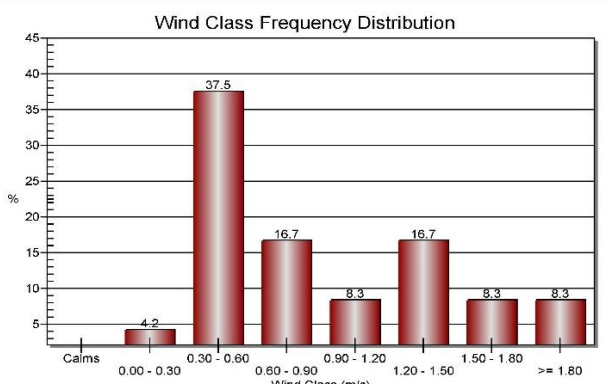
Station A1



Station A2



Station A3

Wind Speed and Direction	Wind Class Frequency Distribution
	
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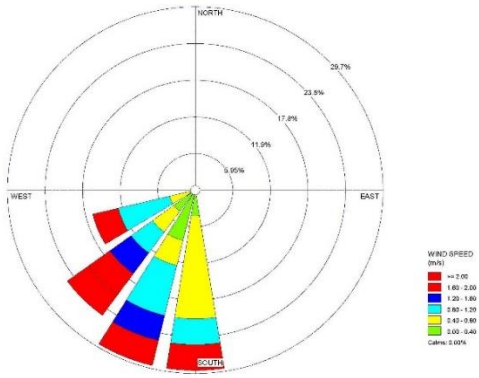
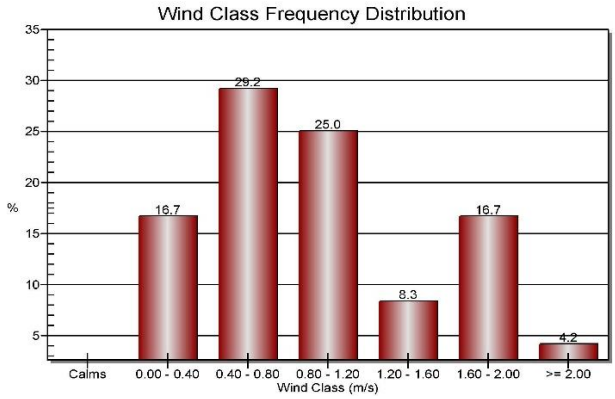
	
Station A5	

Note: Due to conducting the renovation activities in Mya Kyun Thar Resort, the monitoring was not permitted, so Mingalar Zay Yone Monastery was a new location point instead of A2 in second time measurement (2025).

Figure 4-22 Diagrams of Wind Speed and Direction for Second Time Measurement

4.6.3. Noise Level

The construction phase of the project will invariably create noise which could disturb nearby sensitive receptors. All the noise monitoring points are near the residential areas and roads. The noise level will be expected to be high due to the noise impacts of residents and traffic vehicles. Nevertheless, it would be useful to establish the baseline data on background noise levels in the project site.

Noise level on the receptors mainly depend on wind speed and direction. Naturally winds blowing from the noise source towards the noise sensitive location will increase levels, and the stronger the wind, the greater the effect. Therefore, in order to reduce the noise pollution to the nearby receptors, it is required to install the noise barriers at this direction.

4.6.3.1. Methodology

The noise measurement was conducted around the 1 kilometer radius of project area and around the 3 kilometer radius of project area. Location and coordinate of noise level measurement is shown in Table 4-40. The location map for noise monitoring station is described in Figure 4-23 and detail information of noise level measurement is described in Figure 4-24.

The data was recorded every one minute using the Digital Sound Level Meter (Benetech, GM1356), which complies with standard of IEC PUB 651 Type 2 and ANSI S1.4 Type 2. Leq/LAeq is calculated for daytime and nighttime 24-hr average from the measured data.

Table 4-40 Location and Coordinate of Noise Level Measurement

Station	Location	Reference Coordinate	Sampling Date	
			First Time Measurement	Second Time Measurement
N1	Within the Project Site	16°49'35.43"N 96° 9'22.17"E	25th – 26th August, 2020	Within the project site with different location point
		16°49'34.74"N 96° 9'21.01"E	-	27th -28th July, 2025
N2	Mya Kyun Thar Resort	16°49'55.34"N 96° 9'13.80"E	26th – 27th August, 2020	Monitoring is not permitted for this time
	Mingalar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E	-	10th -11th November, 2025
N3	Neik Ban Monastery	16°49'20.00"N 96° 9'44.67"E	27th – 28th August, 2020	28th – 29th July, 2025
N4	Moe Nyin Wi Partthanar Monastery	16°48'26.96"N 96° 8'55.00"E	20th–21st January, 2021	30th – 31st July, 2025
N5	Residential Area	16°49'33.56"N 96°10'46.94"E	21st–22nd January, 2021	5th - 6th August, 2025

Note: Due to conducting the renovation activities in Mya Kyun Thar Resort, the monitoring was not permitted, so Mingalar Zay Yone Monastery was a new location point instead of A2 in second time measurement (2025).

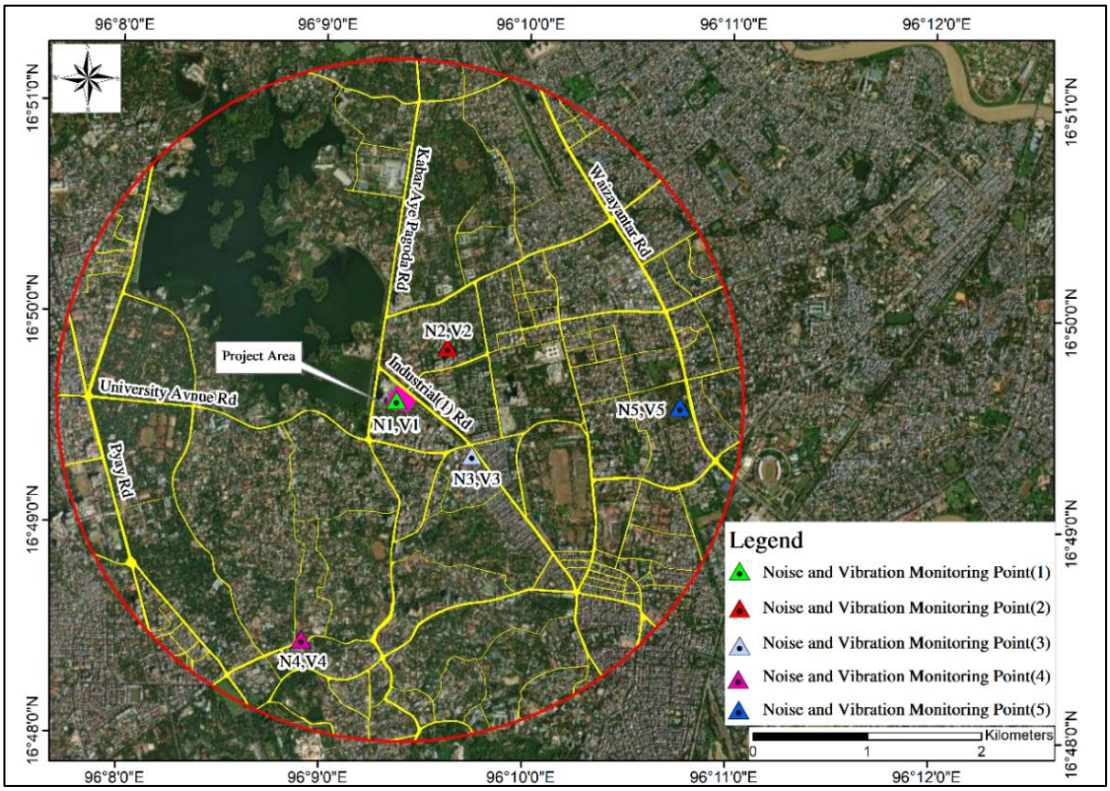
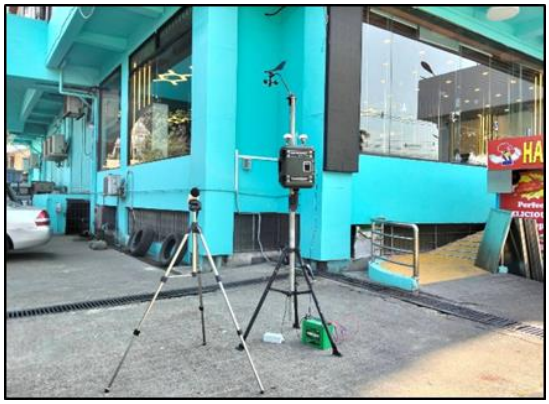


Figure 4-23 Location Map of Noise and Vibration Monitoring Stations

First Measurement	Second Measurement
N1 (Project Site)	
N2 (Mya Kyun Thar Resort)	**N2 (Mingalar Zay Yone Monastery)**
N3 (Neik Ban Monastery)	

N4 (Moe Nyin Wi Partthanar Monastery)



N5 (Residential Area)

Figure 4-24 Noise Monitoring Station for First and Second Time Measurement

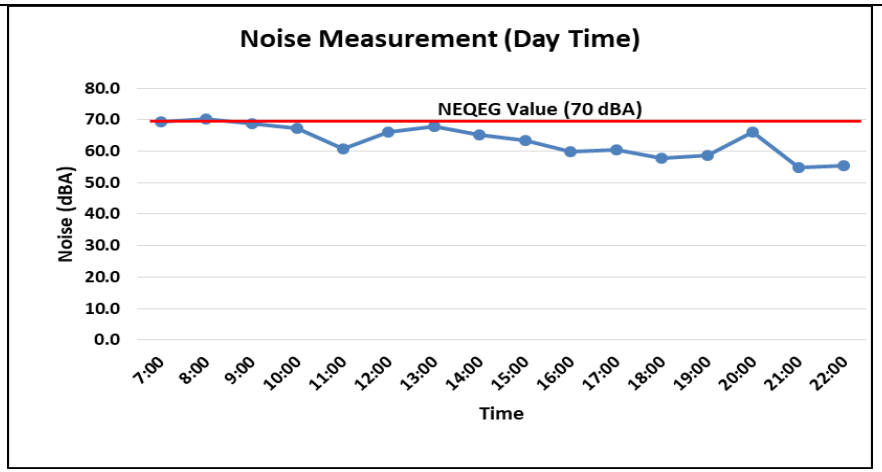
4.6.3.2. Results

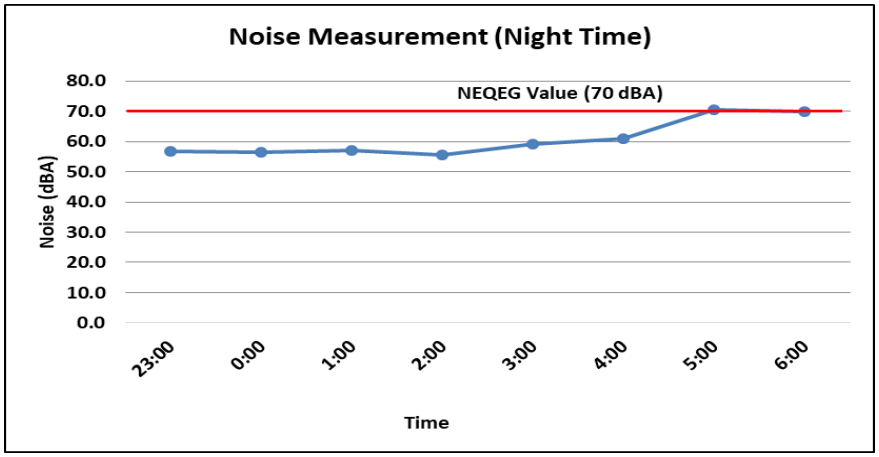
The average background noise levels expressed in LAeq (24 hrs) were compared with maximum limit set by NEQEG (2015) as shown in Table 4-41. The ambient noise levels of first measurement are ranging from 66.44 dBA to 71.57 dBA in daytime and from 59.38 dBA to 70.36 dBA in night time for all stations, making slightly higher than not only the residential, institutional, education but also industrial, commercial noise level guidleline of NEQEG (2015).

During second time, the noise levels are still slightly higher than the residential, institutional education noise level of NEQEG (2015). This is because the project site and study area are located nearby the public traffic road and residential area in downtown of Yangon, in which the high traffic congestion, widespread use of loudspeakers in vendors, ongoing construction and a dense concentration of commercial and human activitives are the major point sources of noise pollution. The results in daytime and nighttime at 5 stations are shown in Figure 4-25 and Figure 4-26.

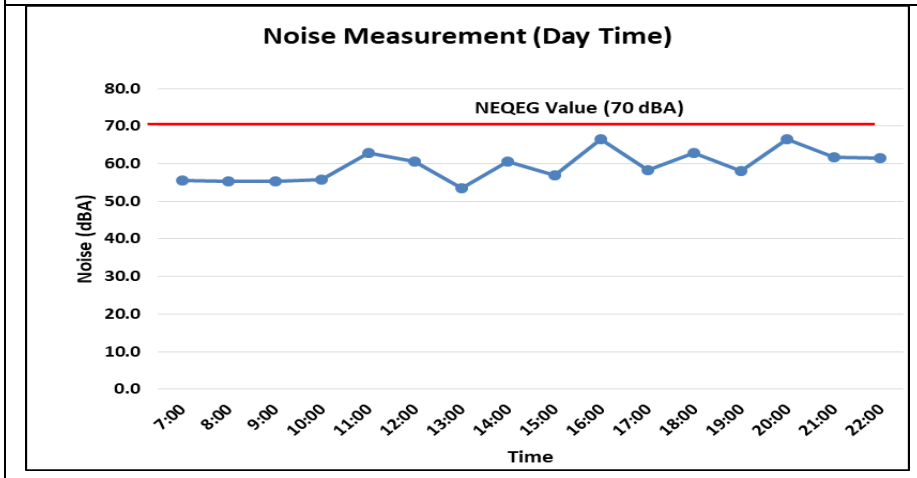
Table 4-41 Result of Noise Level Measurement

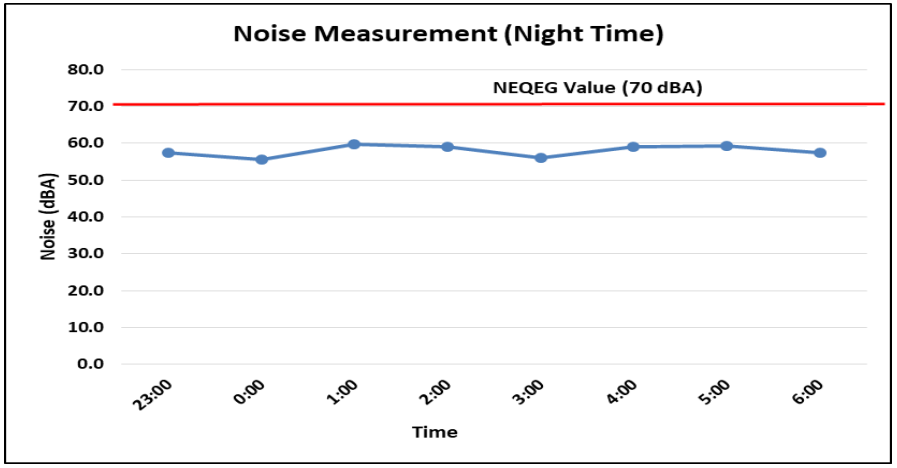
Station		First Measurement (dBA)		Second Measurement (dBA)	
		Day Time	Night Time	Day Time	Night Time
N1		70.1	70.36	55.5	66.4
N2		66.44	59.78	52.4	43.4
N3		71.57	62.28	54.6	44.9
N4		68.73	62.36	52.4	43.4
N5		70.51	59.38	53.6	43.1
NEQEG (2015)	Residential, institutional, education	55	45	55	45
	Industrial, commercial	70	70	70	70



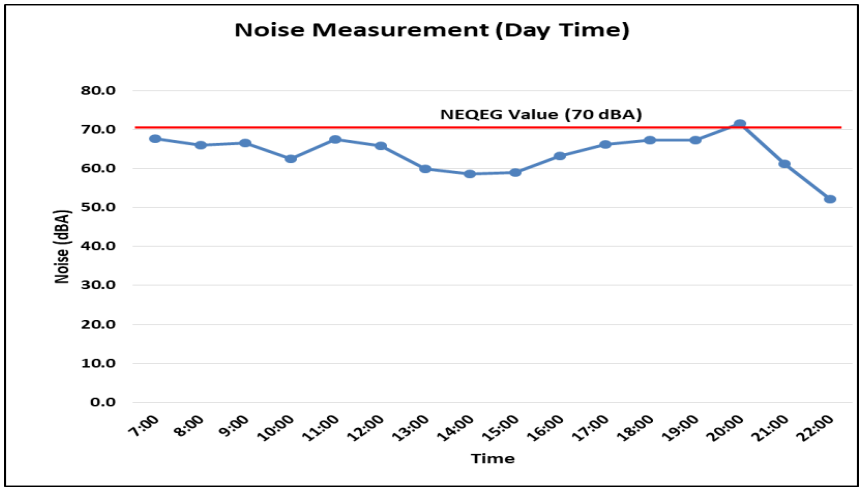


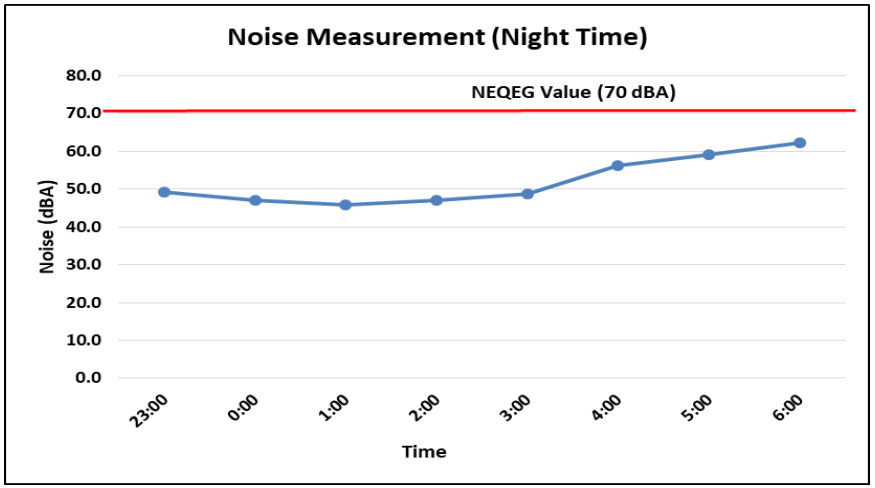
Noise Measurement Result of N1



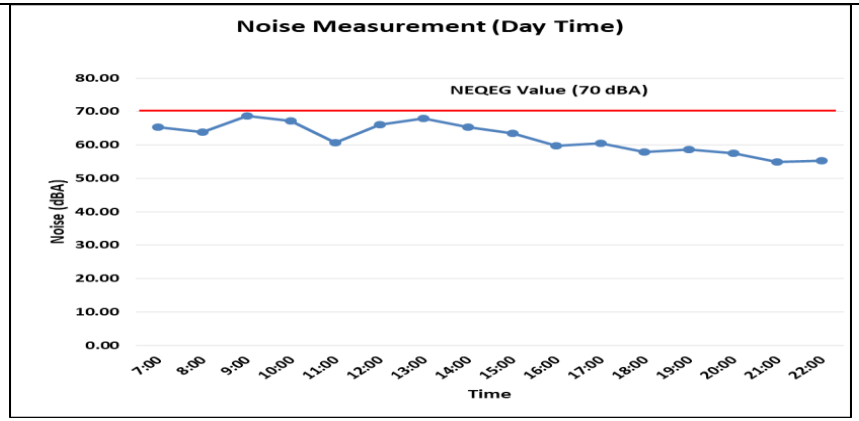


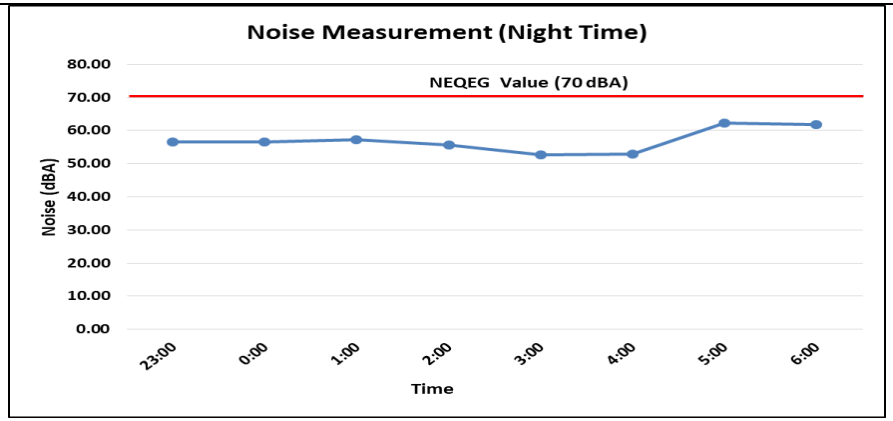
Noise Measurement Result of N2



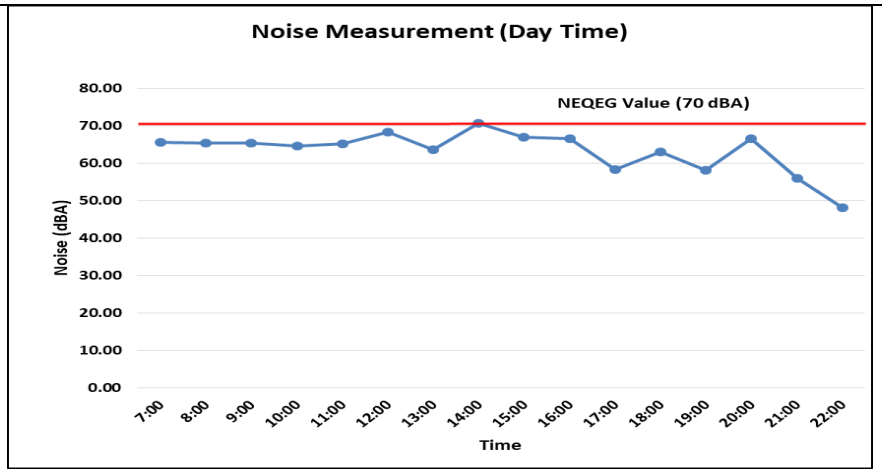


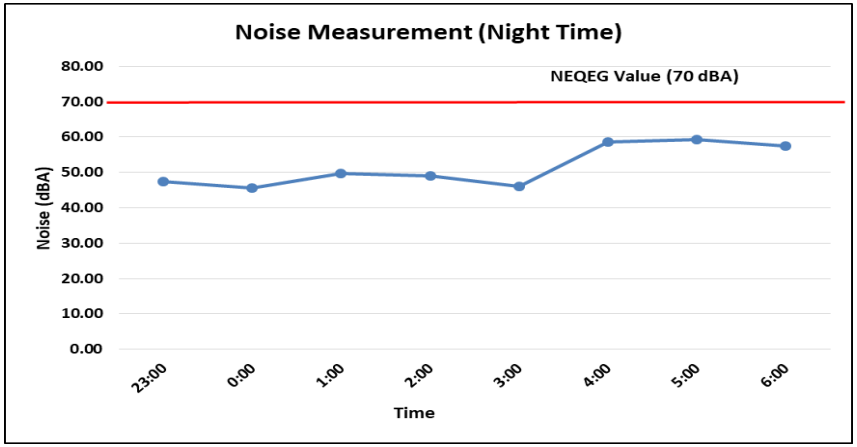
Noise Measurement Result of N3





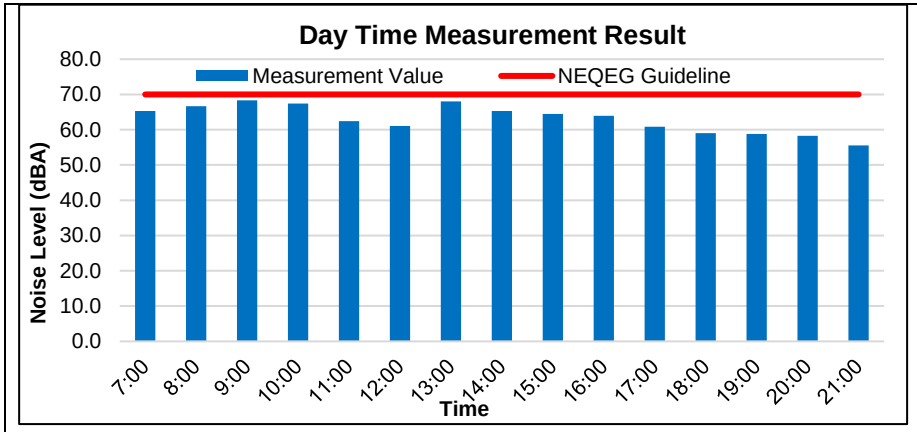
Noise Measurement Result of N4

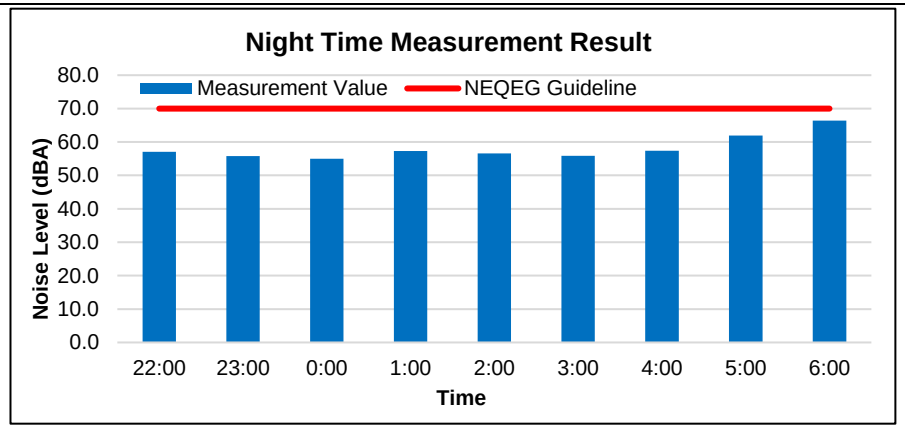




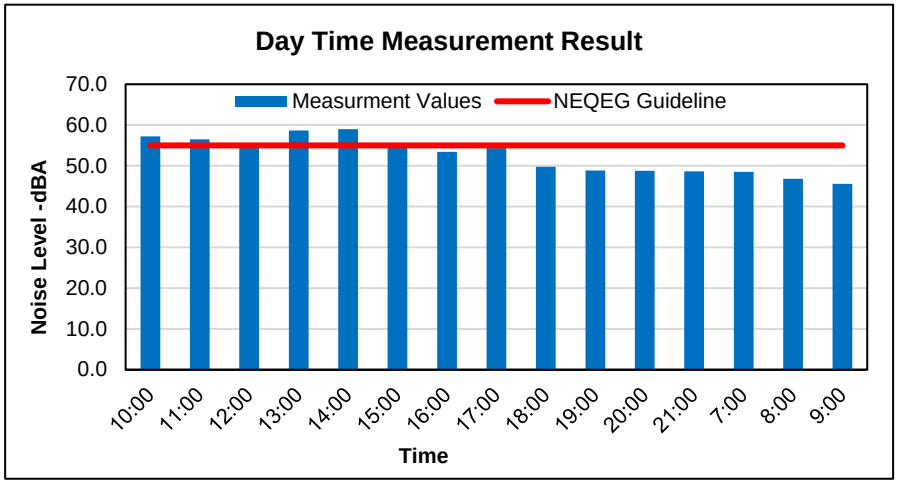
Noise Measurement Result of N5

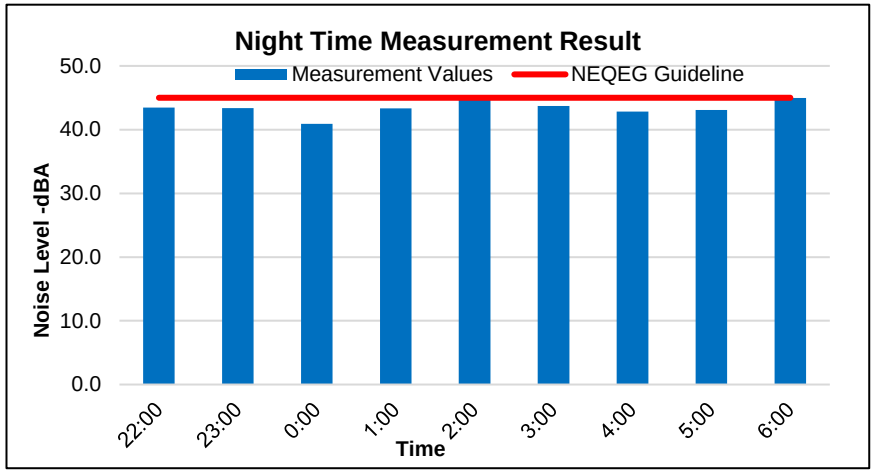
Figure 4-25 First Time Noise Measurement Results



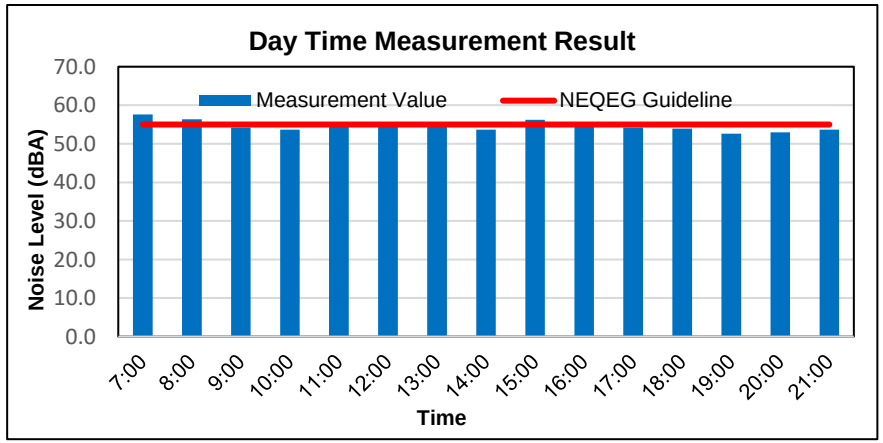


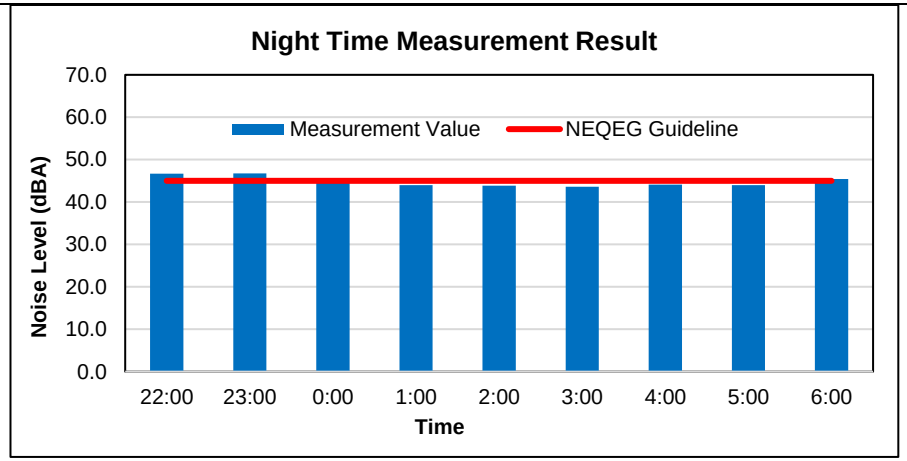
Noise Measurement Result of N1



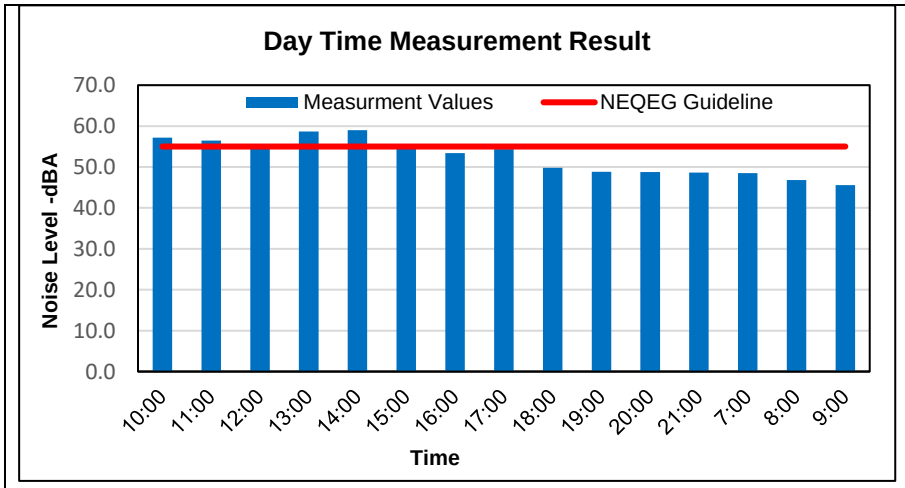


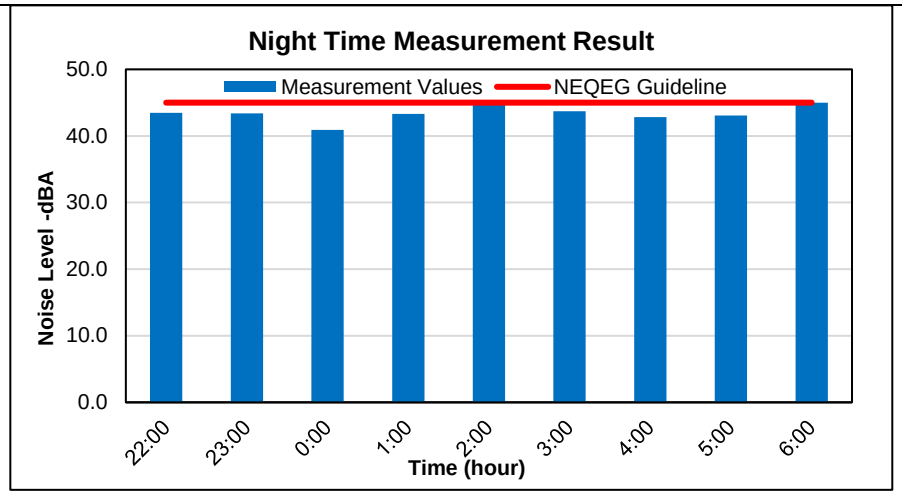
Noise Measurement Result of N2



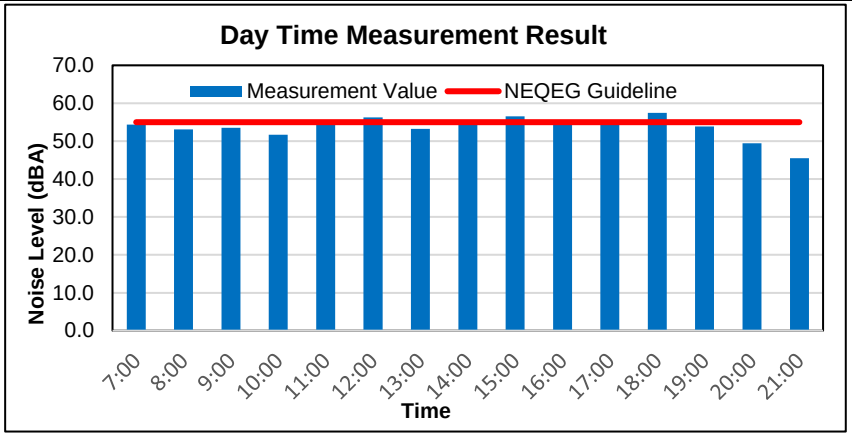


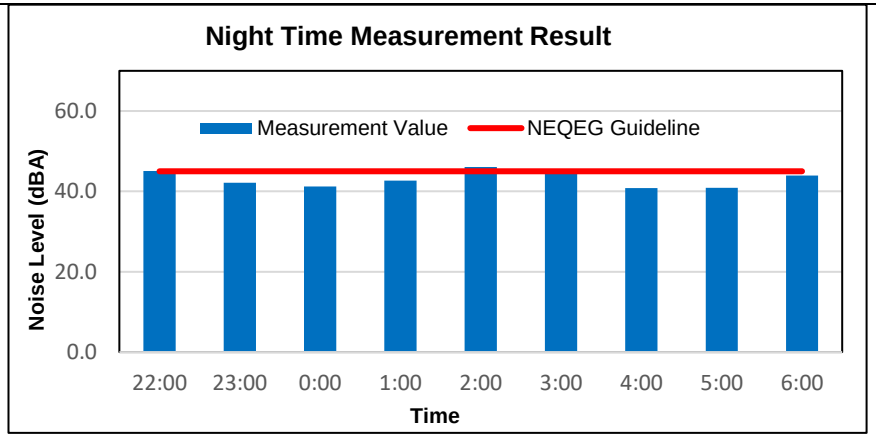
Noise Measurement Result of N3





Noise Measurement Result of N4





Noise Measurement Result of N5

Figure 4-26 Second Time Noise Measurement Results

4.6.4. Vibration

4.6.4.1. Methodology

Vibration measurements were conducted at three monitoring points. Nomis Seismograph (Mini Supergraph II) was used for ground vibration measurements. The seismograph monitors vertical, transverse and radial particle velocity in millimeter per second and frequency. The measured results were compared with German standard DIN 4150-3, which adopts frequency versus Peak Particle Velocity (PPV) plot to determine vibration effects on the structures such as sensitive building, residential and commercial buildings are shown in Table 4-41.

Table 4-42 German Standards DIN 4150-3 for Vibration

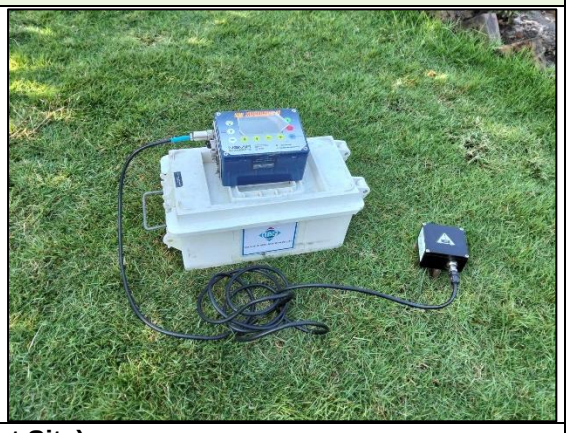
Structure Type	Peak Particle Velocity (mm/s)		
	4-8 Hz	8-30 Hz	30-100 Hz
Commercial	20	20-40	40-50
Residential	5	5-15	15-20
Very sensitive	3	3-8	8-10

Vibration measurement was conducted at in the study area around the 1 km radius of project area and around the 3 kilometer radius of project area. Field measurements were carried out for 24 hours at each station. The information at the five stations is summarized in Table 4-43 and Figure 4-27.

Table 4-43 Vibration Measurement Station Information

Station	Location	Reference Coordinate	Vibration Measurement Date	
			First Time	Second Time
V1	Within the Project Site	16°49'35.43"N 96° 9'22.17"E	25th – 26th August, 2020	Within the project site with different location point
		16°49'34.74"N 96° 9'21.01"E	-	27th -28th July, 2025
V2	Mya Kyun Thar Resort	16°49'55.34"N 96° 9'13.80"E	26th – 27th August, 2020	Monitoring is not permitted for this time
	Mingalar Zay Yone Monastery	16°49'55.34"N 96° 9'13.80"E	-	10th -11th November, 2025
V3	Neik Ban Monastery	16°49'20.00"N 96° 9'44.67"E	27th – 28th August, 2020	28th – 29th July, 2025
V4	Moe Nyin WI Partthanar Monastery	16°48'26.96"N 96° 8'55.00"E	20th–21st January, 2021	30th – 31th July, 2025
V5	Residential Area	16°49'33.56"N 96°10'46.94"E	21st–22nd January, 2021	5th -6th August, 2025

Note: Due to conducting the renovation activities in Mya Kyun Thar Resort, the monitoring was not permitted, so Mingalar Zay Yone Monastery was a new location point instead of A2 in second time measurement (2025).

First Measurement	Second Measurement
	
V1 (Project Site)	
V2 (Mya Kyun Thar Resort)	**V2 (Mingalar Zay Yone Monastery)**
V3 (Neik Ban Monastery)	
V4 (Moe Nyin Wei Partthanar Monastery)	

V5 (Residential Area)

Figure 4-27 Information of Vibration Sampling Measurement

4.6.4.2. Result

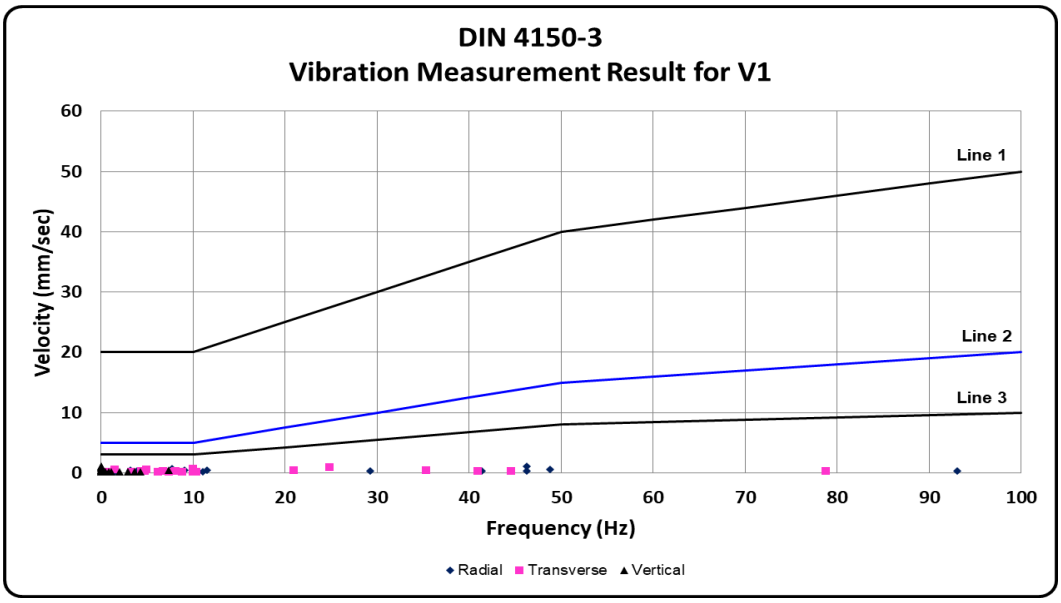
The summary of vibration measurement over a 24-hr period is shown in the following Table 4-44. The results are compared with the German Standard. According to the field survey results, evaluation results of vibration level for all stations are within the standard. However, these vibration results may increase by the time the initial construction work has started. Vibration level result is shown in Table 4-44. The graph of vibration measurement is presented in Figure 4-28 to Figure 4-32.

Table 4-44 Result of the Vibration Level Measurement

Station	Direction	First Measurement Result		Second Measurement Result	
		Peak particle velocity (mm/s)	Frequency (Hz)	Peak particle velocity (mm/s)	Frequency (Hz)
V1	Radial	0.38	51.54	0.12	45.20
	Transverse	0.31	31.74	0.21	23.54
	Vertical	0.36	0.97	0.54	50.24
V2	Radial	0.32	50.752	0.56	40.56
	Transverse	0.22	52.679	0.10	53.12
	Vertical	0.25	23.31	0.21	56.14
V3	Radial	0.65	30.225	0.64	59.56
	Transverse	0.748	45.270	0.57	64.25
	Vertical	0.457	18.137	0.33	41.23
V4	Radial	0.70	50.62	0.75	62.75
	Transverse	0.35	40.90	0.85	60.75
	Vertical	0.31	1.83	0.28	62.01
V5	Radial	0.85	60.75	0.10	53.12
	Transverse	0.28	62.01	0.21	56.14
	Vertical	0.33	41.23	0.41	1.75

Note: Due to conducting the renovation activities in Mya Kyun Thar Resort, the monitoring was not permitted, so Mingalar Zay Yone Monastery was a new location point instead of A2 in second time measurement (2025).

Measurement Result for 1st Time



Measurement Result for 2nd Time

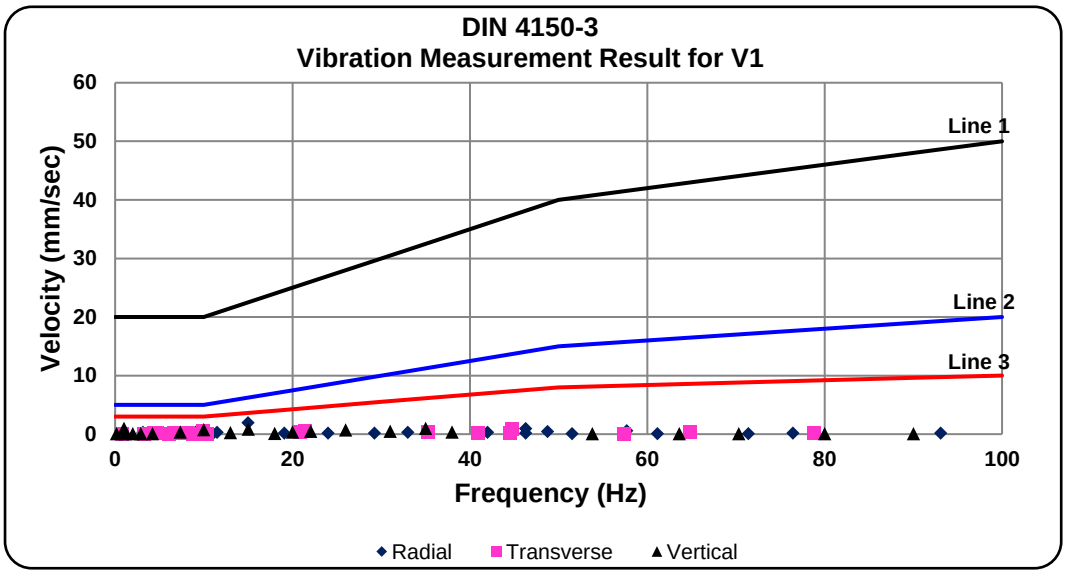
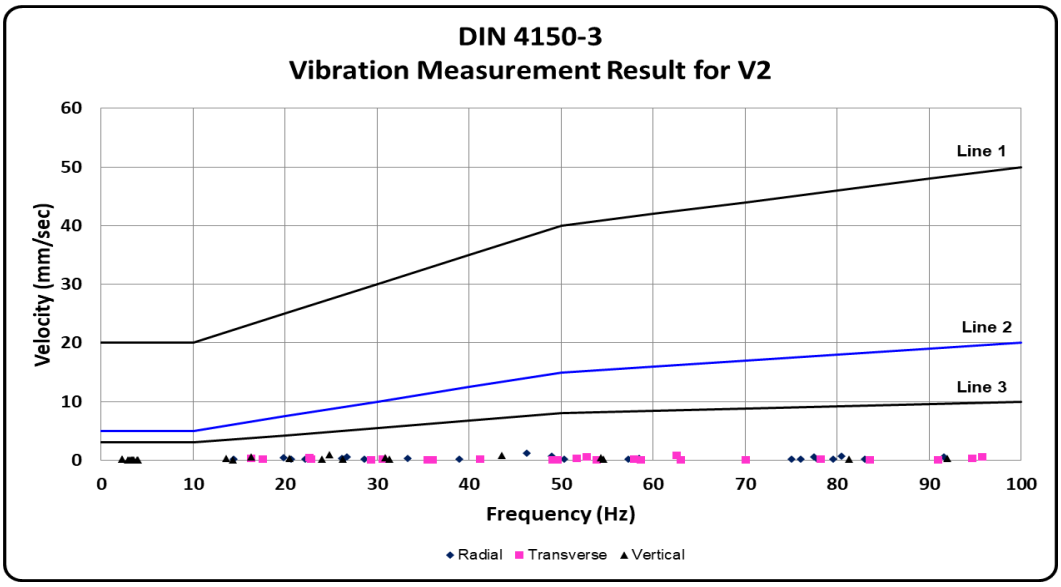


Figure 4-28 Vibration Measurement Result for V1

Measurement Result for 1st Time



Measurement Result for 2nd Time

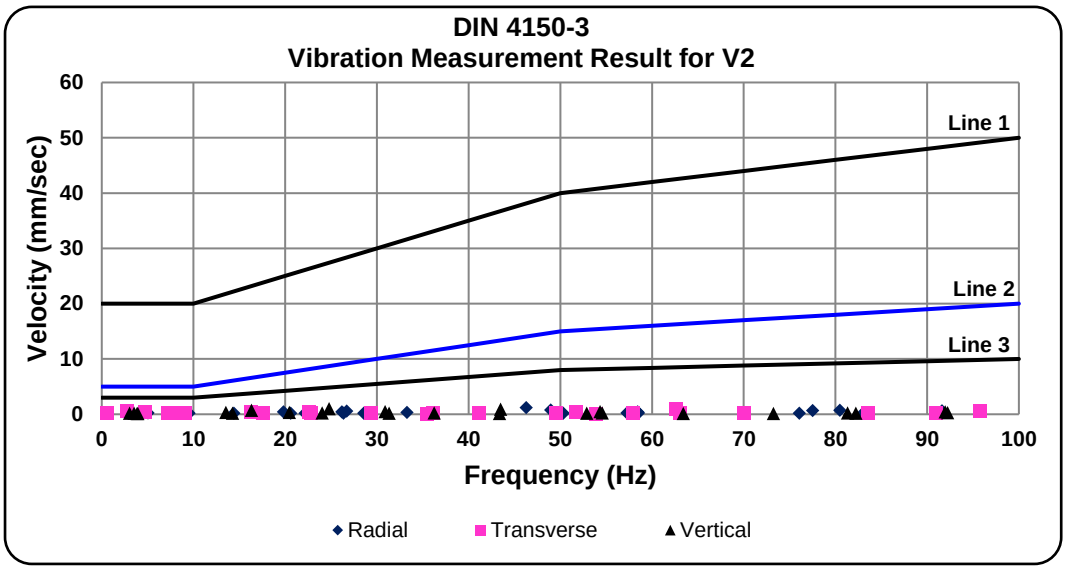
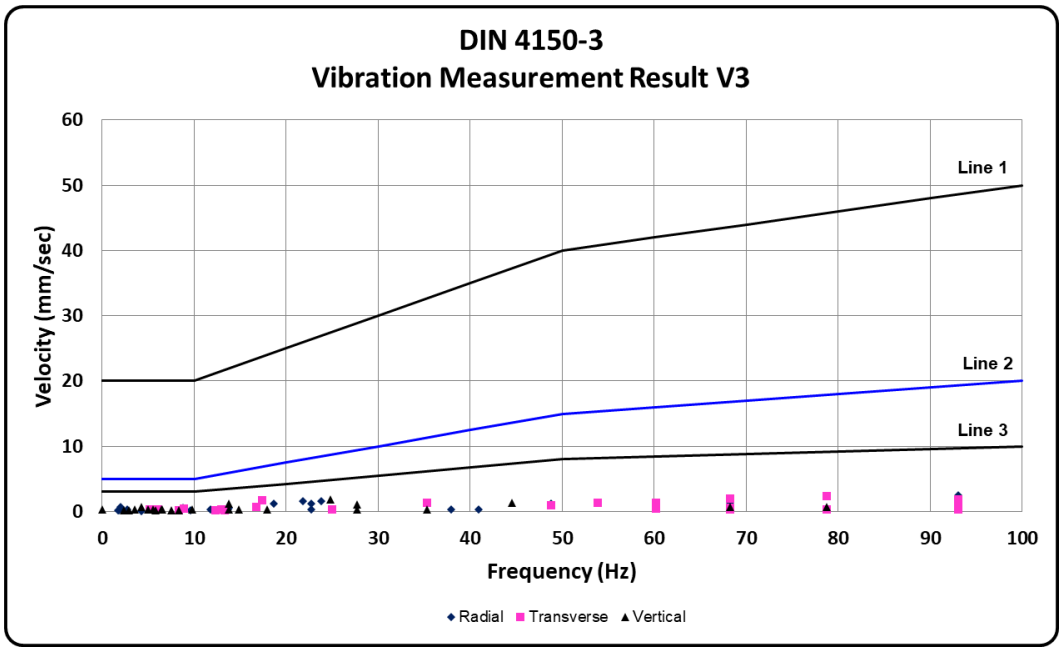


Figure 4-29 Vibration Measurement Result for V2

Measurement Result for 1st Time



Measurement Result for 2nd Time

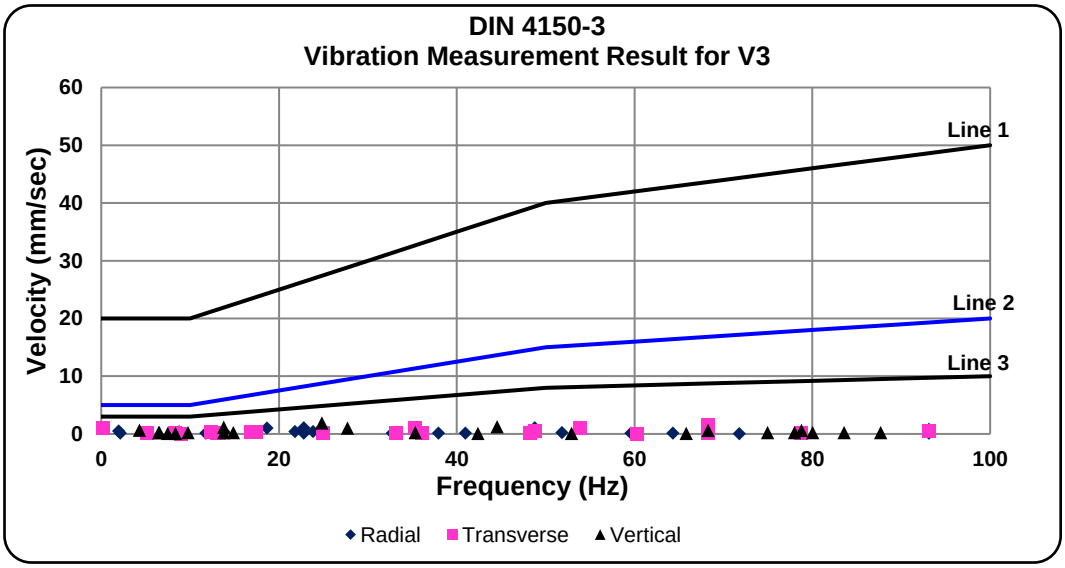
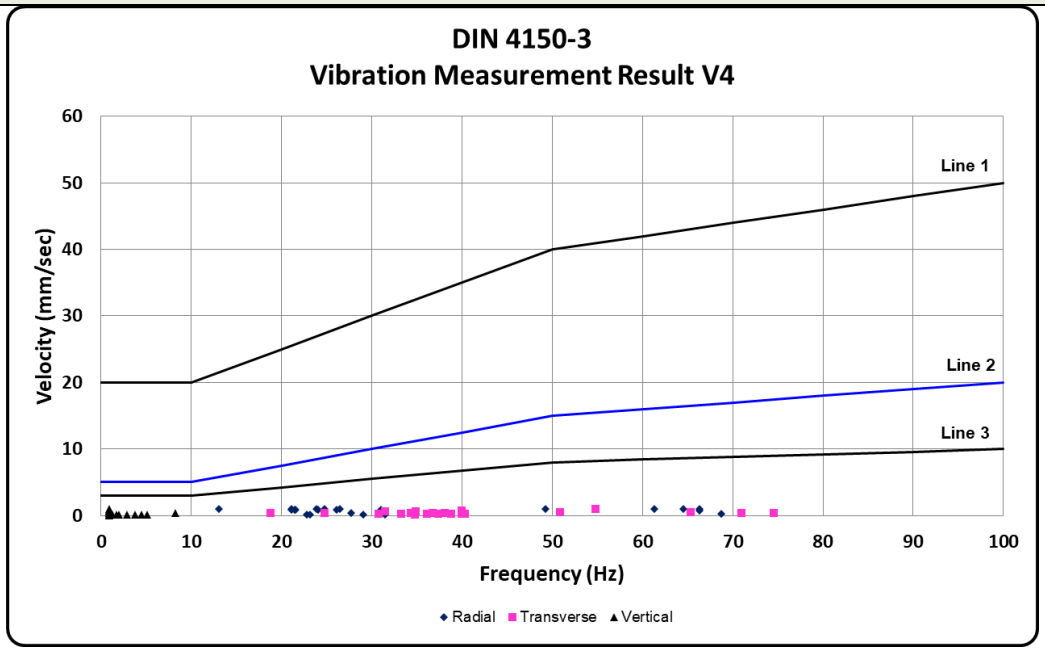


Figure 4-30 Vibration Measurement Result for V3

Measurement Result for 1st Time



Measurement Result for 2nd Time

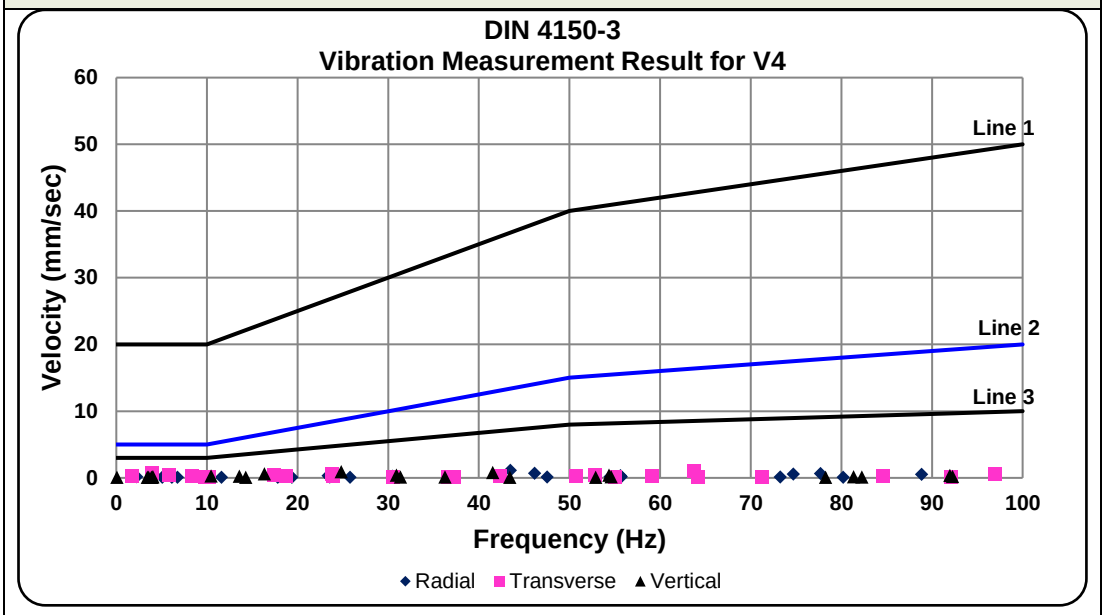
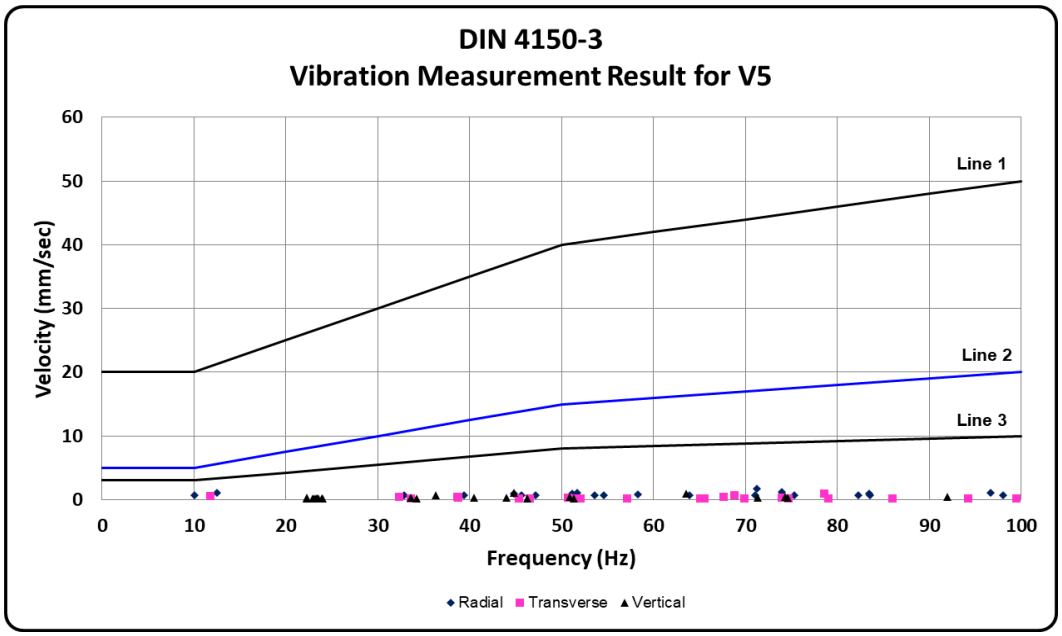


Figure 4-31 Vibration Measurement Result for V4

Measurement Result for 1st Time



Measurement Result for 2nd Time

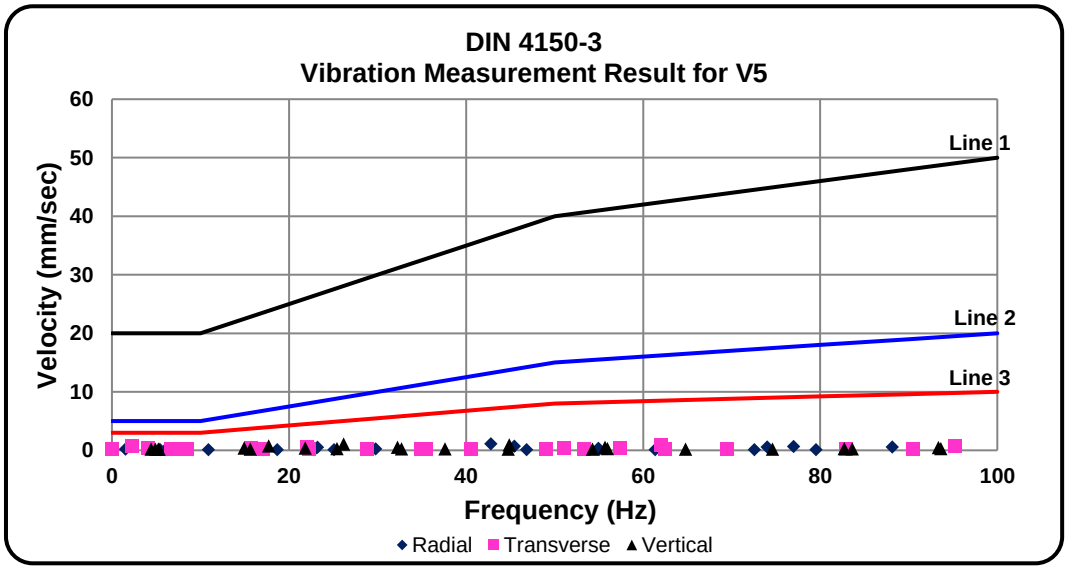


Figure 4-32 Vibration Measurement Result for V5

4.6.5. Water Quality

4.6.5.1. Methodology

The method for sample collection and treatment follow the QA/QC of ISO/IEC 17025:2005 accreditation for laboratory to ensure that the water samples are free form contamination. The sample collectors have to wear starch-free rubber gloves at all time while collecting water samples. The water samples bottles must be rinsed with the sampling water before use.

In this study, for surface water, water quality parameters such as pH, temperature, total dissolved solids (TDS), conductivity, and salinity are measured in situ using Oakton PCTS Testr™ Waterproof Pocket tester as presented in Table 4-45.

For the wastewater quality, the samples are sent to the ALARM Ecological Laboratory and BOD_5, COD, free cyanide, total phosphorous, iron, lead, oil & grease, total nitrogen are tested as presented in Table 4-46.

Table 4-45 Water Quality Parameters Tested by Oakton PCTS Testr™ Waterproof Pocket tester

No.	Parameter	Description	Remark
1.	pH	A measure of how acidic/basic water is. The range goes from 0 to 14, with 7 being neutral.	<7 indicate acidity >7 indicates a base
2.	Total dissolved solids (TDS)	A measure of amount of dissolved mineral constituents in water.	High TDS may affect the taste of water.
3.	Temperature	An impact on inorganic constituents and chemical contaminants in water.	High temperature influence taste, odor, color and corrosion.
4.	Conductivity	Conductivity is a measure of the **ability of water to pass an electrical current**. Conductivity in water is affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, and phosphate anions (ions that carry a negative charge) or sodium, magnesium, calcium, iron, and aluminum cations (ions that carry a positive charge)	Purified water is said to have low conductivity/high resistivity.
5.	Salinity	The saltiness or amount of salt dissolved in a body of water	

Table 4-46 Water Quality Parameters Tested in ALARM Ecological Laboratory

No.	Parameter	Description	Remark
1.	BOD5	A measure of amount of oxygen required to remove waste organic matter from water under decomposition by aerobic bacteria that live only in oxygen present environment.	High BOD leads low DO.
2.	COD	A measure of amount of oxygen required during the decomposition of organic matter and the oxidation of inorganic chemicals.	High BOD leads low DO
3.	Free Cyanide	Cyanide is toxic. Free cyanide is the most toxic form as it is the sum of the cyanide present as either hydrogen cyanide (HCN) or CN-.	Maximum contaminant level goal (MCLG) of 0.2 mg/L.
4.	Total Phosphorous (P)	Phosphorus is an essential element for plant life, but too much of it can reduce DO in water by an increase of mineral and organic nutrients.	High concentration leads to hypoxic zone or dead zone.
5.	Iron	A measure of amount of dissolved iron in water. High concentration of iron will cause metallic taste and metallic odor.	> 3ppm can affect water color and odor.
6.	Lead	A measure of amount of dissolved iron in water. A cumulative poison, toxic in small concentration.	Loss of appetite, anemia, abdominal pain and death.

No.	Parameter	Description	Remark
7.	Oil and Grease	Oil and grease refers to a combination of substances that do not readily mix with water and are commonly used in industry and daily activities.	Limitation is 0.5 mg/L
8.	Total Nitrogen	Total Nitrogen is an essential nutrient for plants and animals but an excess amount of it may reduce DO.	High concentration leads to hypoxic zone or dead zone.

4.6.5.2. Surface Water Quality for 1st Time Measurement

4.6.5.2.1 Field Survey

Baseline water quality survey was carried out on 22th December, 2020 at one location which is within 3 kilometer of the project. This surface water from Gyobyu Reservoir sampling point was done in project area (16° 49' 36.99"N and 96° 9' 25.79" E). The location of all water sampling stations are shown in Figure 4-33.

Figure 4-33 Location Map of Surface Water Sampling Collection (1st and 2nd Time of Water Sampling Area)

4.6.5.2.2 Result

The water quality data was compared with NEQEG (2015). Result of surface water is shown in Table 4-47. The details of the result are presented in Appendix E-1.

Table 4-47 Result of Surface Water Tested with Oakton PCTS Testr™ Waterproof Pocket Tester

No.	Parameters	Units	Results	NEQEG (2015)	WHO	MNDWQS (2019)	Water Testing Instrument	Remark
1.	pH	S.U	8.5	6.0-9.0	6.5-8.5	6.5-8.5	Oakton PCTS Testr™ Waterproof Pocket Tester	Within the limit
2.	Temperature	°C	29.4	-				
3.	TDS	ppm	79.7	-				
4.	Conductivity	µs/cm	111.5	-				
5.	Salinity	ppt	0.00	-				

Source: Field survey on December 22, 2020

4.6.5.3. Wastewater Quality for 1st Time Measurement

4.6.5.3.1 Field Survey

Baseline wastewater quality survey was carried out on 22nd December 2020 at one location within 3 kilometer of the proposed Project. This wastewater sampling point was done in project area (16° 49' 36.99" N and 96° 9' 21.5" E). The location of all water sampling stations are shown in Figure 4-33. In this study, surface water quality parameters such as pH, temperature, total dissolved solids (TDS), conductivity and salinity are measured in situ using Oakton PCTS Testr™ Waterproof Pocket tester.

The wastewater samples are sent to the ALARM Ecological Laboratory and BOD_5, COD, free cyanide, total phosphorous, iron, lead, oil & grease, total nitrogen were tested in the lab.

4.6.5.3.2 Result

The water quality data was compared with NEQEG (2015). The result of pH was above the limit. Wastewater results is shown in Table 4-48 and Table 4-49. The details of the results are presented in Appendix E-1 and E-2.

Table 4-48 Result of Wastewater Tested with Oakton PCTS Testr™ Waterproof Pocket Tester

No.	Parameters	Units	Results	NEQEG (2015)	Water Testing Instrument	Remark
1.	pH	S.U	11.2	6.0-9.0	Oakton PCTS Testr™ Waterproof Pocket Tester	Above the limit
2.	Temperature	°C	27.5	-		
3.	TDS	ppm	697	-		
4.	Conductivity	µs/cm	982	-		
5.	Salinity	ppt	0.5	-		

Source: Field survey on December 22, 2020

Table 4-49 Result of Wastewater Tested by ALARM Ecological Laboratory

No.	Parameters	Results	Units	* NEQEG (2015)	Remarks
1.	BOD5	19	mg/L	≤50mg/L	Wthin the NEQEG
2.	COD	<30	mg/L	≤250mg/L	Normal
3.	Free Cyanide	<0.01	mg/L	≤0.1mg/L	Normal
4.	Phosphorous	<1.5	mg/L	2 mg/L	Normal
5.	Iron	0	mg/L	3.5 mg/L	Normal
6.	Lead	ND	mg/L	≤0.1mg/L	LOD= 0.1 mg/L
7.	Total Nitrogen	6	mg/L	<10 mg/L	Normal
8.	Oil and Grease	<0.5	mg/L	≤10 mg/l	Normal

Source: Field survey on December 22, 2020, *National Environmental Quality (Emission) Guidelines (2015)
NG= No Guideline, ND= Not Detected, LOD= Lower Limit of Detection

4.6.5.4. Water Quality Analysis for 2nd Time Measurement

4.6.5.4.1 Field Survey

On November 25, 2025, water sample collection activities were conducted, and both surface water and wastewater samples were collected within the project area. Two sampling points were located near the project site 16° 49' 37.31" N and 96° 9' 19.68" E for surface water (Gyophyu reservoir) within the Project Phase 1 compound and 16° 49' 33.12" N and 96° 9' 20.04" E for wastewater. The location of all water sampling stations are shown in Figure 4-33.

When commencing the construction phase, water will be drawn from the Gyophyu Reservoir. For this purpose, a sample was taken near the project site to determine whether the water quality was suitable or not for construction and general usages. The construction process has not started yet, for this reason fresh construction wastewater cannot be available. Alternatively, wastewater from the existing buildings (from adjacent residential apartments and commercial areas) which is next to the project boundry. Wastewater samples are being taken to ensure that neighbouring wastewater does not enter into the construction effluent, which is the primary objective of the sampling and final discharge point is municipal drain channel.

Collecting Surface Water Sample

Collecting Wastewater Sample

Figure 4-34 Water Samples Collection (2nd Time Water Quality Analysis)

4.6.5.4.2 Result

The analyzed water samples are compared to the legislated national guidelines based on the types of water. As an example, surface water is tested for various construction works, and the result is compared with the National Surface Water Quality Standards in Myanmar (2024) and National Drinking Water Standards (2019). According to the comparison, the individual parameters are align with both Standard Guidelines.

Both of the water samples are complied with the National Environmental Quality (Emission) Guidelines (2015). The water results are described in Table 4-50 and Table 4-51. Laboratory test results are mentioned in Appendix E-1 and E-2.

Table 4-50 Surface Water (Gyophyu) Quality Result, Tested by ALARM Ecological Laboratory

No.	Parameters	Units	Results	*NSWQSD (2024), Class IV	*NDWQSM (2019)	Remark
1.	pH	S.U	7.3	5-9	6.5-8.5	Within the limit
2.	BOD	mg/L	12	25	-	
3.	COD	mg/L	34	50	-	
4.	TSS	mg/L	<10	100	-	
5.	DO	mg/L	5.69	>3	-	
6.	Lead (Pb)	mg/L	ND	0.01	0.01	-
7.	Ammonium-Nitrogen (NH_4^+-N)	mg/L	0.54	0.8	-	Within the limit
8.	Oil and Grease	mg/L	4	-	-	-

Source: Field survey on November 25, 2025
*National Surface Water Quality Standards in Myanmar (2024)
*National Drinking Water Quality Standards (NDWQS), 2019

Table 4-51 Wastewater Quality Result, Tested by ALARM Ecological Laboratory

No.	Parameters	Results of Wastewater	Units	NEQEG* (2015)	Remarks
1.	pH	7.3	S.U.[a]	6.0-9.0	Normal
2.	BOD	26	mg/L	50mg/L	
3.	COD	64	mg/L	250mg/L	
4.	TDS	265	mg/L	1,000	
5.	TSS	21	mg/L	50mg/L	
6.	Chloride	36	mg/L	-	-
7.	DO	2.27	mg/L	-	
8.	Sulfate	12	mg/L	-	
9.	Phosphate	4.318	mg/L	-	
10.	Oil and Grease	6	mg/L	10 mg/L	Normal
11.	Lead	ND	mg/L	≤0.001	-
12.	Copper	0.17	mg/L	0.5	Normal
13.	Mercury	0.006	mg/L	0.01	
14.	Chromium (VI)	0.029	mg/L	0.1	Above
15.	Total Nitrogen	6.15	mg/L	<10 mg/L	Normal

Source: Field survey on November 25, 2025, *National Environmental Quality (Emission) Guidelines (2015)

4.6.6. Traffic Counting

The traffic conditions were analyzed to establish as a baseline data. Traffic counting were carried out at three stations within the study area on 26th August, 2020 (week day) and 5th September 2020 (weekend) for TC1, TC2 and 22th January 2021 (week day) and 24th January 2021(weekend) for TC3, from 7:00 am to 7:00 pm.

The second time traffic survey was performed over a total of 4 days during weekdays and weekends.The survey was started in August 1, 2025, and the duration was the same as the first survey.

The details of three traffic counting (TC) stations are shown in Table 4-52. The locations of these three TC stations are described in Table 4-52, Figure 4-35, Figure 4-36 and Figure 4-37. The detail of traffic counting for week day and weekend are shown in Appendix F-1 and F-2.

Table 4-52 Detail of 3 TC Stations

No.	Station	Location	Coordinates	Measurement Date	
				First Measurement	Second Measurement
1.	TC 1 (A)	Industrial (1) Road – Kabaraye Pagoda Road	16°49'39.54"N 96° 9'23.80"E	**Week day -** 26th August, 2020 **Weekend -** 5th September, 2020	Restricted Area
2.	TC 1 (B)	Kabaraye Pagoda Road – Industrial (1) Road	16°49'38.50"N 96° 9'23.82"E	**Week day -** 26th August, 2020 **Weekend -** 5th September, 2020	
3.	TC 2 (A)	Kabaraye Pagoda Road – Down Town	16°49'38.93"N 96° 9'15.34"E	**Week day** 26th August, 2020 **Weekend** 5th September, 2020	**Week day** 18th August, 2025 **Weekend** 23th August, 2025
4.	TC 2 (B)	Down Town – Kabaraye Pagoda Road	16°49'39.04"N 96° 9'16.18"E	**Week day** 26th August, 2020 **Weekend** 5th September, 2020	**Week day** 18th August, 2025 **Weekend** 23th August, 2025
5.	TC 3 (A)	Yan Shin Street – Industrial (1) Road	16°49'44.80"N 96° 9'36.27"E	**Week day** 22th January, 2021 **Weekend** 24th January, 2021	**Week day** 1st August, 2025 **Weekend** 2nd August, 2025
6.	TC 3 (B)	Industrial (1) Road – Yan Shin Street	16°49'44.19"N 96° 9'36.39"E	**Week day** 22th January, 2021 **Weekend** 24th January, 2021	**Week day** 1st August, 2025 **Weekend** 2nd August, 2025

Note: Due to temporay road closure in Industrial (1) Road, the public traffic is a short-term restricted along TC-1 for second measurement in 2025.

Figure 4-35 Location Map of Traffic Counting for First Time

Figure 4-36 Location Map of Traffic Counting for Second Time

TC1

First Time Counting	Second Time Counting

TC2

TC3

Figure 4-37 Traffic Survey Collection Activities

4.6.6.1. Methodology and Approach

Traffic counting was done both manually by five surveyors and by using digital video cameras during 7:00 am to 7:00 pm for weekday and weekend at 3 stations. During the survey, the number and types of vehicles passing the stations were recorded. The traffic counting data were used to calculate the V/C ratios.

Traffic condition is normally assessed in terms of road capacity relative to traffic volume. The V/C ratio is commonly used to consider as a baseline traffic flow condition and will be further utilized to evaluate the consequences of the impact of the project on local transportation.

The V/C ratios is calculated as per following procedures:

(1) Convert the number of vehicles from observation to Passenger car Unit (PCU) by using Passenger Car Equivalents (PCD) factors specified for each type of vehicles as described in Table 4-53. This is used as "Traffic Volume" or "V"

(2) Choose an applicable carrying capacity of "C" for the road (as in Table 4-54).

(3) V/C ratio can be calculated using the following formula.

$$V/C = \frac{\text{Traffic Volume}}{\text{Carrying Capacity of Respective Road}}$$

V/C ratio can be used to compare with the values defined by the Department of Highways, Thailand as shown in Table 4-55 for indication of current traffic condition.

Table 4-53 Passenger Car Equivalents Factor (PCD)

No.	Types of Vehicles	Passenger Car Equivalents Factor (PCD)
1.	Bicycle/Tricycle	0.20
2.	Motorcycle	0.33
3.	Motor-tricycle	1.00
4.	Passenger Car/Taxi	1.00
5.	Light Truck	1.00
6.	Light Bus	1.50
7.	Medium Bus	1.50
8.	Medium Truck	2.10
9.	Heavy Bus	2.10
10.	Heavy Truck	2.50

Source: Department of Highways, Thailand

Table 4-54 Design Service Volume

No.	Types of Carriageway	Total Design Service Volumes for Different Categories of Urban Roads		
		Arterial*	Sub-Arterial**	Collector***
1.	2-Lane (One way)	2,400	1,900	1,400
2.	2-Lane (Two way)	1,500	1,200	900
3.	3-Lane (One way)	3,600	2,900	2,200
4.	4-Lane Undivided (Two way)	3,000	2,400	1,800
5.	4-Lane Divided (Two way)	3,600	2,900	-
6.	6-Lane Undivided (Two way)	4,800	3,800	-
7.	6-Lane Divided (Two way)	5,400	4,300	-
8.	8-Lane Divided (Two way)	7,200	-	-

* No frontage access, no standing vehicles and very little cross traffic.

** Frontage development, side roads, bus stops, no standing vehicles, waiting restrictions

*** Roads with free frontage access, parked vehicles and cross traffic

Source: IRC 106:1990

Table 4-55 Level of Service

Level of Service (LOS)	Volume/Capacity Ratio (V/C)	Nature of flow
A	<0.30	Free Flow
B	0.30-0.50	Reasonably free flow
C	0.50-0.70	Stable flow
D	0.70-0.90	Approaching unstable flow
E	1.00	Unstable flow
F	>1.00	Forced flow

Source: Gajjar R., and Mohandas D. (2016)

4.6.6.2. Results

The results of traffic counting are presented in Table 4-56 and Table 4-57. Based on the data from Department of Highway, Thailand, there were 10 categories of vehicles such as (i) bicycle/tricycle, (ii) motorcycle, (iii) motor-tricycle, (iv) passenger car/taxi, (v) light truck, (vi) light bus, (vii) medium bus, (viii) medium truck, (ix) heavy bus and (x) heavy truck. The survey form is shown in Appendix (F-1 and F-2).

4.6.6.2.1 TC-1

Table 4-56 shows the traffic condition of Kabaraye Pagoda road near the Inya Lake on August 2020 and on August 2025. In contrast to 2020, traffic volume of working hour is gradually increased in 2025 and the average V/C ratio at that period was 0.83 for weekday and 0.79 for weekend, showing the status of approaching to unstable flow traffic condition. The Passenger car and Taxi are the majority of vehicles in the study area of TC-1. The accelerating of economic growth and private vehicle ownership in Yangon city will significantly increase the traffic volume in main transporting roads, leading to raising the motorization, traffic congestion and travel time.

Table 4-56 Existing Traffic Counting Condition near Proposed Project Site

TC-2				
Description	First Survey Period		Second Survey Period	
	Weekday	Weekend	Weekday	Weekend
Traffic volume: 12 hr of working hour (PCU/hour)	4,384.88	3,374.38	4,473.73	4,275.50
Carrying capacity (C) (PCU/hour)	5,400	5,400	5400	5400
Average V/C ratio	0.81	0.62	0.83	0.79
Traffic condition	Approaching unstable flow (D)	Stable Flow (C)	Approaching unstable flow (D)	Approaching unstable flow (D)

Source: Traffic survey by Survey Team in 2020 and 2025

4.6.6.2.2 TC-2

shows the traffic condition of Yanshin road in front of Yanshin market on January 2021 and on August 2025. According to the survey results, the traffic volume in 2025 is relatively higher than in 2021 with 1,955.97 PCU/ hour for weekday and 1,867.99 PCU/hour for weekend. The more significant transportation vehicles are passenger cars (taxi) and light truck are followed by. The traffic condition at study area of TC-2 are the reasonably free flow in 2021 and the stable flow in 2025.

Table 4-57 Existing Traffic Counting Condition on Yan Shin Street

TC-2				
Description	**First Survey Period**		**Second Survey Period**	
	Weekday	**Weekend**	**Weekday**	**Weekend**
Traffic volume: 12 hr of working hour (PCU/hour)	1,541.54	1,247.89	1,955.97	1,867.99
Carrying capacity (C) (PCU/hour)	3,600	3,600	3,600	3,600
Average V/C ratio	0.43	0.35	0.54	0.52
Traffic condition	Reasonably free flow (B)		Stable Flow (C)	

Source: Traffic survey by Survey Team in 2020 and 2025

4.7. BIOLOGICAL CHARACTERISTICS

Hoang Anh Gia Lai Myanmar Project is located No.192, Kabar Aye Pagoda Road, Bahan Township, in a densely developed urban area near the Innyar Lake, biodiversity in the immediate surroundings is limited. The project site lies within a heavily built-up zone characterized by residential, commercial, and recreational infrastructure, leaving minimal space for natural habitats. There are no forested areas, wetlands, or designated wildlife habitats within or near the project boundary. No rare or ecologically significant flora and fauna have been identified in the vicinity. The majority of the area surrounding the project consists of urban development and landscaped green spaces such as sports grounds and ornamental trees.

Wildlife presence is extremely low due to human activity and urbanization. Common plant species observed in the area include ornamental and shade trees such as Padauk, Kokko, Ohn and Thayet, while the presence of native wildlife is negligible.

4.7.1. Biodiversity Study Area

The Biodiversity observation points are shown in Figure 4-38. The coordinate of sampling points is described in the Table 4-58.

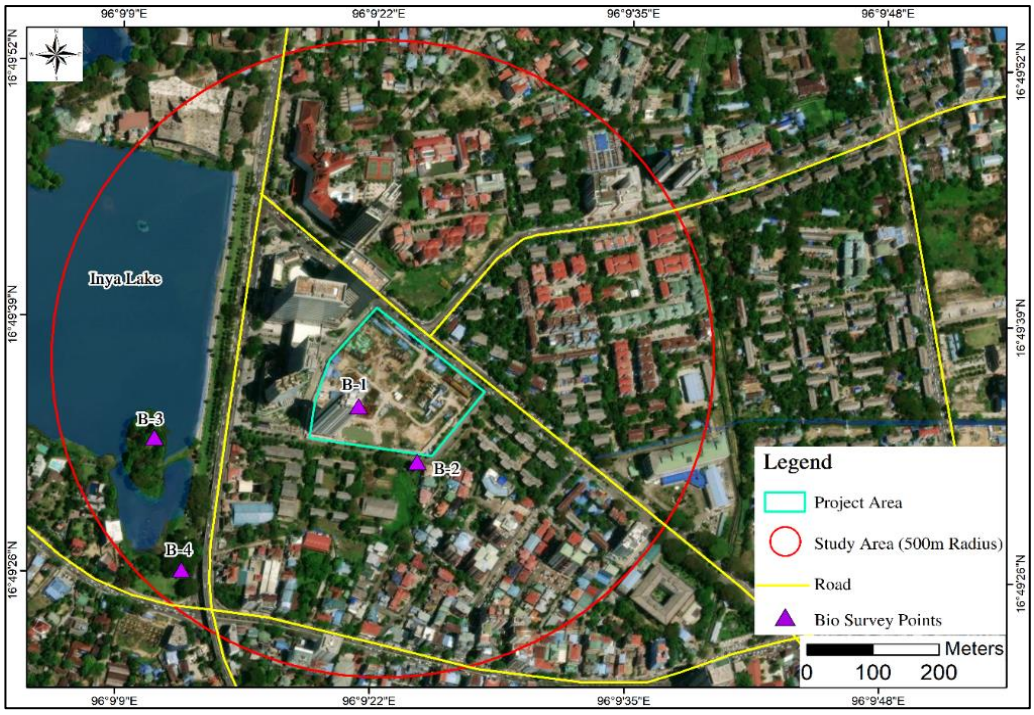


Figure 4-38 Location Map of Biodiversity Survey Areas

Table 4-58 Coordinate Points of Sampling Area

Name of sampling points	Coordinate locations	
	Latitude	Longitude
Bio-1	16.826272°	96.156007°
Bio-2	16.825495°	96.156849°
Bio-3	16.825793°	96.153115°
Bio-4	16.823932°	96.153524°

4.7.2. Flora Survey

A floral survey is a systematic assessment and documentation of the plant species present within a specific area. In the context of the project, the floral survey involves identifying and recording plant species found within and around the project site, including trees, shrubs, herbs, and grasses. The purpose of the survey is to evaluate the existing vegetation, determine the presence of any ecologically significant or protected plant species, and assess the overall biodiversity of the area. The survey helps determine the environmental baseline and guides any necessary mitigation or conservation measures related to vegetation within the project's footprint.

4.7.2.1. Methods for Flora Survey

For the flora survey at the project site, methods would include a detailed site walkthrough and visual inspection to document the plant species present within the project boundaries and surrounding areas. The survey would focus on identifying ornamental and commonly occurring urban trees and vegetation, particularly those typical of the township.

Given that the project site is situated in a highly urbanized area without any forested regions, wetlands, or designated wildlife zones, the survey would primarily aim to

assess the landscaped vegetation and any green areas around the buildings, roads, and open spaces. The objective is to determine the existing floral conditions and evaluate any potential impacts the project may have on the local vegetation, although no ecologically sensitive or rare plant species are expected in this setting.

4.7.2.2. Result of Flora Survey

Flora surveys were conducted to obtain an understanding of the diversity of flora taxa groups. A total of 31 flora species were identified during the survey. (14) species of least concern, (1) Data Deficient, (1) Endangered and (15) species of Not Evaluated on the IUCN Red List.

Pterocarpus macrocarpus or Burma padauk (Endangered) is a species of tree in the family Fabaceae. It is native to the seasonal tropical forests of southeastern Asia in Myanmar, Laos, Cambodia, Thailand and Vietnam. It has been naturalized in India and the Caribbean.

Pterocarpus macrocarpus is a medium-sized tree growing to 10–30 m (rarely to 39 m) tall, with a trunk up to 1.7 m diameter it is deciduous in the dry season. The bark is flaky, grey-brown if cut, it secretes a red gum. The leaves are 200–350 mm long, pinnate, with 9–11 leaflets. The flowers are yellow, produced in racemes 50–90 mm long. The fruit is a pod surrounded by a round wing 45–70 mm diameter, containing two or three seeds.

The wood is durable and resistant to termites it is important, used for furniture, construction timber, cart wheels, tool handles, and posts though not a true rosewood it is sometimes traded as such. The seasonal padauk flowers bloom annually around Thingyan (April) and is considered one of the national symbols of Myanmar (formerly Burma).

Table 4-59 List of Plant Species Recorded in Survey Area

No.	Family Name	Scientific Name	Common Name	Habitat	IUCN
1.	Fabaceae	*Pterocarpus macrocarpus*	Padauk	T	EN
2.	Mimosaceae	*Albizia lebbekoides*	Kokko	T	LC
3.	Arecaceae	*Cocos nucifera*	Ohn	T	NE
4.	Anacardiaceae	*Mangifera indica*	Thayet	T	DD
5.	Annonaceae	*Monoon longifolium*	Arthaw-ka, Lan-tama	T	LC
6.	Myrtaceae	*Psidium guajava*	Malaka	ST	LC
7.	Moraceae	*Ficus glomerata*	Thapan	T	NE
8.	Moraceae	*Ficus obtusifolia*	Nyaung-gyat	T	LC
9.	Rhamnaceae	*Ziziphus jujuba*	Zi	T	LC
10.	Myrtaceae	*Syzygium mytifolium*	Thabye	ST	NE
11.	Mimosaceae	*Acacia auriculiformis*	Malaysia-padauk	ST	LC
12.	Bignoniaceae	*Oroxylum indicum*	Kyaung-sha	T	NE

No.	Family Name	Scientific Name	Common Name	Habitat	IUCN
13.	Fabaceae	*Delonix regia*	Seinban	T	LC
14.	Amaranthaceae	*Alternanthera sessilis*	Pazun-sar	H	LC
15.	Rubiaceae	*Ixora coccinea*	Ponna-yeik	S	NE
16.	Asteraceae	*Chromolaena odorata*	Bizat	S	NE
17.	Malvaceae	*Urena lobata*	Kat-sine	S	LC
18.	Caesalpiniaceae	*Bauhinia acuminata*	Swe-daw	ST	LC
19.	Convolvulaceae	*Ipomoea turbinate*	Kazun-/ nwe	Cr	NE
20.	Asteraceae	*Sphagneticola calendulaceae*	Nay-kyar-gale	H	NE
21.	Euphorbiaceae	*Bridelia retusa*	Seik-chi	T	LC
22.	Mimosaceae	*Acacia pruinescens*	Kinmum-gyin	Cl/Cr	NE
23.	Vitaceae	*Cayratia trifolia*	Taw-sabyit	Cl/Cr	NE
24.	Caesalpiniaceae	*Cassia angustifolia*	Pwegaing	S	NE
25.	Fabaceae	*Tadehagi triquetrum*	Lauk-thay	S	LC
26.	Combretaceae	*Terminalia catappa*	Banda	T	LC
27.	Moringaceae	*Moringa aleifera*	Dantalon	T	NE
28.	Passifloraceae	*Adenia cardiophylla*	Kinmon	Cr	NE
29.	Convolvulaceae	*Ipomoea batatas*	Kazun	Cl/Cr	NE
30.	Mimosaceae	*Mimosa pudica*	Htikayon	H	LC
31.	Solanaceae	*Solanum indicum*	Khayan-kazaw	S	NE

T = Tree, ST = Small Tree, S = Shrub. H = Herb, Cl = Climber, B = Bamboo
G = Grass
NE = Not Evaluated, LC = Least Concerned, NT = Near Threatened, EN= Endangered

4.7.3. Fauna Survey

A fauna survey is a systematic investigation aimed at identifying and recording the animal species (including mammals, birds, reptiles, amphibians, and insects) present within a defined area. In the context of the project, the fauna survey focuses on assessing the presence or absence of wildlife in and around the project site, which is located in a densely populated urban setting with limited natural habitat.

Due to the site's highly developed surroundings—consisting mainly of buildings, roads, and artificial landscapes—natural wildlife is scarce or absent. The survey is therefore intended to confirm the lack of significant faunal presence and to ensure that no protected

or sensitive animal species inhabit the project area. Observations may be limited to common urban species such as birds, insects, or small mammals adapted to city environments, with no expectation of ecologically important or endangered fauna.

4.7.3.1. Methods of Fauna Survey

For the fauna survey at the project site, methods would include a site walkthrough to observe any animal species present, particularly focusing on common urban species found in the developed area. As the project site is located in a densely populated and built-up zone without forest cover, wetlands, or designated wildlife habitats, no ecologically significant or rare fauna are expected.

The survey would primarily involve visual observations during daytime and early morning hours, along with the identification of any tracks, droppings, or other animal signs. Camera traps or live traps could be selectively installed in green patches or near landscaped areas to monitor potential nocturnal or hidden wildlife activity. Photographic documentation would support the record of any notable fauna observed, though species presence is expected to be minimal due to the urban environment.

4.7.3.2. Result of Fauna Survey

The wildlife groups of the survey area consist of 5 groups of animals: mammals, birds, insects, Herpet and Fish. Fauna species habitat was found in small pools at the lower elevation, paddy field and low plain and in potential hiding places such as among leaf litter, inside holes and under stones and logs within the study area.

4.7.3.2.1 Mammals

A total of 3 mammal species 2 family were recorded in survey sites, during the survey period. Base on globally threatened status of IUCN Red List, all species were least concerned (LC). There was no threatened species in survey area. All species were recorded by interviewed information from local people who live in this survey area. List of Damselfly (Order Odonata) Recorded from Project Area, mentioned in Table 4-60 and Figure 4-39.

Table 4-60 Mammal Species List Recorded around the Survey Area

No.	Family Name	Common Name	Scientific Name	IUCN	Observation
1.	Sciuridae	Phayre's Squirrel	Callosciurus phayrei	LC	Observed
2.	Muridae	House Rat	Rattus rattus	LC	Interview
3.	Muridae	Greater Bandicoot Rat	Bandicota indica	LC	Interview

LC – Least concerned

Phayre's Squirrel (Callosciurus phayrei)

Figure 4-39 Photo of Mammal species recorded in survey areas

4.7.3.2.2 Herpetology

A total of 7 species 5 families were recorded in survey sites during the survey period. Base on globally threatened status of IUCN Red List, there was no threatened species and no endangered species in this area. All species were recorded by interviewed information from local people who live in this survey area, in Table 4-61 and Figure 4-40.

Table 4-61 Herpet Species List Recorded around the Survey Area

No.	Family Name	Common Name	Scientific Name	Observation	IUCN
Snake					
1.	Colubridae	Oriental Rat Snake	*Ptyas mucosa*	Interview	LC
2.	Elapidae	Monocled Cobra	*Nija kaouthia*	Interview	LC
3.	Colubridae	Chequered Keelback Water	*Xenocbrophis piscator*	Interview	LC
Lizard					
4.	Agamidae	Blue Forest Lizard	*Calotes mystaceus*	Observed	Not Evaluated
5.	Agamidae	Oriental Garden Lizard	*Calotes versicolor*	Observed	LC
Skink					
6.	Scincidae	Common Sun Skink	*Eutropis multifasciata*	Observed	Not Evaluated
Gecko					
7.	Gekkonidae	Common House Gecko	*Hemidactylus frenatus*	Observed	Not Evaluated

NE-Not Evaluated
LC-Least concerned

Oriental Garden Lizard *(Calotes versicolor)*	**Blue Forest Lizard *(Calotes versicolor)***

Figure 4-40 Photo of Herpet species recorded in all survey areas

4.7.3.2.3 Butterfly

A total of 9 species with 5 families were recorded. The family (4) species of Nymphalidae were found dominant and (2) species of Pieridae and (1) species of Lycaenidae, Hesperiidae and Riodinidae. According to the IUCN Red List of (2025-1), all species were Not Evaluated in this project, in Table 4-62 and Figure 4-41.

Table 4-62 Butterfly Species List in Survey Area

No.	Family Name	Common Name	Scientific Name	Observation	IUCN
1.	Pieridae	Common Grass Yellow	*Eurama hecabe*	Observed	NE
2.	Pieridae	Great Orange Tip	*Hebomoia galucippe*	Observed	NE
3.	Lycaenidae	Common Cerulean	*Jamides celeno*	Observed	NE
4.	Nymphalidae	Common Crow	*Euploea core*	Observed	NE
5.	Nymphalidae	Grey Pansy	*Junonia atlites*	Observed	LC
6.	Nymphalidae	Grey Count	*Tanaecia lepidea*	Observed	NE
7.	Nymphalidae	Common Sailer	*Neptis hylas*	Observed	NE
8.	Hesperiidae	Grizzled Skipper	*Pyrgus malvae*	Observed	NE
9.	Riodinidae	Plum Judy	*Abisara echerius*	Observed	NE

NE=Not Evaluated

Great Orange Tip (*Hebomoia galucippe*)

Grey Pansy (*Junonia atlites)*

Common Crow (*Euploea core*)

Grizzled Skipper (*Pyrgus malvae*)

Figure 4-41 Photo of Butterfly Species Recorded in Survey Area

4.7.3.2.4 Birds

A total of 21 bird species recorded in the proposed project area. The two bird species were also observed Red-vented Bulbu (Pyconotus cafer) and Red-whiskered Bulbul (Pycnonotus jocosus) were also noted as forest birds. Especially, one bird species is Myanmar Endemic species Ayeyarwady Bulbul (Pycnonotidae) recorded in the project area. The Ayeyarwady bulbul (Pycnonotus blanfordi) is found in near the project site especially in the human habitat. This species is Least Concern (LC) in IUCN Red List (2025-1) because of they are many of population in Myanmar, in Table 4-63 and Figure 4-42.

Table 4-63 Birds Species List in Survey Area

No.	Family Name	Common Name	Scientific Name	IUCN
1.	Corvidae	House Crow	*Corvus splendens*	LC
2.	Corvidae	Large-billed Crow	Corvus macrorhynchos	LC
3.	Passeridae	House Sparrow	Passer domesticus	LC
4.	Passeridae	Eurasian Tree-sparrow	Passer montanus	LC
5.	Columbidae	Spotted Dove	Streptopelia chinensis	LC
6.	Columbidae	Red collared Dove	Streptopelia tranquebarica	LC

No.	Family Name	Common Name	Scientific Name	IUCN
7.	Columbidae	Rock Pigeon	Columba livia	LC
8.	Accipitridae	Black kite	Milvus migrans govinda	LC
9.	Cuculidae	Asian Koel	Eudynamys scolopacea	LC
10.	Meropidae	Little green bee-eater	Merops orientalis	LC
11.	Oriolidae	Black- naped Oriole	Oriolus chinensis	LC
12.	Apodidae	Asian Palm-Swift	Cypsiurus balasiensis	LC
13.	Pycnonotidae	Red-vented Bulbul	Pyconotus cafer	LC
14.	Pycnonotidae	Red-whiskered Bulbul	Pycnonotus jocosus	LC
15.	Pycnonotidae	Ayeyarwady Bulbul	Pyconotus blanfordi	LC
16.	Sturnidae	Common Myna	Acridotheres tristis	LC
17.	Ardeidae	Chinese pond-heron	Ardecola bacchus	LC
18.	Ardeidae	Black-crowned night-heron	Nycticorax nycticorax	LC
19.	Jacanidae	Bronze-winged Jacana	Metopidius indicus	LC
20.	Ramphastidae	Coppersmith Barbet	Megalaima haemacephala	LC
21.	Dicruridae	Black Drongo	Dicrurus macrocercus	LC

LC-least concerned

House Crow (*Corvus splendens*)

Common Myna (*Acridotheres tristis*)

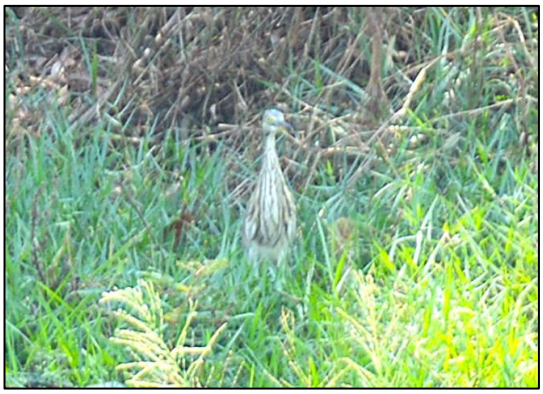
Coppersmith Barbet *(Megalaima haemacephala*	**Red-vented Bulbul *(Pyconotus cafer)***
	
Chinese pond-heron (*Ardecola bacchus*)	**Bronze-winged Jacana *(Metopidius indicus)***

Figure 4-42 Photo of Bird Species Recorded in Survey Area

4.7.4. Potential Impacts and Management Measures of the Project

4.7.4.1. Ecological Impacts

The existing biological environment primarily consists of urban landscaping and a few ornamental trees, including common species such as Padauk, Kokko, Ohn and Thayet. While these trees offer some ecological value, they do not support rich biodiversity due to the fragmented and artificial nature of the surrounding environment.

During the construction phase, the removal or disturbance of trees and green patches could result in the temporary loss of shade, minor habitat features, and local temperature regulation. This could disrupt common urban fauna such as birds, squirrels, and insects that rely on the limited greenery for nesting or shelter. Additionally, increased noise, vibration, and human activity may lead to the displacement of these species. Although the fauna present is not considered ecologically sensitive or rare, even minor disruptions may further reduce the already limited biodiversity in the area.

During the operation phase of the project, increased human activity, vehicular traffic, artificial lighting, and noise may continue to disturb the limited urban fauna that exists in the area. Constant foot traffic and commercial activity could discourage birds and small animals from inhabiting the landscaped zones. Additionally, the maintenance of landscaped areas using chemicals such as pesticides or herbicides could negatively affect insect populations, including pollinators. While the fauna present is not ecologically sensitive, the

continuous urban pressure may prevent natural recolonization and reduce opportunities for minor biodiversity enhancement within the site.

During the decommissioning phase, activities such as demolition, removal of infrastructure, and land clearance may cause renewed disturbance to any established vegetation and minor habitats that may have developed during the operational period. The sudden increase in dust, debris, and noise could temporarily displace any remaining urban species. Trees or shrubs planted for landscaping may be removed or damaged if not properly managed during dismantling. Though the site is not home to rare or endangered species, the destruction of established green areas may contribute to further degradation of the already limited biological value of the site.

In the long term, without proper mitigation, the project may contribute to urban heat island effects and further fragmentation of green infrastructure. However, these potential impacts can be addressed through measures such as preserving existing trees where feasible, incorporating native or pollinator-friendly plant species into the landscaping plan, and creating small-scale green spaces such as rooftop or vertical gardens.

4.7.4.2. Mitigation measures

The development should adopt environmentally responsible land-use practices to minimize the impact on flora and fauna caused by the construction of the AMSS Kan Tharyar Project. Careful planning and use of natural resources are essential to preserving the site's limited biological value. Efforts should be made to retain existing trees and green patches where feasible. Native plant species including shade trees and shrubs common to the area should be replanted in landscaped zones to restore greenery and support minor wildlife habitats.

These landscaped areas can serve as microhabitats for urban birds, insects, and small animals. Using vertical gardens, green roofs, or plant-covered facades can further enhance urban biodiversity while contributing to temperature regulation and improved air quality. The fencing plants and dense woody vegetation should be introduced in areas surrounding the project to mitigate the impact of habitat degradation. This will help provide cover and refuge for local fauna and contribute to visual greenery in the urban setting. These measures support the ecological restoration of the site, help reduce environmental degradation, and create a more resilient and sustainable urban environment for the long term.

4.7.5. General Discussion

The project site is located in a highly urbanized area of Yangon, near the Innyar Lake, a zone surrounded by existing commercial, recreational, and residential developments. The project site is primarily composed of previously developed land with limited remaining natural features. As such, the ecological baseline of the area is low, and there are no designated forests, wetlands, or protected wildlife habitats within or near the project boundary. However, the site still contains ornamental trees and green patches that contribute to the local urban landscape and provide minimal habitat value to common city-dwelling species.

Despite the limited ecological richness of the area, construction activities may still result in localized impacts, such as the removal of existing trees, soil disturbance, dust

generation, and noise. These disturbances can affect small urban fauna such as birds and insects, as well as alter microclimatic conditions by reducing green cover. During the operational phase, increased human activity, lighting, and infrastructure use could further discourage wildlife presence and lead to long-term reductions in biodiversity if mitigation measures are not implemented. Therefore, the project must adopt best environmental practices to minimize these impacts across all phases of development.

To ensure environmental sustainability, the project should integrate green infrastructure solutions such as tree preservation, native plant landscaping, green roofs, and vertical gardens. These strategies can help offset the ecological loss, enhance the visual and environmental quality of the development, and contribute positively to the urban ecosystem. Additionally, implementing proper environmental management during construction and decommissioning phases will help safeguard any remaining biological features and support urban resilience. The Project, while located in a heavily built-up area, still has the opportunity to contribute to greener and more sustainable city development through thoughtful design and ecological considerations.

CHAPTER 5
POTENTIAL ENVIRONMENTAL IMPACT AND MITIGATION MEASUREMENT

5.1. INTRODUCTION TO ENVIRONMENTAL IMPACT ASSESSMENT

This chapter provides an assessment of potential impacts which may be either positive or negative arising from the project. According to EIA Procedure (2015) by MOECAF, IEE reports requires to include impact and risk assessment and mitigation measures covering each project phase such as construction, operation and decommissioning phases.

The methodological approach used for the project impact assessment is adapted from the impact assessment methods recommended by the Canadian Environmental Assessment Agency (1990), by the World Bank (1991) and by the International Finance Corporation (Dec. 1998).

5.2. A CORE FRAMEWORK OF THE EIA MECHANISM

In this chapter, it involves several steps and processes to identify, predict and evaluate the environmental impact of the construction project. The process flow chart is mentioned in Figure 5-1.

5.2.1. Screening

The first step in the EIA process is to decide if the construction project requires EIA or not. It is an initial study to examine the benefits and adverse impacts or the qualitative and quantitative impacts of the proposed project. The environmental impact is predicted by evaluating the type, location of development and scale of the project. Screening can be performed using two main approaches, by using thresholds and by doing a case-to-case examination for the prescribed criteria.

5.2.2. Scope of EIA

In the scoping stage, the potential impacts of the construction project or development activities are determined and subsequently, the final list of parameters for the impact assessment is decided. These assessment parameters are generally based upon legislative requirements, international conferences, experience and expertise and public participation. The main objective at this stage is to determine the most important environmental issues from among a bunch of potential impacts of the proposed project along with all other alternatives.

In addition to this, the term environmental impact is now generally used to cover not only natural environment but also social environment or social impacts as well as occupational health and safety. This scope of environmental impacts is adopted from EIA procedure. Environmental impact means the probable effects or consequence on the natural and built environment, and people and communities of a proposed project or businesses or activities or undertaking. Impacts can be direct or indirect, cumulative, and positive or adverse or both. For purposes of this procedure, environmental impacts include

occupational, social, cultural, socio-economical, public and community health, and safety issues.

5.2.3. Baseline Environmental Condition (Data Collection)

The baseline data collection also cannot be computerized. Due to changes in site variations, climatic factor, local people and environmental conditions the computerized process is not appropiate but the data collected from site inspection and information collected from face-to-face meeting can be provided as input into the system for further processing and subsequent EIA decision.

5.2.4. Impact Assessment and Evaluation

A comparative study is done between the effects related to the implementation of the project and the effects related to abortion of the project to determine the environmental impacts. This stage is divided into two stages such as identification of Impacts and prediction of Impacts. Alternative solutions are worked out if there is any adverse impact on the environment due to the implementation of the project. If these impacts are inevitable then appropriate measures are taken to eliminate or counterbalance the adverse effects on biodiversity. If there is no solution to the concurrent problem, the option of not proceeding with the proposed project is also available. Since the impact duration is equally important, the evaluation can be done based on three-time ranges that are, Short term(3- 9 years), Medium term(10- 20 years) and Long term(more than 20 years).

5.2.5. Mitigation

Recommendations are provided in this step for the damaging effects on the environment revealed from the assessment of impacts, to mitigate the adverse impacts of the proposed construction project. Mitigation refers to the measure taken to reduce or remove the above assessed impacts, which can also help to portray the iterating behaviour of EIA. The mitigation measures can be preventive (by organising public awareness programmes), compensatory (to reduce potential reactions) and corrective (placing devices and installations).

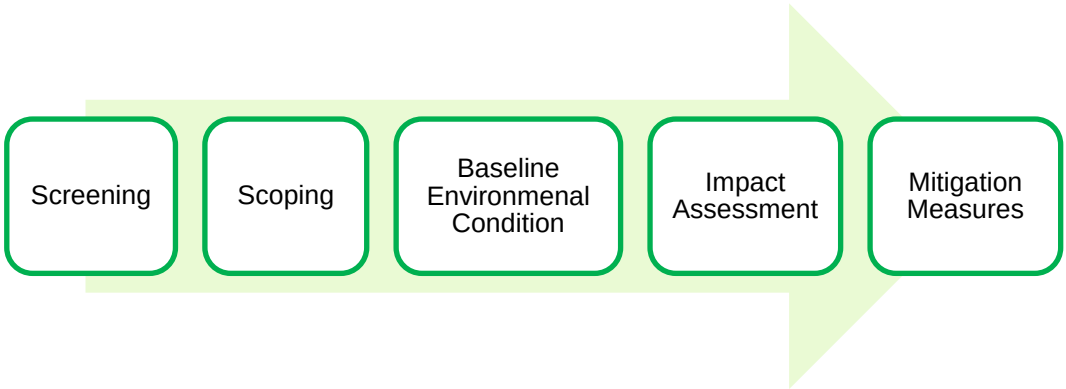


Figure 5-1 The Workflow Diagram of the EIA Stage

5.3. POTENTIAL IMPACTS ANALYSIS OF THE PROJECTS

The analysis is the identification or assessing of potential positive and negative impacts on the environment (physical, socio-economic, biodiversity, health, etc.) based on the project activities.The project implementation phases can be divided into three stages namely construction, operation and decommission for this reason the impacts will be assessed on each of the satge. Normally, construction and decommission phases might be take a year or less than to complete the activities therefore the impact might be existed in a short-term. The operation phase will be a long-term thus, both positive as well as negative impacts will have a long time.

According to National Environmental Policy Act (1969), an environmental impact analysis is generally conducted to assess the potential impact of a proposed project on the natural and social environment. All the project phases might have the same environmental and social criteria such as air pollution, noise and vibration qualities, water contamination and; solid wastes (general and hazardous), soil degradation linked with the ecosystem, occupational health and safety as well as cultural heritage. Although the themes of pollution may be the same, the adversities and the existance of the impacts will be different rely on the period of the project phases and the activities of the operation.

Project activities and requirements consume environmental resources and produce nuisances to the surrounding environment. They are the sources, or root causes of environmental impacts, if not adequately controlled or managed, certainly cause significant changes to the environmental components.

5.4. METHODOLOGY OF IMPACT ASSESSMENT

5.4.1. Methodology of Significant Impact Assessment

The project activities are considered as sources that are capable of changing one or more environmental or social components. The assessment of impacts from the project activities includes the identification of the potential significant environmental impacts of the project. The evaluation of significant impact assessment considers four major factors such as probability, magnitude, extent and duration of impacts on the environment with the consideration of potential positive or negative impact. Therefore, matrix of rapid environmental impact evaluation (REIM) is applied for the impact assessment.

5.4.1.1. The Importance of the Condition (A_1)

The existing state of an environmental or social factor that could be affected by a proposed project or action and its important lies in identifying which aspects of environmental are most vulnerable to change, allowing for a focus analysis of potential impacts and prioritizing mitigation strategies based on severity of potential damage to those conditions. The description of the A_1 scales can be noted as Table 5-1.

Table 5-1 Descritption of A_1 Scales

Criteria/Group	Category	Scale	Description
A	A_1	4	International importance
		3	National importance
		2	Outside (near) of local condition
		1	Local condition
		0	Not important

5.4.1.2. The Magnitude of Changing/ Effect (A_2)

A measure of the scale of benefit/ dis-benefit of an impact or a condition, can be categorized as Table 5-2.

Table 5-2 Description of A_2 Scales

Criteria/Group	Category	Scale	Description
A	A_2	+3	Major importance benefit/ Major positive benefit
		+2	Meaningful benefit of the quo status/ Significant improvement
		+1	Improvement in 'status quo'/ Benefit of the status quo
		0	No change/ 'Status quo'/Lack of change/ No influence
		-1	Negative change of 'status quo'/
		-2	Significant negative effect/ Significant negative changes
		-3	Major negative effect/ Major disadvantages or changes

5.4.2. Methodology of the Impact Probability

5.4.2.1. Permanence (B_1)

Represent as the duration of the impacts affected by the project implementation as Table 5-3.

Table 5-3 Description of B_1 Scales

Criteria/Group	Category	Scale	Description
B	B_1	1	No changes/ Not applicable
		2	Temporary
		3	Permanent

5.4.2.2. Reversibility (B_2)

Refers to a particular environmental impact caused by a project which can be reversed or restored to its original state after the project is completed. It can be classified as Table 5-4.

Table 5-4 Description of B_2 Scales

Criteria/Group	Category	Scale	Description
B	B_2	1	No changes/ Not applicable
		2	Reversible
		3	Irreversible

5.4.2.3. Cumulative (B_3)

Refers to the combined effect of multiple impacts from different projects or activities occurring over time, essentially meaning the total impact is greater than the sum of each individual impact when considered separately; it looks at how the impacts of one project add to the existing impacts from other projects in the same area, potentially leading to a more significant overall environmental or social effect, shown in Table 5-5.

Table 5-5 Description of B3 Scales

Criteria/Group	Category	Scale	Description
B	B_3	1	No changes/ Not applicable
		2	Non-cumulative/Unique/Single
		3	Cumulative/ Synergetic

5.4.3. Environmental Scores (ES)

Refers to a numerical rating assigned to a project or activity based on its potential environmental impacts. ES can be determined the multiplication of significant impact and probability of the impact, can be noted as follows. The scores can be altered into the description through the numerical classification to easily understand the impacts intensity or the types of impacts (positive or negative) which is grouping in Table 5-6.

Environmental Scores (ES) = Significant Impact (Group A) x Probability (Group B)

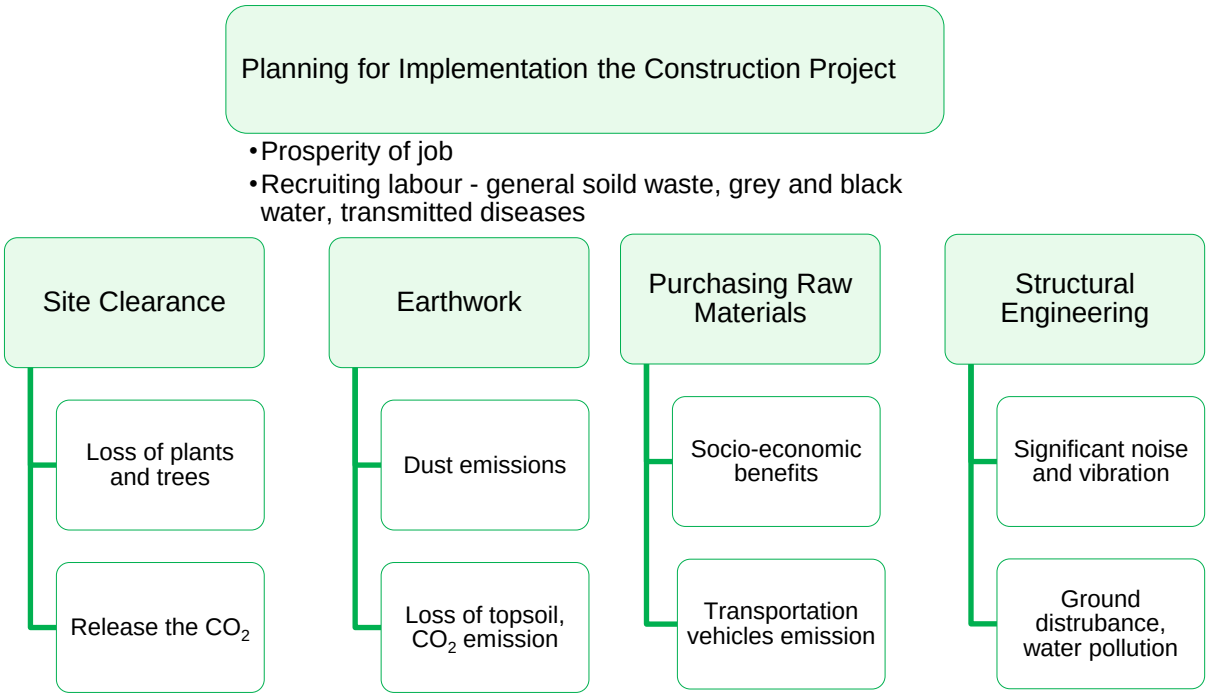
Table 5-6 The Conversion of the Environmental Scores in Categories

Environmental Score	Class	Class (Numerical)	Description of the Category
108 to 72	+E	+5	Major positive change/impact
36 to 71	+D	+4	Significant positive change/impact
19 to 35	+C	+3	Moderately positive impact

Environmental Score	Class	Class (Numerical)	Description of the Category
10 to 18	+B	+2	Less positive impact
1 to 9	+A	+1	Reduced positive impact
0	N	0	No alteration/changes
-1 to -9	-A	-1	Reduced negative impact
-10 to -18	-B	-2	Less negative impact
-19 to -35	-C	-3	Moderately negatively impact
-36 to -71	-D	-4	Significantly negative impact
-72 to -108	-E	-5	Extremely negative impact

5.5. POTENTIAL ENVIRONMENTAL, AND SOCIAL IMPACTS DURING CONSTRUCTION PHASE

The construction stage can produce a considerable amount of potential environmental related issues, but most of the impacts on the local community will be transient since the impacts will be occurred. Majority of the impacts created in construction phase will be transient in nature. The construction site mostly contributes the negative affect such as air pollution, noise and vibration intensity, water contamination, solid wastes (domestic and hazardous materials), soil degredation, and habitats loss. None of the cultural heritage structure is found on such area where the project location is existed thereby, the impact might be neglected. Among a wide range of negative measures, the livelihoods or benefit consequences may have on the communities. The activities and its potential impacts under the construction phase can be summarized as Figure 5-2.



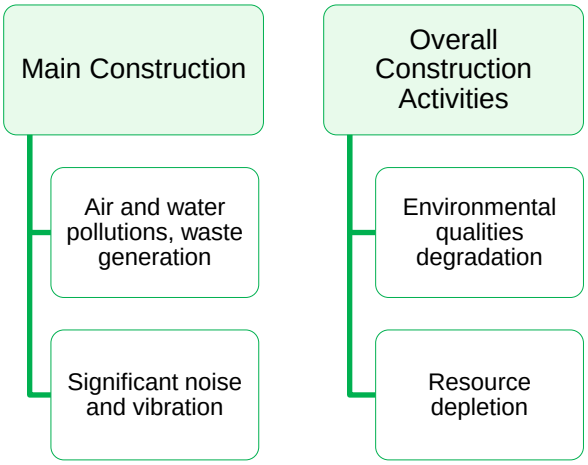


Figure 5-2 Impacts Summary of the Construction Phase

5.5.1. Air Quality

(a) Impact Assessment

The proposed project will construct different types of buildings such as residential buildings, service apartment, hotel, commercial and office building that will need substantial amount of construction materials. The initial stage of the construction phase is the site cleaning which makes a enough space for constructing a building. Thus, the action of removing plants and cutting trees is necessary as a result the stored carbon dioxide (CO_2) within the leaves, stems, roots, trunk, branches and even in the bark of the tree, is released into the atmosphere. Similarly, excavating the topsoil may emits CO_2 into the air and dust generation can be faced. CO_2 concentration is account for the largest share of green house gas (GHG) emission on the environment.

Disel emission at the construction site is a common scenario because of the using of heavy duty vehicles, road-building machines along with the stationary engines. The activity likes removing the topsoil can be done by the excavator as well as bullodozer such road-building machineries may produce nitrogen dioxide (NO_2), sulfur dioxide (SO_2), CO_2, particulate matters ($PM_{2.5}$ and PM_{10}). The toxic gases will be releasing from the heavy duty vehicles (concrete mixer and dump truck, etc.), vehicles on site, and diesel generator and so on. When operating equipment, those generate CO_2, NO_x, PMs, volatine organic compounds (VOCs), Carbon monoxide (CO) and methane (CH_4), benzene (C_6H_6), hydrocarbon (HC) and formaldehyde (CH_2O). Diesel exhaust particulate matter pollutants can include carbon, polycyclic aromatic hydrocarbons (PAHs), and metals.

Moreover, the diesel generator for emergency use can emit air pollutants (NO_x, SO_2, CO_2, PMs, HC, etc.) to the surrounding environment. Each of the gases can introduce the respiratory problem, cardiovascular diseases, kidney/liver damage, cancer, abnormal blood circulation, cataracts, and other serious health aligment. Among these fume gases, CH_4 is the significant GHG contributer than CO_2 which is the major source of the climate change. Almost all the gases mentioned above are negatively effect on the plant health for example, CO may hinder the plant growth and malfunction the metabolism of palnts. It can attack the overall heath situation of plants.

Cement dust and silica dust raise the concern at the construction site. Silica dusts can be released into the air when materials containing silica are disturbed by activities like grinding, cutting, or drilling, etc. Silica as a known carcinogen (IARC 1) which can cause

lung cancer from inhaling the dust and fibres. Although plant requisite silica for structural support and disease resistance, a high volume of the dust may distrupt the main function for plant thriving namely; photosynthesis and nutrient uptake.

(b) Mitigation Measures

- Avoid dusting raw or unprocessed materials, such as the cement, sand, lime is stored in the open air.
- Cement and pale grey must be stack in sealed type.
- Materials handling system and stockpiling of materials will be minimized exposure to wind (hold systematically at the specific area).
- The field where earthwork heaps should be chose reasonably and not be in principal windy direction, concrete mixer should fix in a shed, the cement and sand spilled by mixer should be often cleaned.
- When conveying sand and gravel or dust generating materials in the on and off-site, vehicles should cover with tarpaulin, then check to ensure the cover are properly in place.
- Fix fence in construction field and regular watering the every day to prevent generating floating dust.
- Install the water spingkler or spraying should be used as required specially in dry and windy periods.
- To mitigate air pollutants emission from the transportation vehicles, a regular maintenance is needed.
- In order to reduce fugitive dust emission from the civil work activities, spraying water and usage of safety nets at and around the construction areas are recommended.
- Instead of using pure diesel generators, retrofit emission devices or diesel fuel with lower sulfur content should be utilized in order to reduce emission of air pollutants from the diesel generators.

The above measures are taken, construction period has less impact on surrounding environmental air quality. On the other hand, the construction size may be varies from small to large, most of the construction period would be short-term (12 months to 24 months). For this reason, the neagative impacts could be under the control and management. As a consequence, the gas and dust emission might not be a remarkable issue to the environment.

5.5.2. Noise and Vibration

(a) Impact Assessment

The noise and vibration of the building operations are major issues during the construction periods. A single machine sound level is generally above 80 dB (A), which will take some influence on the environment. The noise volume of mechanical equipments vary from different stages during construction period. Using heavy machinery such as concrete mixer generates approximately 85 dB that noise level should be not exceeded 1-hour period by WHO. The operator may experience the consistence loud noise which has the high chance to face hearing impairment, besides noise threads are cumulative. Generator noise levels can range from 60 dB to over 100 dB, depending on the model and size of the generator. Intensive construction noise may enhance the hearing impairment and cause

high blood pressure, headache, heart diseases, stress and even affecting the well-beings of people in nearby communities.

The lack of regular maintenance the heavy machinery can be the source of vibration at the site. Vibrating machinery can create noise, cause safety problems and lead to degradation in plant working conditions. Rock blasting, deep pile foundation and soil compacting equipment are other drivers of the vibration. In spite of plant growing can occur at the low-level of vibration, the intense level of vibration may adversely effect on the plant development, individually the growth of root and nourishing system. Likewise, a lous noise reduces the seed dispersion rate which plays a vital role in plant reproduction, foraging patterns, perhaps metabolism malfunctions in plants.

Despite the fact that it seems to have the environmental impacts, the construction phase will be last a short time. Moreover, the activites have been set the exact timeline. It can be considered as the negative impact would not have much effected to the environment or local communities because of the project will implement the following mitigation actions.

(b) Mitigation Measures

- Build temporary sound barrier: the mechanical equipment that has relatively stationary position should set up in shed as much as possible and set up single-side sound barrier.
- Arrange the construction time reasonable: civil work generating high noise levels should be carried out only at daytime.
- Civil work that is necessary to be carried out at nighttime need to have proper noise control equipment or facilities.
- Consider/substitute alternative methods of construction to reduce noise, such as using drill piling instead of percussion piling.
- Dampers can effectively reduce the vibrations from heavy machinery and excavation activities. These devices absorb and dissipate vibration energy, protecting both the site and surrounding structures.
- Low-noise level generator should be selected in order to reduce impact from the diesel engine generators.

The proposed mitigation measures will be needed to be included as conditions in the construction contracts for implementation by the contractors.

5.5.3. Water Quality

(a) Impact Assessment

Wastewater can be produced throughout the whole construction process extending from piling and foundation activities to be continuing through the temporary labour camps. Dewatering water from the excavated area may contain a high volume of silt and sand accumulations. During excavation for foundation work, suspended particles from the soil can be carried by the surface runoff (especially in the heavy rain or flashflooding event). The volume of suspended solid will increase then the water become turbid. As a consequence, the water cannot trap or store oxygen that kind of environment might be difficult to survive for aquatic biota.

For the operational requirement, fuel need to retain on-site. Oil, fuel and chemical spill from the storage tank, vehicles and heavy machinery is another factor of water pollution. Diesel spillages spread very rapidly, killing fish as well as plant life and

invertebrates in streams and rivers, triggered with the groundwater pollution. When locals consume polluted water may suffer minor to major causes namely diarrhoea, cholera, dysentery, and adverse health problems.

Temporatory labour camps also discharge the blackwater and greywater. Blackwater in camp settings originating from toilets and urinals is highly concentrated with organic matter and pathogens, it is the most polluted type of wastewater. The primary pollutants in blackwater include Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), nitrogen (N), and phosphorus (P). Greywater in camp settings is all wastewater that does not contain human waste. It typically generates from sources like showers, hand basins, and kitchen sinks. High concentration of N and P can lead to eutrophication in water bodies, causing excessive algal growth, oxygen depletion, and harm to aquatic ecosystems, and so do BOD and COD.

(b) Mitigation Measures

- Must be install a silt fence to control the soil erosion, sand, silt, and sediments runoff into the nearby water body.
- Protect all surface water drains and watercourses with cut-off ditches or earth bunds. These should be at least 10 metres from the watercourse.
- The bunded area for chemical storage should be as far away as possible from surface waters, groundwater and surface water drains.
- If possible, put a roof over the bund and cover the sides that receive the most severe weather. By reducing the amount of contaminated rainwater in the bund.
- The volume of rainwater within any bunded area should never exceed 5% of the total volume of the bund. Accumulated rainwater and other liquid in the base of the bund will reduce its capacity and may need to be disposed of as hazardous/special waste.
- Wastewater should be kept in the sedimentation pond before discharging off-site. The characteristic of the pond must be involve with the slowing down the speed of water flow so that it has the sufficient time for deposition.
- The separate water drain channels have to be created depending on the type of wastewater discharge.
- Greywater can also be separated from blackwater and has a higher possibility for filtration and reuse onsite.
- Sewage must be collected into septic tanks and treated properly.
- Systemtic solid waste damp site has to be provided then dispose them with city municipal weekly so as not to infilterate the leachate into the groundwater.
- Wastewater from the project site and domestic wastewater from worker camps were treated by wastewater treatment plant which include Equalization tanks, Anoxic and Aeration Tanks. Regular monitoring of wastewater discharge system is recommended.

5.5.4. General Solid Waste

(a) Impact Assessment

Components of solid waste in construction can include sand, stone, bricks, tiles, ceramics, wood, glass, aluminium frame, plastic, metals, gypsum board, roofing, and mixed

construction waste. Plastic waste from the PVC, water plumbing, plastic sheet, and potable wall covering, plastic sheet as well. Glass materials include waste from glass windows or door panels, glass from sky lighting or glass shelves. Most of these materials when untreated or uncontaminated are non-hazardous but sometimes they may contain hazardous substances. Although they are less likely to have impact on the environment, they can block the water drainage channels, and minor accidents in the working areas. It can be noteded that the wastes may introduce the flash flood within the construction phase.

Sometimes pieces of bricks, and tiles wastes can also produce resulting from the changing the designs and mistakes in workmanship. Dining area and temporary accommodation sites are notably ocurred the leftovers, food scrapes, plastics, food containers, tissues and sanitation items from the toilets. A long-time storage of those wastes may be smelling to environment, may encourage the breeding the insects, fly and mouse which exacerbate the negative impacts on the surrounding areas and public health issues.

(b) Mitigation Measures

- The solid waste should be piled up on the fixed-point and regulated.
- Separate the trash in five categories: cement, soil, metal, wood and plastic, bricks and stemming.
- The recyclable waste should be recycled while the unrecyclable waste should be cleared and transported by city sanitation department for the treating.
- Solid waste from the removal of top soil and old structures and faulty construction activities will be disposed at a suitable landfill site in accordance with the approval of YCDC.
- Construction wastes should be classified and sorted out at sources for disposal. The disposal methods will depend on the types of wastes: direct reuse in the construction, sale as recycle materials, landfill for inert materials and specific treatment method for each type of hazardous materials.
- Non-hazardous wastes especially domestic wastes from construction workers such as plastic, garbage, glass and food waste should be separated and managed according to YCDC guidelines and regulation.

5.5.5. Hazardous Materials

(a) Impact Assessment

A certain amount of concrete waste also occurs during transportation, in which it may settle over a long period and cannot be used for construction activities. Washing and cleaning activities from the concrete batching truck produces concrete sludge. Very high alkalinity level and the potential for heavy metal concentration can be expected in the concrete sludge. pH represents a great influence on the chemical and biological processes for aquatic organisms communities. When fish exposing to changes in pH level, their functions may turn into unsual behaviour sometimes can be stressed, decreased reproduction, growth reduction, disease or even die. Extreme pH range (either very low or too high) can impede the photosynthesis, nourishing and growth of the aquatic plants.

Paint cans, paint removers, thinner, vanish removers, adhesive containers contribute the extremely risky to the public health via the environment. Electrical

appliances, fluorescent tubes, electric cables and wires are discharging the heavy metal to the environment. Others are able to evaporate with the higher chance to catch fire easily then have very flammable propertiy. Once it encroaches the environment, it destructures the entire ecosystem functioning.

However, the construction project team will manage solid wastes properly during construction stage in accordance with the approval of city municipal. Therefore, the potential negative impacts will be low since the solid wastes are treated by refuse compaction system during construction stage.

(b) Mitigation Measures

- Neutralizing the sludge with acids or other materials to reduce its pH and bind heavy metals, making it suitable for landfill disposal. If not, the sludge should be disposed with the city sanitation department's guideline.
- Using the sludge in other construction materials like road base, or as a soil stabilizer.
- Hazardous waste disposal in or off the construction site will be prohibited.
- Hazardous waste management systems include waste classification, separation, collection, storage, transfer and disposal in compliance with applicable regulations of the government, if any.
- Hazardous wastes should be disposed of at a designated site inside or outside the project area as appropriate.
- The method of disposal needs to follow the best international practices.

5.5.6. Soil Quality

(a) Impact Assessment

Soil disturbtance can occur during various phases of the project cycle. Physical and chemical characteristics of the soil are changed. Filling and grading are examples of activities that degrade soil quality, cause erosion, and harm the ecosystem.The highest levels of organic matter, biological activity, and plant nutrients; all these essential elements of healthy soil are found in the soil layer. The fertile topsoil layer is eliminated with the help of road building machines (excavaotrs, bulldozer and so on). While implementing the project, the seepage or leakage the fuel, oil and other chemicals onto the soil. Discharge the leachates from the temporary damp site. The actions create reduction the soil quality, compact the soil, lack of the microorganism, plasticity the soil, all of them lead to the low nutrient and infertile soil. In addition, the temporary solid waste disposal site can cause leakage of leachate to the surrounding soil at the project site.

(b) Mitigation Measures

- Limit site disturbance (defined as piling, tilling, scraping, storing, and removal of any and all soil) to 40 feet beyond the building perimeter.
- In addition, 5 feet beyond primary roadway curbs, walkways, and main utility branch trenches, 5 feet beyond tree driplines and the edges of site areas identified for protection.
- It should be 25 feet beyond pervious paving areas and stormwater management features that require additional staging areas in order to limit compaction in the constructed areas.

- Doing the earth work at topsoil in the meanwhile excavate the soil layer by layer, store as the sequence systematically.
- Do not sell or dispose any topsoil from the project site.
- Configure the area to preserve the water's natural flow. Create spaces like swales to filter and slow down water, reducing erosion.
- Check and monitor the fuel and toxic chemical storeroom regularly without having any spilling onto the soil in every stage of the project.
- All hoses, valves, trigger guns, funnels and other associated equipment should be kept within the bunded area or chemical storage area to prevent land around the bund from being contaminated.
- The construction vehicles or machineries should be maintained in order to prevent leakage of fuel and oil to the soil.
- If fuels, oil and grease are spilled onto the soil, carefully remove the affected soil from the area and store it separately.

* However, application the enzyme-based solution is the most effective approach to safely clear the oil from the soil. The solution is easily sprayed onto the affected soil area and sometimes additional nutrients are needed for microbial growth. The progress should be monitored over several weeks or months.

- If fuels, oil and grease are spilled onto the concrete slab floor, the scenario must involve the use of spill kits and skill response to minimize the impact.

* The absorbents (e.g., land boom, hydrpcarbon pad and envirosolution floor sweep) can safely and effectively manage the spill. The most crucial point is the right choice of spill equipment depending on the place, type of oil and amount of spilling. Using appropriate materials can limit the environmental harm, minimize the cleanup costs, and time-consuming process or even potential injuries (e.g., hydrocarbon pad works efficiently at the a pool of oil and the contamination at the water body).

- After completing the construction works, restore and replace the soil in accordance with its sequence.
- The temporary solid waste disposal site should be constructed properly in order to prevent leakage of leachate to the surrounding soil.

5.5.7. The Strength of Road and Traffic Congestion

(a) Impact Assessments

i. Road Strength

Generally, the development of the construction stage may increase the demand for the construction materials which can be seen more heavy vehicles are required for conveying logistics project. This influx of vehicles can overwhelm existing road capacity, leading to traffic jams. This condition creates a variety of serious problems including , which is aggravated by factors such as population growth, economic growth, increased vehicle counts, reduced road capacity, poor city planning, accidents, and natural factors (heavy rain and extreme temperature, etc.). If the pavement loading increases due to increased HCV (heavy commercial vehicles) loading, this will shorten the gradual deterioration phase, which in turn brings forward the rapid deterioration phase of the pavement. If the road

surface cracks due to heavy axle loads, water can seep into the underlying layers, weakening the pavement structure and causing premature failure. A poor road infrastructure due to heavy vehicle damage can compromise overall road safety, affecting the ability of all vehicles to travel safely.

ii. Traffic Congestion

The impact of congestion includes material losses, such as increased energy consumption and pollution, as well as non-material consequences like time and opportunities lost due to the psychological pressure and stress experienced during commutes, which affect communities. Furthermore, traffic congestion affects travel costs, speed delay, travel time, mobility, accessibility, productivity, and also impacts on the environment such as air pollution and global warming. The dust is blowing in a sunny day while the road will be silting and slippery in a rainy day, which will lead a jam and chaos to the traffic.

(b) Mitigation Measures

i. Road Strength

- Contractors must be properly weigh and measure loads on the vehicles to ensure they do not exceed legal limits, which significantly damages roads.
- Fit both on-site loaders and excavators, as well as the operator vehicles, with relevant weighing systems to verify load mass.
- The project proponent is responsible for ensuring the pavement has a surface with adequate strength, drainage, skid resistance, and visual delineation to ensure safe travel after construction is completed.

ii. Traffic Congestion

- Toward to the very hectic road, the work time should keep away from the rush hour. For example: people should work at late evening time (especially for loading and unloading materials) to guarantee a free flow of traffic in daytime.
- Provide separate entry and exit gateways for pedestrians and vehicles.
- Provide a clearly signed and lit crossing point at the walkways cross roadways where drivers and pedestrians can see each other clearly.

5.5.8. Cultural Heritage

(a) Impact Assessment

The project is located at Bahan Township which is the urban residential area. The cultural heritage as Yangon University is over 1.7 km distance from the project site and Shwe Dagon Pagoda is over 2.8 km far away from the project site. It was presented in Figure 3-1. Therefore, it is not expected to cause any visual impact due to this project. The height of the proposed project is lower than that of Shwe Dagon Pagoda as shown in Figure 3-4.

(b) Mitigation Measures

Since no potential negative impact on cultural heritage are expected, there is no mitigation measures.

5.5.9. Ecosystem

(a) Impact Assessment

There may be no significant impacts on surrounding ecosystem since the project is located in the urbanized area and there are no protected areas, reserved forests and wetlands, threatened species and national parks near the project area. Although civil works from the construction activity of the project may generate impacts on fauna and flora, the scale of impact is expected to be negligible.

The clearing of the site in preparation for the construction phase represents a permanent and irreversible commitment of land resources. The land use of the project may lose the vegetative coverage of weeds and small herbs in the construction area. The major threats of the project may be the habitats of insect including butterflies, dragonflies and damselflies because of the clearance of weeds and small vegetation such as shrubs and herbs.

The use of heavy construction equipment during transportation of the building materials and site clearance will make noise and dust those leading to the disturbance for the faunal assemblages. Noise and dust emission made by heavy vehicles and machinery are inevitable both during the site clearance and construction phases. Inya Lake situated at the indirect impact area of the project site provides the aquatic habitat for some indigenous fish species and amphibians but it is threatened by so many exotic species, plastic and trash pollution.

(b) Mitigation Measures

- Cutting tree and clearance of vegetation must be at a minimum and replantation is mandatory.
- Oil, grease and hazardous waste must be stored properly to prevent the leakage on the ground or water bodies.

5.5.10. Local Economy such as Employment and Means of Livelihood

There will be positive impacts on local economy due to getting job opportunities and necessary materials and equipment may be purchased from local shops during construction and decommission stages of the project. Therefore, potential positive impacts on their job opportunities and livelihood are expected.

Table 5-7 Evaluation and Prediction of Significant Impacts for Construction Phase

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description
1.	Air	Earth works	Dust and PMs	-4	8	-32	-3	Moderately negative impact
		Heavy duty machines	CO_2, NO_x, PMs, VOCs, CO and CH_4, C_6H_6 and CH_2O					
		Transportation vehicles	CO_2, PM_{10}, $PM_{2.5}$, CO2, SO_x, NO_x, CO and GHG					
		Diesel generator	NO_x, SO_2, CO_2, PM, HC, etc.					
2.	Noise Vibration	Heavy duty machines	High intensity of noise and vibration	-4	7	-28	-3	Moderately negative impact
		Diesel generator						
		Rock blasting and piling						
3.	Water	Dewatering excavation	Silt and sand	-4	8	-32	-3	Moderately negative impact
		Chemical spilling and leakage	A compound of hazardous substances					
		Sewer from temporary labour camp						
4.	General Waste	Construction wastes	Masonry, sand, stone, slab, aliminium frame, iron/ wood/ steel, PVC	-1	6	-6	-1	Reduced negative impact
		Domestic waste	Kitchen waste, food waste, plastic and so on					
5.	Hazardous Material	Construction wastes	Cement waste, paints, thinner, vanish removers, etc	-4	7	-28	-3	Moderately negative impact

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description
6.	Soil	Soil distrubance	Loss of topsoil, lack of the microorganism and low the nutrients	-4	8	-28	-3	Moderately negative impact
7.	The Strength of Road	Throughout the construction work	Lack in compaction and uniformity, weak aggregate strength	-2	7	-14	-2	Less negative impact
	Traffic Congestion		Pressure on a daily commutes, minor to major accidents	-4	7	-28	-3	Moderately negative impact
8.	Ecosystem	Construction work	Loss of ecosystem	-4	8	-28	-3	Moderately negative impact
9.	Socio-economic	Construction work	Job opportunities (temporarily)	2	7	17	+2	Less positive impact

5.6. POTENTIAL ENVIRONMENTAL, SOCIAL AND HEALTH IMPACTS DURING OPEARATION PHASE

The operating phase of a building is defined as the period in which the building can withstand the conditions of normal use. For buildings, this period will last at least 50 years and can last several hundred years. It is because of this long serviced life, the operational stage of a building is the phase with the most environmental impact. Conversely, medium to low level of negative impacts in environmental qualities such as air, noise, vibration, water and solid waste might be introduced. It is not because the building is unoccupied but because a spacious, green areas and introducing the renewable energy source can regulate the air quality.

With the exception of the industrial zone and certain mechanical enginnering work, residential areas may produce negligible noise and vibration volumes. Household wastewater and significant amount of solid waste can be found from each of the residential units block, serviced apartment, commercial and office building. Moreover, negative social consequences are more likely to face due to differences in beliefs, religions and cultural norms. All of the impacts' significance during operation phase is presented in Table 5-8.

5.6.1. Air Quality

(a) Impact Assessment

The operating phase of buildings contributes about 10% to 30% of global CO_2 emissions, without taking into account the indirect emissions because of the electricity produced as a result of the high consumption of energy for heating and cooling systems, water heating, lighting and appliances. A building's will emits carbon footprint entire its lifespan therefore, carbon emissions can be contributed as long as the infrastructure is existed. A growing amount of CO_2 emission contribute to global warming which is a significant encompass the climate change in the long term.

New buildings usually mean more residents, employees, or visitors, all of whom may drive cars or trucks. Intense population density is another reason for traffic problem nearby area as a consequence exhausted fumes, smoke, PM_{10} and $PM_{2.5}$ shape poor air quality. The emergency used diesel generators will emit CO_2, NO_2, CO, SO_2, and CH_4 while cooking processes may emit CO_2 and VOCs. The impact will be small due to proper mitigation measures will be taken.

(b) Mitigation Measures

- Growing climbing plants can be an effective approach for reduction CO_2 emission from the building.

* It might have some disadvantages such as foliage and structural damage to the building; sometimes, it can also lead to the encroachment of invasive species. However, this approach can partially reduce the CO_2 emission from the building. For this reason, it requires regular maintenance and monitoring the overall conditions of the plants.

- Installing the solar panels especially at the rooftop is another consideration for energy efficiency and also minimize indirect CO_2 emissions associated with energy consumption.
- Generators are retrieved as the emergency power source which must be checked and maintained regularly to ensure they are working in good condition.

- Low Sulphur content diesel fuel should be used for the operation of generators, stoves and vehicles in order to reduce gaseous emission.
- Air quality around the project site should be monitored regularly.

The project has already incorporated a green space area within the residential compound. Taking advantage of this gardening area, it can consume the atmospheric CO_2. The measures can be achieved by purifying the air thereby, decreasing the CO_2 emissions into the atmosphere.

5.6.2. Noise and Vibration

(a) Impact Assessment

Noise and vibration levels during the operational phase are not envisaged to have significant impacts. However, the sources of noise and vibration will be from the generators when a power outage occurs, vehicles used by the residents who lived in apartment, interior decoration and renovation of the buildings. However, the magnitude will be at a low range due to its limited time.

(b) Mitigation Measures

- Improving the acoustic performance of constructed buildings by applying sound insulation.
- Relocating noise sources (for instance., generators) to less sensitive areas to take advantage of distance and shielding.
- Developing a mechanism to record and respond to complaints.
- Regular monitoring of ambient noise in and around the site shall be conducted; and alert public when loud noise will be generated.

5.6.3. Water Quality

(a) Impact Assessment

Occupied at a new building may experience with a growing population and changes in lifestyle are also contributing to a higher volume of wastewater discharge which poses a serious threat to aquatic ecosystems. Grey water and black water are the common wastewater types which release from the household. Grey water such as wastewater from washing, laundering, bathing, etc. and black water such as wastewater from toilets or urinals will be generated. The wastewater contains various inorganic and organic chemicals, toxic metals, hazardous chemicals, aromatic compounds, dyes, etc. These harmful substances have great potential to contaminate natural resources and can disturb their normal functioning.

(b) Mitigation Measures

- Systematic water drain channels have to be constructed around the residential compound with the aim of surface runoff.
- Channel drains should be located the areas such as driveways, patios, car parks, loading bays, and or anywhere surface water runoff could threaten structural integrity or interrupt safe, regular use.

- Correct installation is not merely recommended, but essential: a poorly installed channel drain, or one constructed with unsuitable materials, can lead to water sitting on the surface, accelerating wear, and sometimes overflow can be encountered.
- The final discharge point for the surface water drain channels must be a direct flow into the municipal drainage channels.
- Separate wastewater treatment plant must be installed for grey water and black water.
- Treated grey water from wastewater treatment plant should be reused for another purpose such as toilets, watering for landscaping, gardening, etc.
- The discharged wastewater should be monitored at the effluent point.

5.6.4. Solid Waste

(a) Impact Assessment

General solid waste can be produced throughout the operation phase of the building. The building's design is inspired by the residencial complex compounds. The waste comes not only from the housing units but also from the offices, and the shopping mall. Therefore, a large quantity of waste generation can be observed as a consequence. The waste stream normally includes non-hazardous materials such as paper, plastics, food scraps, and other items that are discarded during the day-to-day use of the building.

A long-time storage of those wastes may be smelling to environment, may encourage the breeding the insects, fly and mouse which exacerbate the negative impacts on the surrounding areas and public health issues. This concerned caused substantial environmental damage and adversely impacted the public health through the transmission of infected diseases.

(b) Mitigation Measures

- Society can display posters in the lift or corridor to raise the awareness concerned with the waste disposal system.
- Follow the regulations linked with the systematic disposal methods – segeration, and 4Rs especially apartments and within the compound.
- Broken glass and any other kind of sharp material should be stored in a separate transparent bag before throwing to the bin.
- Some dry wastes such as aluminum and tin can, plastic bottles, etc. will be recycled or reused for the same purpose or in different ways to reduce the amount of waste.
- The wet wastes (kitchen wastes and food scrape) must not stored for a long time.
- Solid waste will be collected separately with different types of waste bins and the collected waste will be kept before collecting by city municipal.
- Monitor the amount and type of waste regularly to maintain the capacity of temporary wastes storage area.

5.6.5. Hazardous Materials

(a) Impact Assessment

The materials is regarded to health or the environmental issues such as physical, chemical, biological, reactive, toxic, inflammable, explosive or corrosive. It covers expired goods, syringes, chemicals, specific types of medicine, solvent washing, insect repellent, paints, thermometers, cosmetics used, e-wastes, alongside razors, etc.

(b) Mitigation Measures

- It must be provided a separate area to discarded the toxic wastes.
- Prior to disposal those items which must be tetra pack-style cartons and fully labelled with the type of substance contained within.
- This can be stored in a safe place as per the instruction from in society.
- Final discharge point for the wastes must be YCDC.

5.6.6. Soil Health

(a) Impact Assessment

Construction activities left the soil unproductive by compacting the soil structure, which hinders water infiltration and aeration for roots. Construction often involves removing the valuable topsoil layer, which is rich in organic matter and nutrients, replacing it with less fertile subsoil or fill. However, green space is one of the components for the project. It also provides for environmental advantages, especially in temperature regulation, regulating overall soil health, and conserving soil erosion through better rainwater management.

(b) Mitigation Mesure

- The project includes gardening area within the residential complex compound.
- Benefits of green space contributes to partial soil improvment as well as restoring the native plants.
- Maintain the sustainable residential landscaping by having a regular schedule on weekly or monthly basis for weeding, trimming and pest management.
- Regularly monitor the plant conditions alongside the soil health and water consumption.

5.6.7. Ecosystem

(a) Impact Assessment

Improper discharge of untreated wastewater and solid waste from the project can cause certain adverse impact on nearby aquatic ecosystem and habitats of flora and fauna. However, the possibility is unlikely since wastewater and solid waste of the all buildings will be managed properly.

(b) Mitigation Measure

The generated wastewater must pass through wastewater treatment plant to reduce impact on ecosystem.

The project should be systematically managing and use the natural resources such as land and water in this area. Maintaining and replanting of certain native plant species (trees and shrubs) as landscaping or fencing may provide a home for the faunal

assemblages such as insects, amphibians, reptiles and birds. Green belt space or small green space may provide a good habitat for insects and recreation of all the inhabitants.

Awareness program of prohibiting exotic species which releasing to water body of Inya should be carried out by local authorities. Plastic pollution and blockage of trash and plastic at the inlets of Inya Lake should be solved as a special issue.

5.6.8. Local Economy such as Employment and Means of Livelihood

The socio-economic impacts are considered as positive because more jobs opportunities are created during operation phases of the project. The employees for the shopping mall and service apartment comprising both skilled and unskilled will be recruited from the local community. The project proponent will implement the following practices during operation phase:

- Promote the fair treatment, non-discrimination and equal opportunity for workers;
- The project proponent plans to increase the production capacity and nearby communities will get benefit by being the source of work force for the project;
- Ensure total compliance with national labor and employment laws;
- To avoid exploitation of child labor by contractor, sub-contractor and supply chain;
- Promote safe and healthy working conditions;
- Project proponent should try to mitigate or minimize negative impacts while enhancing and maximizing the positive impacts to their optimum.

Table 5-8 Evaluation and Prediction of Significant Impacts for Operation Phase

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description
1.	Air	Houses and buildings, using electricity	CO_2	-4	7	-28	-3	Moderately negative impact
		Disel generators	CO_2, NO_x, PMs, VOCs, CO and CH_4, C_6H_6 and CH_2O					
		Cooking activities	CO_2, and VOCs					
2.	Noise Vibration	Disel generators, Interior decoration and renovation (performed periodically or occasionally)	Medium to low level of noise and vibration	-4	7	-28	-3	Moderately negative impact
3.	Water	Household wastewater	BOD, COD and nutrient rich compounds	-4	8	-32	-3	Moderately negative impact
4.	General Waste	General household solid wastes	Kitchen waste, food waste, plastic and so on	-1	6	-6	-1	Reduced negative impact
5.	Hazardous Material	Damaged electric appliances, lightings and batteries	Leakage of heavy metals and released the chemical to the environment	-1	7	-7	-1	Reduced negative impact

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description
6.	Soil Health	Implementation the gardening space within residential compound	Moderately improved soil health and native plant restoration	+2	8	+16	+2	Less positive impact
7.	Ecosystem	Landscaping in residential compound	Slightly enhance the ecosystem services	+1	8	+8	+1	Reduced positive impact
8.	Socio-economic	Commercial areas (company offices and shops) can be included within the residential copmpound	Job opportunities (long-term)	+4	7	+28	+3	Moderately positive impact

5.7. POTENTIAL ENVIRONMENTAL, SOCIAL AND HEALTH IMPACTS AND MITIGATION MEASURES DURING DECOMMISSION STAGE

If the project would be terminated due to the various circumstances such as the building is no longer safe, structurally instability due to aging, and then affected by natural disasters. There are four possible scenarios when the permission for building operation is due-

- Scenario i: If the project proponent extent/renew the permission to continue the infrastructures of the building, the environmental impact evaluation and management plan would be identical to the operation phase.
- Scenario ii: The project proponent would not extent/renew the permission. The new proponent would apply for permission and resume the building operation. For this case, the environmental impact evaluation and management plan would be identical to the operation phase.
- Scenario iii: If the project proponent doesn't extent/renew the permission, the structures of buildings would be left in its original form and without having activities would be performed. For this case, the proponent is recommended to follow the procedures guided by the relevant authority. Moreover, the proponent needs to inform the residents and public about the decommission plan, clear all the payment payable to related people, and compensate them-if necessary.
- Scenario iv: The project proponent would not extent/renew the permission. The structures of the project's buildings would be partially or wholly demolished for new business activity. For this case, the environmental impact evaluation would be indentical to construction phase and the demolition contractor is advised to follow the management plan described in construction phase.

If the project meets the 4th scenario, the potential impacts such as air, noise/vibration, water, soil and solid wastes, as well as rehabilitation after closure the project are taken into account in this section. The impacts assessment concerned with the demolition or decommission stage is mentioned in Table 5-9.

5.7.1. Air Quality

5.7.1.1. Impact Assessment

Although three kinds of demolition stages can be found, the process may apply partially manual and mechanical demolition methods. The most noticeable impact will be placed by the dust and particulate emissions. When demolition the structure (especially wall-brick, cement, and block), the activity may generate respirable crystalline silica dust. Those particles are able to travel and deposit on the lung, causing the permanent damage and serious illness such as silicosis and lung cancer or even death. Some building materials namely plaster wall and ceilings may contain asbestos fibers which are emitted by destructuring them. Inhaling the fiber may increase the chance of suffering lung cancer. Then, greenhouse gases and other toxic gaseous (CO_2, CH_4, CO, HC, NO_x, SO_x, $PM_{2.5}$, PM_{10}, VOCs and so on) are released by using the heavy machineries in the demolition progress. Among them hydrocarbon (HC) is one of the source of carcinogens prone gas, contribute to the environment.

In spite of the demolition period will be estimated as the short-termed, airbrone dust and gases are more likely to have tragetic effect on the environment and commuinties. Therefore, several actions should be taken with the aim of mitigating the impact.

5.7.1.2. Mitigation Measures

- Wet method is the most effective way with the reasonable charges to control the silica dust emission during a mass generation of dust.
- When application the wet method, time and activity performed as the key player for example timing the application of the water.
- Water must be adjusted the flow rates, sufficient to minimize the release of visible dust then necessary to make sure controlling the volume of water neither too much water nor too little water.
- In the same way, controlled dust suppression can be undertaken by water spray and misting systems for limiting the asbestos exposure to the environment.
- This should continue be targeted on fresh, dry surfaces uncovered during demolition.
- Asbestos fiber contains debris should be transport through covered lorries.

5.7.2. Noise and Vibration

5.7.2.1. Impact Assessment

Excess noise will occur during the demolition stage as same as the construction phase. Structural demolition stage may involve the help of heavy machineries, contribute to the intense ground vibtration can be faced. During the progress, generator may run for efficient and effective advancement. Minor cause of noise and vibration can be seen the use of vehicles and other transporting items (motorcycles, ect.,). Construction related noise may impact not only on the workers but also on the environment. Once high intensity of noise is transmitted to the surrounding area, the high potential to distrupt neighbouring residents' activities. Likewise, the terms of vibration may influence with noise generation sources. The animals behaviours such as mating, predatory, nagivitating, extend to the permantent hearing loss may be affected due to the intense noise level. Furthermore, low-level whole-body vibration causes cardiovascular effects in dogs and swine.

Demolition stage will last short-term but deafening sound without interruption even in the daytime may deter the mental health and wellbeing. Even though the process produces excessive noise, the activities need to proceed with consistency in the working hours especially in daytime. By doing this, the duration of impacts on the environment will be minimized. Based on the facts, mitigation measures must be taken to create a healthy environment.

5.7.2.2. Mitigation Measure

- Explore the possibility of using modern machinery with sound and vibration dampening features.
- Occasionally monitored heavy machinery and vehicles.
- Install the noise barriers in areas with excessive noise generation.
- Using an anti-vibration map or carpet under the instruments or devices to reduce vibration.
- The source of noise should be isolated, and heavy-duty equipment should be kept at a considerable distance.

5.7.3. Water Quality

5.7.3.1. Impact Assessment

Employing wet methods for dust suppression on-site can lead to overflow. When runoff erodes soil, it can cause suspended solids to accumulate in water bodies. Increasing temperature reduce dissolved oxygen and increses water turbidity. Rubbles, naturally composed of cement, can potentially dissolve in alkaline water due to the cement's alkaline pH. Then, asbestos fibers, which may easily flow with water, can be deposited beneath the water bed. Those sediments mainly attack the benthic fish species by developing epidermal tumors, thickened epidermal tissue, increased mucuous cell density in the intertinal tract. When the communities consume infected fish or other marine products, they may be at risk of developing adverse health problems. A few volume of domestic wastewater may discharge from the temporary camping site, toilets and general sanitary water (heavy metals, coliform, oil and grease, etc.,) and spilling fuel and oils from the vehicles and machineries.

5.7.3.2. Mitigation Measure

- When using the wet method for dust control, be careful to apply just enough water or spray to suppress the dust.
- Excessive water will create a slurry that can carry soil particles.
- Install the temporary silt fence at the water spraying area.
- After that it must have the temporary drainage channel which may be neither not too straight nor too meander like channel. As a consequence it allow enough time for deposition.
- If possible, Oil Water Separators can be used to treat oil and chemical pollution, of which there are several different types depending upon water volume, flow rate, concentration of pollutant and required discharge concentration.
- Chemical Dosing – use of dosing systems to introduce coagulants, flocculants and pH regulators.
- The method is the effective and reliable, often used in conjunction with other technologies, but requires power and knowledge regarding the correct use of chemicals.

- The discharge must not contain sewage, result of discolouration, foaming or growth sewage fungus for this reason, regularly checked the sewer pipelines (previous and temporary ones) and septic tanks.

5.7.4. Solid Waste

5.7.4.1. Impact Assessment on Hazardous and Non-hazardous Wastes

Demolition phase generates both hazardous and non-hazardous wastes in single each of the task. Hazardous wastes were produced by the structural destruction in which rubbles (mainly composed of concrete), trace amount of asbestos, fluorescence light, electric cables and wires, recharageable batteries. Those wastes release toxic chemicals (heavy metals – Hg, Cd, and toluene, etc) which contribute to attack the nerve system, immune system, memory loss, flu-like symptom, respiratory problem, reproduction system, liver and kidney damages. However, stainless steel is the another kind of harzardous chemical discharging waste like chromium (Cr) which can deter the liver and kidney functions, asthma, respiratory irritation as well as cancer diseases.

Normally, non-hazardous waste can be produced by the workers and their temporary camps. Food scraps, water bottle, plastics, tissue, paper, personal care products and various sanitary items can be considered as the general wastes. Other demolition waste as PVC pipe, wood, aluminum, Domestic wastes are less dangerous than the hazardous wastes. However, they can be harborage zone of the bacteria, and fungi without having systematic waste management method in the project site. Therefore, several actions need to control not only the hazardous but also non-hazardous waste.

5.7.4.2. Mitigation Measure

- Rubbles and bricks can be used as the recycled concrete aggragate for the a base of road and pavement as well as a drainage material for underground pipes and lines.
- Resold materials, namely steel, copper, pipe, aluminium, glass, and wood, can be used in renovation and new construction projects.
- Some hazardous wastes for example broken fluorescence lamps must be dispose at the designated damp site with well-packed during handling the workplace.
- In the same way, domestic wastes are packed with the black plastic bags and store at the temporary damping site.
- If it contains sharp materials, wraps them well in newpaper or use sharp bins.
- For all the waste (hazardous and general wastes), their final discharge point must be the city municipal’s waste disposal site.

5.7.5. Soil Quality

5.7.5.1. Impact Assessment

Since the construction phase commence, soil has been disturbance by biological, chemical and physical manners. Soil quality degrades during the demolition phase, as it does during the construction stage. The operation of heavy-duty equipment and vehicles on the project site will compact the soil, potentially reducing its ability to absorb water. Flash flood will perhaps frequently occur at the project site during heavy rain event. Soil compaction, which increases soil density, impedes root penetration. Furthermore, spills of oil, disel and lubricant from machinery can contaminate the soil. These petroleum products are made of hydrocarbon (HC) which is the long chains of hydrogen and carbon.

It seems to have dire consequences for soil chemistry, structure, properties of soil and reduce soil fertility and arable value. Leaving oil spills untreated soil, the toxic compound cannot neutralize itself. HC can remain stable and lock in the soil particles for decades, especially if the environment is lacking oxygen or microbial activity. As oil seeps deeper, it can eventually reach the water table. This is a major problem because hydrocarbons can dissolve partially in water or form a floating layer on top of groundwater. If this contaminated water flows into a well, stream, or river, it can cause widespread pollution, killing aquatic life and making the water unsafe for human use.

Although soil is a renewable resource, it requires a particular attention to preserve and conserve it. Thus, mitigation measure will play a main role to retain the soil quality.

5.7.5.2. Mitigation Measure

- Pass through the machinery and vehicles over the dry soil which means wet soil is able to easily compact than the dry sand so as to prevent the soil compaction.
- If fuels, oil and grease are spilled onto the soil, carefully remove the affected soil from the area and store it separately.

* However, application the enzyme-based solution is the most effective approach to safely clear the oil from the soil. The solution is easily sprayed onto the affected soil area and sometimes additional nutrients are needed for microbial growth. The progress should be monitored over several weeks or months.

- If fuels, oil and grease are spilled onto the concrete slab floor, the scenario must involve the use of spill kits and skill response to minimize the impact.

* The absorbents (e.g., land boom, hydrpcarbon pad and envirosolution floor sweep) can safely and effectively manage the spill. The most crucial point is the right choice of spill equipment depending on the place, type of oil and amount of spilling. Using appropriate materials can limit the environmental harm, minimize the cleanup costs, and time-consuming process or even potential injuries (e.g., hydrocarbon pad works efficiently at the a pool of oil and the contamination at the water body).

- After completely demolition the site, organic matter should be added to the soil to improve the microorganism populations and aeration the soil.

5.7.6. Rehabilitation After Demolition Works

Upon completion of the demolition process, the effective management of debris clearance is the main key. Most of the debris can be recycled and resold depending on the type of waste. If the land is intended for a new building, mitigation measures and impact control procedures must be implemented during the construction phase. On the other hand, the land will have no arrangements for a new structure, rehabilitation requires special attention.

Firstly, soil quality recovery will be priority concern for the restoration strategy of the abandoned land. Thereby, some additives or organic matters will be added for the soil improvement so as to make a home for soil microbes. Then, make sure the soil has good aeration and relieve the soil compaction. Once the soil health is fully recovered, the next step will be to replant the native plants. The most crucial point is that vegetation and plants must be the native species to protect against the encroachment of invasive species.

Table 5-9 Evaluation and Prediction of Significant Impacts for Demolition Stage

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description
1.	Air	Demolition the structure	Dust and PMs	-4	8	-32	-3	Moderately negative impact
		Heavy duty machines	CO_2, NO_x, PMs, VOCs, CO and CH_4, C_6H_6 and CH_2O					
		Transportation vehicles	CO_2, PM_{10}, $PM_{2.5}$, CO_2, SO_x, NO_x, CO and GHG					
		Diesel generator	NO_x, SO_2, CO_2, PM, HC, etc.					
2.	Noise Vibration	Heavy duty machines	High intensity of noise and vibration	-4	7	-28	-3	Moderately negative impact
		Diesel generator						
3.	Water	Demolition the structure, cement-contained rubbles	Silty runoff, fluctuate the pH level	-4	8	-32	-3	Moderately negative impact
4.	General Waste	Demolition the structure	Aggregate, wood, metal, PVC, and glass	-2	6	-12	-2	Less negative impact
		Domestic waste	Kitchen waste, food waste, plastic and so on					

No.	Potential Impacts on the Media	Activities and Source	Components	Group A $A_1 \times A_2$	Group B $B_1+B_2+B_3$	Environmental Score	Class	Description
5.	Hazardous Material	All demolition works	Electrical waste, cables and concrete					
6.	Soil	All demolition works	Soil compaction, spilled or leaked fuels and oils	-4	7	-28	-3	Moderately negative impact
7.	Rehabilitation	After demolition works	Restoration the native species (flora and fauna)	6	8	48	+4	Significant positive change

5.8. RISK ASSESSMENT OF THE OCCUPATIONAL HEALTH AND SAFETY

5.8.1. Methodology

Risk assessment methodology is adopted by International Civil Aviation Organization-ICAO (2013)[19]. Environmental risk assessment is the process of evaluating the likelihood of adverse effects on, or transmission through, the natural environment, as well as the hazards associated with human activities. The risk assessment will be evaluated based on hazard identification, risk analysis probability, risk analysis severity, risk assessment and tolerability. The risk assessment of metal smelting and refinery is performed based on the potential hazards happened in construction/decommission (where the risk in demolition state is as same as the constuctin), and operation activities. The risk assessment and management process will be performed as shown in Figure 5-3.

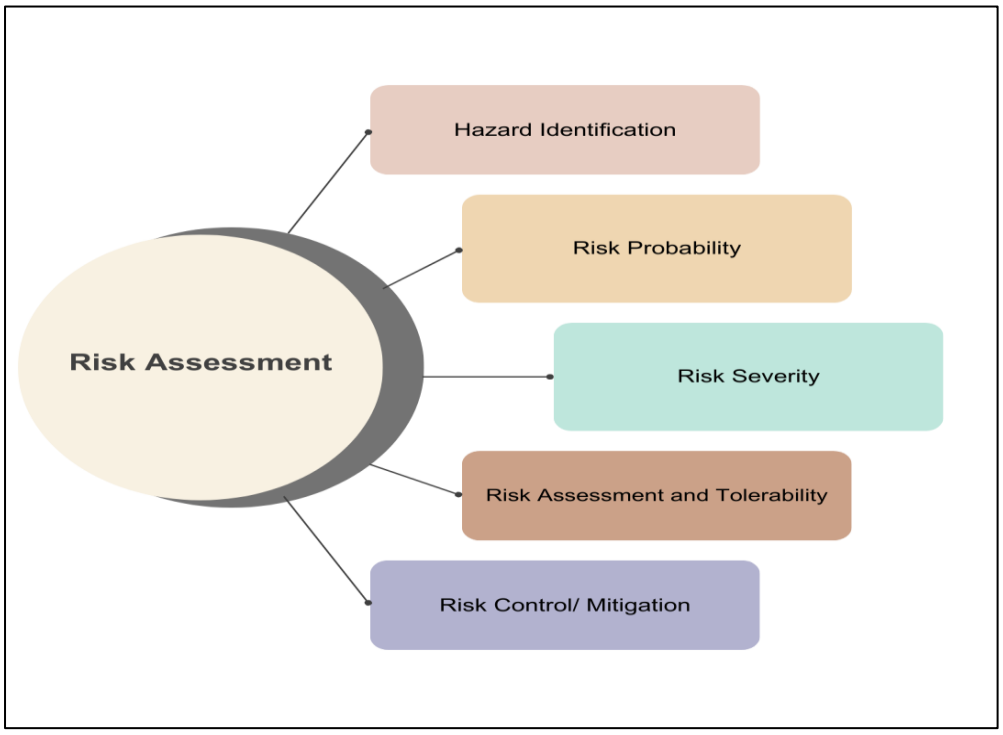


Figure 5-3 Risk Assessment and Management Process

5.8.2. Hazard Identification

According to Canadian Centre for Occupational Health and Safety, hazard identification is the part of the process used to evaluate if any particular situation, item, thing, etc. may have the potential to cause harm. Addressing both anthropogenic and natural hazards is crucial for comprehensive disaster preparedness and risk mitigation. This project considers natural hazards (physical hazards) such as floods and storms, and earthquake as well as major anthropogenic hazards including occupational (chemical, physical, and biological) hazard.

[19] International Civil Aviation Organization (ICAO) (3rd edition, 2013), Safety Management Manual

5.8.3. Risk Probability

ICAO states that the risk probability is the likelihood or frequency that a hazard may exist. The risk probability range is defined by five level of likelihood such as frequent, occasional, remote, improbable and extremely improbable. The risk probability range is shown in Table 5-10.

Table 5-10 Risk Probability Range

Likelihood	Definition	Value
Frequent	❖ The hazard is likely to occur many times.	5
Occasional	❖ The hazard is likely to occur sometimes.	4
Remote	❖ The hazard is unlikely to occur, but possible.	3
Improbable	❖ The hazard is very unlikely to occur.	2
Extremely improbable	❖ The hazard is almost inconceivable that the event will occur.	1

5.8.4. Risk Severity

The risk severity is the potential harm or adverse effect that may occur due to exposure to the risk. The risk severity is determined by five levels as described in Table 5-11.

Table 5-11 Risk Severity

Severity	Definition	Value
Catastrophic	❖ Equipment destroyed ❖ Multiple deaths	A
Hazardous	❖ Serious injury ❖ Major equipment damage	B
Major	❖ Serious incident ❖ Injury to persons	C
Minor	❖ Nuisance ❖ Operating limitations ❖ Use of emergency procedures ❖ Minor incident	D
Negligible	❖ Few consequences	E

5.8.5. Risk Assessment and Tolerability

The risk assessment is performed based on the risk analysis probability and risk analysis severity. The risk assessment and tolerability is evaluated as shown in Table 5-12. If the assessed risk index is in intolerable region, the risk is unacceptable under the existing circumstance and it need to perform priority risk mitigation. In addition, the kind of risk should be ceased or cut back if necessary. If the assessed risk is in the tolerable region, the risk is acceptable based on the risk mitigation and it may require management decision. If the risk is acceptable region, the risk is acceptable and no further risk mitigation might not require.

Table 5-12 Risk Assessment and Tolerability

Risk Probability	Risk Severity				
	Catastropic-A	Hazardous-B	Major-C	Minor-D	Negligible-E
Frequent-5	5A (Intolerability)	5B (Intolerability)	5C (Intolerability)	5D (Tolerable)	5E (Tolerable)
Occasional-4	4A (Intolerability)	4B (Intolerability)	4C (Tolerable)	4D (Tolerable)	4E (Tolerable)
Remote-3	3A (Intolerability)	3B (Tolerable)	3C (Tolerable)	3D (Tolerable)	3E (Acceptable)
Improbable-2	2A (Tolerable)	2B (Tolerable)	2C (Tolerable)	2D (Acceptable)	2E (Acceptable)
Extremely Improbable-1	1A (Tolerable)	1B (Acceptable)	1C (Acceptable)	1D (Acceptable)	1E (Acceptable)

5.8.6. Risk Control and Mitigation

Control can be regarded as the reduction the likelihood or consequences from the unwanted and or tragedic event. Migitation will be continued as the post-control actions. Even though all the controlling /preventative measures completed, it may still harm to the human or environment and both. Risk control can be varies depend on the types of risks and so does mitigation. In general, there are six steps to control the risk. Elimination the hazard from the receptors while the substitution with minor or less hazard substances with the aim of minimizing the risk.

Moreover, isolation the hazard is the another option of the risk control factor which can help without having directly impacted on the receivers or merging one or more risk to become a bigger ones. Changes the performance or designing the process, engineering controls will be followed by the isolation the hazard. Next, administrative controls include accept the standard procedures or safe work practices or providing appropriate training, instruction or information to outweigh the risk. Finally, using the personal protective equipment (PPE) may exist the last line of the protection or defence from the harmful situation.

5.9. TYPES OF RISKS

5.9.1. Natural Disaster

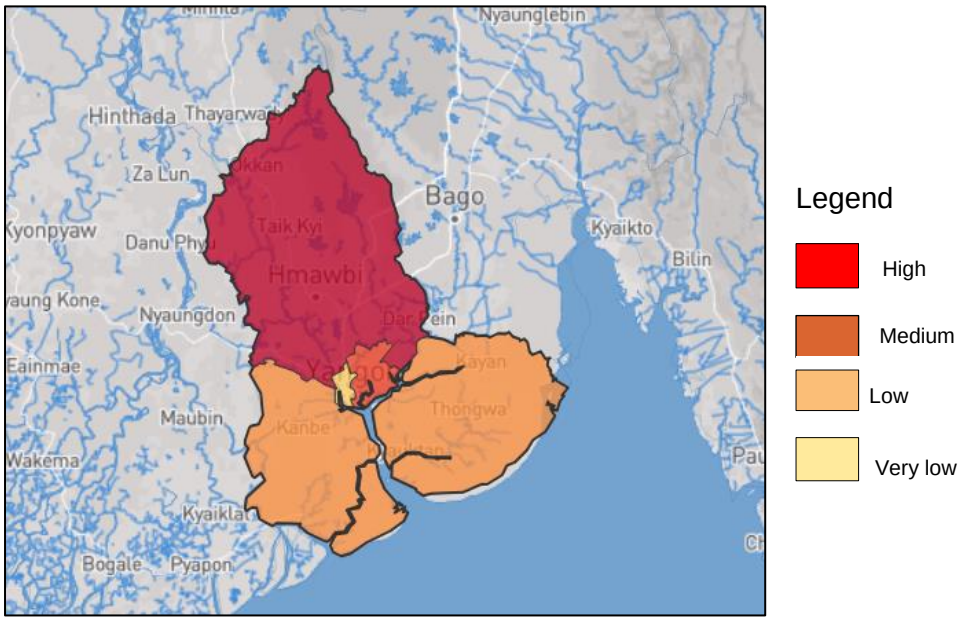
5.9.1.1. Floods and Storms

(a) Potential risks

Coastal cities like Yangon are highly vulnerable to rising sea levels, floods and other impacts of continued climate change. Flooding is found more frequently in Yangon city during this decade, and it is likely to get worse as a result of poor and old drainage systems, a rising sea level, and record-breaking rainfall. According to Figure 5-4, the project is located at Bahan Township, Yangon Region where is at the medium flood prone area. On the other side, the risk of strom is less likely to be faced. The area is in need of a proper flood control system and

infrastructure. Occasionally, the dwellers has experienced about the spread the diseases and minor loss of properties by the flash flood, the risk assessment is mentioned in Table 5-13.

With Cyclone Nargis in 2008 likely the most well-known example, Yangon has already experienced climate change and its effects such as high temperature, sea level rising, floods, water shortages, ground water depletion, frequent flooding, and unhealthy levels of pollution. It will be getting worse and worse, along with global warming, in coming decades.



Source; GFDRR, World Bank Group

Figure 5-4 Flood Hazard of Yangon

(b) Mitigation Measure

The effective mitigation methods may weaken or protect the overall flood hazards, will discuss as follows;

- Even in the normal situation, systematically construct the channels drain inside as well as the outside the project area.
- Cleaning the drain esures to collect plastic, bottles, and non-biodegradable materials with the prupose of being well-drained.
- If the project compound had still left bare soil or vacant area, created the greenspace in such area with natural vegetation and plants which can absorb the runoff quickly from the roots.
- Regularly maintenance the infrastructure and building without any structural damages.
- Keep the chemicals and fuels must be stored at the robust or approved safety cans.
- Must have emergency exit doors where sufficient wide, unobstructed with materials and doors should be easy opening and closing.
- Aware the weather forecasting news, government websites such as www.moezala.gov.mm and others, as well as through radio and television news.

- Consider relocation of the project. If local flood risk information confirms that the project's location is exposed to a high level of flood hazard, relocation to areas not prone to flooding is recommended where viable.
- Identify early warning systems (EWS) that may exist in the project area.
- Ensure that the warnings will be received in the facilities built and the people working or living there.
- Evacuation maps together with the emergency contact lists must be attached on every corner of the working area. Then, emergency assmbley point must be designated which may be occupied at the large open space, big enough to safely assemble as well as risk-free distance from the disaster prone area.
- All the staffs along with the people at the management level must be familiar and participate the training program concerned with the emergency response action plans.

5.9.1.2. Earthquake

(a) Potential Hazard

Normally, Yangon is not typically major seismic activity than the cental part of Myanmar. Therefore, the coastal area like Yangon has experienced minor earthquake event frequently. Earthquakes can cause extensive damage to infrastructure, including airports, railroads and bridges, potentially leading to ruptured gas lines, sparking fires that can engulf extensive grounds, damages to the infrastructure, and chemical spill. Even though Bahan township in Yangon has not experienced any major earthquakes in the last decade, some of the control measures should be prepared in case of an emergency. The risk assessment is mentioned in Table 5-13.

(b) Mitigation Measures

- Regularly maintenance the infrastructure and factory building without any structural damages.
- Keep the chemicals and fuels must be stored at the robust or approved safety cans.
- All the staffs along with the people at the management level must be familiar and participate the training program concerned with the emergency response action plans.
- Therefore, evacuation maps and emergency contact lists must be attached in prominent locations throughout the working area and the building.
- A designated emergency assembly point must also be established in a large, open space that is sufficiently sized to safely assemble personnel and is a safe distance from the disaster-prone area.
- Exit routes (including the doors and pathways leading to them) must remain permanently and completely unobstructed by materials, equipment, or other potential barriers at all times when the building is occupied.
- Set up the earthquake early warning system so that negative impacts can be eliminated or at least minimized.

- Be aware of the information about natural disasters such as earthquakes, available on government website, including Meterology and Hydrology (Myanamar) website, as well as through radio and television news.

5.9.1.3. Climatological Hazard

(a) Potential Risk

Generally, atmospheric pollution, is the primary cause and a major contributor to a long-term climate change which in turn leads to a higher incidence of acute climatic hazards. Human activities are the main drivers of climate change. Activities like using the motor vehicles, burning fossil fuels and destroying rainforests have an increasing influence on the climate and Earth's temperature. This adds huge quantities of greenhouse gases to those naturally present in the atmosphere, increasing the greenhouse effect and global warming. The destruction of forests also causes substantial damage to the harmony of the climate. It will bring various climate-related disasters ranging from cyclone, drought, flood, heatwave, infectious diseases, sea level rise and wildfire.

(b) Mitigation Measures

- Contribute to a clean atmosphere by choosing environmentally friendly cars (electric vehicles) over fossil fuel or diesel-powered vehicles.
- If it difficult to change from fuel to electric ones immediately, driving at a moderate speed for the first five miles or not abusing the air conditioning are ways to reduce fuel consumption, which also saves money.
- Facilitate educational workshops to help raise awareness about the importance of sustainable transport and how individuals can contribute. They can cover topics such as reducing carbon footprints, energy-efficient vehicles, and smart travel planning.
- Introduce a public transportation day or an environmental friendly day to promote sustainable travel options.
- Trees help regulate the climate by absorbing carbon dioxide from the atmosphere, so if they are destroyed, this beneficial effect is diminished and the carbon stored in those trees is emitted into the atmosphere, adding to the greenhouse effect.

Table 5-13 Risk Assessment of Natural Disaster

Disasters	Risk Index	
	Before Mitigation Measure	After Mitigation Measure
Flood and strom	3A (Intolerability)	3C (Tolerable)
Earthquake	5D (Tolerable)	3E (Acceptable)
Climatological	3A (Intolerability)	3C (Tolerable)

5.9.2. Occupational, Health and Safety Hazard

The main activity of the project is construction. Thus, the risk assessments related with the occupational, health and safety are focused on the construction and demolition phases rather than the operational phase of the building. It is not because the occupied phase of building is safe but because the inherent dangers associated with construction/ demolition activities, including working at heights, handling heavy materials, and the potential for accidents involving machinery and equipment.

5.9.2.1. Chemical Hazard

Chemical risk can be determined by assessing activities involving the handling or processing of chemicals. It is considered that chemical spillage/ leakage is not the only chemical hazard; rather, any process releasing chemicals, such as air pollution, also poses a chemical hazard. All relevant aspects of risk assessment linked with the occupational, health and safety risks are mentioned in Table 5-14.

(a) Potential Risk in Construction/ Demolition Phases

Construction works can encounter adverse circumstances throughout their lifecycle and so do decommission phase. The most significant hazard may be noted as the air pollution, may emit chemical elements such as toxic gases (CO_2, CO, NO_X, VOCs, $PM_{2.5}$ and PM_{10}) and heavy metals (mercury (Hg), lead (Pb) and dioxins) while doing the earth works and using the heavy machineries, loading and unloading vehicles, and the releasing the toxic metals is largely dependent on the type of fuel consumption. Transporting vehicles (diesel engine) emits benzene and 1,3 butadiene both of them can be faced carcinogens, a subsequent of chemical hazard at the workplace. Those chemicals and toxin may introduce hay fever as a result of short-term exposure, on the other hand chronic obstructive pulmonary disease (COPD), respiratory tissues damages, heart problem, asthma, lung cancer can be suffered from the constant exposure. The cement dust or constituents of cement causes pathogenesis of various lung diseases including chronic bronchitis, asthma, lung cancer, pneumonia and tuberculosis.

Heavy toxin may be dissolved or carried by the polluted water under progressing the construction/decommission activities. Failure to place the fuel tanks at appropriate points away from vehicle routes (to minimize the risk of collisions) and access points (to minimize the risk of vandalism) can result in accidental spillages. Other chemicals present, such as those used in the cement making process and solvents, can also harm the environment if accidentally released. Moreover, lead (pb), mercury (Hg), Cadmium (Cd) and Arsenic (As) which are commonly found in the industrial paints, may disperse the surface runoff. If people drank heavy metal polluted water, they might be experienced about the neuro toxin lead to the disordered the nervous system, kidney diseases, and cancer, etc. Furthermore, sewer water from the temporary restrooms are the another contaminated metal such as Cd, Cr, Cu, Zn, Pb and Ni mostly accumulated sewage water and sludge. Most of them may cause the allergic dermatitis, liver, kidney, affected the density of bones and disrupt the bone composition.

Hazardous solid wastes are the common source of chemical hazard in the construction / decommission sites. Fuel and paint containers, electrical wastes (electric buds, fluorescent lights and batteries) which can be considered as one of the chemical sources, can indeed pose chemical hazards to workers. Workers are at a high risk of contact with heavy

metal substances may can be diagnosed with damage to the cental nervous system, chronic diseases even life-threatening. Additionally, the hazardous chemicals can be partially released from a temporary waste dump site due to the seepage of leachate. Once those metals encroach the soil, surface water and groundwater, the locals as well as the workers have a higher chance to diagnose minor to major health problems (fatal diseases) linkage with this chemical hazard.

(b) Mitigation Measures

Despite the fact that the construction and decommission stages may each take one or two years, actions are needed to mitigate the negative impacts, as followed:

- Regularly checked the engine and exhaust of the vehicles so as not to exceed the toxic fumes emission.
- Changing the fuel for vehicles and machineries to the better quality (premium) ones which can produce the high efficiency and reduce the emissions.
- If possible, it should be minimized the usage of vehicles during the peak hours and stock the necessary materials at the construction site to reduce transportation times.
- If the project compound had still left bare soil or vacant area, developing such area with the natural vegetation and plants which can absorb toxic chemical gases.
- One of the most effective preventative measure for chemical hazard through air pollution is using the PPE to the workers.
- Must keep the fuel, paint and chemical container systematically at the designated storage room which area should have an appropriate distance to the water resources or drainage drain.
- Store fuel and engine oil at a leak-proof container, then checked them without any spilling or leakage after each use.
- Flooring the chemical warehouse with the impermeable or oil absorbent material.
- Occasionally, monitored the sewer pipeline not having any hole or leakage into the surrounding environment.
- Damaged electrical equipment and fluorescent light/bulb should be maintained at the separated area while handling within the factory compound. Should not contact those with rain or any liquid.
- Among the hazardous waste, some can be sold or reuse that kind of waste should be managed properly for eg., engine oil.
- If not, it should be disposed accordance with the regulation of the township municipal.

After mitigation methods have been implemented, for chemical hazard at the workplace can nearly eliminate or lessen the risk, impact to workers.

5.9.2.2. Physical Hazard

(a) Potential Risk in Construction/ Demolition Phases

Construction and decommission works are the inextricably linked with the health hazard among the workers. There are many pollutants which lead to minor to major problems since the commencement of construction projects until complete all the processes. Physical harm can potentially occur in any task during both construction and decommissioning. Despite control measures, some construction dust is unavoidable. During activities like cutting and grinding, operators are exposed to silica dust, which can be inhaled and lead to irreversible lung damage, as seen with the development of silicosis.

Thus, he can diagnose the malfunction of the lungs, which may lead to disabling or even fatal conditions, such as pulmonary fibrosis or cancer. In particular, labourers in the construction trades, drywallers and plasters as well as operators of heavy equipment face the greatest occupational health risks. Working at the height is one of the most common risks, ranging from less severe injuries to fatal accidents. Heavy machinery operators, especially those involved in piling, face a high risk of continuous exposure to high noise levels. Consequently, not only the operators but also the neighbours can suffer disordered sleeping patterns, sudden hearing loss, stress, headaches, high blood pressure due to temporary exposure to high noise level.

On the other hand, prolonged exposure to loud, consistent noise can cause permanent hearing loss and increases the risk of heart problems. Vibration is a hazard that leads to physical impairments, such as nerve damage, muscle pain, or joint issues. Short-term exposure to whole body and or to hand-arm vibration may result in temporary disability, but repeated exposure leads to chronic musculoskeletal disorder, nerve problems, blood vessels, dislocation of joints and spinal cord. A high level of prolonged exposure to vibrations triggers short-term health problems (e.g. migraine, difficulty concentrating, dizziness and pain). The workers who runs such machine are more likely to experience nerves, muscles, the dislocation of joints of backbone/ hand/ wrist/ arm causing hand-arm vibration syndrome (HAVS). In case of using generators, the constant exposure is more likely to suffer hearing loss problems.

Working in open or unshaded space is more likely to face with extreme heat as a result dehydration, headache, fatigue are the sign of short-term exposure. Otherwise, cardio-vascular issues, respiratory disorders and serious illness linked with the excessive high temperature can be faced. Construction workers are often required to lift heavy objects, which strains and fatigues their muscles. It can lead to chronic back pain, shoulder pain, and other musculoskeletal disorders. Repetitive tasks, such as hammering or drilling, can lead to discomfort and strain on workers' muscles over time. It can lead to injuries such as carpal tunnel syndrome, tendonitis, and bursitis. Other occupational disease risks include silicosis, pulmonary tuberculosis, asthma, COPD, and rheumatoid arthritis.

Electrical hazards arise frequently at construction and demolition stages. Due to the unskilled workers damaging equipment, cables and devices, workers can suffer from electrocution, burns, shock, fall, life-changing injuries or death. In some serious condition, the electrical danger is indirectly initiate the fire hazard. General physical hazard will extend in various situations such as wet floors, poor equipment, uneven walkways and other structural issues can cause slip, trips and fall which is an array of adverse scenario including; broken bones, traumatic brain injury, shoulder/joint dislocation or muscle pain and strain.

Furthermore, a sedentary lifestyle, repetitive jobs, and poor posture create an ergonomic hazard from static positions, which increases the potential for health issues in muscles, tendons, nerves, and tissues.

(b) Mitigation Measures

- Switch the duties or minimize the exposure of potential dust inhalation for those who operate grinding and cutting materials.
- Let them use respirator or face-mask and if possible ensure the working space is well ventilated.
- Even if the operator is wearing respiratory protection, he must require to limit the work in a dusty atmosphere.
- Before working at specific height, the worker should be a professional or competent with skillful, having a knowledge and experience how to response when the accident happens.
- Ensure the access equipment (ladder, scaffold and trestle) is suitable, stable and strong enough for the job, maintained and checked them regularly.
- Do pay the attention the labels' instruction on those work platforms with the aim of avoiding the overload on ladder.
- Make sure the ground level is even and take additional protection measures when working on or near the fragile sufaces.
- The construction site must have the rescue plan and additional precautions from the sudden fall the objects at height.
- Replace with the quiet power tool and equipment or modern construction devices to manage the noise pollution.
- Operating noisy machinery and equipment when fewer people are present. Limiting the amount of time that a worker is exposed to noisy areas. Establishing tranquil spaces where staff can rest during breaks.
- Maintaining and lubricating equipment and machinery as well as utilising noise barriers and other noise suppression equipment.
- As soon as noise impacts are mitigated, the source of vibration would be moderately controlled.
- Anti-vibration isolators should be placed under rotating machines to absorb vibrations, and a suitable isolation system should be used to create a comfortable and stable seat for vehicle occupants.
- Using soft rubber hand tools to control the speed quickly and avoid using electrical tools when working with heavy materials such as concrete.
- Provide the electrolyte to the worker for rehydration during the daytime.
- If possible, allowing workers to relax and take a break after working for a long time and warning them from relaxing next to vibration machines.
- If possible, arrange a shady area like a shelter and let the workers hold meetings, prepare tools or mix materials.

- A permanent umbrella must be provided for workers who are spending a long time working in a particular area, workers who are moving more frequently may benefit from a portable shade umbrella.
- Egronomic risk can be reduced by providing mechanical lifting equipment or implementing proper lifting techniques.
- Work schedule must be rotate and switch among workers and provide rest breaks to reduce the risk of ergonomic injuries.
- Keep dry the area where electrical accessories and wiring are mostly installed.
- It must ensure the voltage and current are within acceptable levels for the electrical appliances.
- Whenever maintenance is needed, replace old cables and wires with new ones, and have a certified electrician check the electrical currents and panels.
- Clear any obstacles such as electrical cables and wires at the walkway.
- Stand the safety sign especially at the risky area (wet floor, the potential of slip or trip) to raise the awareness to all the workers.

Risk Control Procedure by Contractor

- Prior to implementation of the project, it must establish well-defined safety policies and procedures that comply with local regulations and industry standards.
- These guidelines should encompass various aspects, such as working at heights, scaffolding, confined spaces, electrical safety, and emergency response plans.
- Regular audits and inspections can ensure adherence to these policies, identifying gaps that need improvement.
- Routine inspections are critical to identify potential hazards and ensure compliance with safety standards.
- Regular site walkthroughs by supervisors and safety professionals help identify and rectify unsafe conditions promptly.
- Providing adequate training is key to equipping construction workers with the knowledge and skills necessary to perform their tasks safely.
- Training programs should cover essential areas such as hazard recognition, proper use of equipment and tools, emergency response procedures, and ergonomics.
- The contractor must encourage open lines of communication between workers, supervisors, and management. Workers should feel comfortable reporting hazards, near misses, and incidents without fear of reprisal.
- The contractor focuses on safety should extend beyond physical hazards. The authorities of the project must promote workers' well-being by addressing factors such as mental health, fatigue management, and ergonomics.

- Encouraging work-life balance, providing access to counseling services, and facilitating rest breaks can contribute to a healthier and more engaged work force.
- Finally, the most important fact in this section is that contractors must provide and enforce the use of appropriate PPE for all workers, as general safety measures are dependent on their specific duties.

5.9.2.3. Biological Hazard

(a) Potential Risk in Construction/ Demolition Phases

To accomplish the project implementation and dismantling stages, a lot of workforce is crucial to meet the limited timeframe. Infectious diseases such as viral hepatitis, HIV/AIDS, and bacterial and viral illnesses like tuberculosis, cholera, COVID-19, and influenza are common at construction site. Another issue is poor hygiene and sanitation, which are ususally found in toilet and handwashing facilities. Workers often work and live in crowded spaces, such as break areas, work trailers, or temporary housing.

This makes the airborne transmission of respiratory infections like tuberculosis, influenza, and COVID-19 more likely. They can adversely affect human health in a variety of ways, ranging from relatively mild allergic reactions to serious medical conditions, even death. Many microbes reproduce rapidly and require minimal resources for survival, they are a potential danger in a wide variety of occupational settings. Secondly, breeding the disease vectors (mosquitoes, rats, and cockroaches) at the temporary housing camp will spread dengue fever, malaria, plague, rat-bite fever and some intestinal diseases.

(b) Mitigation Measures

- All the workplace area must have adequate welfare and washing facilities.
- The washing facility must involve suitable size of sink i.e., large enough to wash the hands, face and forearms.
- Preferably running water, soap (or other cleaning products) and towels (or other means of drying) must also be provided.
- In some circumstances, additional facilities may be needed. For example, when dealing with sewage, nail brushes and disposable paper towels should be provided in addition to the usual facilities.
- If heavy contamination is foreseeable, showers will also be appropriate.
- Practice good personal hygiene (washing and drying hands, covering mouth when sneezing or coughing, cleaning cuts and scratches).
- Covering existing cuts and grazes with waterproof dressings and/or gloves before starting work. If cuts and grazes occur during work, wash immediately with soap and running water and apply a waterproof dressing.
- It must have a label alongside a warning sign on the biohazard bag and sharps containers.
- It is essential to use protective clothing whenever handling the biohazard wastes.

- Instead of throwing all the food waste into one container, it must separate them into different containers. It is compulsory to provide enough waste containers conveniently located around the dining area.
- Containers must be easy to clean and have features like tight-fitting lids to contain odors and waste.
- Mandate for a regular waste disposal system at the workplace. It makes sure the bins are not overflowing with rubbish.
- The final designated disposal site for all waste, both dry and wet waste must be approved by YCDC.

Table 5-14 Risk Assessment of Occupational Health and Safety Hazard

Phases of Project	Risk	Hazard	Risk Index	
			Before Mitigation Measure	After Mitigation Measure
Construction/ Decommission	Air pollution	Chemical	3A (Intolerability)	3C (Tolerable)
	Water pollution		3A (Intolerability)	3D (Tolerable)
	Hazardous soild waste		3A (Intolerability)	2D (Acceptable)
Construction/ Decommission	Dust Pollution, Noise, Electricity, General accidents	Physical	3A (Intolerability)	2B (Tolerable)
Construction/ Decommission	Communicable diseases and vetor-brone diseases	Biological	3B (Tolerable)	2D (Acceptable)

CHAPTER 6
CUMULATIVE IMPACT ASSESSMENT

6.1. THE ROLE OF CUMULATIVE IMPACT ASSESSMENT (CIA) IN EIA STAGE

Cumulative impact analysis provides examining multiple chemicals, multiple sources, public health, environmental effects, and characteristics of the population that influence health outcomes. It means exposures, public health or environmental effects from the combined emissions and discharges, in a geographic area, including environmental pollution from all sources, whether single or multimedia, routinely, accidentally, or otherwise released. This impact assessment reveals significant changes in social and environmental factors not only for the proposed project but also for the individual activities. It can be deduced that CIA plays critical component for tracking the root cause of the problems as well as decision making for suitable environmental management in the EIA stage.

6.2. STAGES OF CUMULATIVE IMPACT ASSESSMENT (CIA)

The following steps are typically involved in conducting the CIA, in Figure 6-1:

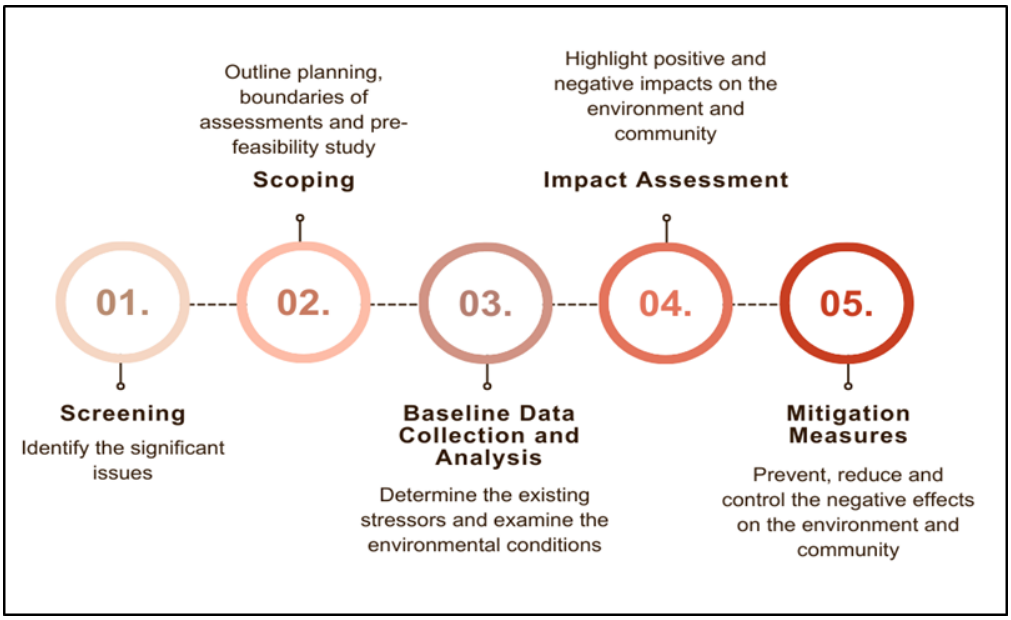


Figure 6-1 Workflow Diagram of the Cumulative Impact Assessment (CIA)

6.2.1. Screening

Screening is one of the most powerful tools for the CIA because of serving as a critical initial gateway to decide on the level of assessment. Professionals with extensive experience, knowledge as well as engaging with the local communities can implement the screening method even with insufficient data and information. It can highlight the key issues of the cumulative impacts, allow for the identification of potential areas of concern and communities, alongside saving the time-consuming process. As a consequence, the impact assessment can be completed more straightforwardly by excluding time-consuming processes, charges and focusing on more precise, specific environmental impacts.

6.2.1.1. Methodology of the Screening Method

The screening methodology was developed based on Cal/EPA's[20] working definition of cumulative impacts, and in consideration of existing approaches for assessing impacts on communities. This methodology screens for relative levels of cumulative impacts among communities using a scoring system based on five primary components identified from the working definition: exposures, public health and environmental effects, sensitive populations and socioeconomic factors (see Figure 6-2). The benefit of separating the components into these groups becomes evident when calculating cumulative impacts.

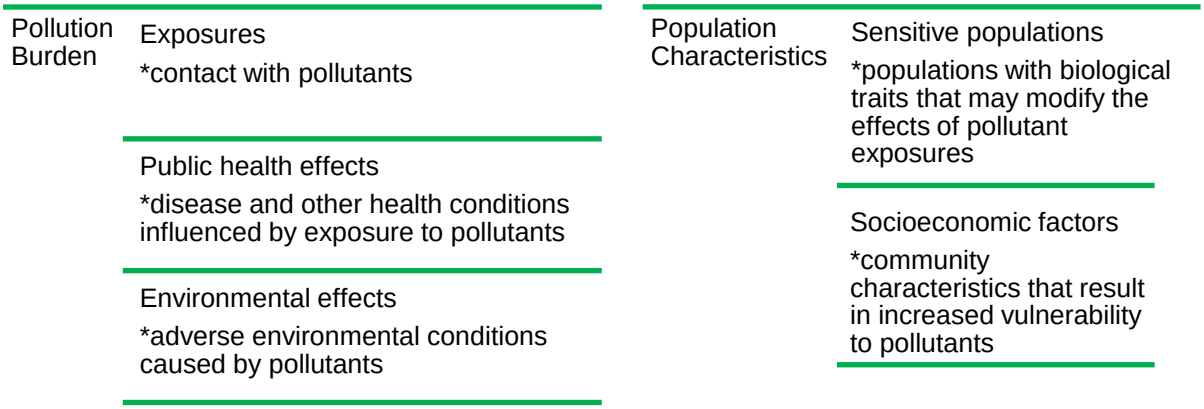


Figure 6-2 Five Components of Cumulative Impact

The core of the methodology reflects the community well-beings and environmental health through the two main factors (pollution burden and population characteristics). The final score for a census tract is calculated by multiplying these two components:

Cumulative Impact Score = (Pollution Burden Score) x (Population Characteristics Score)

A range of possible scores is assigned to each component, as shown in Table 6-1. The overall cumulative impact score ranges from 6–120, a range is large enough to distinguish impacts among communities.

Table 6-1 Range of Scores Assigned for Each Component

Criteria	Component	Range of Possible Scores
Pollution Burden	Exposures	1-10
	Public Health Effects	1-5
	Environmental Effects	1-5
Population Characteristics	Sensitive Population	1-3
	Socioeconomic Factors	1-3
	Cumulative Impact	6-120

[20] Cal/EPA : California Environmental Protection Agency

6.2.1.2. Classification the Ranges of Scores

The resulting scores can be interpreted as in Table 6-2.

Table 6-2 Interpretation of the Score Range

Score Range	Interpretation
High (Scores, closer to 120) (approximately 81 to 120)	Highest potential for cumulative impacts. These communities typically face a "double jeopardy" of having both a high pollution burden and vulnerable population characteristics. They are identified as priority areas for additional monitoring, targeted enforcement, or cleanup activities.
Intermediate (Scores, approximately 51 to 80)	Moderate potential for cumulative impacts. The contributing factors can vary. A community might have a high pollution burden but fewer vulnerable residents, or vice versa. Further investigation is needed to understand the specific drivers behind the score.
Low (Scores, closer to 6) (approximately 6 to 50)	Lower potential for cumulative impacts relative to other areas. These communities have a comparatively low burden of pollution and social vulnerability. A score of 13, for example, was recorded for a neighborhood considered the least-impacted in one analysis.

6.2.1.3. Assessing Cumulative Impact Using Screening Method

Based on the nature of construction industry, the construction phase may have more significant impacts than operational phase of the building. Construction involves heavy machinery, large amounts of materials, and extensive site disturbance, leading to high-intensity but short-term impacts like increased particulate matter, noise, water runoff, and soil erosion.

Even though individual construction impacts might seem small, the combined effects of various human activities in an area can accelerate to significant environmental degradation. Although the construction period is short-term, some of the permanent changes can be irreversible. A few negative impacts might be occurred during the operational phase, however, it can be easily mitigated or controlled. For this reason, the cumulative impact assessment will mainly focus on the construction and decommissioning phases of the project.

Prior to assessing the screening method, data are collected through the environmental, alongside the social-economic surveys of the local population. The survey was conducted among 10 households from each of the three townships near the project site, for a total of 30 households. The result of assessing cumulative impact using screening method is shown in Table 6-3.

Table 6-3 Result of Screening Method during Construction and Decommissioning Phases

Townships	Bahan Township	Yankin Township	
Wards	**Sayar San**	**5**	**6**
Population **No. of houses** **Household**	4,210 348 1,003	3,756 312 934	2,597 209 650
Exposure	6	7	
Public health effects	2	3	
Environmental effects	3	4	
Pollution Burden	**11**	**14**	
Sensitive population	1	2	
Socioeconomic factors	1	1	
Population Characteristics	**2**	**3**	
Cumulative Impact Scores	**22**	**42**	

6.2.1.4. Result Interpretation

According to the result of screening method across two townships, the scores fall within the 6 to 50 range, which reflects lower potential for cumulative impacts. Although the project is within Bahan Township boundary, its location is adjacent to Yankin Township especially 5 and 6 Wards. Thus, the impact rating is moderately higher than in the other township. Even though the construction activities are being conducted at the township, the minimal impact effect on the surrounding area can be observed.

The analysis transitioned to a cumulative impact assessment, the townships showed the highest exposure levels (between 1 and 10) when comparisons with the particular components of pollution burden and population characteristics. The emissions such as PMs (especially $PM_{2.5}$), traffic, various hazardous waste and solid waste facilities, are relevant with the exposure level. Moreover, drinking water contamination and lead exposure can be taken into account. For this reason, exposure will be a primary factor in the cumulative impact assessment; other indicators can be excluded because of the very low or negligible impact on the environment and community.

6.2.2. Scoping

The main objective of scoping is to ensure that the environmental studies provide all the relevant information on the impact of the project, focusing on the most important impacts, alternatives to the project, and any other matters to be included. Normally, the scoping process follows a screening method to define the boundaries of an investigation, to determine the specific environmental issues alongside the social factors. The need for more detailed cumulative impact assessment will depend on the situation in each case, such as the nature and scale of the proposed development and other relevant future projects, and the sensitivity of the surrounding environment to the compounding effects of other development.

Scoping can be achieved through the following four steps:

Step 1 – Initiation of Scoping, scoping can be initiated either by the developer requesting a scoping opinion from the competent authority (voluntary scoping) or can be mandatory, where the competent authority has to give an opinion on the scope of the EIA report.

Step 2 – Information needed to undertake scoping, the developers must provide to the competent authority with the information on the project in order to prepare a scoping opinion for them. The developer prepares a preliminary document that includes information on the project's specific characteristics, including the location, technical capacity, and a brief description of the project's likely impacts on the environment.

Step 3 – Scoping consultation involves consultations with the environmental authorities, local and regional authorities, other interested parties, and the public from the important parts of the process. Consultations help to ensure that all of the key impacts, issues, concerns, and interests are identified and taken into account.

Finally, in Step 4 – Scoping Opinion, the competent authority provides a scoping opinion, which identifies the content and extent of the information to be elaborated in the EIA report. The scoping opinion defines the scope of the environmental information to be submitted to the competent authority and the terms of reference (ToR) for the environmental studies to be undertaken to compile that information.

6.2.2.1. Temporal and Spatial Boundaries

The setting of temporal and spatial boundaries of CIA would also require for specific VECs. The duration of impacts considered on VECs is the lifetime of the proposed project, including the proposed project construction and operation phases. The proposed project is construction, and its investment period is about 30 years at initial and can be renewed 10 years for 2 times. However, it will be extended the lifespan in accordance with stipulated laws and regulations.

Regarding the geographic boundaries of the CIA, 3 km radius around the project site (2841.6 hectares) is set up as the study area by consideration of project characteristics and its regional geographical features. The influence area includes residential area, hospitals, government, and commercial buildings which are occupied as much as near the project area within 3 km radius around the project site. The location map of Cumulative Impact Spatial Boundary of the proposed project is shown in Figure 6-3.

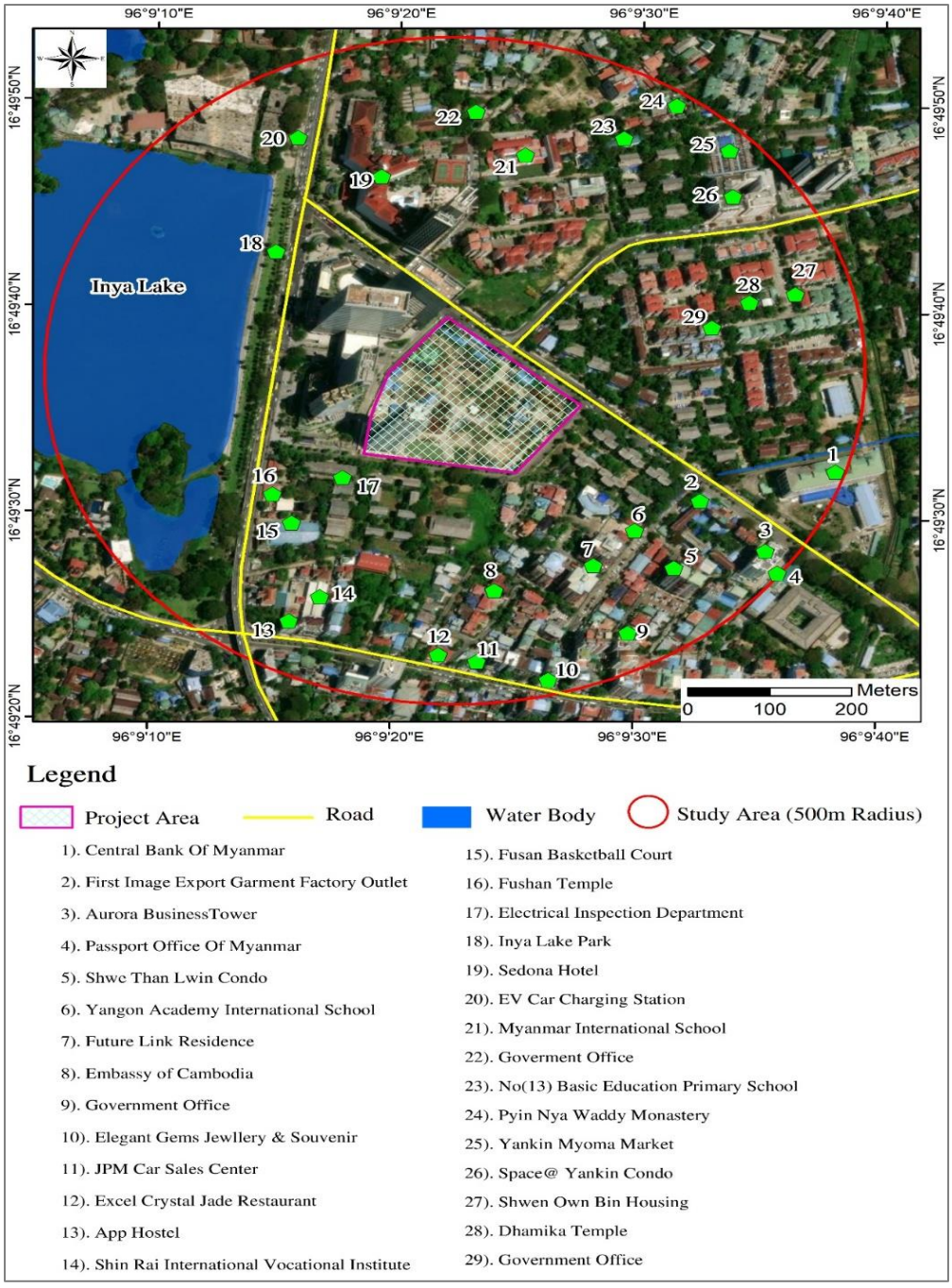


Figure 6-3 Cumulative Impact Spatial Boundary of the Project Area

6.2.3. Baseline Data Collection and Analysis

Baseline study for CIA helps in a deep understanding of the project area environment before starting any developing activities in the area. It offers detailed information on key environmental components. Baseline data are crucial for accurately monitoring and assessing changes over time, allowing for adaptive management strategies. The surrounding environmental baseline data of proposed project; air qualities, water qualities, noise and vibration level, and traffic survey, are carried out for dry season and rainy season within the study area as well as the social survey of the affected area, which are fully described in Chapter (4).

6.2.3.1. Potential Pathways for Cumulative Impacts

The most pathways such as air, water, general waste, hazardous waste, odor are to be considered as the common source of the cumulative impacts. Depend on the project types water has a high potential for collective impact over the others unless the project has the effective wastewater treatment method. Regarding the result of the screening method, exposure is a primary concern of the CIA in the construction stage.

6.2.4. Cumulative Impact Assessment

The assessment of impact significance would be undertaken in line with the methodology described in Chapter (5) Methodology of Significant Impact Assessment. The summary of methodology of impact assessment as follow:

Environmental Scores (ES) = Significant Impact (A group) x Probability (B group)

6.2.4.1. Environmental Scores (ES)

Refers to a numerical rating assigned to a project or activity based on its potential environmental impacts. ES can be determined the multiplication of significant impact and probability of the impact, can be noted as follows. The scores can be altered into the description through the numerical classification to easily understand the impacts intensity or the types of impacts (positive or negative) which is grouping in Table 6-4.

Table 6-4 Conversion of the Environmental Scores in Categories

Environmental Score	Class	Class (Numerical)	Description of the Category
108 to 72	+E	+5	Major positive change/impact
36 to 71	+D	+4	Significant positive change/impact
19 to 35	+C	+3	Moderately positive impact
10 to 18	+B	+2	Less positive impact
1 to 9	+A	+1	Reduced positive impact
0	N	0	No alteration/changes
-1 to -9	-A	-1	Reduced negative impact
-10 to -18	-B	-2	Less negative impact
-19 to -35	-C	-3	Moderately negatively impact
-36 to -71	-D	-4	Significantly negative impact
-72 to -108	-E	-5	Extremely negative impact

6.3. ASSESSMENT OF CUMULATIVE IMPACT ON EXPOSURE

In a cumulative impact assessment, exposure is represented across all potential routes, such as inhalation (air pollution), ingestion (contaminated water or food), and dermal contact (skin contact with chemicals). When connecting exposure to sources, it results from the various origin of pollutants such as hazardous waste storage site, solid waste facilities, human activities, traffic density and its proximity to roads. The project is near the area with a diverse range of street market, shopping mall, commercial, government, and residential buildings, indicating high activity and population density. Therefore, traffic congestion especially during the rush hours creates the high volume of toxic gas and fumes from the motor vehicles at the same time. Furthermore, the combination of the construction works of the project and the nature of the surrounding area may decline the environmental air quality.

Construction site may produce the hazardous wastes (for example; paints, varnishes) and adhesives, occasionally. Unless the site has systematic handling and management of that waste, it will become a source of chemical emission. If hazardous waste disposal site co-located with the local dump site, it poses a severe risk to human health and the environment due to potential soil, water, and air contamination from the hazardous materials leaking or migrating into the regular waste. Household wastes both from construction workers and residential area may create toxic chemicals and gases to the environment. The cumulative impact assessment is mentioned in Table 6-5.

Mitigation Measure

The negative impacts through the various factors (air, water, soild waste and hazardous materials, etc.) emanating from the proposed project can be minimized with the effective control measures as mentioned in Chapter 5. However, cumulative impact can result from the various point sources. Thus, the impact should be mitigated by the individuals as well as the related government authorities.

To address cumulative and disproportionate impacts, community organizations across the township and affected areas have campaigned for laws, regulations, and ordinances using strategies and tactics ranging from educating, to building the base of supporters, to taking direct action. Large coorporation, along with the people and instituations benefitting from the hazardous and pollution facilities, have more resources and influence than do individuals or households.

Table 6-5 Cumulative Imapct Assessment

Type of Impact	Activities and Source	Exposure Routes	Components	Group A A1 x A2	Group B B1+B2+B3	Environmental Score	Class	Description
Exposure	Traffic congestion	Air	Dust, PMs, CO_2, NO_x, CO and etc.,	-4	7	-28	-3	Moderately negatively impact
	Hazardoues waste dumping site	Surface water pollution during the heavy rain Heavy metals seep and infiltrate into the groundwater	Cement waste, paints, thinner, vanish removers, etc from construction	-3	7	-21	-3	Moderately negatively impact
			Damage electric appliances and lights from household					
	Solid waste disposal area	Surface water pollution during the heavy rain Breeding ground for insects and bacteria, and so on	Food scraps, containers from construction's workers	-2	7	-14	-2	Less negative impact
			Vegetable wastes, kitchen waste, food waste and scrape from local markets and household					

CHAPTER 7
ENVIRONMENTAL MANAGEMENT PLAN

7.1. INTRODUCTION

This chapter presents the Environmental Management Plan (EMP) of infrastructure development project. The EMP will be implemented during the construction phase, operation phase and decommission phase to ensure that the environmental condition is acceptable. This EMP provides the procedures and processes, which will apply to the project production activities to check and monitor compliance and effectiveness of the mitigation measure to HAGL has committed. In addition, this EMP was prepared in line with applicable environmental laws and regulations.

7.2. SCOPE OF THE ENVIRONMENTAL MANAGEMENT PLAN

The objective of the environmental management plan is to manage potential environmental issues by implementing proper mitigation measures and monitoring plan in compliance with the relevant laws and regulations stipulated by national authorities. Environmental management plan based on the basic principles of management is known as the P.D.C.A cycle (see Figure 7-1). Environmental management plan consists of four related tasks as described below:

- **Plan (P):What need to be done**

The planning phase includes reviewing applicable environmental policies (see Chapter 2), identifying the project activities that can cause adverse effects on the environment (see Chapter 5), implementing mitigation measures to manage the impacts of those activities and designing effective programs of proper environmental management plan.

- **Do (D):Implement the plan**

HAGL as described in this chapter will implement the monitoring measures based on the mitigation plan and environmental management plan for the potential environmental impacts appropriately.

- **Check (C):Monitor and evaluate the results of implementation**

The effectiveness of the mitigation measures will be monitored, evaluated and documented.

- **Act (A):Taking corrective actions to improve the results, if found inadequate**

If nonconformities or weakness in the environmental management plan were benchmarked, corrective actions are needed to plan for mitigating the existing environmental impacts.

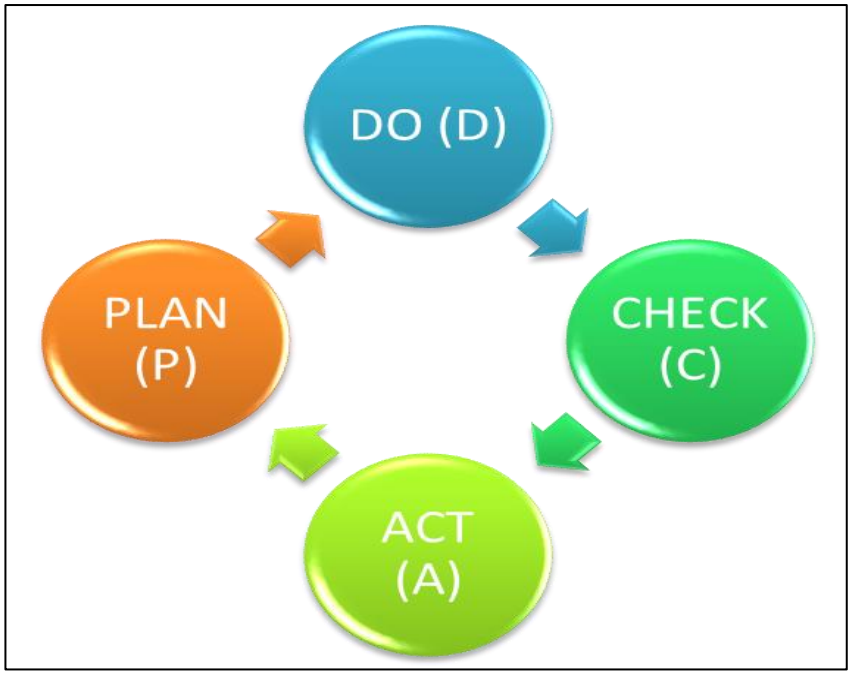


Figure 7-1 P.D.C.A. Cycle

7.3. INSTITUTIONAL ARRANGEMENT FOR SOCIO-ENVIRONMENTAL MANAGEMENT

With the socio-economic goals, the Health, Safety and Environment (HSE) team will be positioned directly under the project proponent or within the executive management team in order to integrate the environmental considerations into their core business strategies and decision-making processes. The HSE team is constituted with the public relations manager, environmental management team leader, emergency response team leader and occupational health and safety team leader, who are working under the supervision of HSE manager. The organization structure of HSE team is shown in Figure 7-2.

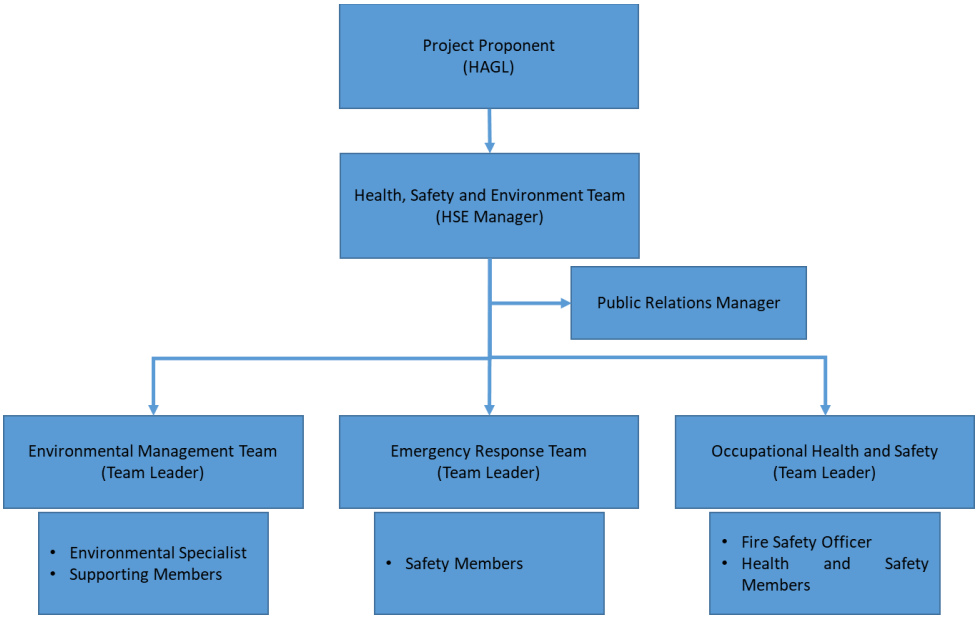


Figure 7-2 The Organization Structure of HSE Team

Under the HSE manager, the Environmental Management Team will be operated. In this team, the environmental management team leader is assigned to lead the entire EMP unit and conduct the regular environmental monitoring and maintenance of the project. Moreover, the environmental specialist may be hired to consult environmental impacts and potential risk assessment when suffering from the environmental pollutions. To implement day-to-day monitoring actions and support to the team leader, 8 to 10 supporting members are selected from each working section of proposed project. The ToR of Environmental Management Team Members are shown in Table 7-1.

Table 7-1 ToR of Environmental Management Team Members

No.	Position	Duties and Responsibilities
1.	Team Leader	Supervising to comply with the approved environmental management actions from ECD in line with national and international laws and regulations. Identifying, assesing and mitigating environmental risks and impacts associated with the organization's activities. Creating mitigation action plans, policies and procedures to minimize environmental impact, promote sustainability. Developing and delivering training programs to educate employees and other stakeholders on environmental best practices. Regularly submitting the environmental report to HSE manager once a month.
2.	Environmental Specialist	Raising awareness about environmental issues and promoting sustainable practices within the organizations. Conducting the assessment of environmental qualities and consulting the sustainable environmental sound manners and advices. Assisting in development of environmental strategies, monitoring compliance, managing waste and pollution to team leader.
3.	Supporting Members	Implementing the day-to-day environmental monitoring and management actions. Daily reporting to the team leader about environmental affirs.

In the emergency response team, the team leader will have the strong background on hazard identification and also experience in occupational health and safety. To support his team, the safety members will be chosen from each operation sections, who are trained for all emergency procedures of potential hazards. There are 10 to 15 staffs assigned in the emergency response team to monitor the environmental related problems and ensure the effective collaboration and communication with working staffs. The terms of reference (ToR) of Emergency Response Team members are described in.

Table 7-2 Terms of Reference of Emergency Response Team

No.	Position	Duties and Responsibilities
1.	Emergency Response Team Leader	Creating building site-specific emergency plans including personnel roles and functions, communication strategies and evacuation routes. Arranging first aid supplies, fire extinguishers and emergency contact lists among other resources. Implementing day-to-day safety procedures. Conducting risk assessments of workplace area upon the potential hazards explored by safety members.
2.	Safety members	Following the response plans and safety procedures and coordinating the policy makers and working staffs. Recording the emergency accidents and giving discussion to the team leaders, using learning from past experiences and occurrences.

In occupational health and safety (OHS) team, fire safety officer and health and safety members are reinforced to the team leader. Generally, there are 10 to 15 members observed to operate the OHS policy and procedures. The specific ToR of OHS team is shown in Table 7-3.

Table 7-3 Terms of Reference of Occupational Health and Safety Team

No.	Position	Duties and Responsibilities
1.	Team Leader	Provide the health and safety members with the necessary assistance, facilities and training to carry out their functions. Identify the risks and hazards to which persons may be exposed to. Analyze and evaluate the identified risks and hazards Create a plan of safe work procedures, including the use of any personal protective equipment or clothing and the undertaking of periodic “tookbox talks” or inductions before undertaking hazardous work, to mitigate, reduce or control the risks and hazards that have been identified. Submit the occupational health and safety report regularly to HSE manager once a month.
2.	Fire Safety Officer	Develop, implement and enforce fire safety policies and procedures within the workplace. Identify the fire hazards and assess the level of risk Implement the risk management strategies to reduce the likelihood of fires occurring in the workplace Conduct the fire safety training sessions for employees to educate them about fire hazards, proper use of firefighting equipment, and other relevant safety protocols.
3.	Health and Safety Members	Represent the interest and concerns of working staffs regarding health and safety matters. Actively participate in identifying hazards and assessing risks in the workplace. In collaboration with team leader, examine the causes of incidents and review the effectivieness of health and safety measures. Contribute to raising awareness about health and safety issues, promoting safe work practices and assisting in the delivery of training programs for employees.

7.4. SUMMARY OF PROJECT DESCRIPTION

The detail of information for project implementation are fully described in Chapter 3 and the summary of project description is shown in the following;

No.	Project Phase	Project Activities
1.	Construction Phase	The proposed HAGL Myanmar Project (Phase 2) is the development of commercial building, serviced apartment and residential units merged with green areas. The total land area of project site is 37,816.55 square meter and its elevation is about 14 meters above mean sea level. The phase 2 project consists of low to high rise residential and commercial building, including 5 units of 30- 33 storeys of high rise residential buildings, 1 unit of 28 storeys of high-rise office building and commercial centre, green areas, 2 to 4 levels of basement carpark and external areas. This project development was commerced in 2018 and expected to be fully completed in 2030. The maximum number of construction staff and workers is approximately 392 workers during construction period. The total numbers of construction workers in each day will vary depend on the type of construction work and schedule.
2.	Operation Phase	The proposed infrastructures includes residential units block (B1, B2 and B3), serviced apartment (A1 and A2) and commercial and serviced apartment (A3 and A4), in which the wastewater treatment system and waste management system are installed in line with the stipulated national laws and regulations.
3.	Decommissioning Phase	As the proposed project is the Mixed Use development, the decommissioning phase will depend on the maintenance and renovation activities of existing buildings. Moreover, proper usage of construction materials and structural design are the critical role in consideration of decommission time. The project designates all buildings to resist the physical and ecological disturbances for 50 years and the lifespan of buildings can also extend with maintenance and repair services. At the age of decommissioning, the demolition process will be carried out in compliance with the stipulated laws and regulation of Yangon City Development Committee and Ministry of Construction.

7.5. SUMMARY OF IMPACTS AND MITIGATION MEASURES

The detail of potential impact assessment and mitigation measurements are described in Chapter 5 and the summary of potential impacts and mitigation measures for the proposed project is shown in Table 7-4,Table 7-5 and Table 7-6.

Table 7-4 Summary Impacts and Mitigation Measures during Construction Phase

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
1.	**Air Quality** Emission of air pollutant such as particulate matter ($PM_{2.5}$ & PM_{10}), SO_2, CO_2, NOx, CO and VOCs to the atmosphere.	Before starting the construction process, the risk hazard areas are set up and declared by the notice signs and barriers. The water sprays are employed to minimize the airborne particulate matter during process. (Aviod the overwatering to the surrounding, which causes muddy ground) Adopting the sustainable manners by recycling materials from construction wastes, such as concrete and metal after examination of their strength. Prohibiting to heap the raw materials in the open space. Using the safety nets and shelters while transporting and piling of lightweight materials. Using efficient machines with low emission technologies for the ones that burn clean fossil fuels, eg. Unleaded and de-sulphurized fuels. Controlling the speed and operation of construction vehicles. Conducting regular maintenance and services of machines and engines. Educate and raise awareness of construction workers on emission reduction techniques.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget
2.	**Noise and vibration** Noise exposure to the surrounding environment Occupational hazards and structural damage due to virbration exposure	Substitute with the modern machines with low sound level and vibration proof system. Ensuring the well maintained equipments, which produce the less noise and vibration. Using the mat and fences or walls to absorb the vibration and noise level at point source.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Placing the noise sources (generators) away from the residential area, with noise barriers. Arranging the shifted work schedules and PPEs (earplugs) for workers in nosiy area. Using the sound proof generators and engines if possible. Aviod unnecessary revving of the engine. Making the construction schedules and informing nearby residents and businesses; provision of bill boards notifying of construction activities and timings.		
3.	**Water Quality** The surface runoff and storm water can carry the sediment particles, chemicals and debris from construction site, declining the water quality and negatively impacts on aquatic animals and plants	Prohibiting the piling of building materials on the open space, placing with shelters and cover. During construction, the design (of the drainage system) should ensure that surface flow is drained suitably into the public drains provided to control flooding within the site. The drainage should have suitable gradient and appropriate erosion control measures eg silt fences. The channels should be covered with gratings or other suitable and approved materials to prevent occurrence of accidents and entry dirt that would compromise flow of run-off. Storm water generated from roof catchments should be harvested, stored and made us in various household activities such as general cleaning to reduce run-off reaching the drainage channels. Providing the hygienic toilet or restroom with adequate septic tanks. Regular removing of sludges from septic tanks and making sercure not to cause the leakage.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget
4.	**Soil Quality** Changes in soil characteristics due to construction activities	Installing the temporary silt fence at the water spraying area. Ensuring proper handling and storing the fossil fuel, lubricant oil and grease. Removing the polluted soil immediately after spillage of oil.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Collecting the used engine oil and lubricants with safty containers and disposed as per their SOP. Preventing pollution from construction wastes by having specific sites for collection, sorting and transport of wastes. Ensuring there is enough space for normal percolation of water Installing cascades to break the impact of water flowing into the drains. Controlling the earthworks and ensuring the management of excavation activities by providing soil erosion control structures and controlling activities, especially on the steeper areaas of the site during the rainy season.		
5.	**Solid Waste** Generating the non-hazardous and hazardous wastes from construction activities.	**Non-hazardous Construction Wastes** Before starting, planning and anlayzing the type and quantity of waste generated during the process. Segregating the waste types (eg. Wood, concrete, metal) at pollution sources and heaping as per composition materials. Encouraging the reusable materials to reuse in the project site or resell to the local buyers. Disposing the waste that cannot be recycled or reused in accordance with local regulations and environmental guidelines. Forbidding the open burning of wastes. Ensuring all wastes are dumped in their designated areas and through legally acceptable methods Ensuring all dust bins with the covers are regularly cleaned and disinfected not to release offensive odor and leachate.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget
		Hazardous Construction Wastes Separating the hazardous and e-wastes from the usable waste, storing and disposing in accord with regional guidelines. Allocating responsibilities for waste management and identifying all sources of wastes, and ensuring wastes are handled by personnel licensed to do so.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Ensuring the environmentally safe area to temporarily store the hazardous waste where should be impermeable flooring and protecting rain and other weather hazards.		
6.	**Land Use and Utilization of Local Resources** Changes in land use type and increased pressure on utilities	Site clearing will be minimized with sustainable design and planning. Employing water conservation techniques and only using the required amounts of water to prevent wastage. Employing power saving techniques such as switching off equipment when not in use, using natural light whenever possible. Using machines with power saving technologies i.e. high efficiency equipment.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget
7.	**Traffic Condition** Increased the heavy traffic and traffic jam on the main road.	Placing signs around the site notifying other vehicles about the heavy traffic and to set the speed limit around the site. Ensuring all drivers for the project comply to speed regulations. Making sure the construction doesn't occupy the road reserves and complying to traffic and land demarcation obligations. Ensuring all vehicles used for the project are in good working condition both legally and commensurate to their intended use. Adequate parking lots will be constructed inside the compound in order to avoid parking beside the roads. Bus cars will be arranged for the workers in order to reduce the numbers of vehicles on the road.	Construction Constructor and Environmental Management Team of HAGL	Included in Construction Budget
8.	**Occupational Health and Safety** Causing the workplace accidents such as physical injuries, occupational diseases, etc	Providing the workplace safety training programme to ensure the safe handling and operation of heavy mechines and emergency equipments. Ensuring all potential hazards such as movable machine parts are labelled. Raising awareness and educating workers on risks from equipment and ensuring they receive adequate training on the use of the equipment. Providing the workers with adequate PPEs and monitoring regularly to ensure they are replaced on time when they wear out.	Construction Constructor and Occupational Health and Safety Team of HAGL	Included in Construction Budget

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Ensuring there is security in and around the site to control the movement of people. Providing fire fighting equipment and in easily accessible areas as well as ensuring site personnel are well trained to use them as well as maintaining them regularly. Labelling chemicals and material according to the risks they possess. Creating safe and adequate fire and emergency assembly points and making sure they are well labelled. Establishing emergency procedures against hazards and ensuring the workers stay aware/educated on following them and commensurate to the magnitude and type of emergency, by conducting regular drills and involving the neighbours.		

Table 7-5 Summary Impacts and Mitigation Measures during Operation Phase

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
1.	**Air Quality** Increasing the concentration of carbon and particulate matters in ambient air quality due to livelihoods of residents.	Using the renewable clean energy, environmental friendly refrigerants and mechines. Adopting the de-sulphurized and unleaded fuel in vehicles. Banning the burning of wastes and other materials at the site. Keeping the green space and green belts to absorb the carbon emitted from the residents.	Environmental Management Team of HAGL	5,000,000
2.	**Noise and vibration** Emitting the noise and vibration from the activities of daily living.	Erecting signs and notifying other users of noisy activities. Conducting all noisy activites during the day when permissible levels are higher. Controlling the noise through the design and layout of rooms and buildings. Identifying the acceptable noise and vibration level within the building and ensuring to be followed by all residents. Adopting the fine and penalties process if necessary. Creating the “No Honking” zones within the residential area, especially between 11:30 pm and 6:00 am. Getting the permission from building’s management committee when operating the renovation activities. Adopting the environmentally sound manners (using quieter equipments and anti-vibration mat) to minimize the noise and vibration during renovations.	Environmental Management Team of HAGL	5,000,000
3.	**Water Quality** Generating the domestic wastewater and grey water.	Installing the wastewater treatment system for all wastewater before discharging to the municipal drainage. Regularly investigating the performance of treatment system and carried out the required maintenance activities as per its SOP. Landscaping to ensure there are areas where water will percolate underground. Constructing proper drains and monitoring them to ensure there are no blockages. This also includes ensuring the size of the drains can accommodate storm flows during the rainy season.	Environmental Management Team of HAGL	5,000,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
4.	**Soil Quality** During operation phase, the potential hazard for soil pollution is really limited, causing the insignificant impact on soil characteristics and quality.	Keeping the soil with vegetative covers to minimize the weather erosion. Using the organic soil amendments like compost, aged manure and shredded leaves instead of chemical fertilizers in landscaping process to improve the soil quality. Carefully handling and storing of oil and grease in line with their SOP. Promptly removing of polluted soil when occurring the unexpected spillage or leakage.	Environmental Management Team of HAGL	5,000,000
5.	**Solid Waste** The domestic wastes are mainly generated.	**Non-hazardous Wastes** The garbage disposal system is designed to meet the YCDC guidelines. The segregated dust bins that are clearly labelled and marked with color are provided within the buildings. All bins are regularly cleaned and disinfected not to emit the leachate and offensive odor. Creating the regular waste collection system and waste disposing method in collaboration with Township Municipal. Ensuring all wastes are dumped in their designated areas and through legally acceptable methods. Making available suitable facilities for the collection, segregation and safe disposal of the wastes. Encouraging the reusable materials to reuse or resell to the local buyers. Ensuring waste bins are protected from rain and animals.	Environmental Management Team of HAGL	2,500,000
		Hazardous Wastes The main hazardous wastes are batteries, fluorescent ligh bulb and containers of pesticides emitted from housing. All hazardous wastes are collected and disposed separately by responsible personnel or organization in line with YCDC.	Environmental Management Team of HAGL	2,500,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Carefully handling with appropriate gloves not to contact with bare skin. For sharp objects, the safety containers should be used.		
6.	**Land Use and Utilization of Natural Resources** Changes in land use type and increased pressure on utilities	Aligning the project's objectives with those of national lanuse policies and development plan. Implementing water conservation techniques such as having faucets with automatic senser. Creating awareness through signs of conservation of water and electricity. Using natural light during the day for lighting purposes. Using machines and equipment with a high level of power efficiency in the offices and residential houses and servicing them as often as required to maintain their efficiency.	Environmental Management Team of HAGL	3,000,000
7.	**Traffic Condition** Increased the transportation vehicles and traffic jam on the main road.	Erecting visible and clear signs to control the movement of vehicles in and out of the proposed area. Having alternative entrances and exits for emergency operations. Arising knowlegles of traffic regulations to all drivers. Adequate parking lots will be constructed inside the compound in order to avoid parking beside the roads. Smart parking solutions that provide real-time information about parking availability to drivers will be developed in order to reduce the time spent searching for parking spaces, which contributes to traffic congestion.	Environmental Management Team of HAGL	3,000,000
8.	**Health and Safety** Impact on health and safety of residents due to improper building's management and security system.	Employing of security guards/competent security firm at the project area and searching all vehicles and people entering the project. Use of CCTV cameras to monitor security within the project area. Collaborating with the national police on security matters. Placing alarms around the project and establishing emergency preparedness and response procedures. Developing and promoting public hygiene to reduce community-base infections and epidemis through raising the awareness,	Health and Safety Team of HAGL	5,000,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		implementing strong waste management systems and encouraging reusing and recycling.		

Table 7-6 Summary Impacts and Mitigation Measures during Decommission Phase

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
1. .	**<u>Air Quality</u>** Emission of air pollutant such as particulate matter ($PM_{2.5}$ & PM_{10}), SO_2, CO_2, NOx, CO and VOCs to the atmosphere.	Declaring the demolition areas with notice signs and temporary fencing, along with dust containment barriers to protect public safety and dispersion of dust. Spraying the water mist during the demolition processes, where the large amount of water is prohibited, causing the muddy soil. Using the safety nets and appropriate covers while transporting the demolition wastes. Carefully dismantling a structure to salvage reusable materials, reducing dust emission and preserving valuable resources. Adopting the sustainable manners by recycling materials from demolition wastes, such as concrete and metal after examination of their strength. Prohibiting to heap the raw materials in the open space. Using efficient equipment and machines with efficient engines meaning low emission. Providing workers with Personal Protective Equipment such as face mask when operating heavy machinery in a dusty environment. Provision of bill boards at the site gates notifying people of the activities and timings.	Demolition contractor and HAGL	3,000,000
2.	**<u>Noise and vibration</u>** Noise exposure to the surrounding environment Occupational hazards and structural damage due to virbration exposure	Carrying out the decommissioning works only during 10:00 AM to 3:00 PM where permissible levels of noise are high Machineries should be maintained regularly to reduce noise resulting from friction.	Demolition contractor and HAGL	3,000,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
		Providing workers with Personal Protective Equipment such as earmuffs when operating noisy machinery and when in a noisy environment. Provision of bill boards at the site gates notifying people of the activities and timings. Shielding the area to reduce noise propagation. Substituting with the modern machines with low sound level and vibration proof system. Adopting the demolition techniques and actions, producing the less noise and vibration such as mitimizing the drop heights when unloading material. Using the sound proof generators and engines if possible.		
3.	**Water Quality** Generating the domestic wastewater and grey water. The surface runoff and storm water can carry the sediment particles, chemicals and debris, declining the water quality and negatively impact on aquatic animals and plants.	Prohibiting the heaping the demolition materials and debris on the open space without having shelters and covers. Conducting the suitable gradient of drainage channels to completely drain into the public drainage. Adopting the effective drainage system, embedding the erosion control measures such as silt fences. Ensuring the workers to use the oil absorbent pads while occurring the unexpected spillage of hydraulic oil, motor oil, brake fluid and other oil and greased in wastewater. Providing the hygienic toilet or restroom with adequate septic tanks. Regular removing of sludges from septic tanks and making sercure not to cause the leakage.	Demolition contractor and HAGL	3,000,000
4.	**Soil Quality** Declining the soil fertility and changes in soil characteristics due to the demolition activities.	Installing the temporary silt fence at the water spraying area. Ensuring proper handling and storing the fossil fuel, lubricant oil and grease. Removing the polluted soil immediately after spillage of oil. Performing the site preparation after demolition processes by creating vegetative covers for soil stabilization, reduced erosion and then restoration of ecological functions.	Demolition contractor and HAGL	3,000,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
5.	**Solid Waste** The demolition wastes and domestic wastes from staffs are mainly generated.	**Non-hazardous Demolition Wastes** Segregating the waste types (eg. Wood, concrete, metal) at pollution sources and heaping as per composition materials. Encouraging the reusable materials to reuse in the project site or resell to the local buyers. Disposing the waste that cannot be recycled or reused in accordance with local regulations and environmental guidelines. Adopting the regular collection and disposal of domestic wastes from working staffs by providing dust pins throughout site area. Setting up the temporary waste storage area where has impermeable floor and protective shelters to avoid the animals and seasonal disturbance. Forbidding the open buring of wastes.	Demolition contractor and HAGL	2,500,000
		Hazardous Demolition Wastes Segregating the hazardous wastes (such as lead-based paint, mecury, sharp objects and other chemicals remained in building) at pollution sources. Training the workers for proper identification and handling of hazardous wastes. Allocating the responsibilites for waste disposal to local municipal or the licensed waste management company. Providing the appropriate PPE and making available suitable facilities for collection, segregation and safe disposal of wastes.	Demolition contractor and HAGL	2,500,000
6.	**Traffic Condition** Increased the heavy vehicles.	Placing signs around the site notifying other vehicles about the heavy traffic and to set the speed limit around the site. Ensuring all drivers for the project comply to speed regulations. Making sure the demolition doesn't occupy the road reserves and complying to traffic and land demarcation obligations. Ensuring all vehicles used for the project are in good working condition both legally and commensurate to their intended use.	Demolition contractor and HAGL	2,000,000

No.	Potential Impact Assessment	Mitigation Measures	Responsible Team	Annual Cost (MMK)
7.	**Occupational Health and Safety** Causing the workplace accidents such as physical injuries, occupational diseases, etc	Providing the workplace safety training programme to ensure the safe handling and operation of heavy mechines and emergency equipments. Ensuring all potential hazards such as movable machine parts are labelled. Raising awareness and educating workers on risks from equipment and ensuring they receive adequate training on the use of the equipment. Providing the workers with adequate PPEs and monitoring regularly to ensure they are replaced on time when they wear out. Ensuring there is security in and around the site to control the movement of people. Providing fire fighting equipment and in easily accessible areas as well as ensuring site personnel are well trained to use them as well as maintaining them regularly. Labelling chemicals and material according to the risks they possess. Creating safe and adequate fire and emergency assembly points and making sure they are well labelled. Establishing emergency procedures against hazards and ensuring the workers stay aware/educated on following them and commensurate to the magnitude and type of emergency, by conducting regular drills and involving the neighbours.	Demolition contractor and Occupational Health and Safety Team of HAGL	3,000,000

7.6. SUMMARY OF MONITORING PLAN

Environmental monitoring plan is important for the effective execution and successful implementation of EMP. Environmental monitoring is a tool to judge environmental conditions and tends which support the proposed project's implementation, and develop information for reporting to national policymakers and the public. According to article 108 of EIA procedure (2015), the project proponent shall submit monitoring reports to the Ministry not less frequently than every six months, as provided in a schedule in the EMP.

Table 7-7 Summary of Monitoring Plan for Construction Phase

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
1.	Air Quality	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC	A1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Construction Phase	Construction Contractor and Environmental Management Team of HAGL	5,000,000
			A2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			A3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
			A4 Moe Nyin Wei Partthanar Monestery	16°48'26.96"N 96° 8'55.00"E			
			A5, Residential Area	16°49'33.56"N 96°10'46.94"E			
2.	Water Quality	pH, Temperature, TDS, Conductivity, Salinity	W1 (Water from Gyobyu Reservoir)	16°49'36.99"N 96°9'25.79" E	Once in Construction Phase	Construction Contractor and Environmental Management Team of HAGL	2,000,000
		pH, Temperature, TDS, Conductivity, Salinity, BOD5, COD, Free Cyanide, Phosphorous, Iron, Lead, Total Nitrogen, Oil and grease	W2, (Wastewater)	16° 49' 36.99" N 96° 9' 21.5" E			
3.	Noise Level	Day time and night time noise level	N1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Construction Phase	Construction Contractor and Environmental Management Team of HAGL	1,500,000
			N2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			N3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
			N4, Moe Nyin Wei Partthanar Monestery	16°48'26.96"N 96° 8'55.00"E			

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
			N5, Residential Area	16°49'33.56"N 96°10'46.94"E			
4.	Vibration Level	Peak particle velocity for vibration	V1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Construction Phase	Construction Contractor and Environmental Management Team of HAGL	2,500,000
			V2, Mingalar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			V3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
			V4, Moe Nyin Wei Partthanar Monestery	16°48'26.96"N 96° 8'55.00"E			
			V5, Residential Area	16°49'33.56"N 96°10'46.94"E			
5.	Non-Hazardous Waste	Amount and type of non-hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Construction Contractor and Environmental Management Team of HAGL	2,500,000
6.	Hazardous Waste	Amount and type of hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Construction Contractor and Environmental Management Team of HAGL	2,500,000
7.	Traffic Management	Increasing the number of heavy traffic Condition of traffic	Main transportation roads and around the project area		Weekly	Construction Contractor and Environmental Management Team of HAGL	1,500,000
8.	Occupational Health and Safety	All accident cases related to the factory.	Within the Project Compound		Weekly	Construction Contractor and Occupational Safety and Health Team of HAGL	2,000,000

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
		Health condition of communities in the factory All sickness related to work in the factory					

Table 7-8 Summary of Monitoring Plan for Operation Phase

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
1.	Air Quality	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC	A1, Project Site	16°49'35.43"N 96° 9'22.17"E	Twice a year (dry and wet seasons)	Environmental Management Team of HAGL	6,000,000
			A2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			A3, (Neik Ban Monestery),	16°49'20.00"N 96° 9'44.67"E			
2.	Water Quality	pH, Temperature, TDS, Conductivity, Salinity	W1 (Water from Gyobyu Reservoir)	16°49'36.99"N 96°9'25.79" E	Twice a year (dry and wet seasons)	Environmental Management Team of HAGL	4,000,000
		pH, Temperature, TDS, Conductivity, Salinity, BOD5, COD, Free Cyanide, Phosphorous, Iron, Lead, Total Nitrogen, Oil and grease	W2, (Wastewater)	16° 49' 36.99" N 96° 9' 21.5" E			
3.	Noise Level	Day time and night time noise level	N1, Project Site	16°49'35.43"N 96° 9'22.17"E	Twice a year (dry and wet seasons)	Environmental Management Team of HAGL	1,800,000
			N2 Mingalar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
			N3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
4.	Vibration Level	Peak particle velocity for vibration	V1, Project Site	16°49'35.43"N 96° 9'22.17"E	Twice a year (dry and wet seasons)	Environmental Management Team of HAGL	3,000,000
			V2 Mingalar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			V3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
5.	Non-Hazardous Waste	Amount and type of non-hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Environmental Management Team of HAGL	200,000
6.	Hazardous Waste	Amount and type of hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Environmental Management Team of HAGL	300,000
7.	Traffic Management	Increasing the number of heavy traffic Condition of traffic	Main transportation roads and around the project area		Weekly	Environmental Management Team of HAGL	300,000
8.	Occupational Health and Safety	All accident cases related to the factory. Health condition of communities in the factory All sickness related to work in the factory	Within the Project Compound		Weekly	Occupational Safety and Health Team of HAGL	500,000

Table 7-9 Summary of Monitoring Plan for Decommission Phase

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
1.	Air Quality	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC	A1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Demolition Phase	Demolition Contractor and Environmental Management Team of HAGL	5,000,000
			A2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			A3, (Neik Ban Monestery),	16°49'20.00"N 96° 9'44.67"E			
			A4 (Moe Nyin Wei Partthanar Monestery)	16°48'26.96"N 96° 8'55.00"E			
			A5 (Residential Area),	16°49'33.56"N 96°10'46.94"E			
2.	Water Quality	pH, Temperature, TDS, Conductivity, Salinity	W1 (Water from Gyobyu Reservoir)	16°49'36.99"N 96°9'25.79" E	Once in Demolition Phase	Demolition Contractor and Environmental Management Team of HAGL	2,000,000
		pH, Temperature, TDS, Conductivity, Salinity, BOD5, COD, Free Cyanide, Phosphorous, Iron, Lead, Total Nitrogen, Oil and grease	W2, (Wastewater)	16° 49' 36.99" N 96° 9' 21.5" E			
3.	Noise Level	Day time and night time noise level	N1, Project Site	16°49'35.43"N 96° 9'22.17"E	Once in Demolition Phase	Demolition Contractor and Environmental Management Team of HAGL	1,500,000
			N2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E			
			N3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
			N4, Moe Nyin Wei Partthanar Monestery	16°48'26.96"N 96° 8'55.00"E			
			N5, Residential Area	16°49'33.56"N 96°10'46.94"E			
4.	Vibration Level		V1, Project Site	16°49'35.43"N 96° 9'22.17"E			2,500,000

No.	Monitoring Item	Parameters	Location	Coordinate Points	Frequency	Responsible Team	Annual Estimated Cost (MMK)
		Peak particle velocity for vibration	V2, Minglar Zay Yone Monastery	16°49'50.59"N 96° 9'37.07"E	Once in Demolition Phase	Demolition Contractor and Environmental Management Team of HAGL	
			V3, Neik Ban Monestery	16°49'20.00"N 96° 9'44.67"E			
			V4, Moe Nyin Wei Partthanar Monestery	16°48'26.96"N 96° 8'55.00"E			
			V5, Residential Area	16°49'33.56"N 96°10'46.94"E			
5.	Non-Hazardous Waste	Amount and type of non-hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Demolition Contractor and Environmental Management Team of HAGL	2,500,000
6.	Hazardous Waste	Amount and type of hazardous wastes Disposal method	Segregated waste bin, temporary waste storage area and within the project compound		Weekly	Demolition Contractor and Environmental Management Team of HAGL	2,500,000
7.	Traffic Management	Increasing the number of heavy traffic Condition of traffic	Main transportation roads and around the project area		Weekly	Demolition Contractor and Environmental Management Team of HAGL	1,500,000
8.	Occupational Health and Safety	All accident cases related to the factory. Health condition of communities in the factory All sickness related to work in the factory	Within the Project Compound		Weekly	Demolition Contractor and Occupational Safety and Health Team of HAGL	2,000,000

7.7. SUB PLAN FOR ENVIRONMENTAL MANAGEMENT PLAN

According to Article 63, Section 8, Sub-section 8.6 of EIA Procedure (2015), the environmental management Sub-Plan is required to include in EMP implementation. Each monitoring Sub-Plan shall include objectives, legal requirement, overview maps, implementation schedule, management actions, monitoring plans, projected budgets and responsibilities. The environmental monitoring Sub-Plan for air quality, water quality, noise and vibration, non-hazardous waste management, hazardous waste management, traffic management sub plan, health and safety plan, emergency response plan as well as natural disaster management plan are as follows.

7.7.1. Air Quality Management Sub Plan

7.7.1.1. Objectives

The main objectives are to establish a framework for planning and managing air quality in a specific area through a combination of monitoring, assessment, and implementation of control measures. The key goad is to protect human health and the environment from the negative impacts of air pollution.

7.7.1.2. Relevant Law and Regulation

The air quality management is conducted by referring ambient air quality standards in National Environmental Quality (Emission) Guidelines 2015, were announced on 29th December 2015.

7.7.1.3. Construction Phase

7.7.1.3.1 Management Actions

Before starting the construction process, the risk hazard area are set up and declared by the notice signs and barriers. During the process, the water sprays are employed to minimize the airborne particulate matter, however, the overwatering to surrounding should be avoid, causing the muddy soil. The construction materials, especially sand and small gravel are prohibited to pile up on the open windy space and should place under the protective cover or safety nets. Within the construction area, the efficient machines with low emission technologies for the ones that burn fossil fuels and clean fuels. Moreover, controlling the speed and operation of construction vehicles and heavy mechines can reduce the dispersion of dust to the surrounding area. The regular investigation and maintenance activities of machines and engines should be conducted.

7.7.1.3.2 Monitoring Actions

The ambient air quality should be monitored within the construction area as per the following plan.

Construction Phase	
Monitoring Item	Ambient Air Quality
Monitoring Parameter	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC
Monitoring Frequency	Once in Construction Period
Estimated Annual Budgets	3,000,000 MMK
Responsibility	Construction Contractor and Environmental Management Team of HAGL
Mornitoring Location	A1 (Project Site), 16°49'35.43"N 96° 9'22.17"E
	A2 (Mingalar Zay Yone Monastery), 16°49'50.59"N 96° 9'37.07"E
	A3 (Neik Ban Monestery), 16°49'20.00"N 96° 9'44.67"E
	A4 (Moe Nyin Wei Partthanar Monestery), 16°48'26.96"N 96° 8'55.00"E
	A5 (Residential Area), 16°49'33.56"N 96°10'46.94"E

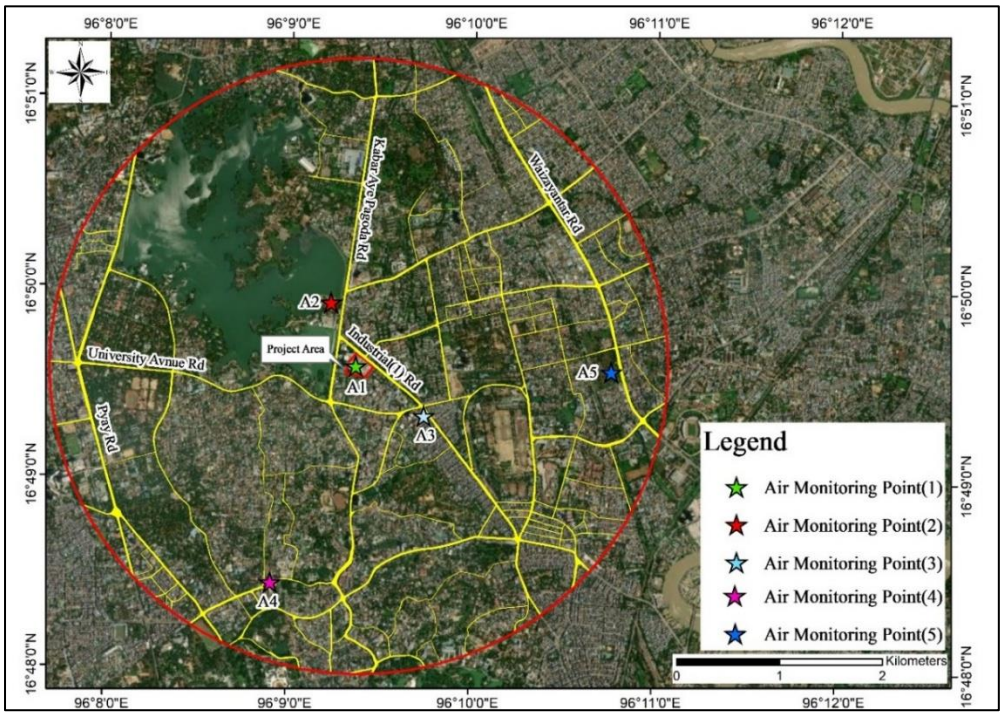


Figure 7-3 Location Map of Air Quality Monitoring for Construction Phase

7.7.1.4. Operation Phase

7.7.1.4.1 Management Actions

As the proposed project is Mixed-Use Development, air pollutants released from activities of daily living (ADLs) can only be contributed to the ambient air quality during operation phase. To minimize the potential negative impacts, utilization of renewable clean energy (solar power will be introduced to project which generate 4.598 MW per hour), environmental friendly refrigerants and machines are preferred. Moreover, the de-sulphurized and unleaded fuels should be adopted for motor engines and transportation vehicles. The

open burning of wastes and other materials is strictly prohibited within the residential area, whereas establishment of green space and green belts should be encouraged.

7.7.1.4.2 Monitoring Actions

The ambient air quality should be monitored within the residential area during operation phase as per the following plan.

Operation Phase	
Monitoring Item	Ambient Air Quality
Monitoring Parameter	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC
Monitoring Frequency	Twice a year (dry and wet seasons)
Estimated Annual Budgets	3,000,000 MMK
Responsibility	Environmental Management Team of HAGL
Mornitoring Location	A1 (Project Site), 16°49'35.43"N 96° 9'22.17"E
	A2 (Minglar Zay Yone Monastery) 16°49'50.59"N 96° 9'37.07"E
	A3 (Neik Ban Monestery), 16°49'20.00"N 96° 9'44.67"E

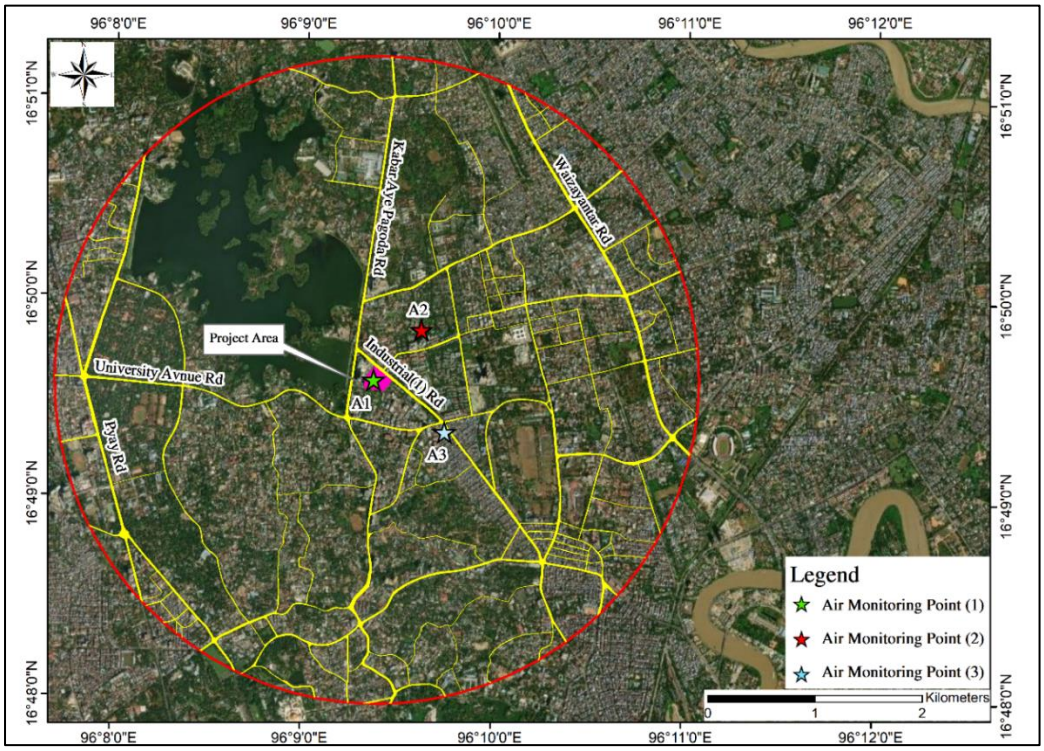


Figure 7-4 Location Map of Air Quality Monitoring for Operation Phase

7.7.1.5. Decommission Phase

7.7.1.5.1 Management Actions

The declaration of demolition area should be conducted with notice signs and temporary fencing, along with dust containment barriers to protect public safety and dispersion of dust. The appropriate dust control measures should be adopted at the point source, which means spraying water mist on dusty space, using safety net while transporting and heaping

of demolition wastes and using de-sulphurized fuel for operation of motor engines. Carefully dismantling a structure to salvage reusable materials can reduce the dust emission and preserve the valuable resources by recycling the reusable demolition wastes. Moreover, the appropriate personal protective equipments ($PM_{2.5}$ face mask) should be provided to freely be used for demolition workers and the shifted work schedule should be assigned to the workers who working in the dusty area.

7.7.1.5.2 Monitoring Actions

The ambient air quality should be monitored within the construction area as per the following plan.

Decommission Phase	
Monitoring Item	Ambient Air Quality
Monitoring Parameter	CO_2, CO, CH_4, NO_2, O_3, PM_{10}, $PM_{2.5}$, SO_2, VOC
Monitoring Frequency	Once in Decommission Period
Estimated Annual Budgets	3,000,000 MMK
Responsibility	Site Contractor and Environmental Management Team of HAGL
Mornitoring Location	A1 (Project Site), 16°49'35.43"N 96° 9'22.17"E
	A2 (Mingalar Zay Yone Monastery), 16°49'50.59"N 96° 9'37.07"E
	A3 (Neik Ban Monestery), 16°49'20.00"N 96° 9'44.67"E
	A4 (Moe Nyin Wei Partthanar Monestery), 16°48'26.96"N 96° 8'55.00"E
	A5 (Residential Area), 16°49'33.56"N 96°10'46.94"E

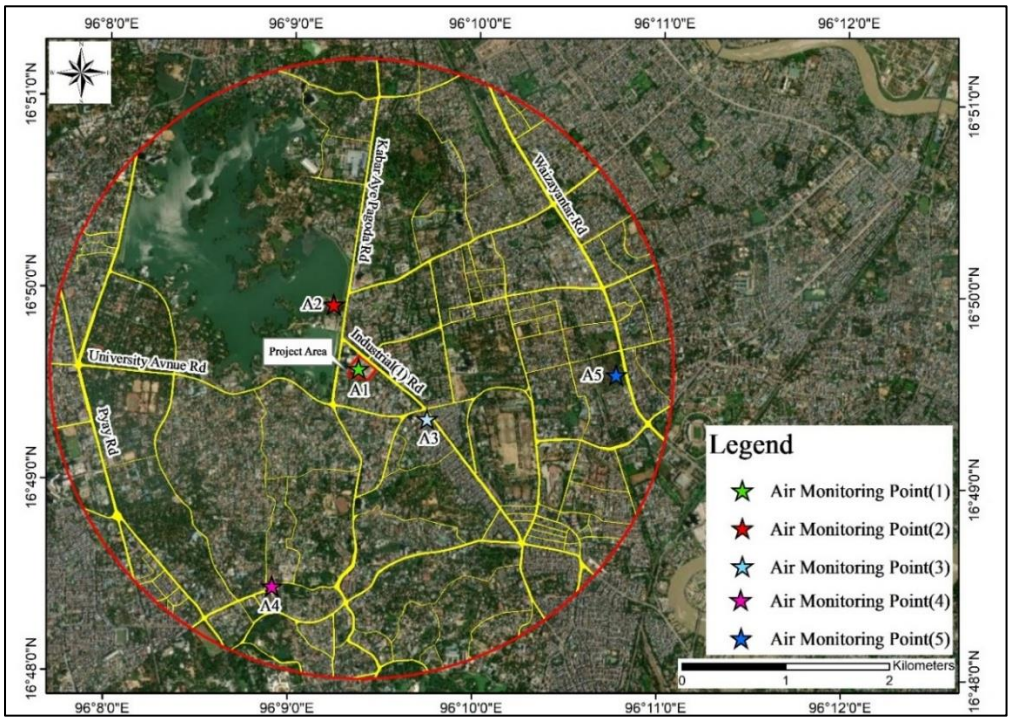


Figure 7-5 Location Map of Air Qaulity Monitoring for Decommission Phase

7.7.2. Wastewater Quality Management Sub Plan

7.7.2.1. Objectives

The main objectives are to establish a framework for planning and managing water quality in a specific area through a combination of monitoring, assessment, and implementation of control measures. The key goal is to protect human health and the environment from the negative impacts of water pollution.

7.7.2.2. Relevant Law and Regulation

The proposed project will comply with the general application from effluent guidelines of NEQEG (2015), National Drinking Water Quality Guidelines (2019) and National Surface Water Quality Standards (2024).

7.7.2.3. Construction Phase

7.7.2.3.1 Management Actions

During construction, the design (of the drainage system) should ensure that surface flow is drained suitably into the public drains provided to control flooding within the site. The suitable gradient of drainage channels will perform the self-cleaning. The channels should be covered with gratings or other suitable and approved materials to prevent occurrence of accidents and entry dirt that would compromise flow of run-off. In addition, the installation of the erosion control measures eg. silt fences in construction site can significantly reduce the concentration of suspended solid in wastewater. Moreover, roof catchment should be installed to harvest, store and reuse the storm water for various household activities such as general cleaning, which can reduce the run-off reaching the drainage channels. Regarding the grey water, the adequate hygienic septic tank are provided, where sludges are regularly removed from septic tanks should be conducted during construction period.

7.7.2.3.2 Monitoring Actions

The water quality should be monitored within the construction area as per the following plan.

Construction Phase	
Monitoring Item	Water Quality
Monitoring Parameter	**Gyobyu Reservoir** pH, BOD, COD, TSS, Ammonium-Nitrogen (NH_4^+-N), Oil and grease, lead (Pb)
	Wastewater pH, Temperature, TDS, Conductivity, Salinity, BOD_5, COD, Free Cyanide, Phosphorous, Iron, Lead, Total Nitrogen, Oil and grease
Monitoring Frequency	Once in Construction Phase
Estimated Annual Budgets	3,000,000 MMK
Mornitoring Location	W1 (Gyobyu Reservoir), 16° 49' 36.99"N 96° 9' 25.79” E
	W2 (Wastewater Quality), 16° 49' 36.99" N 96° 9’ 21.5” E

Figure 7-6 Location Map of Water Quality Monitoring for Construction Phase

7.7.2.4. Operation Phase

7.7.2.4.1 Management Actions

The water treatment system is installed to treat the wastewater generated from buildings before disposing to the municipal drainage. To obtain the optimal performance, the regular investigation of treatment system and carried out the required maintenance activities as per its SOP. Generally, domestic wastewater can be seen in the operation phase, however, the volume of wastewater generation cannot be estimated. The design of landscaping should focus on the concept of rainwater harvesting and should not disturb the natural water flowing pattern. During operation, the networks of drainage channels should be investigated to ensure there is no blockages of water. Another effective approach for water and energy saving systems will monitor with the sensor system. Currently, the system is under consideration and being discussed with the technicians, the project proponent cannot provide detail explaination at this time.

7.7.2.4.2 Monitoring Actions

The water quality during operation phase should be monitored as per the following plan.

Operation Phase	
Monitoring Item	Water Quality
Monitoring Parameter	**Gyobyu Reservoir** pH, BOD, COD, TSS, Ammonium-Nitrogen (NH_4^+-N), Oil and grease, lead (Pb)
	Wastewater BOD_5, Ammonia, Arsenic, Cadmium, COD, Chlorine (total residual), Chromium (hexavalent), Chromium (total), Copper, Cyanide (free), Cyanide (total), Fluoride, Heavy metals (total), Iron, Lead, Mercury, Nickel, Oil and grease, pH, Phenols, Selenium, Silver, Sulfide, Temperature increase, Total coliform bacteria, Total phosphrous, Total suspended solids, Zinc
Monitoring Frequency	Twice a year (dry and wet seasons)
Estimated Annual Budgets	6,000,000 MMK
Mornitoring Location	W1 (Gyobyu Reservoir), 16° 49' 36.99"N 96° 9' 25.79" E
	W2 (Wastewater Quality), 16° 49' 36.99" N 96° 9' 21.5" E

Figure 7-7 Location Map of Water Quality Monitoring for Operation Phase

7.7.2.5. Decommission Phase

7.7.2.5.1 Management Actions

During the decommison phase, the heaping of demolition materials and debris on the open space should be prohibitied to control the blockages of drainage channel caused by the surface runoff and storm water. The erosion control measures such as silt fences should be installed in the area where water spraying and earthwork activities are performed. Moreover, the provision of oil absorbent pads can remove the oil and grease level in wastewater due to unexpected spillage of hydraulic oil, motor oil and brake fluid. Within demolition site, the hygienic toilet and septic tanks should be arranged for all workers and all sewage sludges should be removed regularly. As a sustainable water consumption behaviors, the domestic wastewater generated from the activities of daily living of working staffs (such as bathing, cleaning and washing) is encouraged to be reused in the tree planting and dust control measures.

7.7.2.5.2 Monitoring Actions

The water quality during demolition phase should be monitored as per the following plan.

Decommission Phase	
Monitoring Item	Water Quality
Monitoring Parameter	**Gyobyu Reservoir** pH, Temperature, TDS, Conductivity, Salinity
	Wastewater pH, Temperature, TDS, Conductivity, Salinity, BOD_5, COD, Free Cyanide, Phosphorous, Iron, Lead, Total Nitrogen, Ammonium-Nitrogen (NH_4^+-N), Oil and grease
Monitoring Frequency	Once in Decommission Phase
Estimated Annual Budgets	3,000,000 MMK
Mornitoring Location	W1 (Gyobyu Reservoir), 16° 49' 36.99"N 96° 9' 25.79” E
	W2 (Wastewater Quality), 16° 49' 36.99" N 96° 9’ 21.5” E

Figure 7-8 Location Map of Water Quality Monitoring for Decommission Phase

7.7.3. Noise and Vibtration Level Management Sub Plan

7.7.3.1. Objectives

The main objectives are to establish a framework for planning and managing noise and vibration level in a specific area through a combination of monitoring, assessment, and implementation of control measures. The key goal is to protect human health and the environment from the negative impacts of noise and vibration pollution.

7.7.3.2. Relevant Law and Regulation

The proposed project will comply with the National Environmental Quality (Emission) Guidelines for noise level and the German Standard DIN 4150-3 for vibration level.

7.7.3.3. Construction Phase

(a) Management Actions

Before starting the construction, the working plan should be set up and notified to the surrounding environments, by sharing construction activities and timings as well as erecting the notice sign board. In working plan, the noisy construction works are assigned with shifted schedules only in daytime. The construction machines employed the low sound level and vibration proof system are prioritized to adopt in the workplace area and all of them are regularly investigated their joints of components and conducted with the maintenance activities as per their standard operation procedures. At the point source pollution, the control measures (using anti-vibration pad and noise barriers) should be installed, especially in generator room. Not only provision of personal protective equipments (ear plugs, gloves, etc)

to workers but also the regular monitoring and recording of the noise and vibration level have to be conducted.

(b) Monitoring Actions

The noise and vibration level for construction phase should be monitored as per the following plan.

Construction Phase	
Monitoring Item	Noise and vibration level
Monitoring Parameter	Day time and night time noise level Peak particle velocity for vibration
Monitoring Frequency	Once in Construction Phase
Estimated Annual Budgets	3,000,000 MMK
Mornitoring Location	N1, V1 (Project Site), 16°49'35.43"N 96° 9'22.17"E
	N2, V2 (Minglar Zay Yone Monastery), 16°49'50.59"N 96° 9'37.07"E
	N3, V3 (Neik Ban Monestery), 16°49'20.00"N 96° 9'44.67"E
	N4, V4 (Moe Nyin Wei Partthanar Monestery), 16°48'26.96"N 96° 8'55.00"E
	N5, V5 (Residential Area), 16°49'33.56"N 96°10'46.94"E

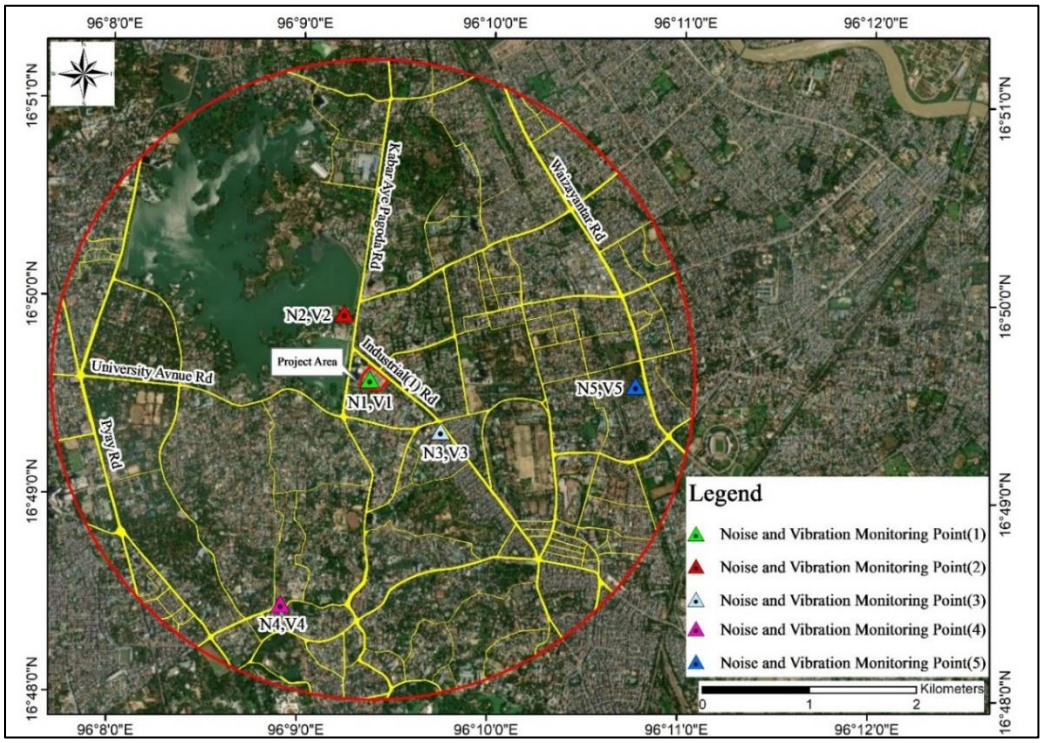


Figure 7-9 Location Map of Noise and Vibration Monitoring for Construction Phase

7.7.3.4. Operation Phase

(a) Management Actions

During operation, the noisy activities are permitted only during the day time. The appropriate room design and layout to control the noise level should be preferred. The acceptale noise and vibration level within the building should be informed to all residents, making to be followed and if not, fine and penalities process should be adopted. The residents are responsibilities to get the permission from the building's management committee when operating the renovation activities. Within the public recreation area, "No Honking" zones are created.

(b) Monitoring Actions

The noise and vibration level during operation phase should be monitored as per the following plan.

Operation Phase	
Monitoring Item	Noise and vibration level
Monitoring Parameter	Day time and night time noise level Peak particle velocity for vibration
Monitoring Frequency	Twice a year (dry and wet seasons)
Estimated Annual Budgets	4,800,000 MMK
Mornitoring Location	N1, V1 (Project Site), 16°49'35.43"N 96° 9'22.17"E
	N2, V2 (Minglar Zay Yone Monastery), 16°49'50.59"N 96° 9'37.07"E
	N3, V3 (Neik Ban Monestery), 16°49'20.00"N 96° 9'44.67"E

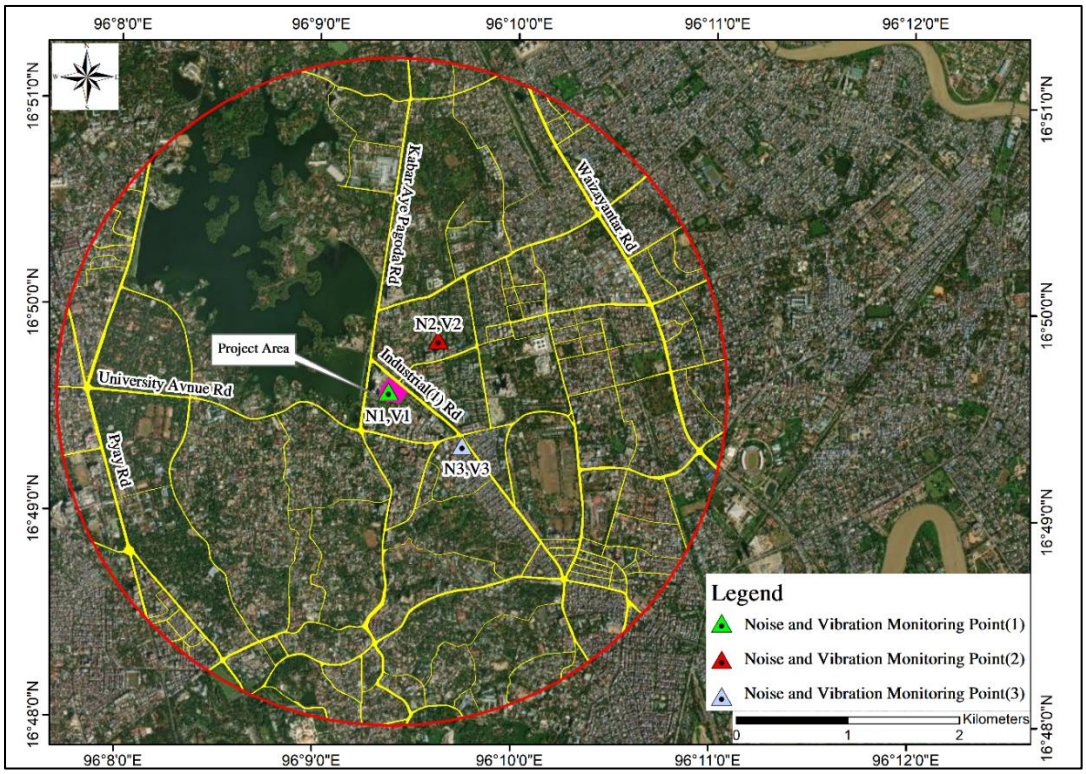


Figure 7-10 Location Map of Noise and Vibration Monitoring for Operation Phase

7.7.3.5. Decommission Phase

(a) Management Actions

The decommission activities should be carried out only during 10:00 AM to 3:00 pm where the permissible levels of noise are high. The demolition machines should be monitored and maintained regularly to reduce noise resulting from friction. The advanced demolition techniques and actions should be adopted to produce the less noise and vibration such as mitimizing the drop heights when unloading materials. The modern technique and mechines with low sound and vibration level should be prioritized to adopt in the workplace area. The provision of Personal Protective Equipment such as earmuffs should be conducted in the operation area of noisy machines.

(b) Monitoring Actions

The noise and vibration level should be monitored for decommission phase as per the following plan.

Decommission Phase	
Monitoring Item	Noise and vibration level
Monitoring Parameter	Day time and night time noise level Peak particle velocity for vibration
Monitoring Frequency	Once in Decommission Phase
Estimated Annual Budgets	3,000,000 MMK
Mornitoring Location	N1, V1 (Project Site), 16°49'35.43"N 96° 9'22.17"E
	N2, V2 (Minglar Zay Yone Monastery), 16°49'50.59"N 96° 9'37.07"E
	N3, V3 (Neik Ban Monestery), 16°49'20.00"N 96° 9'44.67"E
	N4, V4 (Moe Nyin Wei Partthanar Monestery), 16°48'26.96"N 96° 8'55.00"E
	N5, V5 (Residential Area), 16°49'33.56"N 96°10'46.94"E

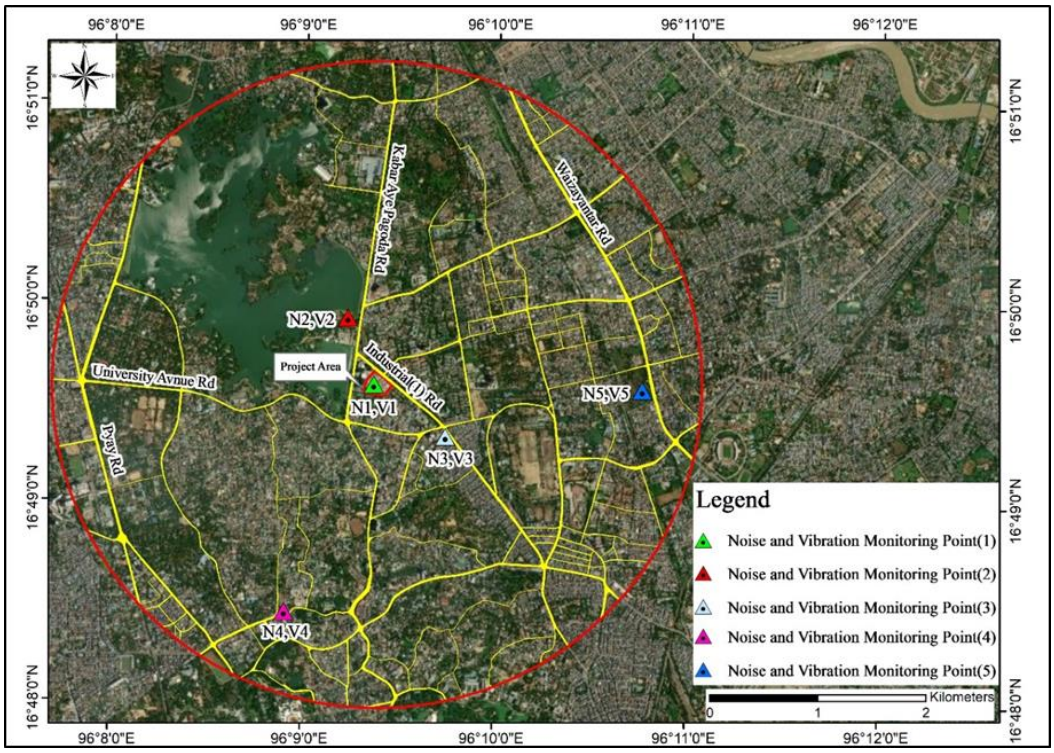


Figure 7-11 Location Map of Noise and Vibration Monitoring for Decommission Phase

7.7.4. Non-hazardous Solid Waste Management Sub Plan

7.7.4.1. Objectives

The main objectives are to establish a framework for planning and managing solid waste in a specific area through a combination of monitoring, assessment, and implementation of control measures. The key goal is to protect human health and the environment from the negative impact of waste pollution.

7.7.4.2. Relevant Law and Regulation

The proposed project will comply with the general guidelines of NEQEG (2015) and Yagon Municipal Law.

7.7.4.3. Construction Phase

(a) Management Actions

During construction, the non-hazardous wastes; wood, concrete, metals, rubbles etc are mainly released from the siteworks and domestic wastes are also generated from workers. Depending on their components and nature, all wastes are segregated into the reusable, nonreusable and organic wastes before heaping on the temporary waste storage area. All reusable materials are encouraged to reused in the project site or resell to the local buyers, whereas the waste that cannot be recycled or reused are disposed regularly by the Township municipals in accordance with the local regulations and environmental guidelines. Open burning of wastes are strictly prohibited.

(b) Monitoring Actions

The non-hazardous solid waste should be monitored for construction phase as per the following plan.

Construction Phase	
Monitoring Item	Non-hazardous waste
Monitoring Parameter	Amount and type of non-hazardous wastes Disposal method
Monitoring Frequency	Once in Construction Phase
Estimated Annual Budgets	2,500,000 MMK
Mornitoring Location	Segregated waste bin, temporary waste storage area and within the project compound

7.7.4.4. Operation Phase

(a) Management Actions

The waste segregation system should be adopted within the project area by separating at the point source with segregated dust bins marked with different colors. All dust bins should be disinfected and completely covered by shelters to protect from animals and weather condition (impact of rain and wind). All wastes are regularly collected and disposed at the designatd dumping areas by the Township Municipal or licensed waste management company. The odor-producing wastes such as kitchen waste and food scraps, those will be thrown away everyday.

Based on the mix-used building feature, the best way to approach the 3 R waste management system is raising the public awareness by attaching posters the idea of the substituting recyclable items and setting the colour coded bins will be provided depend on the type of wastes (wet and dry wastes, plastic waste and hazardous waste). It is difficult to estimate the number of bins and waste-generation ratio currently; however, waste containers will be placed adequately every corner of the coridors. The awareness programs of environmental conservation activities should be conducted with the aim of enhancing the 3 R waste management method (reduce, reuse and recycle) and also reducing the amount of waste generated from domestic buildings.

Sludge can be found at the wastewater treatment process, and then disposed of by YCDC. Firstly, contact the township municipal office by preparing a formal letter and requesting in person. The contact numbers for the township municipality will be attached at the waste collecting area. The frequency of sludge and all types of wastes are discharged depends on the volume of sludge generated.

(b) Monitoring Actions

The non-hazardous solid waste should be monitored during operation phase as per the following plan.

Operation Phase	
Monitoring Item	Non-hazardous waste
Monitoring Parameter	Amount and type of non-hazardous wastes Disposal method
Monitoring Frequency	Twice a year (dry and wet seasons)
Estimated Annual Budgets	2,500,000 MMK
Mornitoring Location	Segregated waste bin, temporary waste storage area and within the project compound

7.7.4.5. Decommission Phase

(a) Management Actions

The released demolition debris should be segregated into the recyclable and non-recyclable materials, heaping separately as per their type. All reusable materials are encouraged to recycle or resell to the local buyers to reduce the amount of waste disposal. The non recyclable wastes are disposed to the designated dumping area in accordance with the local regulations and environmental guidelines. The temporary waste storage area should be set up the area where has the impermeable floor and protective cover to avoid the animals and seasonal disturbance. The open burning of organic and inorganic wastes are strictly prohibited throughout the project timeline.

(b) Monitoring Actions

The non-hazardous solid waste should be monitored for decommission phase as per the following plan.

Decommission Phase	
Monitoring Item	Non-hazardous waste
Monitoring Parameter	Amount and type of non-hazardous wastes Disposal method
Monitoring Frequency	Once in Decommission Phase
Estimated Annual Budgets	2,500,000 MMK
Mornitoring Location	Segregated waste bin, temporary waste storage area and within the project compound

7.7.5. Hazardous Waste Management Sub Plan

7.7.5.1. Objectives

The main objectives are to establish a framework for planning and managing solid waste in a specific area through a combination of monitoring, assessment, and implementation of control measures. The key goal is to protect human health and the environment from the negative impacts of waste pollution.

7.7.5.2. Relevant Law and Regulation

The proposed project will comply with the general guidelines of NEQEG (2015).

7.7.5.3. Construction Phase

(a) Management Actions

The hazardous wastes emitted from construction site are old batteries, fluorescent light, container of paints, sharp object and used engine oil, which are stored and collected by safety containers and disposed as per standard operation procedures. To achieve the proper handling of hazardous wastes, the appropriate safety facilities and PPE should be provided for selection, segregation and disposal of waste. The awareness training program of hazardous waste are conducted to the construction staffs to manage with minimal environmental impacts. All hazardous wastes are disposed at their designated dumping site in line with local regulation by Township Municipal or licensed waste management company.

(b) Monitoring Actions

The hazardous wastes should be monitored during contruction phase as per the following plan.

Construction Phase	
Monitoring Item	Hazardous waste
Monitoring Parameter	Amount and type of hazardous wastes Disposal method
Monitoring Frequency	Once in Construction Phase
Estimated Annual Budgets	2,500,000 MMK
Mornitoring Location	Segregated waste bin, temporary waste storage area and within the project compound

7.7.5.4. Operation Phase

(a) Management Actions

The domestic hazardous wastes such as batteries, fluorescent ligh bulb, used engine oil and empty containers of pesticides are produced during operation stage. During handling of chemical and acid based wastes, it is noticed to wear the safety gloves or safety clothing before contact. For the sharp object and used engine oil, the safety containers should be used and clearly labelled while disposing. According to their potential hazard, the wastes are handled as per their prescriptions and disposed at the permissible dumping site of Township municipal in line with national and regional laws and regulations.

(b) Monitoring Actions

The hazardous wastes emitted from the operation stage of proposed project should be monitored as per the following plan.

Operation Phase	
Monitoring Item	Hazardous waste
Monitoring Parameter	Amount and type of hazardous wastes Disposal method
Monitoring Frequency	Twice a year (dry and wet seasons)
Estimated Annual Budgets	2,500,000 MMK
Mornitoring Location	Segregated waste bin, temporary waste storage area and within the project compound

7.7.5.5. Decommission Phase

(a) Management Actions

During demolition, the hazardous wastes (such as lead-based paint, mercury, sharp objects and other chemicals remained in building) are segregated at the pollution point sources. The training for proper identification and handling of hazardous wastes should be provided to the workers. Moreover, the licensed waste management service company should be allocated the responsibilities for waste disposal in line with municipal regulations and guidelines. The suitable facilities for collection, segregation and safe disposal of wastes

including personal protective equipments should be provided to all workers who are handling with hazardous wastes.

(b) Monitoring Actions

The hazardous wastes emitted from the decommission stage of proposed project should be monitored as per the following plan.

Decommission Phase	
Monitoring Item	Hazardous waste
Monitoring Parameter	Amount and type of hazardous wastes Disposal method
Monitoring Frequency	Once in Decommission Phase
Estimated Annual Budgets	2,500,000 MMK
Mornitoring Location	Segregated waste bin, temporary waste storage area and within the project compound

7.7.6. Traffic Management Sub Plan

7.7.6.1. Objectives

The main objectives are to establish a framework for planning and managing the traffic condition in specific area through a combination of monitoring, assessment, and implementation of control measures. The key goal is to improve the safety for all road users, reduce congestion and travel times due to project implementation.

7.7.6.2. Relevant Law and Regulation

The proposed project will comply with the Road Safety and Motor Vehicle Management Law (2020) and The Road Safety and Motor Vehicle Management Rules (2022).

7.7.6.3. Construction Phase

(a) Management Actions

The notice signs should be placed around the construction site to notify the other vehicles about the movement of heavy traffic. The speed limitation should be set up depending on the size and capacity of vehicles and all drivers of project have to comply with the regulated speed guidelines. Moreover, all construction works doesn't occupy the road reserves and comply to the traffic and land demarcation obligations. The proposed project will arrange the adequate parking lots in order to avoid the parking beside the roads.

(b) Monitoring Actions

The monitoring plan for traffic management during construction stage should be presented in the following.

Construction Phase	
Monitoring Item	Traffic Condition and Transportation Vehicles
Monitoring Parameter	Increasing the number of heavy traffic Condition of traffic
Monitoring Frequency	Once in Construction Phase
Estimated Annual Budgets	1,500,000 MMK
Mornitoring Location	Main transportation roads and around the project area

7.7.6.4. Operation Phase

(a) Management Actions

The proposed project will arrange the adequate parking lots inside the compound and if possible, the smark parking system based on real-time information about parking availability to drivers should be adopted. Moreover, the visible and clear signs to control the movement of vehicles in and out of the proposed area should be erected. The alternative entrances and exits are set up along the project boundary. The training and awareness program of traffic regulations should be take place to all workers and residents.

(b) Monitoring Actions

The monitoring plan for traffic management during operation stage should be presented in the following.

Operation Phase	
Monitoring Item	Traffic Condition and Transportation Vehicles
Monitoring Parameter	Increasing the number of heavy traffic Condition of traffic
Monitoring Frequency	Twice a year (dry and wet seasons)
Estimated Annual Budgets	1,500,000 MMK
Mornitoring Location	Main transportation roads and around the project area

7.7.6.5. Decommission Phase

(a) Management Actions

Due to decommission activities, the increasement of heavy vehicles on public main road can be caused. To avoid the potential traffic problems and accidents, the notice sign to notify the movement of heavy vehicles should be placed around the project site and it is also arranged to make speed limitation for all vehicles and shifted schedules to avoid the rush hours. The consideration of alternative routes to project site will be another potential solution to reduce the physical pressures on road infrastructure and traffic congestion, however, this alternative routes cannot pass through the high population density area of township. All

demolition activities are carried out by complying with traffic and land demarcation obligations, making sure the demolition works do not occupy the road reserves.

(b) Monitoring Actions

The monitoring plan for traffic management during construction stage should be presented in the following.

Decommission Phase	
Monitoring Item	Traffic Condition and Transportation Vehicles
Monitoring Parameter	Increasing the number of heavy traffic Condition of traffic
Monitoring Frequency	Once in decommission Phase
Estimated Annual Budgets	1,500,000 MMK
Mornitoring Location	Main transportation roads and around the project area

7.7.7. Occupational Health and Safety Managment Plan

7.7.7.1. Relvant Law and Regulation

The proposed project will comply with national and international laws and regulations including the Occupational Safety and Health Law (2019), The Union Myanmar Public Health Law (1972), Prevention of Hazard from Chemical and Related Substances Law (2013) and IFC's Standards and Guidelines.

7.7.7.2. OHS Program

7.7.7.2.1 Site Security

The installation of fencing and/ or physical barriers should be conducted to keep the general public off the site and to keep materials and equipment inside the site. All gates should be closed when not in use and opened only when required for specific deliveries or other authorized entries. For safe access, each site will have specifc identified emergency route lighting that is automatically initiated when there is an electrical power loss. These emergency light systems will be inspected and tested on a regular basis and identified on the site safety plot plan. For ste security, all visistors must report to the project office prior to going on site and are required to sign in and out at the project office. The escord should be provided for the safe acts and conditions of the visitor while they are on site.

7.7.7.2.2 Safe Work Practices

(a) Fall Protection

- A body holding device is another term for a fall protection harness. Depending on the type of work being conducted, a specific harness may be required
- All fall protection equipment is to be used as per manufacturer's instructions and applicable standards.
- No scaffold shall be erected or be substantially added to or altered or be dismantled except under the immediate supervision of a qualified person and by trained and experienced personnel.

- During scaffold erection and dismantlement fall protection is required. The qualified erector is required to provide a written fall protection plan prior to commencing erection or dismantling of the scaffold.
- Extension ladders should be installed using the 4:1 angle ratio. Extension ladders must not be taken apart to use the extension as a second ladder as no swivel feet are on this section of the ladder.
- Equipment and/or materials shall not be carried up a ladder. A rope shall be utilized to transport equipment and/or materials.

(b) Fire Protection Overview

- A fire extinguisher rated at not less than 10 kgs and all fire extingusihers shall be inspected monthly and identified as such on the monthly inspection tag required by the National Fire Department.
- All inhabited spaces including trailers, luch rooms and storage areas on the project site will have a fire extinguisher immediately accessible.
- Fire extinguisher access shall not be covered or blocked by material or debris. Clear access to fire protection equipment must be maintained.
- Fuel storage areas will have a fire extinguisher nearby within close proximity, not immediately adjacent to the storage area.
- Any equipment with a combustion engine is required to have a fire extinguisher attached, unless there is an integral automatic fire suppression system designed into the equipment. Any fuel tanks on site must be grounded during transfer or fuel.

(c) Motorized Vehicles (such as trucks, forklifts, tractors, etc)

- All operators and passengers in vehicles shall wear their seatbelts while being transported in the vehicles. No personnel are permitted to ride in the back of any vehicle, unless designed to transport passengers in this manner.
- All operators' of motorized equipment shall hold a current operator's license for the equipment they are operating.
- Fork-lift trucks of all classes shall be only operated by trained and certified operators and must be operated within the parameters of the equipment design.

(d) Manual Lifting and Moving Equipment and Material Overview

Back injury is the common injury of manual lifing and below are the few basic suggestions to lifting that may prevent the occurrence of a back injury.

- Avoid lifting where possible and practical by pushing, pulling, rolling or sliding the object to be moved.
- Use mechanical aids (hand trucks, carts, winches, forklifts, etc.)
- Request help from other employees
- Avoid lifting the heavy objects from the floor or ground and lift only loads you can safely handle.

(e) Fuel Storage

The criteria for storage tanks in the designated area are as follows;

- Tank must be mounted on a steel cradle and grounded
- Must have approved vent cap, fill nozzle and tank shut-off.
- A 10 kg dry chemical extinguisher must be within a 7 meter radius of the storage facility (not directly beside the fuel itself).

(f) Electrical Safety

- All electrical equipment shall be of contruction grade. This means that it must be certified in accordance with the electrical code.
- Portable electrical hand tools must be double insulated or grounded.
- All electrical cords and cables if practicable must be elevated or covered to protect them from damage and to mitigate tripping hazards.
- Qualified electricians are the only personnel authorized to repair electrical equipment. Field repairs or tampering with any electrical equipment by unauthorized personnel will not be tolerated.
- Temporary lighting must have guards over bulbs.
- Electrical cords must be of commercial gauge with heavy-duty insulation, weather and sun resistant with a ground conductor and free from splices.

7.7.7.2.3 Personal Protective Equipment (PPE)

To provide an effective barrier between a worker and potential dangerous objects, substances, and processes, the personal protective equipments are used. The project proponent wil ensure all personnel have the right PPE while perform the job. All personal protective equipment must meet the applicable standard as defined by legislation and policy. The specific rules and procedures of PPE usage will vary based on its type and the specific workplace hazards, described in the following;

(a) Head Protection

- Personnel shall wear hard hats that are in good condition and meet legislative jurisdictional requirements and standards.
- Bump hats and metal hard hats shall not be worn as head protection.
- Personnel must wear hard hats with their company logo and the workers name clearly displayed on the hard hat.
- Alteration of hard hats is prohibited
- Hardhats are required while welding. They are to be fitted with the appropriate shield.

(b) Eye and Face Protection

- All personnel must wear properly fitting eye and face protection relevant to the active work sites.
- Face and eye protection shall be kept clean and in good repair.
- If a worker cannot wear safety glasses, as documented by a physician’s note, alternate arrangements must be made to verify the individual’s face and eyes are protected.

- All components of prescription glasses that are being used for eye protection must meet approved applicable regulatory standards.
- Face shields are required when grinding/cutting steel, concrete, chemical use.
- When using a face shield, safety glasses are also required under the face shield.

(c) Hand Protection

- All personnel must have appropriate gloves available for their task on their persons. Gloves are to be worn when conducting work activities with hazards that may cause injury to hands.

(d) High Visibility Vests

- High visibility apparel shall be worn whenever worker and mobile equipment are working in a common area.

(e) Hearing Protection

- Personnel should not be exposed to noise in excess of the occupational exposure limits of 85 dBA Lex for daily noise exposure level and 140 dBC peak sound level.
- Earplugs and earmuffs are two recognized hearing protection available for use in effectively reducing noise exposure. (Cotton plugs are not acceptable and shall not be used)
- When using earmuffs for hearing protection, special care must be given to check they are infected before being used by another employee.
- As per regislated requirements hearing testing is required to be conducted within six months of tenure and annually after that.

(f) Respiratory Protection

- To protect the lungs from nuisance particles, single use disposable particle masks (doubl strapped types) are used.
- In case of exposure to harmful substances including dust, fog, fumes, gases and particulates, air purifying, half mask respirators must be provided.
- When using the half mask respirators, a respiratory fit test should be conducted to verify the respirator creates a proper seal on the user's face and also traing should be provided for usage, storage and limitations.

7.7.7.2.4 Medical Facilities Arrangement

The medical arrangements including basic first aid kits, on-site clinic and medical staffs are provided in workplace area. All medical services including medical requirements and ambulance are arranged to be available within the worksite in order to handle the emergency cases. If they are not onsite, the backup plans should be drawn up in conjunction with the local ambulance services or first aid team how patients will be taken to hospital. The onsite clinics not only address the immediate injuries but also contribute to the overall wellbeing of workers.

Regular health screenings and wellness programs can help identify potential health issues before they become major concerns. Moreover, on-site clinic play a crucial role in educating workers on the safety procedures and emergency response for enhancing overall safety awareness.

7.7.7.2.5 Setting up Assembly Point

The basic criteria of assembly point are;

- Assembly points should be situated in a large open space, one that is big enough to safely accommodate everyone from your building.
- If your workplace is especially large and has multiple exit points, more than one primary assembly point can be arranged.
- The assembly point must be easily reachable from your building.
- Open areas that are within other structures, such as gardens, courtyards etc are off limits.

The assembly point must be unobstructed all times, clearly signposted and well lit in order to make exit as easy as possible. Moreover, it should avoid winding corridors, the area where is possible to use of staircases and busy roads. By collaboration with emergency response team, the appropriate evacuation plans are prepared in case of unexpected emergency, which are fully informed and trained to all staffs.

7.7.7.3. Monitoring Actions

The Occupational health and safety monitoring plan is described in the following.

Monitoring Item	**Occupational Health and Safety**
Monitoring Parameter	All accident cases related to the factory. Health condition of communities in the factory All sickness related to work in the factory
Monitoring Frequency	Throughout the project period
Estimated Annual Budgets	2,000,000 MMK
Mornitoring Location	Within the Project Compound

7.8. EMERGENCY RESPONSE PLAN

7.8.1. Objectives

The Emergency response plan has been prepared to ensure that in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for the particular circumstances. The main objectives of emergency response plan are;

- Ensure the health and safety of personnel and commuters along the proposed scheme;
- Minimize any impacts to the environment and ensure the protection of environmental qualities;
- Minimize any impacts on properties, services etc.

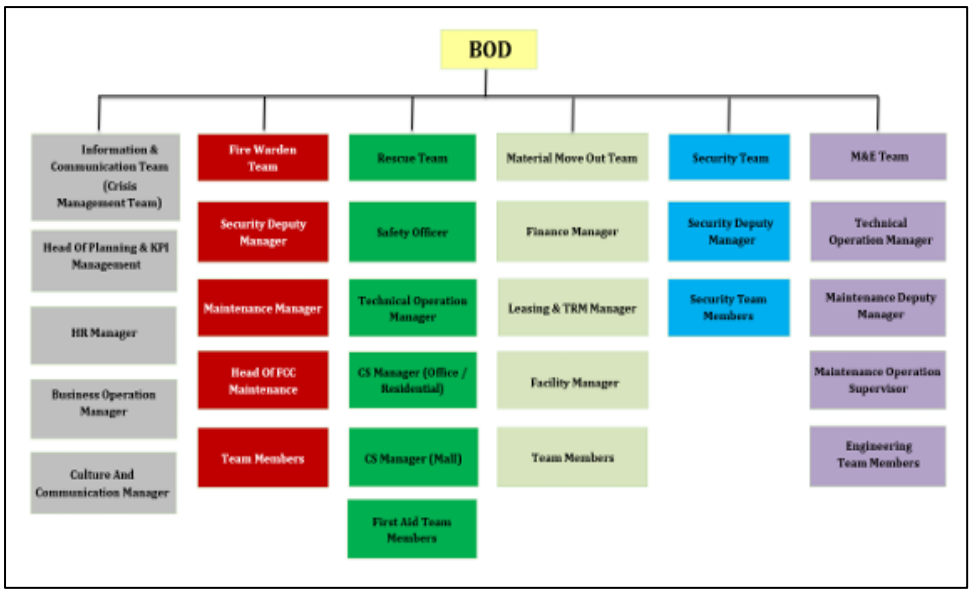
- Establish procedures that enable personnel to respond to incidents with an effort and in a manner that minimizes the possibility of loss and reduces the potential for affecting health, property and the environment.

7.8.2. Emergency Contact Details

The response team leader will detail the initial contact that should be made in case of an emergency incident as well as those responsible for following up once an emergency event is declared. The internal communication system within working communities will be created through various channels, like text messages, email and office alarm system. Adoption of effective communication systems will facilitate the timely dissemination of information to first responders and relevant stakeholders, enabling coordinated action and minimizing the impact of emergency. To cover the proposed scheme, more than one contact may be required and the emergency contact detail is shown in Table 7-10 and the organization chart is mentioned in Figure 7-12.

Table 7-10 Emergency Contact Details

No.	Roles	Organization	Phone Numbers
1.	Project Proponent	HAGL	09-250900244
2.	Environmental Regulators	Environmental Conservation Department	01-8203840
3.	Local Authority	Bahan Township Administration Department	01-545825, 01-545826, 01-545827
4.	Fire Services	Myanmar Fire Service Department, Mayangone Station	01-661501
5.	Civil Defense	Mayangone Police Station	01-660352



*Source: Emergency Manual 2025, Hoang Anh Gia Lai Myanmar Co., Ltd.

Figure 7-12 Organization Chart of the Emergency Response Team

7.8.3. Emergency Response Procedures

The emergency response procedures will vary depending on the sensitive receptor and nature of operation activities. More detailed plans may be location-specific to a particular activity depending on the nature of the work. They will identify the potential sources of pollution and pathways to receptors so that containment measures can be put in place at these locations. The emergency response steps that could be followed in the case of emergency to ensure that the environmental risk is reduced to as low as reasonably practical are provided in this section.

7.8.3.1. Fuel and Chemical Spillages

With regards to fuel and chemical spillages, the emergency response procedures are as follow;

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- Notify the team leader immediately giving information on the location, type and extent of the spill so that they can take appropriate action.
- If necessary, the response team leader will inform the appropriate regulatory authority, including the Environmental regulators and Fire Services depending on the size and nature of the spill – the appropriate regulatory authority will vary depending on the nature of the incident.
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident.
- Remove the spillage, using the spill kits or absorbent materials as required. Do not use detergent or hoses to disperse the spilled fuel.
- If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats.
- Clean up as much as possible using the spill control materials and dispose of used materials appropriately by Township Municipal or using a fully licensed waste contractor with the appropriate permits so that further contamination is limited;

7.8.3.2. Fire Emergency Procedures

The fire safety officer should create maps or diagrams which indicate the details of fire fighting equipment provided, types and location of emergency alarm system and location of emergency exist routes. The training and knowledge sharing programs how to handle the fire incidents and emergency case should be conducted within the workplace. The emergency response actions that the staffs should do if they discover a fire are;

- Informing about the fire by raising the alarm by operating the nearest fire alarm call point; see Table 7-11.
- Fire brigade should be informed immediately about the fire incident.
- Evacuate to a safe place without using the lift.
- Leave the building by the nearest emergency exit to the designated assembly point, following the pre-determined evacuation routes (do not stop or return to collect personal belongings).
- Trained personnel to tackle the fire only when appropriate.
- Respond as required following actions as identified in the emergency response training program.

- If the fire is small, the trained personnel may attempt to extinguish with a fire extinguisher, ensuring a clear escape path. Otherwise, if the fire grows or the extinguishers are not available evacuate immediately.
- Contact to the emergency services, in which the specific information should be given, including location of the fire incident, number of missing persons, flammable material stores, location of high risk areas (boiler room, chemical storage area, gas and fuel storage site and generator), and any unusual activities such as building works or temporary structures.
- Please remain at the assembly place and inform the personal information to team leader.
- Return to the building only when authorized to do so.

Table 7-11 Emergency Contact to Report Fire

No.	Personnel	Contact No.
1.	Security Shopping Mall	09 766 661 101
2.	Security Office Tower	09 974 421 122
3.	Engineering Operation	09 450 587 711
4.	Engineering Maintainance	09 450 587 722
5.	FCC Hot Line	09 264 444 624

*Source: Emergency Manual 2025, Hoang Anh Gia Lai Myanmar Co., Ltd.

Fire Extinguisher Types

Beyond the emergency procedures, types of extinguisher used is one of the crucial factors for effective fire control within a short period. There are various extinguishers based on the specific types of fire are listed below.

i. WATER: All red in color. On all solid materials like paper, textile fabrics, wood, etc. DO NOT USE WATER on live electrical apparatus, gas or flammable liquids.

ii. FOAM: Blue band. On flammable & combustible liquids, oil and petrol. DO NOT USE FOAM on live electrical apparatus or gas.

iii. DRY POWDER: White band. On most fires including live electrical. DO NOT USE DRY POWDER on cooking fat or oil.

iv. CO2 GAS: Black band. On flammable liquids and electrical apparatus. DO NOT USE on flammable liquids, wood, paper, rubbish or outdoor.

7.8.3.3. Workplace Accidents Response Procedures

In workplace area, the HSE manager and team leader should investigate ways to provide the emergency medical and first-aid services. In case of serious injury, the first-aid treatments should begin within 3 to 4 minutes after accidents. All medical services including medical requirements and ambulance are arranged to be available within the worksite in order to handle the emergency cases. If they are not onsite, the backup plans should be drawn up in conjunction with the local ambulance services or first aid team how patients will be taken to

hospital. The effective immediate assistances and basic first-aid tips for common workplace injuries are guided in the following;

(a) Cuts and Abrasions
- Wash your hands thoroughly with clean water.
- Apply gentle pressure with a hygiene cloth or bandage to control bleeding.
- Clean the wound with mild soap and clean water.
- Apply an antibiotic ointment.
- Cover the wound with a sterile dressing or bandage.

(b) Burns
- For minor burns, cool the affected area with cold running water for at least 10 minutes.
- Cover the burn with a sterile, non-stick dressing or a clean, non-fluffy cloth.
- Do not use ice or adhesive bandages on burns

(c) Sprains and Strains

You should utilize the RICE method (Rest, Ice, Compression, and Elevation):
- Rest the injured area.
- Apply ice wrapped in a cloth for 15-20 minutes every 1-2 hours.
- Use an elastic bandage to compress the area.
- Elevate the injured limb if possible

(d) Fractures
- Do not try to realign the broken bone.
- Immobilize the injured area using a splint or a rolled-up newspaper.
- Apply ice if there is swelling.
- Sending to the nearest healthcare center and being treated by medical treatments of healthcare professionals.

(e) Eye Injuries
- For foreign objects in the eye, do not rub the eye.
- Rinse the eye gently with mild saline solution or clean water.
- Cover the eye with a clean, sterile bandage or cloth and seek medical help.

(f) Heat Exhaustion and Heat Stroke
- For heat exhaustion, move the person to a cooler place and provide water.
- For heat stroke, call a medical emergency immediately and cool the person down using any available means, such as ice packs or a cool bath

(g) Chemical Exposure
- Immediately flush the affected area with copious amounts of water.
- Remove contaminated clothing.
- Seek medical assistance if the exposure is severe or if symptoms develop.

(h) Electric Shock
- Ensure the power source is off before approaching the injured person.
- Do not touch the person until the power source is confirmed to be off.
- Call a medical emergency and provide CPR if necessary.

7.8.3.4. Emergency Response Actions for Natural Disasters

(a) Flooding

In case of flooding, the emergency response procedures are;

- Regular contact to be maintained with local meteorological department to get the information regarding flood.
- In case of alert is issued the entire site should be evacuated.
- The material which may release pollutants should be removed from site and should be shifted to safe location
- The site should not be occupied or work should not be started unless the danger is settled completely.
- Information about the nearest shelter should be given to be people which can be taken up by people in case of flood.
- Entry to the site should be closed through barricading in case of flood.

(b) Tropical Storm/ Cyclone

In case of storm, the emergency response procedures are as follows;

- All customers, tenants and staff shall be advised not to open doors and windows to external areas and to stay clear of windows where practical.
- Avoid using lifts during the height of a typhoon or storm.
- Switch off power to landscape lighting and non-essential lighting, including signage.
- Switch on security lighting where necessary.
- Place sandbags into position and other suitable barriers at entrances which may otherwise permit water entry to the building.
- Stop all escalators and provide signage to advice customers not to use escalators as stairs.
- Security staff to monitor external areas, and in particular external buildings and storage spaces.
- Damage or problems are to be reported to the ERT. Additional staff will be arranged for dispatch to problem areas.

(c) Earthquake

In case of earthquake, the emergency response procedures are

- If in outdoors, move into the open, away from buildings, streetlights and utility wires and stay there until the earthquake stops.
- If in a moving vehicle and machines, stop quickly and stay in the vehicle. Move to a clear area away from buildings, trees, overpasses or utility wires. Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the quake.
- Inform the necessary authorities for aid.
- In case of a structural failure, examine to ensure no one is stuck beneath any debris.

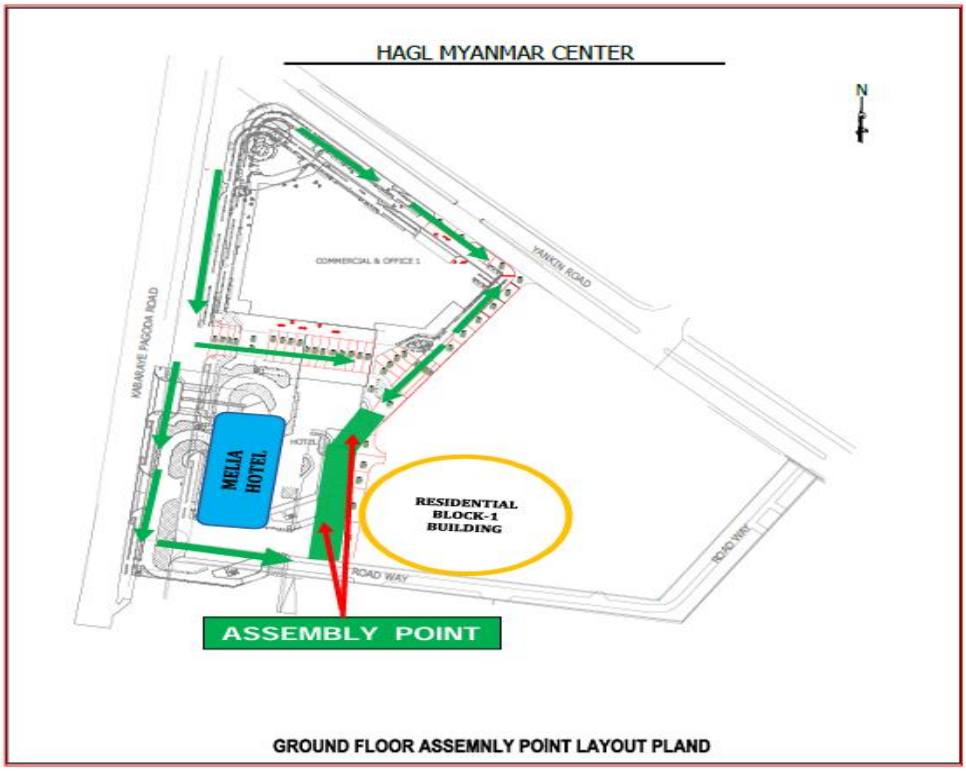
- Ensure that the first aid ambulance and fire tender vehicles are summoned if necessary.

After the quake, be prepared for aftershocks. Although smaller than the main shock, aftershocks cause additional damage and may bring weakened structures down. They can commonly occur in the first hours, days, weeks or even months after the destructive quake.

7.8.4. Evacuation Procedures

This general evacuation procedure can help workers evacuate safely and orderly during fires, earthquakes, hazardous material spills, and other emergencies. Specific emergencies may require a different approach or guide.

- Sound the emergency alarm to warn site personnel to evacuate immediately.
- Listen to and follow the evacuation coordinators' (HSE manager or Emergency Team Leader) instructions.
- Examine the equipment and machines to secure. If only safe, close windows and doors to reduce hazards. If not, move quickly and calmly to the nearest exit to avoid accidents. Avoid running or pushing.
- Check restrooms, vacant rooms, and other areas and help anyone evacuate.
- Avoid danger zones and ensure a smooth flow of people by following designated evacuation routes, and go directly to headcount locations. (Elevators may malfunction or be unsafe in emergencies, so use stairs instead.)
- Once outside, move away from the building to avoid falling debris and allows (firefighters, police officer, emergency medical responders and other specialized responders) access.
- Report to your supervisor or designated person for a headcount and instructions at the assembly point, in Figure 7-13.
- Stay at the assembly point until the HSE manager gives more instructions.



*Source: Emergency Manual 2025, Hoang Anh Gia Lai Myanmar Co., Ltd.

Figure 7-13 Assembly Point of the Project Site within the Complex Compound

7.9. NATURAL DISASTER MANAGEMENT PLAN

7.9.1. Disaster Risk Profile of Yangon

The Sagaing fault runs through the centre of the country and is known for its seismic activity and for frequently causing landfalls and earthquakes of various magnitudes (Hla Hla Aung 2009, Thein et al. 2009, Soe Thura Tun and Watkinson 2017). Major cities such as Yangon, Mandalay, and the country's capital Nay Pyi Taw are located on this fault, others such as Taunggyi and Mawlamyine are situated on side fault lines (Kyaukkyan fault and Bilin fault) (Kraas et al. 2017). Myanmar also is exposed to tropical cyclones, which develop in front of the coastal areas through the mix of hot air masses from landmasses and colder oceanic air masses. Within the last 15 years, Myanmar has been affected by at least four severe tropical cyclones. Cyclone Nargis in May 2008 cost about 138,000 victims (Kraas 2009; Kraas et al. 2017). Cyclone Giri in October 2010, cyclone Komen in August 2015, and cyclone Maarutha in May 2017 caused devastating damage (Brakenridge et al. 2017; UNOCHA 2017b). Cyclone Nargis, in particular, affected the Ayeyarwady Delta and the megacity Yangon and left vast flooded areas around the city (Heinkel et al. 2021).

Yangon is surrounded by three rivers and creeks, where flooding occurs from either high tide or heavy rainfalls during the monsoon season or tropical storms in the pre- and post-monsoon seasons. The megacity (UN DESA 2015; Kraas et al. 2017, 2019), with its more than 5 million inhabitants, is growing rapidly and therefore exposed to human-made hazards such as flooding by blocked drainages due to rapid urbanization and uncontrolled settlements (Zin Mar Than et al. 2020; Hartanto and Rachmawati 2017, Rachmawati and Budarti 2017). Moreover, weak solid waste management and uncontrolled plastic waste disposal in the open

drainage systems more often result in blockages of the sewage system and cause flooding of rain and sewage water.

7.9.2. Disaster Risk Management Plan

The disasters management plan of proposed factory are described in Table 7-12.

Table 7-12 Disaster Management Plan

No.	Disaster Type	Management Plan
1.	Flooding	The productive drainage networks are distributed throughout the project area to prevent the seasonal flooding in rainy season. Deepening and widening of water channel and bypass channels will be carried out to increase the water flow rate. Before construction, consultation with flood risk experts will provide a understanding of the risk posed to area by flooding and the infrastructures should be constructed above the potential flooding level. Flood early warning systems are designed to provide communities with advanced warning of an imminent flood event based on weather forecasts, rainfall and upstream water levels. Replacing impermeable surfaces with natural landscapes and afforestation are measures to reduce runoff. The restoration of natural wetland areas will performed to alleviate flood risk, whilst also providing additional benefits to local eco-systems. Flood resilient designs should allow a building to continue to function (stilts, floating structures, etc) even if it becomes flooded.
2.	Tropical Storm/ Cyclone	Pre-determine areas designated as "safe" in the event of a typhoon. Customers & staff may be called on to assemble in these areas when necessary. Construct shutters and barriers suitable for quick installation at low level air intakes and store in suitable location. Check all drains on the premises, i.e., roof, podium, light wells, basement, car park, canopy, etc. for any blockage. Check and test the portable water pumps, sump pumps and the emergency generator to ensure they are ready for immediate use. Prepare emergency equipment for immediate use, including spare fuses for all emergency lighting and power panels, torches, helmets, boots, raincoats, etc. Check diesel fuel tanks to ensure adequate supply and that all lids, etc. are sealed.
3.	Earthquake	The construction contractors should comply with the regulations with respect to planning, design and construction, including typology of construction, and materials of appropriate quality suitable for use in areas of low seismic hazard. Engaging the qualified and experienced technical professionals ensure that the design and implementation of all project activities, including infrastructure construction and improvements, provide for earthquake protection and comply with local/ international building standards. Building exteriors should properly design and installed not to fall on people during contrustion and operation to prevent injuries and blockage of exists during earthquakes and the safeguard essential contents such as medical equipments should be supplied. A clear emergency management plan should be drafted and practiced to prepare staff of those buildings for crisis management.

7.9.3. Disaster Risk Monitoring Actions

All Phases of Project Implementation	
Monitoring Item	Natural Disaster
Monitoring Parameter	Waether conditions, Flood, Earthquake
Monitoring Frequency	Every phase of the project implementation
Estimated Annual Budget	3,000,000 MMK
Responsiblity	Site Contractor and Environmental Management Team of HAGL

7.10. TRAINING PROGRAMS

The project provides and support awareness trainings such as audit training, basic management training and fire safety training, occupational safety & emergency first aid training (see in Figure 7-14) to the workers annually. These training covers a wide range of topics, from basic first aid and CPR to more advanced procedures like hazardous material handling and incident commend. All trainings and or drills should consist of not less than an initial 2-hour training session and an annual 1-hour refresher session thereafter.

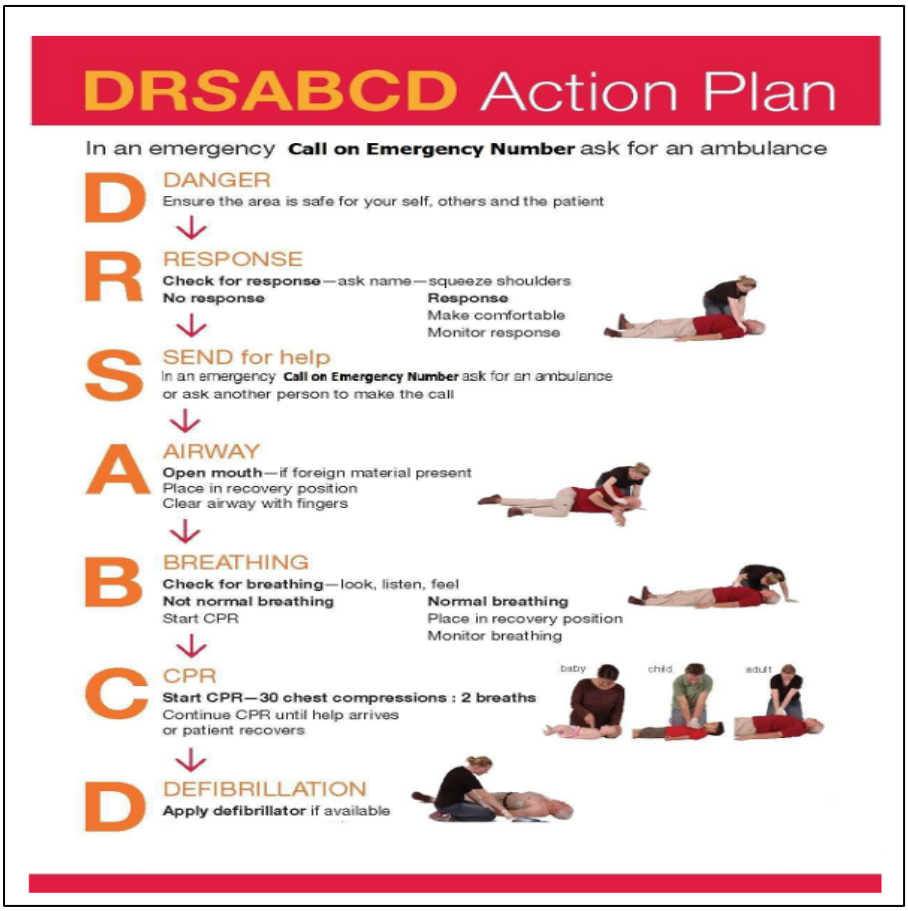
7.11. RECORDING AND DOCUMENTATION

Keeping records and reporting are important management tools for ensuring sustainable operation.

There will be two types of monitoring reports after environmental monitoring and site inspection. The first type is for internal use to provide feedback to the Environmental Management system. Finally, annual review should be prepared and an environmental monitoring report should be submitted to the MONREC/ECD every 6 month under the EIA Procedure (2015). These record will be kept on file by the HSE manager and made available to the relevant authorities if required.

7.11.1. Internal Monitoring and Inspection Report

The EMP responsible cell members may conduct daily, weekly or monthly general inspections of the project area and facilities. The objectives are to identify non-compliances to EMP.



*Source: Emergency Manual 2025, Hoang Anh Gia Lai Myanmar Co., Ltd.

Figure 7-14 Occupational Safety and Emergency First Aid Training

7.11.2. Incident, Accident and Emergency Report

In cases of incident and accident, prompt reporting has been carried out. This must be in the form of verbal reporting followed by written statement, after emergency and contingency procedures have been undertaken. The written statement should be more comprehensive and should be included the information such as the cause, extent, actions, remedial measures and also any recommendations made to avoid the reoccurrence of the incident.

7.11.3. Reporting on Training Program

There must be a regular monitoring and inspection of all training programs provided such as firefighting training, first aid training and training for quick response and preparedness such as drills and mock drills.

EMP cell members conducting monitoring and inspection works must be able to interpret and assess the overall condition of the training processes especially assessment of the effectiveness and applicability of each training.

A report on the training program including assessment on its effectiveness must submit at the end of each training program.

7.12. CORPORATE SOCIAL RESPONSIBILITY PROGRAM

The purposes of implementing CSR program are to develop good relations between the public and project proponents as well as to promote high standard of living near the project area. HAGL will provide CSR fund which is (2%) of the net profit to following sections. The detailed contribution for CSR fund is shown in Table 7-13.

Table 7-13 CSR Fund Contribution

No.	Partial	Contribution%
1.	Education	0.5%
2.	Health	1%
3.	Regional Development	0.5%

7.12.1. Grievance Redress Committee (GRC) Members of Hoang Anh Gia Lai (HAGL Co.Ltd) Myanmar Center Company Limited

The task associated with grievance redress program will be administered and managed some of the EMP personnels. The Public Relations Team will take the main responsibilities then other members will follow under the guidance of Public Relations Team Leader. GRC member list and their responsibilities are mentioned in Table 7-14.

Table 7-14 Grievance Redress Committee (GRC) Members of HAGL Co., Ltd.

No.	Name	Position	Responsibility
From Employer Side			
1.	Ms. Zin Mar Thet Mon	Manager	- Responsible for representing the company in WCC activities and discussions. - Coordinates with the relevant teams and ensures that company requirements and concerns are properly communicated. - Also acts as a bridge between the company and the WCC, helping to maintain good communication and cooperation.
2.	Mr. San Yu	Deputy Manager	
3.	Ms. Thet Htet Aung	Deputy Manager	
From Employee Side			
4.	Ms. Han Su Yin	Manager	- Responsible for representing employees' interests and concerns within the company. - Listen to employees' feedback, concerns, and suggestions and communicate them to the appropriate management or WCC representatives. - Helps ensure that employees' rights, welfare, and workplace concerns are properly considered.
5.	Mr. Ye Man Soe	Head of Mechanical	
6.	Mr. Win Min Htun	Safety Officer	

7.12.2. CSR Implementation Team

There are three main components in the CSR Implementation Team. They are financial support team, management team and CSR program implementation team members. Propose CSR Implementation Team Structure is shown in Figure 7-15.

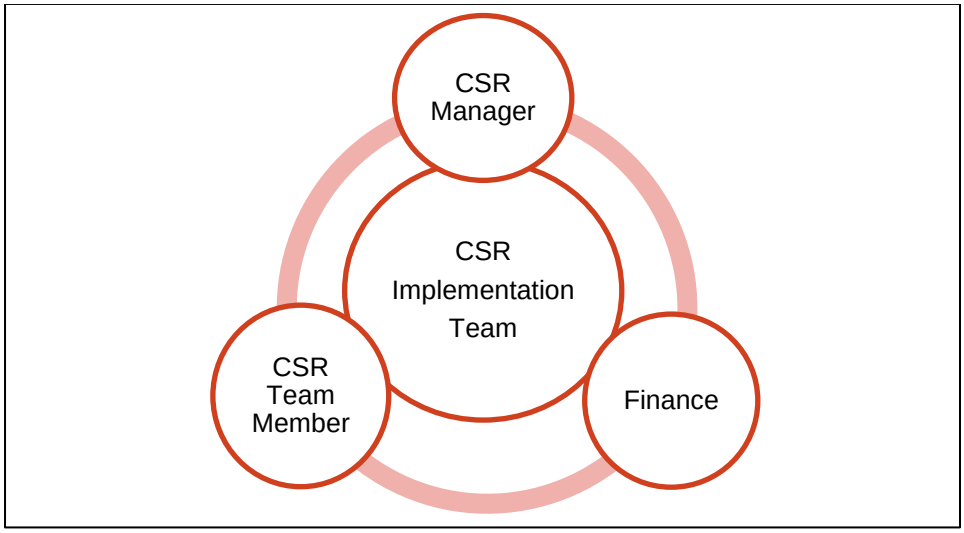


Figure 7-15 Propose CSR Implementation Team

7.12.2.1. CSR Manager

To become more efficient and affective CRS program, CSR Manager is required. The manager can be arranging the CSR program and can suggest to donate in required places. He may be checked out the amount of using CSR fund that the factory really follows as their commitment.

7.12.2.2. Finance

Finance department require to management the fund of CSR.

7.12.2.3. CSR Team Member

All employees from the factory can be the member of CSR Team. Members can be participated in every CSR activity and can give advices to improve CSR activities. CSR Program of the Proposed Project is shown in Table 7-15.

Table 7-15 CSR Program of the Proposed Project

Item	Activities	Expected Budget	Objectives
Health	• Providing medical supplyment for staff and their families • Providing the employees' health examination • To support the protection of the environment as well as from the fire around the Factory	1 %	To ensure that workers working in the workplace and their families are in good health
Education	• Promoting the awareness of education and human right • Providing educational grand for the employee's children • Providing the support in education sector around the project area	0.5 %	To become a better society To improve the education level of the workers' families To develop the skill of the employees
Regional Development	• Doing donation clothes and money to local organizations and poor people nearby project area	0.5 %	To enable local charitable organizations to operate well, To enable employees to cooperate actively in the common work that is being done in the region, To avoid and understand human rights among workers To prevent sexual harassment and oppression in the workplaces

7.13. PENALTIES

If the factory is not complied or not carried out the Environmental Monitoring Program or emission parameters are exceeding the standard of NEQG (2015), WB and IFC Guideline, the factory will get penalties according to EIA Procedure (2015). Penalties and punishment that stated in EIA Procedure (2015) are described in below Table 7-16.

Table 7-16 Penalties and Punishment According to Myanmar Environmental Impact Assessment Procedure

No.	Non-Compliance	Penalties	Specific Administrative Punishment of the Ministry
1.	Failure or delay in timely submission of reports within period prescribed by Ministry.	100 to 500 US$ or equivalent Myanmar Kyat + 10-25 US$ / day until cured or equivalent Myanmar Kyat	Issue Enforcement Notice
2.	Obstruction or interference with an official in the course of their duties	duties 250 to 5,000 US$ or equivalent Myanmar Kyat	Issue Enforcement Notice – Criminal prosecution
3.	Failure to provide information to the Ministry or any representative	1,000 to 5,000 US$ or equivalent Myanmar Kyat	Suspension of Approval of EMP, EMP-CP, EMP-OP in whole or in part – Revocation of Approval of EMP, EMP-CP, EMP-OP in whole or in part – Criminal prosecution
4.	Failure to provide information to Ministry Inspector or any representative when requested in regard to inspection and monitoring	250 to 5,000 US$ or equivalent Myanmar Kyat	– Issue Enforcement Notice
5.	Undertaking or allowing any preparatory or other construction works without the prior approval by the Ministry of a revised EMP or EMP-CP	1,000 to 5,000 US$ or equivalent Myanmar Kyat + 50 to 500 US$ / day until cured or equivalent Myanmar Kyat	Criminal prosecution
6.	Operating/implementing without a permit, or approval by the Ministry of an EMP or EMP-OP	1,000 to 5,000 US$ or equivalent Myanmar Kyat + 50 to 500 US$ / day until cured or equivalent Myanmar Kyat	Criminal prosecution
7.	Non-compliance with an Enforcement Notice or Suspension Notice issued by the Ministry	2,000 to 10,000 US$ or equivalent Myanmar Kyat + 100-500 US$ / day until cured or equivalent Myanmar Kyat	Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part – Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
8.	Failure to notify to the Ministry of any knowledge of any event of an imminent threat of environmental damage	1,000 to 5,000 US$ or equivalent Myanmar Kyat	Issue Enforcement Notice – Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part – Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
9.	Failure to take reasonable steps to prevent an imminent threat of damage to the environment, social, human health,	2,500 to 10,000 US$ or equivalent Myanmar Kyat	Issue Enforcement Notice – Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part – Revocation of Approval of

No.	Non-Compliance	Penalties	Specific Administrative Punishment of the Ministry
	livelihoods, or property, where applicable based on the EMP, EMP-CP or EMP-OP		EMP, EMP-CP or EMP-OP in whole or in part
10.	Failure to comply with conditions in the ECC and allowable Emission Limit Values	1,000 to 10,000 US$ or equivalent Myanmar Kyat	Issue Enforcement Notice – Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part – Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
11.	Failure to pay compensation amounts required in respect of social impacts	1,000 to 10,000 US$ or equivalent Myanmar Kyat	Issue Enforcement Notice – Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part – Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
12.	Failure to fully restore social conditions upon resettlement	1,000 to 10,000 US$ or equivalent Myanmar Kyat	Issue Enforcement Notice – Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part – Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part

Notes: 1. All penalty amounts set forth in this Annex are denominated in United States Dollars (US$) and are subject to annual inflation adjustment

2. Abbreviations are as follows:

EMP = Environmental Management Plan

EMP-CP = Environmental Management Plan - Construction Phase

EMP-OP = Environmental Management Plan - Operation Phase

7.14. OVERALL BUDGET FOR IMPLEMENTATION OF THE EMP

The budget for EMP fund will cover the initial cost and recurring expenses for implementation of EMP Table 7-17 shows annual budget allocation for proposed environmental, health and safety management plan. If the estimated budget allocation needs an additional cost, the budget will be added depending on the environmental management requirements.

Table 7-17 Overall Budget for Implementation of the EMP

No.	Proposed EMP	Estimated Annual Budget (MMK)
Environmental Works		
1.	Environmental mitigation measures	5,500,000
2.	Overall Budget for Wastewater Management Plan	5,000,000
3.	Environmental monitoring program during construction/ decommissioning phase	2,800,000
4.	Environmental monitoring program during operation phase	5,600,000
5.	Capacity building and training	1,000,000
6.	Emergency case	1,000,000
7.	Natural Disaster Monitoring	3,000,000
Health and Safety Works		
8.	Personal protective equipment	700,000
9.	Medical for clinic and other medical facilities	1,000,000
10.	Fire Fighting Equipment	1,000,000
Training Program to the Workers		
11.	Firefighting Training	500,000
12.	Occupational Safety and Emergency First Aid Training	500,000

CHAPTER 8
PUBLIC CONSULTATION MEETING

The main objective of public consultation is to provide project information, production procedures, waste management and potential environmental impacts to the regulators, authorities and stakeholders. During the public consultation meeting, HAGL Myanamar CO. LTD., and third party (ENVCC CO. LTD.) presented the project background, operation processes, environmental conditions, summary of impacts assessment and proposed mitigation measures. Suggestions and comments from the regulators, authorities and stakeholders were collected in the EIA report. The public consultation meeting was held on December 23, 2025 at Myanamar Centre Tower 2 and summary table of attendance sheets, photos of participants and presentation slide are included in APPENDIX G-1 and G-2.

8.1. THE OBJECTIVE OF PUBLIC CONSULTATION MEETING

Public consultation meeting is regarded as a necessary part of the EIA study. HAGL Myanamar CO. LTD., and its consultants have to organize a public consultation meeting among regulators, local community, local authority and other relevant organizations on the project development and plans. As a part of EIA requirement, HAGL Myanamar publicized about the project developments to the concerned stakeholders as follows;

- Information of the stakeholders about the project, environmental and social issues related to project operation, and mitigation measures to minimize environmental and social impacts.
- Considering the views, concerns, and perceptions of stakeholders, communities and individuals that could be affected by the project or who otherwise have an interest in the project.
- Participation and partnership where issues are needed to join for discussing and assess.

8.2. APPROACH TO PUBLIC CONSULTATON MEETING

The approach to the public meeting was adopted as below:

- Third party coordinated with HAGL Myanmar to inform and consult about the date and venue of the public consultation meeting.
- Third party prepared and issued the invitation letter for the public consultation meeting.
- HAGL Myanmar sent the invitation letters to the relevant government sectors, identified stakeholders and nearby residents on the second week of December, 2025.
- Informed to all of the concerned stakeholders 7 days prior to EIA study of public consultation meeting.
- The Power Point presentation for EIA study of HAGL Myanmar presentation slides is written in Myanmar language. Further elaboration are focused on environmental monitoring, impact assessments and mitigation measures.

- The meeting was opened for discussion of HAGL Myanmar and ENVCC consultants were responsible for answering questions from the participants and addressing public concern raised in the meeting regarding the project development plan.

Public Consultation for EIA report was conducted on December 23, 2025 at Myanmar Centre Tower 2, Kabar Aye Pagoda Road, Bahan Township by following the EIA procedure. The methodology and approach of public consultation meeting is presented below.

8.3. PUBLIC ANNOUNCE

Regarding the public announcement, all the information related to the public consultation and public disclosure of the proposed EIA project is announced on the official notice board of HAGL Myanmar. Before starting the meeting, HAGL Myanmar sends the invitation letters and suggestion letters to the relevant government sectors, identified stakeholders and nearby locals to propose their impacts and concerns. Moreover, all information about meeting and its discussion results are declared to the participants and the public through HAGL Myanmar's noticeboard and the private social media pages of the company.

8.4. SUMMARY OF PUBLIC CONSULTATION

Public consultation was conducted on December 23, 2025 at Myanmar Centre Tower 2, Kabar Aye Pagoda Road, Bahan Township from 10:00 AM to 12:00 PM. The participants in the public consultation were HAGL Myanamar CO. Ltd., ENVCC (consultants who perform the EIA study), Officer from ECD, Medical Officer from Social Security Office, Officer from fire department, responsible person from Project Township and nearby communities. Agenda of the public consultation meeting is shown in Table 8-1.

Table 8-1 Agenda of the Public Consultation Meeting

No.	Activity	Time
1.	Registration	10:00 AM - 10:15 AM
2.	Opening Speech from HAGL Myanmar CO., LTD.	10:15 AM - 10:30 AM
3.	Power Point Presentation of Project description and summary of the company profile	10:30 AM - 10:45 AM
4.	Power Point Presentation of existing environmental conditions, potential impacts, mitigation measures and environmental management plan	10:45 AM - 11:30 AM
5.	Discussion time – comments and suggestions by the concerned stakeholders	11:30 AM - 12:00 PM

Public consultation was started with the presentation about the project, followed by questions, answers and discussion. Mr. Zaw Myo Hein as a master of ceremonies (MC) at public consultation. Furthermore, introduction speech was opened by HAGL Myanmar explained about their company profile. HAGL Myanmar requested ENVCC (EIA Consultant) to continue the session regarding the EIA study.

Mrs. Myat Mon Swe (Environmental Consultant), Managing Director of ENVCC explained about the project description for the project. She explained about the project description and baseline data measurement of socio economic condition. Moreover, she also presented about the Environmental Impact Assessment of the project in which potential impacts, mitigation measures, risk assessment, cumulative impact assessment and environmental management plan. Questions and answers session followed after the presentation. The details of the meeting including the meeting time, date, name of participants (governenment departments and local residents) and presentation slides are shown in Table 8-2, Appendix G-1 and G-2, receptively.

Table 8-2 Meeting Contex

Meeting Date	23.12.2025		
Meeting Time	10:00 AM – 12:00 PM		
Place	Myanmar Centre Tower 2, Kabar Aye Pagoda Road, Bahan Township		
Project Stakeholders Government authorities			
No.	**Name**	**Position**	**Organization**
1.	Ms. Hnin Htet Htet Soe	Assistant Director	Environmental Conservation Department
2.	Ms. Htay Htay Win	Deputy Staff Officer	
3.	Mr. Kan Win	Township Administrator,	General Administration Department (GAD) Office, Bahan Township
4.	Mr. Kyaw Thet Aung	Assistant Township Administrator	
5.	Ms. Nyunt Nwe Soe	Assistant Director	Social Security Office
6.	Ms. Htet Htet Myat Noe Oo	Deputy Director	
7.	Mr. Myo Myint	Ward Administrator	General Administration Department (GAD) Office, 5 Ward; Yankin Township
8.	Mr. Nay Min Soe	Assistant Director	Myanmar Investment Commission (MIC)
9.	Mr. Phyo Aye Zaw	Sub-Director	Directorate of Industrial Supervision and Inspection
10.	Mr. Myo Thant Nyein	Chief Officer	
11.	Mr. Thura Swe	Township Fire Officer	Fire Department, Sanchaung Township
12.	Ms. Nyo Nyo San	Chief Officer	Department of Public Health, Bahan Township
13.	Mr. Naung Naung	Head of the house	Sayar San Ward Administrator's Office, Bahan Township
14.	Mr. Maung Maung Aye	Chairman	
Local Communities			
No.	**Name**	**Status**	**Address**
15.	Mrs. Aye Sandar	Housewife	16/17, Set Mhuu Housing, Yankin Township
16.	Mrs. Nilar Thein	Housewife	
17.	Mr. Zaw Zaw Htwe	-	Bahan Township

18.	Mrs. Sandar Toe	Housewife	16/17, Set Mhuu Housing, Yankin Township
19.	Mr. Toe Hlaing	Engineer	17/11, (1) Yankin Township
20.	Mrs. Khin Than Oo	-	Bahan Township
21.	Mr. Zin Wai Myint	-	
22.	Mr. Zaw Zaw Oo	Staff	Sett Mhuu Ward, Yankin Township

8.5. DISCUSSING AND FEEDBACKS RECEIVED FROM MEETING

After the presentation, discussion section was started for questions and answers. Most of questions were about project planning and environmental issues. Photos of PCM activities are shown in Figure 8-1, and Figure 8-2. Table 8-3 shows all detailed discussion and feedbacks received from public consultation meeting.

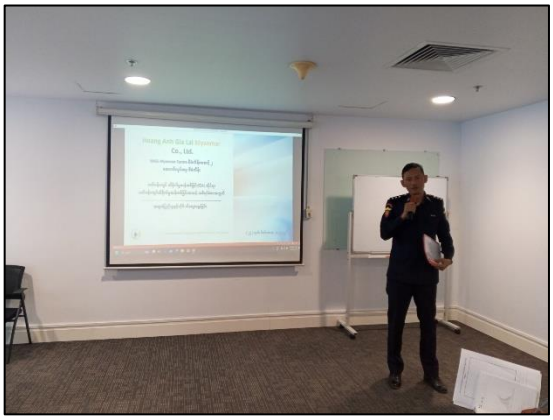
Figure 8-1 Participant Registration Session

Figure 8-2 Environmental Impact Assessment Explanation Session

Table 8-3 Discussion and Feedbacks Received from Meeting

No.	Discussion/Feedbacks	Photo
1.	Suggestions ▪ The Environmental Impact Assessment (EIA) Report must be completed prior to obtaining the Environmental Compliance Certificate (ECC). ▪ The report must follow EIA procedure (Section 55 to 63) recommended by ECD. ▪ The report was reviewed by the ECD. ▪ The department invites the client and the third party to attend the meeting to provide suggestions and comments; both parties must be present at the event. ▪ After receiving ECC, the project proponent is responsible for conducting environmental monitoring once every six months.	 Suggested by Ms. Hnin Htet Htet Soe Assistant Director Environmental Conservation Department (ECD)

No.	Discussion/Feedbacks	Photo
2.	Suggestions ▪ The presented data and facts are insightful and knowledgeable. ▪ A good EIA report must legal, partical, include accurate and precise information, as well as public participation. ▪ Public participation plays the main role in the preparation of the EIA report. ▪ Local residents should suggest ideas and discuss their feelings regarding the project's implementation to ensure the project proponent meets their needs. Comments ▪ Is a wastewater treatment system required or not when starting the project? ▪ How to solve the traffic congestion issue? Responses ▪ Wastewater treatment methods will be applied as described in the wastewater impact assessment section if the construction discharge exceeds NEQEG standards. ▪ A detailed traffic management plan will be presented in the report. Responsed by U Aye Thein (Project Proponent, HAGL Myanmar CO. Ltd) ▪ As part of a future plan to improve traffic, a pedestrian overpass will be constructed at the intersection of Kabar Aye Pagoda Road and Myanmar Plaza.	 Suggested by Mr. Nay Min Soe Assistant Director Myanmar Investment Commission (MIC) Responded by Mrs. Myat Mon Swe Mangaging Director ENVCC CO., Ltd.

No.	Discussion/Feedbacks	Photo
3.	Suggestions ▪ Local residents need to have a sound understanding about the purpose of EIA. ▪ It should have a well-managed plan for dust suppression problem. ▪ The project proponent must implement CSR plan which is easy to assess for dwellers. Comment ▪ Which sectors have been completed as part of the CSR plan? Responses ▪ HAGL Myanmar CO. Ltd. implements the CSR program under the 17 Sustainable Development Goals (SDGs) provided by United Nations. ▪ Among the provided 17 goals, better education, good health, youth empowerment, alongside natural disaster relief are the priority of CSR plan of HAGL Myanmar CO. Ltd.	 Suggested by Mr. Kan Win Township Administrator, Bahan Township Responded by Ms. Zin Mar Thet Mon Communication Manager HAGL Myanamr CO. Ltd
4.	Suggestions ▪ During the construction phase, fire safety is the most important factor. ▪ Thus, the project must have a systematic plan and strategy for fire safety. ▪ The wokers should be familiar with the emergency response plans. Comment ▪ How to prepare a fire safety as well as response plan before starting the construction phase? Responses ▪ Fire safety management plan is the most crucial for the construction stage.	 Suggested by Mr. Thura Swe Township Fire Officer Fire Department, Sanchaung Township

No.	Discussion/Feedbacks	Photo
	▪ The project has established the emergency response plan, fire management plan and the training program which are highlighted as one of the safety management sub plans.	 Responded by Mrs. Myat Mon Swe Mangaging Director ENVCC CO., Ltd.
5.	Sugesstions ▪ Pay a special attention to handling and storing the hazardous waste at the construction site. ▪ The construction workers must have knowledgeable and experienced in the fire drill procedures. ▪ A designated religious place should be included in the construction project as a part of a CSR plan.	 Suggested by Mr. Myo Myint Ward Administrator, 5 Ward; Yankin Township

CHAPTER 9
CONCLUSION AND RECOMMENDATIONS

9.1. CONCLUSIONS

This EIA report has provided an assessment of the potential environmental, social and health impact associated with the construction, operation and decommissioning phases of the proposed project. The study was prepared according to the ToR from EIA procedures, suggestions and comments from PCM, basis of the project information and surveys of environmental and socio-economic setting of the project area in line with Environmental Impact Assessment Procedures (2015).

The Chapter 1 introduces the proposed project's company information and the organization structure of responsible environmental study team. It also outlines the EIA report's structures and the key components. In Chapter 2, the national and international laws, regulations and standard guidelines for environmental baselines related to the proposed project are described. The Chapter 3 reflects the detailed description about the project operation and their utilities (machineries, energy and human resources). That chapter is also involved with the estimated waste generation amounts, waste management system for solid waste and wastewater ,and their disposal methods. The relevant geological features, existing biological conditions and general social related information are described in the Chapter 4. Environmental quality monitoring measures such as air, water, noise, vibration, traffic condition and so on are presented. The monitoring points are set up the potential hazard area within 3 km radius through accessing the geographical condition of study area. The monitoring results are analyzed by comparing with the standard emission guidelines of NEQEG (2015).

Evaluation and predition of environmental impacts as well as risk assessments could be seen in Chapter 5. The potential impacts/risk assessments where occur at the particular operation and its negative impact control measures were provided. The results of the impact assessment can be evaluated based on the environmental baseline qualities, the factory management actions, project behaviors and the operation processures. Overall management plans were referred to Chapter 6 in which sub-plan for project management systems were included. Sub-plan cited that estimated budget with the exact location of monitoring points, frequencies along with the parameters. All the management facilities within the factory for air, water, noise, vibration, non-hazardous solid waste, hazardous solid waste and traffic management mentioned at the same chapter. The estimated expenses for biannual environmental monitoring was also at the last page of the Chapter. In Chapter 7, the suggestions was given by the officers from the Environmental Conservation Department (ECD) and the locals through the Public Consultation Meeting. All feedbacks together with factory response actions were reported in the same chapter. Moreover, the grievance redress mechanism and procedures was also mentioned to relief the public compliants and concerns.

9.2. RESIDUAL IMPACT FROM OPERATION PROCESS

As being a multi mixed development project, the significant environmental impacts are more likely to cause during construction and decommission phase, in contrast to project operation period. The operation of site activities, earthworks and using heavy mechines during construction and demolition can seriously disturb to the ambient air quality by raising the particulate matters (PM_{10}, $PM_{2.5}$) and carbon contents. Moreover, site transportation vehicles, generators and other motor engines can also emit the CO_2, CO, SO_2 and NOx. Another potential impact is to generate the large variety of solid wastes, ranging from rubbles, concrete, construction metals to domestic wastes and if they are not properly managed, the environmental pollutions, such as soil contamination, degradation of surfacewater quality and spreading of infectious diseases can be introduced. Despite performing the point source mitigation measures in project site to minimize the impact severity, only trace amount of contamination will persist as the residual impacts throughout construction and decommission period.

The operation of commercial building, serviced apartment and residential units can cause the stress on the air quality, resource consumption (water, energy) and waste generation. The building requires the significant energy for lighting, ventilation, and air conditioning, often derived from the non-renewable energy sources (fossil fuels), leading to high carbon emissions. In addition, the availability of substantial amounts of water plays an important role for living, potentially stressing the local water supplies and affecting the water quality. The solid waste can be generated from the building occupants and maintenance activities throughout the continuous operation. Although the low impact severity may be derived from building operation, the minor residual impacts may be resulted even after taking the productive managment actions due to its prolongation of project lifespan.

9.2.1. Suggestions the Mitigation Measure for the Residual Impact

During construction and demolition phase, to minimize the dust emission, the effective water spraying on site should be used, which include the selection of proper water nozzles and applying the right amount of water not to cause erosion, mud or slippery conditions. The generators will be regularly checked up its performance and should be exchanged the lubricant oil after 100 hours of use and the air filter for every 200 hours. Moreover, the low sulphur content disel fuel should be priotized to be used for all engines. The safety nets and covers should be securely installed when transporting and heaping the raw materials and site debris. During operation, it is encouraged to use the renewable clean energy, environmental friendly refrigerants and machines tor activities of daily living and if not, the de-sulphurized and unleaded fuel should be adopted. The awareness rising program for resource conservation should be created to share the conventional environmental friendly behaviors and modern techniques with the helps of advanced technologies. The effective waste collection and disposal system should be adopted within the project site in line with the guidance of local authority and YCDC.

To capture the leaked toxic pollutants from management actions, the restoration and rehabilitation of green area should be conducted along the project boundary, in which air purifiers plants (such as spider plant, snake plant, peace lily and aloe vera and rubber

plant) are priotized. In addition, the provision of environmental education can help to understand the causes and effects of environmental degradation, fostering the responsible behaviors and community involvement in conservation efforts.

9.3. OVERVIEW STATEMENT OF THE PROJECT IMPLEMENTATION

According to the overall analysis and impact examination of the report, most of the environmental baseline qualities were under the respected standard guidelines. Maybe, there will be existed a trace amount of impacts as the residue. However, this might be minimized by the regular inseption, biannually monitored the environmental baselines as well as the well implementation of mitigation measures and recommended management actions. With strictly following the prescribed environmental friendly practices and regulations of relevant departments, the proposed project will enhance lifestyle and convenience, stronger community connections and improved health and well-being with the minimal negative imapcts on environmental and social aspects of the community.

9.4. RECOMMENDATIONS

During the construction and decommission hours, the authorities (project proponent) and site constructor should impose to wear PPE on each of the staffs depend on the particular tasks even when all the impact control methods have been implemented within the project compound. It is ensure to arrange the job training programmes to improve not only working skill but also the sound environmental conservation manners. Moreover, the emergency response actions should be practiced and trained to the wokers in order to immediate response and make the safety manners during unexpected emergency. During operation phase, the sustainable living styles should be encouraged by promoting walking, biking, public transport, and reusable bags usage to reduce energy and waste. The operation of buildings will align with the current municipal regulations and guidelines of related departments such as Environmental Conservation Department and Fire Department and comply with the regular inspection of local authorities.

The most important thing is the project proponent must need to have well understanding about the impact mitigation measures, management and monitoring plans that was described in this report, in complies with the EIA Procedures (2015) and legal requirements (as mentioned in Chapter 2) before taking the mitigation actions. Finally, it is strongly recommended that project proponent must submit monitoring report including environmental qualities measurements as described in environmental monitoring plan (as mentioned in Chapter 7) to the Environmental Conservation Department (ECD) once every two times a year.

REFERENCES

Abhishek Pandey, Laterite Soil, Mixed Soil and Soil Erosion (in Hindi), https://unacademy.com/lesson/laterite-soil-mixed-soil-and-soil-erosion-in-hindi/HMZO0RL2

Backer, C. A. and R.C. Bakhuizen. 1963, 1965, 1968. Flora of Java (Spermatophytes only). Vol. I, II & III. N.V.P. Noordhoff-Groningen. The Netherlands: Wolters-Noordhoff N.V.-Groningen

Chatrium Hotel, https://www.chatrium.com/royallakeyangon/experience-yangon/kabar-aye-pagoda

DIN 4150-3, 2016 Edition, December 2016 - Vibrations in buildings - Part 3: Effects on structures.

Du Mingyuan, Seiichiro Yonemura, Shen Zhibao, Shen Yanbo, Wang Wanfu and Taichi Maki, 2002, Wind Erosion Processes During Storm in Dunhuang, China, https://tucson.ars.ag.gov/isco/isco12/VolumeIV/WindErosionProcesses.pdf.

Environmental Conservation Department, (2015). National Environmental Quality (Emission) Guideline, Notification No. 615/2015, Ministry of Natural Resource and Environmental Conservation, Nay Pyi Taw.

Far and High Adventure Travel, https://www.farandhigh.com/kabar-aye-pagoda

Haling Myo Nwee, 2018, Comparative study of Lateritic soil in Mingon Area, Hlegu Township, Yangon Region and Meyon Area, Kyaikhto Township, Mon State, Dagon University Research Journal 2018 Vol.8.

Hooker, J. D. 1875-1897. The Flora of British India. Vol. I-VII. London: L. Reeve & Co., Ltd.

Htun, W. W. (2015). Assessment of Groundwater Vulnerability in Yangon City, Myanmar.https://www.slideshare.net/aung3/7-assessment-of-groundwater vulnerability-in-yangon-city-wint-wint-htun-2

Htun, W. W. (2015). Assessment of Groundwater Vulnerability in Yangon City, Myanmar. doi:https://www.slideshare.net/aung3/7-assessment-of-groundwater-vulnerability-in-yangon-city-wint-wint-htun-2.

HU Qi - ming, WU De-Lin & X JA Nian-he. 2007, 2008, 2009. Flora of Hong Kong. Vol-1, 2 and 3. Edited by Hong Kong Herbarium, Agriculture, Fisheries and Conservation Department (AFCD), South China Botanical Garden (SCBG), Chinese Academy of Sciences Published by Agriculture, Fisheries and Conservation Department, Government of the Hong Kong Special Administrative Region

International Finance Corporation (IFC), (2007). Environmental Health and Safety (EHS) Guideline, www.ifc.org/ehsguidelines

International Finance Corporation (IFC), (2012). Performance Standard on Environmental and Social Sustainability, IFC's Guidance Notes.

Jared Downing, 2016, Secrets of Inya Lake, https://www.frontiermyanmar.net/en/secrets-of-inya-lake/

Kress, J. W., Robert, A. D., Farr, E. & Yin Yin Kyi. 2003. A Checklist of the trees, shrubs, herbs, and climbers of Myanmar. Vol 45: 1-590. Department of Systematic Biology-Botany, National, Museum of Natural History, Washington, DC, USA

Lwin, A., & Khaing, M. M. (2012). Yangon River Geomorphology Identification and its Environmental Impacts Analysis by Optical and Radar Sensing Techniques. ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XXXIX-B8, 175–179. https://doi.org/10.5194/isprsarchives-xxxix-b8-175-2012.

MM Myanmars.net, Myanmar Travel Guide and Reviews, 2020-2021, https://myanmars.net/yangon/maha-pasana-cave.html.

Myanmar Info Travel, https://www.shwemyanmar.info/mobile/attraction/Bogyoke-Aung-San-Museum-89.html

National Library of Myanmar (Yangon), http://www.nlm.gov.mm/bhlib/information/5303

Official Website of University of Yangon, https://www.uy.edu.mm/

Pollution prevention and abatement handbook (1998). Toward cleaner production. World Bank Group in collaboration with United Nations Environment Programme and the United Nations Industrial Development Organization.

Renown Travel, https://www.renown-travel.com/burma/yangon/ngahtatgyipagoda.html

Soe Thura Tun, Maung Thein, Nyunt Htay and Kyaing Sein, (2014). Geological Map of Myanmar, Myanmar Geosciences Society (MGS)

Trip.com, Chaukhtatgyi Pagoda, https://www.trip.com/travel-guide/yangon/chaukhtatgyi-buddha-85458/

Tripadvisor, Martyrs Mausoleum, https://www.tripadvisor.co.nz/ShowUserReviews-g294191-d9597262-r410907972-Martyrs_Mausoleum-Yangon_Rangoon_Yangon_Region.html.

TTR Weekly, Daily Online ASEAN Travel News, https://web.archive.org/web/20160216165429/http://www.ttrweekly.com/site/2012/04/aung-san-museum-reopens/

UNESCO, https://whc.unesco.org/en/tentativelists/6367/

World Health Organization (WHO), 2018. A Global Overview of National Regulations and standards for Drinking-Water Quality

APPENDIX A
HAGL Myanmar Co., Ltd Certificates

ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်

Certificate of Incorporation

ဟုန်အန်း ဂီယာလိုင်း မြန်မာ ကုမ္ပဏီ လီမိတက်

HOANG ANH GIA LAI MYANMAR COMPANY LIMITED

Company Registration No. 146110460

မြန်မာနိုင်ငံကုမ္ပဏီများအက်ဥပဒေ ၁၉၁၄ ခုနှစ် အရ

ဟုန်အန်း ဂီယာလိုင်း မြန်မာ ကုမ္ပဏီ လီမိတက်

အား ၂၀၁၂ ခုနှစ် ဒီဇင်ဘာလ ၆ ရက်နေ့တွင်

အစုရှယ်ယာအားဖြင့် တာဝန်ကန့်သတ်ထား သည့် အများနှင့်မသက်ဆိုင်သောကုမ္ပဏီ

အဖြစ် ဖွဲ့စည်းမှတ်ပုံတင်ခွင့် ပြုလိုက်သည်။

This is to certify that

HOANG ANH GIA LAI MYANMAR COMPANY LIMITED

was incorporated under the Myanmar Companies Act 1914 on 6 December 2012 as a Private Company Limited by Shares.

ကုမ္ပဏီမှတ်ပုံတင်အရာရှိ

Registrar of Companies

ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန

Directorate of Investment and Company Administration

Former Registration No. 248FC/2012-2013

APPENDIX B
Organization License and Related Documents

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

The Government of the Republic of the Union of Myanmar

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

Ministry of Natural Resources and Environmental Conservation

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (အဖွဲ့အစည်း)

Environmental Impact Assessment License (Organization)

Environmental Compliance Consultancy Co., Ltd ၊ **ကုမ္ပဏီမှတ်ပုံတင်အမှတ်-၁၂۶၂၉۶၄۶၀** အား **အကြံပေး အဖွဲ့အမျိုးအစား(က)** အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်းလုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့်အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **Environmental Compliance Consultancy Co., Ltd** ، Registration No. 126296460 has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Consulting Organization Type (A)** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လိုင်စင်နံပါတ် License Number	: EIA-CO(A)005/2024
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 30-7-2024
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 29-7-2027

(ဒေါက်တာဆန်းဦး)
ညွှန်ကြားရေးမှူးချုပ်

Environmental Compliance Consultancy Co., Ltd

လိုင်စင်နံပါတ် License Number : EIA-CO(A)005/2024

(က) အဓိကအကြံပေးပုဂ္ဂိုလ်များ (၈-၆-၂၀၂၆)

စဉ်	အမည်	လုပ်ငန်းလိုင်စင်အမှတ်	မှတ်ချက်
၁	၂	၃	၄
(က) အကြံပေးပုဂ္ဂိုလ်			
၁	ဒေါ်မြတ်မွန်ဆွေ	EIA-C 018/2023	
၂	ဒေါ်သန်းသန်းဌေး	EIA-C 045/2023	
၃	ဒေါ်စိုးမိုးနွယ်	EIA-C 030/2023	
(ခ) တွဲဖက်အကြံပေးပုဂ္ဂိုလ်			
၁	ဒေါ်သန္တာထွန်း	EIA-AC 067/2024	
၂	ဦးရဲမြတ်ဘုန်းလှိုင်	EIA-AC 114/2024	
၃	ဦးချစ်ဘိုဘိုဝင်း	EIA-AC 120/2024	
၄	ဦးသန်းထွန်း	EIA-AC 104/2024	
၅	ဒေါက်တာဖြိုးသူအောင်	EIA-AC 092/2024	
၆	ဦးအောင်ငြိမ်းမြတ်	EIA-AC 013/2023	
၇	ဒေါက်တာဟိန်းလင်းအောင်	EIA-AC 052/2023	

Environmental Compliance Consultancy Co., Ltd

လိုင်စင်နံပါတ် License Number : EIA-CO(A)005/2024

Eligible Categories of Projects to be conducted by the Organization (8-6-2026)

Sr. No.	Categories of Projects as per Form B of Licensing Procedure	Report type that can be processed		
		EIA	IEE	EMP
1.	Onshore oil and gas development projects (12, 13 and 14)	✓	✓	✓
2.	Offshore oil and gas development projects (15, 16 and 17)	✓	✓	✓
3.	Oil and gas refinery/processing plants (18, 19, 20 and 25)	✓	✓	✓
4.	Construction of oil and gas transmission terminals, depots and distribution systems (21, 22 and 23)	✓	✓	✓
5.	Filling stations including liquified petroleumgas and compressed natural gas (24)	✓	✓	✓
6.	Coal-fired power plants (5)	✓	✓	✓
7.	Hydropower plants (2)	✓	✓	✓
8.	Other renewable energy power plants (7, 10 and 11)	✓	✓	✓
9.	Natural gas or biogas power plants (4)	✓	✓	✓
10.	Gas and thermal power plants (8 and 9)	✓	✓	✓
11.	Power plants from waste product (6)	✓	✓	✓
12.	Nuclear power generation (3)	✓	✓	✓
13.	Power distribution/transmission (26, 27 and 28)	✓	✓	✓
14.	Production of agricultural products 29 and 30	✓	✓	✓
15.	Livestock farms (31, 32, 33, 37 and 38)	✓	✓	✓
16.	Fishery farms. (34, 35 and 36)	✓	✓	✓
17.	Forest management and extraction. 39 and 40	✓	✓	✓
18.	Food processing and manufacturing. (42 to 52 and 57)	✓	✓	✓
19.	Beverage processing and manufacturing. (53 to 56)	✓	✓	✓
20.	Garment/textile manufacturing and dying. (58 and 59)	✓	✓	✓
21.	Leather product manufacturing. (60 and 61)	✓	✓	✓
22.	Sawmilling, fininshed wood, board and particle-based product manufacturing . (62 and 63)	✓	✓	✓
23.	Pulp and paper manufacturing .(64)	✓	✓	✓
24.	Printing and other surface decoration (65)	✓	✓	✓

CONFIRMED ECD

Environmental Compliance Consultancy Co., Ltd
လိုင်စင်နံပါတ် License Number : EIA-CO(A)005/2024

Eligible Categories of Projects to be conducted by the Organization (8-6-2026)

Sr. No.	Categories of Projects as per Form B of Licensing Procedure	Report type that can be processed		
		EIA	IEE	EMP
25.	Chemical products manufacturing (66 to 75)	✓	✓	✓
26.	Explosives manufacturing (76 to 78)	✓	✓	✓
27.	Glass and ceramics products manufacturing (79 and 80)	✓	✓	✓
28.	Cement, other construction materials and asphault manufacturing (81 to 84)	✓	✓	✓
29.	Metal production and refinery (85 to 88)	✓	✓	✓
30.	Shipyard, ship and locomotives building, assembling and repair (89 and 90)	✓	✓	✓
31.	Rubber and idustrial raw materials manufacturing (91 to 93)	✓	✓	✓
32.	Electronics and electric equipment manufacturing (94 to 96)	✓	✓	✓
33.	Machinery, vehicles and equipment manufacturing , assembling and repair (97 to 101)	✓	✓	✓
34.	Weapons and ammunition manufacturing industry (102)	✓	✓	✓
35.	Non-hazardous waste recycling, disposal and incineration (103 to 105)	✓	✓	✓
36.	Hazardous waste recycling and disposal (106 to 107)	✓	✓	✓
37.	Wastewater and sewage treatment (108 and 109)	✓	✓	✓
38.	Ground water development for industry or agriculture (110)	✓	✓	✓
39.	Construction of dams, reservoirs and irrigation systems (41 and 101)	✓	✓	✓
40.	Lake, river and channel land fillings that may impact the public (112)	✓	✓	✓
41.	Civil works such as construction of river embankments, seawalls, offshore breakwaters (113)	✓	✓	✓
42.	Dredging and river channel conservation (114 and 115)	✓	✓	✓
43.	Construction and development of industrial zone (118)	✓	✓	✓
44.	Construction of hospitals (119)	✓	✓	✓
45.	Construction of cemeteries (120)	✓	✓	✓
46.	Hotel and tourism development (121)	✓	✓	✓
47.	Construction of golf courses (122)	✓	✓	✓
48.	Development projects for habitat, resettlement, urban and new cities (142)	✓	✓	✓
49.	Projects relating to rivers, lakes, coast, natural resources and cultural heritages (151 to 155)	✓	✓	✓

Environmental Compliance Consultancy Co., Ltd
လိုင်စင်နံပါတ် License Number : EIA-CO(A)005/2024

Eligible Categories of Projects to be conducted by the Organization (8-6-2026)

Sr. No.	Categories of Projects as per Form B of Licensing Procedure	Report type that can be processed		
		EIA	IEE	EMP
50.	Construction of dormitories and condominiums (143)	✓	✓	✓
51.	Construction of all round sport stadiums (144)	✓	✓	✓
52.	Construction Special Economic Zone and Development (145)	✓	✓	✓
53.	Construction of department stores, trade centers and super markets (146)	✓	✓	✓
54.	Construction of underground basements (147)	✓	✓	✓
55.	Infrastructure projects (148)	✓	✓	✓
56.	Restaurants (150)	✓	✓	✓
57.	Railways and tramways projects (123)	✓	✓	✓
58.	Cable car projects (124)	✓	✓	✓
59.	Airports and runway construction (125)	✓	✓	✓
60.	Construction and upgrading of bridges, river bridges and flyovers (126 and 127)	✓	✓	✓
61.	Tunnels construction (128)	✓	✓	✓
62.	Construction of new highways (129)	✓	✓	✓
63.	Construction and upgrading of roads (130 and 131)	✓	✓	✓
64.	Ship navigation (116)	✓	✓	✓
65.	Construction of ports and harbours (117)	✓	✓	✓
66.	Construction of highway terminals (149)	✓	✓	✓
67.	Extraction of rock/gravel/sand and raw minerals for construction and ceramics (132 and 133)	✓	✓	✓
68.	Extraction and refining of industrial raw minerals (134)	✓	✓	✓
69.	Mining, extraction and refining of surface and underground metals (135 to 141)	✓	✓	✓
70.	Telecommunication projects (156 to 157)	✓	✓	✓

CONFIRM ECD CONFIRM

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

The Government of the Republic of the Union of Myanmar

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

Ministry of Natural Resources and Environmental Conservation

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (ပုဂ္ဂိုလ်)

Environmental Impact Assessment License (Individual)

ဒေါ်မြတ်မွန်ဆွေ၊ ၁၂/အစန(နိုင်)၀၂၉၆၁၆ အား **အကြံပေးပုဂ္ဂိုလ်** အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်း လုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့် အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **Daw Myat Mon Swe, 12/AhSaNa(N)029616** has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Consultant** under the Licensing Procedure for the Third Persons or Organizations Undertaking initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်-

The areas of expertise, eligible to be conducted, are as follows:

1. **လူမှုရေးဆိုင်ရာ လေ့လာခြင်းနှင့် သရုပ်ခွဲဆန်းစစ်ခြင်း (Social Study and Analysis)**
2. **အထွေထွေပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်း (General Environmental Management)**
3. **ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး(လေ/ရေနှင့် မြေ) များအား စောင့်ကြပ်ကြည့်ရှုခြင်း (Environmental Quality Monitoring (Air,Water and Soil)**
4.
5.

လိုင်စင်နံပါတ် License Number	: EIA-C 018/2023
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 1-12-2023
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 30-11-2026

(သိန်းတိုး)

ညွှန်ကြားရေးမှူးချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
The Government of the Republic of the Union of Myanmar
သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
Ministry of Natural Resources and Environmental Conservation
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (ပုဂ္ဂိုလ်)

Environmental Impact Assessment License (Individual)

ဒေါ်သန်းသန်းရွှေ၊ ၁၂/ဥကတ(နိုင်)၁၆၁၄၄۶ အား အကြေပေးပုဂ္ဂိုလ် အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်း လုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့် အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **Daw Than Than Htay, 12/OuKaTa(N)161446** has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Consultant** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်-

The areas of expertise, eligible to be conducted, are as follows:

1. ဂေဟစနစ်နှင့် ဇီဝမျိုးစုံမျိုးကွဲ (Ecology and Biodiversity)
2.
3.
4.
5.

လိုင်စင်နံပါတ် License Number	: EIA-C 045/2023
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 29-12-2023
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 28-12-2026

(သိန်းတိုး)
ညွှန်ကြားရေးမှူးချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

The Government of the Republic of the Union of Myanmar

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

Ministry of Natural Resources and Environmental Conservation

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (ပုဂ္ဂိုလ်)

Environmental Impact Assessment License (Individual)

ဒေါ်စိုးမိုးနွယ်၊ ၉/ဝတန(နိုင်)၁۶၁۹۴۵ အား **အကြံပေးပုဂ္ဂိုလ်** အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်း လုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့် အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **Daw Soe Moe Nwe, 9/WaTaNa(N)161945** has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Consultant** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်-

The areas of expertise, eligible to be conducted, are as follows:

1. **လူမှုရေးဆိုင်ရာ လေ့လာခြင်းနှင့် သရုပ်ခွဲဆန်းစစ်ခြင်း (Social Study and Analysis)**
2. **ဂေဟစနစ်နှင့် ဇီဝမျိုးစုံမျိုးကွဲ (Ecology and Biodiversity)**
3. **စွန့်ပစ်အစိုင်အခဲနှင့် ဘေးအန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲခြင်း (Solid Waste and Hazardous Waste Management)**
4.
5.

လိုင်စင်နံပါတ် License Number	: EIA-C 030/2023
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 1-12-2023
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 30-11-2026

(သိန်းတိုး)

ညွှန်ကြားရေးမှူးချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

The Government of the Republic of the Union of Myanmar

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

Ministry of Natural Resources and Environmental Conservation

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (ပုဂ္ဂိုလ်)

Environmental Impact Assessment License (Individual)

ဒေါ်သန္တာထွန်း၊ ၁၄/ဖပန(နိုင်)၁၆၁၀၁၉ အား **တွဲဖက်အကြံပေးပုဂ္ဂိုလ်** အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်း လုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့်အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **Daw Thandar Tun, 14/PhaPaNA(N)161019** has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Associate Consultant** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်-

The areas of expertise, eligible to be conducted, are as follows:

1. **စလေဗေဒ၊ မြေပေါ်ရေနှင့်မြေအောက်ရေထိန်းသိမ်းခြင်း (Hydrology,Surface Water and Ground Water Conservation)**
2. **ရေထုညစ်ညမ်းမှုကြိုတင်ကာကွယ်ခြင်း၊ ထိန်းချုပ်ခြင်း၊ စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ထိခိုက်မှု ကြိုတင်ခန့်မှန်းခြင်း(Water Pollution Prevention, Control, Monitoring and Prediction of Impacts)**
3.
4.
5.

လိုင်စင်နံပါတ် License Number	: EIA-AC 067/2024
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 29-2-2024
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 28-2-2027

(သိန်းတိုး)

ညွှန်ကြားရေးမှူးချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

The Government of the Republic of the Union of Myanmar

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

Ministry of Natural Resources and Environmental Conservation

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (ပုဂ္ဂိုလ်)

Environmental Impact Assessment License (Individual)

ဦးရဲမြတ်ဘုန်းလှိုင်၊ ၁၂/သကတ(နိုင်)၁၈၀၁၆၆ အား **တွဲဖက်အကြံပေးပုဂ္ဂိုလ်**အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်း လုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံး လုပ်နည်းနှင့် အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **U Ye Myat Phone Hlaing, 12/ThaKaTa(N)180166** has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Associate Consultant** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်-

The areas of expertise, eligible to be conducted, are as follows:

1. **လေထုညစ်ညမ်းမှုစောင့်ကြပ်ကြည့်ရှုခြင်း (Air Pollution Monitoring)**
2.
3.
4.
5.

လိုင်စင်နံပါတ် License Number	: EIA-AC 114/2024
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 2-10-2024
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 1-10-2027

(သိန်းတိုး)

ညွှန်ကြားရေးမှူးချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

The Government of the Republic of the Union of Myanmar

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

Ministry of Natural Resources and Environmental Conservation

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (ပုဂ္ဂိုလ်)

Environmental Impact Assessment License (Individual)

ဦးသန်းထွန်း၊ ၁၂/ပဇတ(နိုင်)၀၀၇၀၄၉ အား **တွဲဖက်အကြံပေးပုဂ္ဂိုလ်** အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်း လုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့် အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **U Than Htut, 12/PaZaTa(N)007049** has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Associate Consultant** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်-

The areas of expertise, eligible to be conducted, are as follows:

1. **ရှေးဟောင်းသုတေသနနှင့် ယဉ်ကျေးမှုအမွေအနှစ်(Archaeological and Cultural Heritage)**
2.
3.
4.
5.

လိုင်စင်နံပါတ် License Number	: EIA-AC 104/2024
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 31-8-2024
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 30-8-2027

(သိန်းတိုး)

ညွှန်ကြားရေးမှူးချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

The Government of the Republic of the Union of Myanmar

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

Ministry of Natural Resources and Environmental Conservation

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (ပုဂ္ဂိုလ်)

Environmental Impact Assessment License (Individual)

ဒေါက်တာဖြိုးသူအောင်၊ ၉/မသန(နိုင်)၁၁၇၄၂၈ အား **တွဲဖက်အကြံပေးပုဂ္ဂိုလ်** အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်း လုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့်အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **Dr. Phyo Thu Aung, 9/MaThaNa(N)117428** has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Associate Consultant** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်-

The areas of expertise, eligible to be conducted, are as follows:

1. **မိုးလေဝသနှင့် လေအရည်အသွေးဆန်းစစ်ခြင်းနှင့် ကြိုတင်ခန့်မှန်းခြင်း (Meteorology, Air Quality Assessment and Forecast)**
2. **ရေထုညစ်ညမ်းမှု ကြိုတင်ကာကွယ်ခြင်း၊ထိန်းချုပ်ခြင်း၊စောင့်ကြပ်ကြည့်ရှုခြင်းနှင့် ထိခိုက်မှု ကြိုတင်ခန့်မှန်းခြင်း (Water Pollution Prevention, Control, Monitoring and Prediction of Impacts)**
3.
4.
5.

လိုင်စင်နံပါတ် License Number	: EIA-AC 092/2024
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 30-4-2024
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 29-4-2027

(သိန်းတိုး)

ညွှန်ကြားရေးမှူးချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
The Government of the Republic of the Union of Myanmar
သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
Ministry of Natural Resources and Environmental Conservation
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (ပုဂ္ဂိုလ်)

Environmental Impact Assessment License (Individual)

ဦးအောင်ငြိမ်းမြတ်၊ ၁၃/တကန(နိုင်)၂၀၃၂၄၄ အား တွဲဖက်အကြံပေးပုဂ္ဂိုလ် အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်း လုပ်ငန်းလိုင်စင်ဆိုင်ရာလုပ်ထုံးလုပ်နည်းနှင့်အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **U Aung Nyein Myat, 13/TaKaNa(N)203248** has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Associate Consultant** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်-

The areas of expertise, eligible to be conducted, are as follows:

1. **ဘူမိဆိုင်ရာ ဆန်းစစ်လေ့လာခြင်း (Geological Assessment)**
2. **မြေအသုံးချမှု (Land Use)**
3.
4.
5.

လိုင်စင်နံပါတ် License Number	: EIA-AC 013/2023
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 1-12-2023
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 30-11-2026

(သိန်းတိုး)
ညွှန်ကြားရေးမှူးချုပ်

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
The Government of the Republic of the Union of Myanmar
သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
Ministry of Natural Resources and Environmental Conservation
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (ပုဂ္ဂိုလ်)

Environmental Impact Assessment License (Individual)

ဒေါက်တာဟိန်းလင်းအောင်၊ ၁၂/စခန(နိုင်)၀၆၄၈၈၁ အား တွဲဖက်အကြံပေးပုဂ္ဂိုလ် အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်း လုပ်ငန်းလိုင်စင်ဆိုင်ရာလုပ်ထုံးလုပ်နည်းနှင့်အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **Dr.Hein Lin Aung, 12/SaKhaNa(N)064881** has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Associate Consultant** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်-

The areas of expertise, eligible to be conducted, are as follows:

1. **ကျန်းမာရေး (Health (Impact Studies and Analysis))**
2.
3.
4.
5.

လိုင်စင်နံပါတ် License Number	: EIA-AC 052/2023
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 1-12-2023
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 30-11-2026

(သိန်းတိုး)
ညွှန်ကြားရေးမှူးချုပ်

CVS of SUPPORTING MEMBERS OF ENVCC

Hsutyi Mon

Consultant

Certificate for Transitional Consultant Registration (**TCR No. 00355**)
(Structural Analysis and Design)

With more than (3) years' Experience in the environmental and social survey, impact analysis and stakeholder engagement, ensuring all consultation was conducted to undertaking Environmental and Social Impact Assessments by the requirements of Myanmar Environmental Impact Assessments Procedure and National Environmental Quality (Emission) Guideline, IFC Standards, WHO Standard, ECDF Safeguard Policy, JICA Guidelines including Environmental, Health, Safety and Social (EHSS) Safeguard Screening, Internal Environmental Auditing and Project Management.

Education

B.E (Civil), Technological University (Hmawbi), 2010

Employment

- Director/ Technical Consultant, Environmental Compliance Consultancy Co., Ltd. (EnvCC), Yangon, Myanmar, (Sept 2021 to now) www.envccmyanmar.com
- Project Engineer/ Project Control Engineer, CHIYODA & PUBLIC WORKS Co., Ltd., Yangon, Myanmar, (CPW), (Sep 2017 to Oct 2019) www.cpw.com.mm
- Associate Engineer, (CPW), (Nov 2015 to Sep 2017)
- Structure Engineer, CHIYODA Corporation, Yokohama, Japan, (Aug 2012 to Nov 2015) www.chiyoda-corp.com
- Trainee Civil Engineer, CHIYODA Corporation, Philippines, (Dec 2011 to Aug 2012) www.chiyodaphil.com.ph
- Quantity Surveyor, MVM Roofing Pte Ltd, Singapore, (Nov 2010 to Apr 2011) www.mvm.com.sg
- Junior Engineer (Site), Naing Group Construction Co.,Ltd, Yangon, (Feb 2010 to Oct 2010) www.nainggroup.com
- Trainee Decoration Engineer and Site Accountant, Naing Group Construction Co.,Ltd, Yangon, (Nov 2009 to Feb 2010)

Professional Affiliations & Registrations

- Member (ID: 016934-M/C), Myanmar Engineering Society, Yangon, Myanmar, www.mes.org.mm
- Registered Engineer (ID: 000647/ Structural), Myanmar Engineering Council, Yangon, Myanmar, www.myanmarengc.org

Fields of Competence

- Stakeholder Engagement
- Environmental and Social Impact Assessment (ESIA)
- Environmental Monitoring
- EHSS Safeguard Screening
- Internal Auditing, ISO 14001 & 45001
- Project Management
- Structural Analysis and Design

Training

- OSHE Internal Auditing, ISO14001 & 45001 (Environmental Management System (EMS) and Occupational Health and Safety Management System (OHSMS)
- Environmental Impact Assessment, "Conducting and Writing Environmental Impact Assessment Reports for EIA Practitioners in Myanmar"
- Project Management
- Structural Analysis and Design

Languages

Myanmar, English and Japanese (N4)

Contact Details

Ma-20, NeikBainDa Street, Lanthit Road, NantTharGone Qr.,
Insein Township, Yangon, Myanmar

Mobile: +95 (9) 972508016, +95 (9) 764271056
Email: hsutyimon@envccmyanmar.com
monhsutyi@gmail.com

Key Projects' experience

Offshore and Onshore

- **EIA for Shwe Field – Phase 4 Development for POSCO International (2023):** Assist to Team Leader for Environmental Risk Assessment and General Environmental Management. The work involves assisting site surveying, site interviewing and collecting the required information and writing of EIA.
- **Environmental Monitoring Report for YETAGUN (Offshore) Production Activities (2023):** Updating of the EMP report of YETAGUN Production Facilities written up by Environmental Recourses Management (ERM) as ECD's comments.
- **Environmental Monitoring Report for YETAGUN (Onshore) Production Activities (2023):** Updating of the EMP report of YETAGUN Production Facilities written up by Environmental Recourses Management (ERM) as ECD's comments.
- **Environmental Monitoring Report (Update) for Shwe Field Development for POSCO International (2023):** Updating of the EMP report written up by Environmental Recourses Management (ERM) as ECD's comments.
- **Environmental and Social Performance Review for Yetagun Offshore Project, Petronas Carigali (Hong Kong) Myanmar Ltd - PCML, (2022)** Assist to Team leader and the tasks includes the Environmental and Social performance review of Yetagun Gas field.
- **Environmental and Social Due Diligence for Yetagun Onshore Project, Petronas Carigali (Hong Kong) Myanmar Ltd - PCML, (2022)** Assist to Team leader and the tasks includes the Environmental and Social due diligence for Yetagun Onshore Facilities (Pipeline Operation Centre, Pipeline and Metering Station).

Offshore Supply Base

- **Thaketa Offshore Supply Base, Myanma Oil and Gas Enterprise, Environmental Management Plan (EMP) Yangon Region, Myanmar (2020): EMP** study in this Project aimed to prepare the EMP for export/import licence of Chemicals to provide for onshore/offshore activities. The work involves assisting site surveying, site interviewing and collecting the required information and assisting the preparation of EMP for ECD (MoNREC).

Power

- **EMP for 50MW Gas Power Plant Project (2023-ongoing Project),** Hlawga, Mingalardon Township, Yangon Region, Project Management and conducting environmental and Social Impact Assessment.
- **EIA for Paung Daw Gyi 22 MW Hydropower Project** (2022-ongoing), Dawei, Tanintharyi Region. Assist Team leader for environmental and Social Impact Assessment, Risk Assessment, Stakeholder engagement and Project Management.
- **IEE for Ye River 10MW Hydropower Project** (2022-ongoing): between Kaing Taw Village and Phalan Chaung Wa Village, Ye Township of Mon State. Assist Team leader for environmental and Social Impact Assessment, Risk Assessment, Stakeholder engagement and Project Management.

Infrastructure

- **IEE for Fuel Filling Station Project (Insein Township)** (2021-ongoing), Yangon, Brighter PTT Oil and Retail Business Co., Ltd. Assist Team leader for environmental and Social Impact Assessment, Risk Assessment, Stakeholder engagement and Project Management.
- **IEE for Fuel Filling Station Project (Htauk Kyant, Mingalardon Township)** (2021-ongoing), Yangon, Brighter PTT Oil and Retail Business Co., Ltd. Assist Team leader for environmental and Social Impact Assessment, Risk Assessment, Stakeholder engagement and Project Management.

- ***Others***
  - **Project Management** (2017-2019), Infrastructure Projects and Plant Construction Project in Myanmar.
    - Monitoring and Controlling Project Scopes, Schedule, Cost, Communications and Risk
    - Assist Project Managers for Planning, Schedule Developing, Indirect Cost Estimation, Budget Determination, Project Cost Review Summery (PCRS) Preparation, Risk Management
    - Coordination with relevant disciplines (Internal/ External) for smooth operations along the project life cycle
    - Preparing and Updating Procedures/ Guidelines
    - Reporting to Management and prepare MOM
    - Preparing Project Completion Documents
  - **Construction Management (Civil Engineering Scope)** (2015-2017) Rice Husk Gasification Project in Myanmar
    - Working together with the Civil Team members for the design work and drawing preparation
    - Attending the meeting with Client, Sub-contractor, oversea subsidiaries, and other disciplines
    - Preparing the schedule, specification, and necessary documents of a project under control of Lead Engineer and Project Engineer
    - Working as Site Engineer
  - **Structural Analysis, Design and Coordination** (2013-2015) 2 Onshore LNG Facilities Project in Russia and Australia
    - Attending internal disciplines meetings, Project meetings
    - Checking the 3D model clashing, design, drawings, and design reports submitted by sub-contractor and prepare necessary documents and information to issue in the company document system
    - Coordination between disciplines and joint ventures
    - Schedule, documents, and information controlling for sub-contractor
    - Preparing framing concept and design package for structures to be designed by sub-contractor
    - Expedite if there is any clarification within disciplines.
    - Design steel structure operating stage and platform.
  - **Structural Analysis and Design** (2012-2013) Design scope for Renovation of Refinery Plant Project (Gas) in Venezuela
    - Studying American Design Codes (ACI 318M-11 & AISC 360-10) and prepare summary for use in design
    - Attending Lectures, Meetings and Study group discussions
    - Design table-top concrete structure for fractionators and Steel structure staircase 80m height attached to the vessel, analyzing, detailed member design and foundation design
    - Prepare study report, presentation, and technical report for the designed table-top
    - Prepare the design practice together with project team members under control of Lead Engineer
    - Develop the steel connection capacity calculation spreadsheet from AS 4100 to AISC 360-10, Develop the spreadsheet for capacity calculation of single shear to double shear bolt type connection
  - **Structural Analysis and Design (Trainee)** (2011-2012) Design scope for Refinery Plant Project (Chemical) in Papua New Guinea
    - Studying Structure and Design Software usage, performing sample designs.
    - Assigned in Refinery Plant Project and accomplish the IFC (Issue for construction) design and compile documentation for steel structure pipe rack with pile foundation.
    - Attending Lectures, Meetings and Seminars.
  - **Quantity Surveying** (2010-2011) Roofing Projects in Singapore
    - Preparing and analyzing costing for tenders. Prepare shop drawings.
  - **Construction** (2009-2010) Condominium construction projects in Myanmar
    - Scheduling of rebar cut-off for beams, columns, and slabs,
    - Checking plans, drawings, and quantities for accuracy of calculations and interpreting project specifications,
    - Performing cost estimating, scheduling, and field supervision under control of project engineer,
    - Liaising with interior and exterior designers and architects, supervisors, planners, quantity surveyors and the general workforce involved in the project
    - Estimating cost and materials
    - Managing decoration process.

သိပ္ပံနှင့်နည်းပညာဝန်ကြီးဌာန
Ministry of Science and Technology

ရန်ကုန်နည်းပညာတက္ကသိုလ်
Yangon Technological University

အင်ဂျင်နီယာဘွဲ့
Bachelor of Engineering

နည်းပညာတက္ကသိုလ်/ကောလိပ် ....ဟော်ဘီ.....မှအောင်မြင်ခဲ့သော
....ဦး ကိုကိုလတ် ....၏ သား/သမီး ....မဆွတ်ရည်မွန် ....အား
အင်ဂျင်နီယာဘွဲ့ (.....မြို့တြ.....)
ကို အပ်နှင်းနိုင်မြင့်လိုက်သည်။ NOVEMBER 2009

Upon successful completion of the studies at
Technological University/College....Hmawbi....
The degree of Bachelor of Engineering (....Civil....)
is awarded to
Ma Hsut yi Mon son / daughter of U Ko Ko Latt
အမျိုးသားမှတ်ပုံတင်အမှတ် (National Registration Number) 12/Ah.Sa.Na.(Naing) 189523
ဘွဲ့ရမှတ်ပုံတင်အမှတ် (Graduate Registration Number) ....002155....

ပါမောက္ခချုပ်/ကျောင်းအုပ်ကြီး
နည်းပညာတက္ကသိုလ်/ကောလိပ်
ဟော်ဘီ
Rector/Principal
Technological University/College

ပါမောက္ခချုပ်
ရန်ကုန်နည်းပညာတက္ကသိုလ်
ရန်ကုန်
Rector
Yangon Technological University

၂၀၁၀ ခု၊ မတ် လ၊ ၁၄ ရက်
14 MARCH 2010

သိပ္ပံနှင့်နည်းပညာဝန်ကြီးဌာန
Ministry of Science and Technology

ရန်ကုန်နည်းပညာတက္ကသိုလ်
Yangon Technological University

အင်ဂျင်နီယာနည်းပညာဘွဲ့
Bachelor of Technology

နည်းပညာတက္ကသိုလ်/ကောလိပ် ....မော်ဘီ.....မှအောင်မြင်ခဲ့သော
.....ဦးဇင်ကိုလတ်.....၏ သား/သမီး ...ဆွေတက်ရည်မွန်.....အား
အင်ဂျင်နီယာနည်းပညာဘွဲ့ (.....မြို့ပြဒီဇိုင်းဂျင်နီယာ.....)
ကို အပ်နှင်းချီးမြှင့်လိုက်သည်။ DECEMBER 2008

Upon successful completion of the studies at
Technological University/College.....Hmawbi.....
The degree of Bachelor of Technology (.....Civil Engineering.....)
is awarded to
Ma Hsutyi Man.....son / daughter of...U Ko Ko Latt.....
အမျိုးသားမှတ်ပုံတင်အမှတ် (National Registration Number) 12/Ah.Sa.Na.(Naing)184523
ဘွဲ့ရမှတ်ပုံတင်အမှတ် (Graduate Registration Number) .....002586.....

ပါမောက္ခချုပ်/ကျောင်းအုပ်ကြီး
နည်းပညာတက္ကသိုလ်/ကောလိပ်
.....မော်ဘီ.....
Rector/Principal
Technological University/College
၂၀၀၉ ခု၊ မတ် လ၊ ၂၉ ရက်

ပါမောက္ခချုပ်
ရန်ကုန်နည်းပညာတက္ကသိုလ်
.....ရန်ဇင်ညွန့်.....
Rector
Yangon Technological University

29 MARCH 2009

Government of the Union of Myanmar
Ministry of Science and Technology

Department of Technical and Vocational Education

AGTI

ASSOCIATESHIP OF GOVERNMENT TECHNICAL INSTITUTE

This is to certify that

Ma Hsutyi Mon

~~son~~ / daughter of U Ko Ko Latt has completed the

two year Diploma Course in Civil Engineering,

and passed the final examination held in September, 2006

Registered Date of Birth 8th May 1988

National Registration No. 12/Ah Sa Na (Naing) 184523

Graduate Registration No. 015/06

Principal

Chairman
Examination Board

Date of Issue 1. 9. 08

Place of Issue Hmawbi E.T.C

MYANMAR PROJECT MANAGEMENT CENTER
ENSURING PROJECT SUCCESS

Certificate of Completion

Awarded to

HSUTYI MON

Birth Date: 1988-05-08

For Participating in

PMP Exam Prep

Duration: 40 Hours

From 2023-09-09 to 2023-09-23

Facilitated by Mr. Zin Bo Aung at Myanmar Project Management Center

Verifiable with ZADA on verify.zadanetwork.com

*This verifiable credential was issued by **Myanmar Certified Training Centers Co Ltd**.*
For questions related to verification, contact ZADA on verify@zada.io.

LITHAN

Certificate of Attendance

This is to certify that

Hsutyi Mon

has attended the

Project Management Professional (PMP)® Course

Contact Hours/PDU Value: 35

from 5 May 2018 to 10 June 2018

Project Management Institute

Registered Education Provider

Krishnamoorthy Ramoo
Chief Operating Officer

LITHAN PTE LTD SINGAPORE

Certificate No. PMPMYN0265

Project Management Professional (PMP) and the PMI Registered Education Provider logo are registered marks of the Project Management Institute, Inc.

ABSQ

Exemplar Global Certification

Certificate of Completion

This is to certify that

MS.HSUTYI MON

has completed the course

"Integrating of ISO 14001:2015 & ISO 45001:2018"

"OHSE Internal Auditor Training"

Occupational Health & Safety Environmental Management System

07-08 Dec , 2019

ACCREDITED BENCHMARK
ISO STANDARD MYANMAR

Capt. Zaw Win Aye
Lead Tutor

Certificate No. / 1912070824-11
Issue Date 14 Jan 2020

This certificate is issued by ABSQ , Exemplar Global Recognized Training Partner. It may be found on the "ABSQ" Certification Website (www.standardsmyanmar.com)

MYANMAR KOEI INTERNATIONAL MKI YANGON

UNDP UN environment programme

CERTIFICATE OF COMPLETION

This is to certify that

Ms. Hsutyi Mon

has successfully completed
the 20-hour training on "Conducting and Writing Environmental Impact Assessment Reports for EIA Practitioners in Myanmar" conducted by United Nations Development Programme Myanmar and Myanmar Koei International Ltd. from 6 to 16 December 2021.

青木智男
Mr. Tomoo Aoki
General Manager
Myanmar Koei International Ltd.

Mr. Adnan Cheema
Deputy Resident Representative
UNDP Myanmar

Belgium partner in development · AUSTRIAN DEVELOPMENT AGENCY · Sweden Sverige · NORWEGIAN MINISTRY OF FOREIGN AFFAIRS

M@sterpiece Engineering & Education Group
MEEG

Certificate
of successful completion

Name: Hsut Yi Mon
N.R.C No.: 12/Ah Sa Na (Naing) 184523
Father's Name: U Ko Ko Lat
Course Title: Auto CAD Special Course
Subjects: 2D, 3D, Isoplane
Perspective Drawing, Printing,
Rendering Basic

Certificate No. 01703
Date of issue 5 April,2009
Yangon, Myanmar.

LINN HTIKE B.E (Civil)
Principal

ICML
INSTITUTE FOR COMMUNICATION MANAGEMENT AND LEADERSHIP

Certificate of participation

This is to certify that
Ms Hsutyi Mon

Participated in the workshop
Technical Writing

15 and 16 December 2021
Jill Noble | Facilitator

www.icml.com.au

PIONEER STRUCTURAL DESIGN GROUP

(Education Branch)

CERTIFICATE OF TRAINING

This is to certify that Hsutyi Mon , *daughter of* U Ko Ko Latt *has attended the following training course conducted at the PIONEER Structural Design Group (Education Branch) and has demonstrated considerable understanding and competence in the theoretical and application aspects of the subject.*

Course Title : ADVANCED SOFTWARE APPLICATIONS (ETABS & SAFE)

Course Duration : 6 WEEKS (from 25.6.2011 to 31.7.2011)

U Kyi Lin
B.E. (Civil)
Admin. Officer
PIONEER Structural Design Group

U Soe Naing
B.E. (Civil) ; M.E. (Civil - Structure)
Licensed Structural Engineer (YCDC)
Training Programme Manager
PIONEER Structural Design Group

Date : 1.8.2011

Trainee Reg. No. : 637 / VII

The course mentioned on the front page covers the following topics.

Course Title : ADVANCED SOFTWARE APPLICATIONS (ETABS & SAFE)

Course Contents (main topics only) :

(1) Modeling of tall buildings with shear walls
(2) Modeling with various foundation systems
(3) Reduced live load and pattern loadings for optimum forces
(4) Investigation of shear wall locations
(5) Moment release
(6) P - Delta analysis
(7) Story drifts, overturning checking and sliding checking
(8) Checking of analysis and design results for tall building structures
(9) Other structural types

U Soe Naing
B.E. (*Civil*) ; M.E. (*Civil - Structure*)
Licensed Structural Engineer *(YCDC)*
Training Programme Manager
PIONEER Structural Design Group

KAY KHINE WINT@ARKAR WINT

Legal Consultant

Skilled Professional Lawyer with extensive experience in regulatory compliance and trademark and patent licensing, specializing on document preparation, legal and court procedures, and ensuring full compliance with applicable laws and regulations. As an associate consultant, she has been contributing in preparing and reviewing EIA, IEE and EMP documents and relevant environmental regulations. She has 1 year experience in providing legal and regulatory advice on environmental matters and compliance requirements as well as assisted clients with environmental permits, regulatory procedures, legal documentation and compliance.

Education

- Bachelor of Laws, Yangon University, Myanmar (2005 - 2011)
- Diploma in Business Law (ABE Endorsed ,2025)
- Diploma in International Business Law (ACTD-USA Accredited ,2025)

Employment

- High Grade Lawyer, (2015-2019)
- Advocate (2019)
- Legal Consultant, Environmental Compliance Consultancy Co., Ltd, (2025 to Now)

Fields of Competence

- Environmental Impact Assessment (EIA)
- Initial Environmental Examination (IEE)
- Environmental Management Plan (EMP)

Languages

Myanmar, English

Contact Details

NO.6,Strand Road ,TaungLonePyan Ward, Pazuntaung, Mingalartaungnyunt Township, Yangon, Myanmar

Mobile: +95 (0) 9779933608

Email: arkararkarwint@gmail.com

Key Projects' Experience

- Environmental Monitoring Report for Fuel Station (Insein), (Nilar Yoma Trading Co., Ltd, 2025) - (LAW, Legal Documentation and Compliance)
- Environmental Monitoring Report for Fuel Station (Htauk Kyant), (Nilar Yoma Trading Co., Ltd, 2025) - (LAW, Legal Documentation and Compliance)
- Environmental Management Report for Production and Marketing of Plastic Boxes Project, (2-Go Packaging Co., Ltd, 2025) - (LAW, Legal Documentation and Compliance)
- Initial Environmental Examination Report for Footwear and Semi Footwear Factory project, (King Lead Ind Co., Ltd, 2025)- (LAW, Legal Documentation and Compliance)

Oil and Gas

- Environmental Impact Assessment Report for MIN YE' THU Appraisal and Exploration Drilling Campaign 2026, (GPM, 2025-ongoing) - (LAW, Legal Documentation and Compliance)
- Environmental Impact Assessment Report for Offshore M15 Exploration Drilling (CFG, 2025 - Ongoing) - (LAW, Legal Documentation and Compliance)

Other Ongoing Projects

- Environmental Impact Assessment Report for Pig and Fish Farming Project, (Htoo Htet Han Co., Ltd, 2026-Ongoing) – (LAW, Legal Documentation and Compliance)
- Environmental Impact Assessment Report for Tin and Related Minerals (Large-Scale) Mining Project (MEC, 2025 – Ongoing) - (LAW, Legal Documentation and Compliance)
- Environmental Impact Assessment Report for Antimony Refinery Plant Project, (Ruby Dragon Mine Co., Ltd, 2025- Ongoing) - (LAW, Legal Documentation and Compliance)
- Environmental Impact Assessment Report for Antimony Mine Project (Plot-1 and Plot-2), (Ruby Dragon Mine Co., Ltd, 2025- Ongoing) – (LAW, Legal Documentation and Compliance)
- Environmental Impact Assessment Report for Sand Dredging Project, (MEC, 2025 – Ongoing) - (LAW, Legal Documentation and Compliance)
- Initial Environmental Examination Report for Aluminum, Zinc, and Copper Ingots Production and Exportation Project, (Myanmar Nonferrous Metals Holdings Limited. 2025 – Ongoing) - (LAW, Legal Documentation and Compliance)
- Environmental Impact Assessment Report for Luxury Environmentally Friendly Hotel and Related Service, (Mokan International Co., Ltd, 2025 - Ongoing) – (LAW, Legal Documentation and Compliance)
- Environmental Impact Assessment Report for Lotte Hotel Yangon Project, (POSCO International Amara Co., Ltd, 2025 - Ongoing) – (LAW, Legal Documentation and Compliance)

Environmental Compliance Consultancy Co., Ltd

ရန်ကုန်အဝေးသင်တက္ကသိုလ်

YANGON UNIVERSITY OF DISTANCE EDUCATION

ဥပဒေဘွဲ့
Bachelor of Law (LL.B)

၂၀၁၀ ပညာသင်နှစ် ရန်ကုန်အဝေးသင်တက္ကသိုလ်မှ ဥပဒေပညာ အထူးပြုဖြင့် အောင်မြင်ခဲ့သော (အဘ ဦးဝင်းကြိုင်) ၏ ~~သား~~/ သမီး ~~တော်~~/ မ ငကနိုင်ဝင့် အား ဥပဒေဘွဲ့ကို အပ်နှင်းလိုက်သည်။

This is to certify that Ma Kay Khine Wint ~~son~~/ daughter of U Win Kyaing has been admitted to the Degree of Bachelor of Law (LL.B) in the Academic Year 2010

ပါမောက္ခချုပ်
ရန်ကုန်အဝေးသင်တက္ကသိုလ်
Rector
Yangon University of Distance Education
Yangon, Myanmar

ACTD

IMPERIAL
Law Institute

AMERICAN COUNCIL OF TRAINING AND DEVELOPMENT (ACTD-USA)
ACCREDITATION NO: GNA117N | VERIFICATION NO: AD2387M82CM

Certificate of Competency

This is to certify that

Kay Khine Wint @ Arkar Wint

has successfully met the requirements for and was awarded

Diploma in International Business Law

that is contributed the following subjects list below:

- *Law of Contract*
- *Company Law*
- *Law of Agency*
- *International Sale Law*
- *Payment Methods*
- *Incoterms*
- *Law of Employment*
- *Law of Banking*
- *Partnership Act*
- *Insurance Law*
- *Negotiable Instrument*
- *Unification of Private International Law*
- *International Investment Law*
- *International Arbitration Law*
- *International Trade Law*
- *Intellectual Property Law*
- *Competition Law*
- *Consumer Protection Law*
- *International Labour Law*
- *Due Diligence*
- *Business and Human Rights*
- *Law of Taxation*

With all the rights and privileges pertaining to this Diploma.

Executive Dean

Registrar

IMPERIAL LAW INSTITUTE

Seal

Date of Issue: 10.6.2025
Certification number:
DIBL-418|B-18|2025

The authenticity of this document may be verified by:
https://www.actd.us/imperiallawinstitute/

Kay Khine Wint @ Arkar Wint

has been awarded the

Imperial Law Institute

Diploma in Business Law

Endorsed by ABE

Issued 5th June 2025

DBL-418 – 29795

Rob May - CEO

Nicola Rylett-Jones - Chair

a world of opportunity

Third Party Approval Letter

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
ညွှန်ကြားရေးမှူးချုပ်ရုံး

စာအမှတ်၊ EIA - ၂/၁၂/TP(အတည်ပြု)(၂၅၈ /၂၀၂၅)
ရက်စွဲ ၊ ၂၀၂၅ ခုနှစ်၊ ဇူလိုင် လ ၇ ရက်

သို့

ညွှန်ကြားရေးမှူး
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
ရန်ကုန်တိုင်းဒေသကြီး

အကြောင်းအရာ။ Hoang Anh Gia Lai Myanmar Company Limited (HAGL Myanmar Co.,Ltd) မှ အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ဟိုတယ်ဝန်ဆောင်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာအား ရေးဆွဲဆောင်ရွက်မည့် တတိယအဖွဲ့အစည်းနှင့်စပ်လျဉ်း၍ သဘောထားပြန်ကြားခြင်း

ရည်ညွှန်း ချက် ။ (၁) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ ညွှန်ကြားရေးမှူးချုပ်ရုံး၏ ၁၂-၅-၂၀၂၃ ရက်စွဲပါ စာအမှတ်၊ EIA-၁/၂/အတည်ပြု(SR)(၁၅၅၂(စ)/၂၀၂၃)

(၂) Hoang Anh Gia Lai Myanmar Company Limited ၏ ၁၈-၆-၂၀၂၅ ရက်စွဲပါ စာအမှတ်၊ 18062025.Mya.ECD.doc

၁။ အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ Hoang Anh Gia Lai Myanmar Company Limited မှ အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ဟိုတယ်ဝန်ဆောင်မှုလုပ်ငန်းအတွက် နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာအား ရည်ညွှန်း (၁) ပါစာဖြင့် အတည်ပြုပြန်ကြားခဲ့ပြီးဖြစ်ရာ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်စစ်ခြင်းအစီရင်ခံစာအား Environmental Compliance Consultancy Co.,Ltd (EnvCC) ဖြင့် ပြောင်းလဲရေးဆွဲဆောင်ရွက်ခွင့်ပြုပါရန် ရည်ညွှန်း (၂) ပါစာဖြင့် တင်ပြလာပါသည်။

၂။ Environmental Compliance Consultancy Co.,Ltd (EnvCC) သည် ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းပြုလုပ်သည့် အဖွဲ့အစည်းများ လုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းအရ အကြံပေးအဖွဲ့အမျိုးအစား (က) ရရှိထားသည့် အဖွဲ့အစည်း (လိုင်စင်အမှတ် EIA - CO (A) 005/ 2024) ရရှိထားကြောင်း စိစစ်တွေ့ရှိရပါသည်။

၃။ သို့ဖြစ်ပါ၍ Hoang Anh Gia Lai Myanmar Company Limited မှ အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ဟိုတယ်ဝန်ဆောင်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA)

အစီရင်ခံစာအား ပူးတွဲ (၁) ပါ လေ့လာဆန်းစစ်ရေးအဖွဲ့ဝင်များဖြင့် ရေးဆွဲဆောင်ရွက်မည့် အပေါ် အတည်ပြုကြောင်းနှင့် အောက်ပါတို့ကို ဆောင်ရွက်ရန် လိုအပ်ကြောင်း လုပ်ငန်းရှင် ထံသို့ ဆက်လက်ပြန်ကြားရန် အကြောင်းကြားပါသည်-

(က) အဆိုပြုစီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာ (EIA) အား ပူးတွဲ (၁) ပါ လေ့လာဆန်းစစ်ရေးအဖွဲ့ဝင်များဖြင့် ရေးဆွဲဆောင်ရွက်ရန်၊

(ခ) အတည်ပြုထားသည့် နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာပါ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ စုံစမ်းစစ်ဆေးခြင်းအတွက် ဆောင်ရွက်ရမည့် လုပ်ငန်းတာဝန်များအားအခြေခံ၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းအပိုဒ် ၅၅၊ ၅၆၊ ၅၇၊ ၅၈၊ ၅၉၊ ၆၀၊ ၆၁၊ ၆၂ တို့နှင့်အညီ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) အစီရင်ခံစာကို ရေးဆွဲပြုစု၍ ၃၁-၃-၂၀၂၆ ရက်နေ့မတိုင်မီ တင်ပြအတည်ပြုချက်ရယူရန်နှင့် သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန၏ အမိန့်ကြော်ငြာစာအမှတ် (၁၆/၂၀၂၅) အရ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာကို ပူးတွဲ (၂) ပါ ဝန်ဆောင်ခပေးသွင်းရမည့် လုပ်ငန်းစဉ်များအတိုင်း ဦးစီးရုံးချုပ်သို့ အစီရင်ခံစာ တင်ပြစဉ်တွင် တစ်ပါတည်း ပေးသွင်းဆောင်ရွက်သွားရန်၊

(ဂ) လုပ်ငန်းတည်နေရာပြောင်းလဲခြင်း၊ လုပ်ငန်းတိုးချဲ့ခြင်း၊ ကုန်ကြမ်းအမျိုးအစားပြောင်းလဲအသုံးပြုခြင်း၊ ထုတ်လုပ်မှုလုပ်ငန်းစဉ်ပြောင်းလဲခြင်း၊ ပိုင်ရှင်ပြောင်းလဲခြင်း၊ စီမံကိန်းအဆိုပြုလွှာတွင် ဖော်ပြပါရှိသည့် ထုတ်လုပ်မှုပမာဏထက် ပိုမိုထုတ်လုပ်ခြင်း၊ လုပ်ငန်းရပ်ဆိုင်းခြင်း သို့မဟုတ် ပိတ်သိမ်းခြင်းများပြုလုပ်မည်ဆိုပါက ခွင့်ပြုမိန့်/လိုင်စင်ထုတ်ပေးသည့် သက်ဆိုင်ရာဦးစီးဌာန၊ လုပ်ငန်းများသို့ တင်ပြစာများနှင့်တကွ ရန်ကုန်တိုင်းဒေသကြီး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှတစ်ဆင့် ဦးစီးရုံးချုပ်သို့ တင်ပြရန်။

ပူးတွဲ(၁) - Hoang Anh Gia Lai Myanmar Company Limited မှ အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ဟိုတယ်ဝန်ဆောင်မှုလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာ ဆောင်ရွက်မည့် လေ့လာဆန်းစစ်ရေးအဖွဲ့ဝင်များ (၂) ရွက်

ပူးတွဲ (၂) - ဝန်ဆောင်ခပေးသွင်းရမည့်လုပ်ငန်းစဉ်များ (၃) ရွက်

ညွှန်ကြားရေးမှူးချုပ်(ကိုယ်စား)
(အောင်ကျော်မိုး၊ ဒုတိယညွှန်ကြားရေးမှူးချုပ်)

Study Team

ပူးတွဲ (၁)

Hoang Anh Gia Lai Myanmar Company Limited (HAGL Myanmar Co.,Ltd) မှ
အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ဟိုတယ်ဝန်ဆောင်မှုလုပ်ငန်းအတွက်
ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာအား ရေးဆွဲဆောင်ရွက်မည့် Environmental
Compliance Consultancy Co.,Ltd (EnvCC) ၏ လေ့လာဆန်းစစ်ရေးအဖွဲ့ဝင်များ

စဉ်	ပညာရှင်အမည်	လုပ်ငန်းလိုင်စင်အမှတ်	အဆိုပြုအစီရင်ခံစာအတွက် တာဝန်ယူဆောင်ရွက်ခွင့်ပြုသည့် နယ်ပယ်များ
၁	Daw Myat Mon Swe	EIA-C 018/ 2023	1. Social Study and Analysis 2. General Environmental Management 3. Environmental Quality Monitoring (Air, Water and Soil)
၂	Daw Soe Moe Nwe	EIA-C 030/2024	1. Social study and analysis 2. Ecology and Biodiversity 3. Solid Waste and Hazardous Waste Management
၃	Daw Than Than Htay	EIA-C 045/ 2023	1. Ecology and Biodiversity
၄	U Arkar Phyo	EIA-C 059/2024	1. Risk Assessment and Hazard Management
၅	U Ye Myat Phone Hlaing	EIA-AC 114/2024	1. Air Pollution Monitoring
၆	U Aung Zayer Wint	EIA-AC 008/ 2023	1. Ecology and Biodiversity 2. Air Pollution Prevention and Control
၇	U Chit Bo Bo Win	EIA-AC 118/ 2024	1. Hydrology, Surface Water and Ground Water Conservation 2. Water Pollution Prevention, Control, Monitoring and Prediction of Impacts

CONFIRM. CONFIRM. ECC

Hoang Anh Gia Lai Myanmar Company Limited (HAGL Myanmar Co.,Ltd) မှ
အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ဟိုတယ်ဝန်ဆောင်မှုလုပ်ငန်းအတွက်
ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာအား ရေးဆွဲဆောင်ရွက်မည့် Environmental
Compliance Consultancy Co.,Ltd (EnvCC) ၏ လေ့လာဆန်းစစ်ရေးအဖွဲ့ဝင်များ

၈	Daw Ei Ei Win Myat	EIA-AC 065/ 2023	1. Legal Studies and Analysis
၉	Dr. Phyo Thu Aung	EIA-AC 092/ 2024	1. Meteorology, Air Quality Assessment and Prediction 2. Water Pollution Prevention, Control, Monitoring and Prediction of Impacts
၁၀	U Aung Nyein Myat	EIA-AC 013/ 2023	1. Land Use 2. Geological Assessment
၁၁	Dr. Hein Lin Aung	EIA-AC 052/ 2023	1. Health (Impact Studies and Analysis)
၁၂	U Than Htut	EIA-AC 104/ 2024	1. Archaeological and Cultural Heritage

CONFIRM. CONFIRM. ECD

APPENDIX C
Data from Department of Meteorology and Hydrology

DAILY RELATIVE HUMIDITY (%) at (06:30) hrs M.S.T

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	86	91	74	92	96	92	92	92	96	96	96	92
2	73	91	82	92	92	96	96	92	92	96	96	92
3	77	86	82	92	88	92	92	96	96	100	96	96
4	91	91	78	92	96	92	96	92	92	92	92	88
5	91	90	91	96	96	92	100	96	96	96	96	91
6	86	90	91	92	84	92	96	88	96	96	92	91
7	82	96	91	83	88	96	96	100	88	96	92	91
8	91	91	82	88	84	100	96	96	88	96	100	91
9	82	91	91	96	88	96	92	96	92	96	100	96
10	91	82	86	92	92	100	92	87	96	96	100	91
11	91	91	91	92	84	96	92	92	96	96	91	91
12	95	78	91	92	84	92	88	96	96	92	91	91
13	90	82	91	83	89	96	92	100	96	96	83	91
14	91	91	82	83	88	96	100	96	92	96	92	91
15	91	96	91	80	84	96	96	96	96	92	92	86
16	91	96	92	88	84	92	96	96	88	96	92	91
17	90	95	92	80	85	88	92	96	92	100	92	91
18	81	96	96	92	89	96	96	96	93	96	92	91
19	91	91	91	92	92	96	96	92	92	92	91	100
20	91	82	92	96	92	92	92	96	92	100	91	91
21	91	82	96	92	96	92	92	96	96	96	91	96
22	91	91	92	84	91	92	96	100	96	92	91	96
23	91	91	91	84	92	96	96	96	92	92	91	91
24	91	91	91	92	92	92	92	100	100	96	91	96
25	81	82	82	83	88	92	92	92	96	92	92	100
26	95	82	91	77	89	96	96	96	92	92	91	91
27	80	82	86	84	88	96	92	96	92	96	87	91
28	95	82	96	92	92	96	92	88	96	96	91	100
29	90	77	83	88	92	100	92	96	96	96	91	96
30	90		96	92	92	92	96	92	96	96	91	91
31	82		92		96		96	96		96		82

Source: Department of Meteorlogy and Hydrology (2024)

DAILY RAINFALL (mm)

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0	0	0	0	45	47	Trace	14	25	2	3	0
2	0	0	0	0	8	20	10	5	17	Trace	0	0
3	0	0	0	0	0	11	0	3	0	1	0	0
4	0	0	0	0	3	7	12	Trace	0	71	27	0
5	0	0	0	0	0	13	21	11	Trace	19	0	0
6	0	0	0	0	0	15	28	9	Trace	0	0	0
7	0	0	0	0	0	24	7	15	Trace	2	0	0
8	0	0	0	0	0	21	55	16	8	37	10	0
9	0	0	0	0	0	6	2	6	Trace	2	29	0
10	0	0	0	0	0	21	Trace	Trace	Trace	0	0	0
11	0	0	0	0	0	62	2	5	2	0	0	0
12	0	0	0	0	0	40	0	13	12	0	0	0
13	0	0	0	0	0	5	47	18	2	2	0	0
14	0	0	0	0	0	3	11	37	3	0	0	0
15	0	0	0	0	0	52	4	3	8	0	0	0
16	0	0	0	0	0	17	18	33	0	2	0	0
17	0	0	0	0	0	2	62	21	3	80	0	0
18	0	0	0	0	Trace	13	7	24	0	22	0	0
19	0	0	0	0	48	35	2	28	27	0	0	0
20	0	0	0	0	10	35	0	26	27	6	0	0
21	0	0	0	0	23	8	1	2	7	28	0	0
22	0	0	0	0	40	2	17	13	20	0	0	0
23	0	0	0	0	0	8	Trace	28	72	0	0	0
24	0	0	0	0	0	41	6	18	32	0	0	0
25	0	0	0	0	0	1	0	6	0	0	0	0
26	0	0	0	0	0	48	16	6	29	0	0	0
27	0	0	0	0	0	26	Trace	22	0	0	0	0
28	0	0	0	3	35	22	0	11	0	0	0	0
29	0	0	0	3	1	66	18	5	34	0	0	0
30	0		0	Trace	Trace	Trace	18	2	8	Trace	0	0
31	0		0		8		46	6		1		0

"Trace" : The amounts of rainfall which cannot be measured.

"1mm" = 0.04 inch

Source: Department of Meteorlogy and Hydrology (2024)

DAILY MAXIMUM TEMPERATURE (˚C)

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	33.6	35.0	37.2	39.2	36.8	33.2	30.5	33.2	32.5	29.0	33.8	34.5
2	34.0	35.2	37.3	38.5	36.9	33.0	32.2	32.0	32.2	30.0	34.0	34.8
3	34.5	34.0	36.0	38.6	38.0	35.7	30.2	32.5	33.0	31.2	33.0	34.2
4	33.6	32.5	25.0	40.5	38.5	34.5	29.2	30.0	34.0	29.3	31.5	33.5
5	34.5	33.5	35.0	41.0	40.2	32.0	32.0	29.2	32.2	29.3	33.2	32.8
6	33.8	34.0	35.2	38.5	40.2	30.8	30.2	33.8	34.5	32.5	33.8	33.2
7	32.6	35.2	36.0	39.2	41.2	31.5	30.5	31.0	32.2	31.5	34.5	33.9
8	34.0	36.2	36.5	39.0	39.6	30.2	33.0	32.5	30.5	30.5	33.8	32.2
9	34.5	35.0	37.5	38.8	39.7	33.0	33.0	32.7	32.7	32.0	33.2	32.8
10	34.0	35.0	36.0	38.0	41.0	32.0	33.0	32.5	33.8	32.7	32.8	32.5
11	33.0	35.7	37.0	40.0	40.8	32.0	32.6	31.0	30.5	33.5	33.4	32.8
12	32.5	35.5	37.7	39.2	41.0	32.8	33.5	31.0	32.0	32.5	34.0	33.2
13	32.3	33.5	38.2	39.6	40.0	34.2	31.0	30.8	31.6	31.7	34.2	33.0
14	34.0	32.0	39.5	38.8	40.2	34.0	29.6	28.2	33.5	31.5	34.6	33.2
15	34.2	32.3	39.0	39.6	40.8	29.5	32.0	30.0	34.0	33.0	34.5	34.3
16	33.6	33.6	39.5	39.5	41.0	31.0	31.0	31.5	33.0	32.2	34.7	35.5
17	34.5	35.0	39.0	38.7	38.8	29.7	30.8	33.0	33.2	31.5	34.5	34.0
18	34.0	35.5	37.6	39.3	35.6	32.0	32.0	29.0	34.0	34.2	34.0	34.2
19	34.3	35.5	38.2	39.5	31.3	30.6	33.5	30.5	30.8	29.8	33.7	33.2
20	34.2	35.0	37.4	42.2	31.2	31.3	33.0	30.0	27.2	27.5	33.6	34.0
21	35.2	36.3	36.0	41.2	32.0	33.5	31.5	32.0	28.0	31.5	34.2	32.0
22	34.2	36.5	36.6	40.1	35.3	34.0	32.2	30.2	31.5	32.7	34.6	31.5
23	35.0	36.5	38.3	41.5	36.2	33.0	32.0	29.5	32.4	33.5	33.5	32.0
24	34.2	36.4	37.0	39.8	35.2	33.8	32.0	32.0	29.8	31.5	34.8	33.0
25	30.6	36.0	38.5	40.2	37.0	33.0	34.7	31.5	32.5	34.0	34.5	35.5
26	30.5	35.5	36.7	39.6	37.0	32.0	33.3	33.2	33.5	32.2	34.0	34.2
27	30.0	34.8	37.0	37.5	36.7	30.0	32.5	32.2	33.8	32.3	35.0	35.0
28	31.8	35.3	37.0	35.0	33.0	28.0	32.0	32.0	33.6	32.2	33.0	34.5
29	32.5	37.0	38.0	32.0	33.0	33.0	29.5	34.2	30.5	33.5	34.0	34.8
30	34.0		37.2	38.5	32.0	34.0	32.5	32.2	29.0	30.5	34.0	33.5
31	34.0		38.0		31.4		32.2	33.8		27.5		33.5

Source: Department of Meteorlogy and Hydrology (2024)

DAILY WIN DIRECTION AT (06:30) hrs M.S.T

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	NE	SE	NW	NE	SE	S	S	NE	SE	SE	NE	SW
2	NE	SW	SE	SW	NE	S	NE	SW	SE	SE	SE	SE
3	NE	S	S	SE	SE	SE	SE	SW	SE	SE	Clam	SE
4	SW	S	SW	NW	SE	NE	SE	SE	N	SE	SE	SE
5	NE	SE	SE	SE	SE	S	SE	SW	SW	SE	E	SE
6	NE	SW	SE	NE	SW	SE	SE	E	S	SE	W	SE
7	NE	SW	S	S	SW	SW	NE	SW	SE	NE	SE	W
8	NE	SW	NW	SE	S	SE	S	S	NE	NE	N	S
9	NE	SW	S	S	SW	SE	SW	SW	S	SW	NE	SW
10	SW	S	SE	S	S	SE	SW	SW	S	SE	NW	SE
11	SW	SW	S	S	S	SW	S	NE	SE	SE	W	NE
12	NE	SW	SW	SE	SE	SW	SE	SE	SE	SE	SE	SW
13	SE	S	S	SE	NE	SW	SE	SW	NW	SE	SE	SW
14	S	SW	NE	Clam	Clam	SE	SE	SW	SE	SE	NE	NE
15	SW	SE	S	Clam	Clam	SW	SE	SE	SE	S	NE	SE
16	NE	S	SW	SW	NE	SW	NE	SE	SE	SE	W	E
17	SW	SE	W	SW	SW	SW	W	SE	SE	SW	W	W
18	NE	SW	NW	S	NE	SW	SW	SE	NE	S	W	W
19	S	SE	SE	W	SW	SE	SE	SE	W	SE	NE	NE
20	SE	NW	SW	N	SE	SE	SW	SE	SE	SE	NE	SE
21	NE	NE	SW	NE	SE	SE	SE	S	SE	S	NE	SE
22	NE	SE	S	S	NW	SE	NE	SW	SE	SE	S	SE
23	NE	SW	SE	SW	SE	SW	S	SW	SE	SE	NE	SE
24	SE	SW	SE	SW	S	SW	NE	SW	SE	SE	NE	Clam
25	SW	SE	SE	SE	SW	SE	Clam	SW	SE	S	SE	NE
26	S	NE	NE	SW	NE	SE	NE	S	Clam	NE	NE	NE
27	SW	SE	NW	SE	S	S	NW	E	SE	SE	S	SW
28	SE	E	W	SE	SE	SW	SW	S	SW	SE	NE	NE
29	NE	SW	S	NE	W	SW	SE	SE	NE	NW	NW	SE
30	SW		SW	SW	SE	SE	SE	Clam	SW	E	NE	W
31	SW		SE		SW		SE	SE		NE		SW

Source: Department of Meteorlogy and Hydrology (2024)

APPENDIX D
Air Quality Results

Project Site (A1)

No	Time Frame	CO2	CO	CH4	NO2	O3	PMA	PMB	SO2	VOCs
		ppm	ppm	ppm	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
1	11:00 – 11:59	189.83	0.41	579.58	102	96	10.33	1.00	29	2.42
2	12:00 – 12:59	156.17	0.31	306.25	36	94	11.50	1.00	19	2.42
3	13:00 – 13:59	129.42	0.22	428.08	43	62	8.17	1.00	16	0.00
4	14:00 – 14:59	123.50	0.07	329.17	71	62	9.67	1.00	13	0.00
5	15:00 – 15:59	114.33	0.10	367.83	58	47	7.08	1.00	17	0.00
6	16:00 – 16:59	106.25	0.11	345.25	50	47	6.17	1.00	16	0.00
7	17:00 – 17:59	102.33	0.06	278.75	49	48	6.00	2.42	3	0.00
8	18:00 – 18:59	95.25	0.01	196.33	45	60	3.67	1.92	22	0.00
9	19:00 – 19:59	93.33	0.07	361.25	42	59	5.33	2.25	20	0.00
10	20:00 – 20:59	92.67	0.21	350.58	38	92	12.83	3.50	16	0.00
11	21:00 – 21:59	93.00	0.15	370.67	28	83	15.83	8.00	15	0.00
12	22:00 – 22:59	95.58	0.11	375.50	21	79	17.58	6.75	13	0.00
13	23:00 – 23:59	102.67	0.49	395.33	32	87	33.67	14.33	15	0.00
14	00:00 – 00:59	111.42	0.36	413.17	27	80	23.17	10.33	5	0.00
15	01:00 – 01:59	119.58	0.02	445.08	19	76	25.33	14.83	16	0.00
16	02:00 – 02:59	124.42	0.02	479.50	17	76	20.83	9.92	14	0.00
17	03:00 – 03:59	128.33	0.05	405.50	17	82	17.58	5.92	26	0.00
18	04:00 – 04:59	133.25	0.11	429.42	25	85	14.75	6.83	26	0.00
19	05:00 – 05:59	139.25	0.11	440.17	24	68	13.33	4.08	18	0.00
20	06:00 – 06:59	144.50	0.09	453.17	39	78	13.75	3.75	18	0.00
21	07:00 – 07:59	138.67	0.07	390.25	48	83	23.08	6.17	15	0.00
22	08:00 – 08:59	135.08	0.22	398.75	49	82	14.75	9.25	21	0.00
23	09:00 – 09:59	137.25	0.29	438.67	35	75	27.42	14.17	20	0.00
24	10:00 – 10:59	137.25	0.37	444.08	29	72	22.50	6.42	18	0.00
24 hr Avg.		116	0.1	464	39	74	16	7	19	1.7
8 hours maximum		125	0.17	530						
1 hour maximum					102					

Mingalar Zay Yone (A2)

No	Time Frame	CO2	CO	CH4	NO2	O3	PMA	PMB	SO2	VOCs
		ppm	ppm	ppm	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
1	09:00 – 09:59	160.50	0.10	687.00	116	28	11.25	14.00	13	0
2	10:00 – 10:59	118.17	0.05	569.92	26	58	8.42	4.67	23	0
3	11:00 – 11:59	99.08	0.05	645.25	5	73	9.08	2.50	18	0
4	12:00 – 12:59	98.50	0.07	579.50	4	62	16.92	2.00	16	0
5	13:00 – 13:59	100.67	0.14	542.08	5	81	17.00	2.33	13	0
6	14:00 – 14:59	119.33	0.24	626.42	28	83	12.83	2.75	9	0
7	15:00 – 15:59	138.08	0.30	624.58	29	70	7.58	2.50	37	0
8	16:00 – 16:59	137.00	0.25	595.08	7	54	10.50	1.83	15	0
9	17:00 – 17:59	136.17	0.05	584.92	4	49	13.00	1.00	12	0
10	18:00 – 18:59	136.42	0.14	572.75	4	41	16.58	1.00	9	0
11	19:00 – 19:59	135.17	0.07	579.42	4	39	16.83	2.42	17	0
12	20:00 – 20:59	138.75	0.04	581.75	4	36	14.58	3.25	15	0
13	21:00 – 21:59	139.17	0.06	567.00	4	31	13.25	1.00	10	0
14	22:00 – 22:59	149.75	0.10	574.17	4	41	15.92	1.50	9	0
15	00:00 – 00:59	162.58	0.15	575.67	4	39	19.17	2.33	17	0
16	01:00 – 01:59	163.17	0.11	607.33	4	39	16.75	6.58	5	12
17	02:00 – 02:59	160.25	0.14	588.00	4	38	17.83	11.08	13	0
18	03:00 – 03:59	170.75	0.03	604.58	4	46	4.58	3.50	22	0
19	04:00 – 04:59	176.58	0.09	526.75	34	104	14.00	8.00	10	0
20	05:00 – 05:59	149.58	0.04	518.75	4	52	14.42	1.00	21	0
21	06:00 – 06:59	136.50	0.05	357.75	4	35	17.42	3.75	14	0
22	07:00 – 07:59	123.08	0.02	411.75	4	37	15.17	2.00	10	0
23	08:00 – 08:59	115.92	0.02	418.00	4	34	22.83	7.75	12	0
24	00:00 – 00:59	111.83	0.05	364.58	4	46	8.83	1.67	15	1
24 hr Avg.		137	0.1	554	13	51	14	4	15	0.6
8 hours maximum		161	0.18	622						
1 hour maximum					116					

Nate Ban Monastery (A3)

No	Time Frame	CO2	CO	CH4	NO2	O3	PMA	PMB	SO2	VOCs
		ppm	ppm	ppm	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
1	12:00 – 12:59	102.92	0.05	784.50	4	69	5.75	2.42	37	2
2	13:00 – 13:59	91.92	0.12	893.00	4	56	33.17	15.75	17	0
3	14:00 – 14:59	91.08	0.02	920.17	4	81	2.50	1.42	10	0
4	15:00 – 15:59	84.83	0.23	860.50	4	48	5.92	1.17	14	0
5	16:00 – 16:59	93.92	0.08	867.58	9	69	25.08	11.67	17	0
6	17:00 – 17:59	114.58	0.22	808.75	33	107	5.00	1.58	18	0
7	18:00 – 18:59	116.17	0.08	785.92	6	91	15.50	9.92	12	0
8	19:00 – 19:59	128.17	0.33	814.75	9	87	12.33	1.67	17	0
9	20:00 – 20:59	128.67	0.03	833.25	5	82	12.00	1.50	10	0
10	21:00 – 21:59	118.42	0.05	817.25	4	76	16.67	2.83	6	10
11	22:00 – 22:59	117.00	0.05	827.75	4	71	16.25	3.25	5	0
12	23:00 – 23:59	118.17	0.07	813.83	4	65	11.92	1.00	3	11
13	00:00 – 00:59	118.67	0.08	835.33	4	71	13.33	3.50	4	3
14	01:00 – 01:59	121.67	0.09	833.83	4	66	14.42	1.67	5	3
15	02:00 – 02:59	119.83	0.12	836.25	4	74	16.58	2.50	3	0
16	03:00 – 03:59	123.17	0.09	857.33	4	69	16.75	6.58	5	40
17	04:00 – 04:59	120.25	0.09	838.00	4	68	25.33	4.25	3	3
18	05:00 – 05:59	130.75	0.34	854.58	4	75	12.08	1.00	11	9
19	06:00 – 06:59	136.58	0.17	651.75	34	133	3.58	1.00	11	15
20	07:00 – 07:59	109.58	0.06	685.42	4	81	4.83	1.00	14	0
21	08:00 – 08:59	96.50	0.13	457.75	4	62	5.92	3.75	14	0
22	09:00 – 09:59	83.08	0.02	511.75	4	47	6.92	1.83	11	0
23	10:00 – 10:59	75.92	0.01	668.00	4	61	4.67	1.00	20	0
24	11:00 – 11:59	71.83	0.03	614.58	4	62	2.00	1.00	19	1
24 hr Avg.		109	0.11	778	7	74	12	3	12	4.1
8 hours maximum		126	0.21	865						
1 hour maximum					34					

Moe Nyin Wei Partthanar Monastery (A4)

No	Time Frame	CO2	CO	CH4	NO2	O3	PMA	PMB	SO2	VOCs
		ppm	ppm	ppm	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
1	09:00 – 09:59	224.42	0.01	384.50	30	48	17.50	3.96	7	1
2	10:00 – 10:59	233.33	0.05	493.00	4	51	21.17	6.00	12	1
3	11:00 – 11:59	221.75	0.04	520.17	4	45	21.75	5.00	9	4
4	12:00 – 12:59	228.00	0.04	467.58	8	36	18.67	6.00	9	5
5	13:00 – 13:59	220.33	0.02	460.50	13	44	19.75	11.33	13	0
6	14:00 – 14:59	230.25	0.04	385.92	4	38	17.67	8.83	8	1
7	15:00 – 15:59	227.00	0.03	408.75	5	36	22.67	5.33	7	3
8	16:00 – 16:59	219.17	0.01	409.05	7	44	14.17	4.33	9	2
9	17:00 – 17:59	224.33	0.01	427.55	13	48	19.17	6.00	0	0
10	18:00 – 18:59	227.75	0.03	411.55	29	50	21.67	8.33	16	3
11	19:00 – 19:59	240.17	0.03	422.05	32	42	14.83	4.25	16	3
12	20:00 – 20:59	235.67	0.05	408.13	33	56	16.17	4.33	15	2
13	21:00 – 21:59	207.25	0.06	429.63	9	35	14.42	4.67	6	1
14	22:00 – 22:59	226.67	0.04	428.13	11	45	17.08	5.58	10	1
15	23:00 – 23:59	213.33	0.07	430.55	29	43	16.50	6.25	18	4
16	00:00 – 00:59	227.08	0.07	451.63	25	59	18.92	8.00	0	1
17	01:00 – 01:59	213.92	0.19	432.30	24	58	16.75	6.50	12	3
18	02:00 – 02:59	193.33	0.23	448.88	27	66	16.33	6.25	0	2
19	03:00 – 03:59	204.92	0.01	448.90	20	64	14.00	5.58	18	0
20	04:00 – 04:59	195.92	0.08	496.00	18	72	13.00	3.92	16	2
21	05:00 – 05:59	197.50	0.05	484.00	8	52	15.42	5.00	4	1
22	06:00 – 06:59	212.75	0.02	491.42	23	41	14.42	17.25	7	2
23	07:00 – 07:59	228.92	0.01	482.33	12	61	15.25	18.25	16	1
24	08:00 – 08:59	237.67	0.03	444.42	3	31	18.08	17.00	11	2
24 hr Avg.		220	0.05	444	16	49	17	7	10	1.9
8 hours maximum		232	0.1	486						
1 hour maximum					33					

Residential Area (A5)

No	Time Frame	CO2	CO	CH4	NO2	O3	PMA	PMB	SO2	VOCs
		ppm	ppm	ppm	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
1	09:00 – 09:59	236.58	0.07	340.00	126	94	3.00	1.83	15	0
2	10:00 – 10:59	212.58	0.00	330.50	49	91	2.58	1.00	12	0
3	11:00 – 11:59	194.33	0.02	293.00	13	100	3.17	1.00	11	0
4	12:00 – 12:59	187.75	0.05	286.58	20	96	4.92	1.00	13	0
5	13:00 – 13:59	185.92	0.05	271.42	4	98	2.00	1.00	15	0
6	14:00 – 14:59	186.92	0.05	251.42	4	89	19.00	7.92	4	5
7	15:00 – 15:59	188.17	0.05	276.50	4	85	12.50	4.67	0	0
8	16:00 – 16:59	190.58	0.11	274.33	4	81	5.92	3.17	0	0
9	17:00 – 17:59	188.00	0.16	273.92	4	83	6.75	3.17	0	0
10	18:00 – 18:59	190.50	0.03	267.33	4	80	10.67	5.83	0	0
11	19:00 – 19:59	204.67	0.40	258.33	14	78	16.58	9.08	0	0
12	20:00 – 20:59	214.75	0.19	292.08	22	76	10.50	5.08	0	0
13	21:00 – 21:59	224.17	0.00	309.75	8	72	13.83	5.50	0	0
14	22:00 – 22:59	225.00	0.00	305.83	8	68	12.50	6.58	0	0
15	23:00 – 23:59	224.42	0.21	316.58	23	77	17.25	4.25	0	0
16	00:00 – 00:59	218.67	0.17	304.08	17	75	12.75	4.50	0	0
17	01:00 – 01:59	220.00	0.30	303.75	13	69	6.83	2.25	0	0
18	02:00 – 02:59	217.92	0.01	324.83	7	69	4.92	1.58	0	0
19	03:00 – 03:59	215.33	0.00	307.00	5	65	6.75	3.08	0	0
20	04:00 – 04:59	218.08	0.00	296.58	13	74	17.33	10.83	0	0
21	05:00 – 05:59	222.00	0.00	320.08	20	77	5.00	1.25	0	0
22	06:00 – 06:59	221.83	0.00	331.92	18	80	6.75	1.50	0	0
23	07:00 – 07:59	216.58	0.04	315.67	25	82	16.08	1.00	0	0
24	08:00 – 08:59	213.50	0.07	281.00	19	83	20.00	11.58	0	0
24 hr Avg.		209	0.08	297	18	81	10	4	3	0.2
8 hours maximum		224	0.2	323						
1 hour maximum					126					

APPENDIX E-1
Surface Water Quality Result by Alarm Ecological Laboratory

ALARM Ecological Laboratory

Water Testing Result Report

Report Number: EL-WR-25-05614 **Date: December 9, 2025**

Client Information		Sample Information	
Client Name :	Hoang Anh Gai Lai Myanmar Co., Ltd	Sample ID :	14012
Organization :	-	Sample Name :	Surface Water
Client ID :	-	Sample Type / Source :	-
Registration Date & Time :	25.11.2025 11:58 AM	Sampling Date & Time :	25.11.2025; 11:15 AM
Contact :		Sample Location :	Bahan Township, Yangon
Email :		Latitude :	N 16° 49' 37.31"
Testing Purpose :	For Standard	Longitude :	E 96° 9' 19.68"

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Emission Standards	Remarks
1	TSS[3]	< 10	mg/L	≤50 [d]	Normal
2	Dissolved Oxygen[2]	5.69	mg/L	-	-
3	BOD_5 [6]	12	mg/L	≤ 50 [d]	Normal
4	COD[3]	34	mg/L	≤ 250 [d]	Normal
5	Ammonium- Nitrogen[3]	0.54	mg/L	-	-
6	Lead[7]	ND	mg/L	≤0.01 [c]	LOD=0.1 mg/L
7	Oil & Grease [9]	4	mg/L	≤ 10 [d]	Normal

"ND" = Not Detected "LOD" = Lower limit of detection " - " = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Noe Line Lab.Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab.Technician I Ecological Laboratory ALARM	Dr.Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

No.121, Corner of Shu Khin Thar Street & 7 Street, (3) Block, South Oakkalapa Township,Yangon.
Tel: 09-407496078, Email: aelab.2022@gmail.com

APPENDIX E-2
Wastewater Test Quality Result

ALARM Ecological Laboratory

Water Testing Result Report

Report Number: EL-WR-25-05615 **Date: December 9, 2025**

Client Information

Client Name	:	Hoang Anh Gai Lai Myanmar Co., Ltd
Organization	:	-
Client ID	:	-
Registration Date & Time	:	25.11.2025 11:58 AM
Contact	:	
Email	:	
Testing Purpose	:	For Standard

Sample Information

Sample ID	:	14013
Sample Name	:	Waste Water (Treated)
Sample Type / Source	:	-
Sampling Date & Time	:	25.11.2025; 11:30 AM
Sample Location	:	Bahan Township, Yangon
Latitude	:	N 16° 49' 33.12"
Longitude	:	E 96° 9' 20.04"

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Emission Standards	Remarks
1	pH[1]	7.3	S.U	6.0 – 9.0[d]	Normal
2	TDS[4]	265	mg/L	-	-
3	TSS[3]	21	mg/L	≤50 [d]	Normal
4	Chloride[3]	36	mg/L	-	-
5	Dissolved Oxygen[2]	2.27	mg/L	-	-
6	BOD_5 [6]	26	mg/L	≤ 50 [d]	Normal
7	COD[3]	64	mg/L	≤ 250 [d]	Normal
8	Sulfate[3]	12	mg/L	-	-
9	Phosphate[3]	4.18	mg/L	-	-
10	Oil & Grease [9]	6	mg/L	≤ 10 [d]	Normal
11	Lead[7]	ND	mg/L	≤0.01 [c]	LOD=0.1 mg/L
12	Copper[7]	0.17	mg/L	≤ 0.5 [d]	Normal
13	Mercury	0.006	mg/L	≤ 0.01 [d]	Normal
14	Chromium (Hexavalent)[3]	0.029	mg/L	≤ 0.1	Normal
15	Total Nitrogen[3]	6.15	mg/L	-	-

"ND" = Not Detected "LOD" = Lower limit of detection " - " = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Blue Lab.Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab.Technician I Ecological Laboratory ALARM	Dr.Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

No.121, Corner of Shu Khin Thar Street & 7 Street, (3) Block, South Oakkalapa Township,Yangon.
Tel: 09-407496078, Email: aelab.2022@gmail.com

APPENDIX F-1
Traffic Counting Results (Weekday)

TRAFFIC COUNTING SHEET

D/M/Y- 1 / 8 / 2025 Project TC (2) From Yan Shin Street To (No.1) Industrial Road.

Vehicle Name	7:00AM-8:00AM	8:00AM-9:00AM	9:00AM–10:00AM
Bicycle / Tricycle	50	65	73
Motorcycle	5	3	6
Motor-tricycle	2	1	
Passenger Car / Taxi	457	520	637
Light Truck	47	65	71
Light Bus	15	17	16
Medium Bus	9	11	7
Medium Truck	18	21	25
Heavy Bus	22	25	24
Heavy Truck	7		7

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 1 / 8 / 2025 Project TC (2) From Yan Shin Street To (No.1) Industrial Road.

Vehicle Name	10:00AM-11:00AM	11:00AM-12:00PM	12:00PM –1:00PM
Bicycle / Tricycle	85	83	86
Motorcycle	2	2	4
Motor-tricycle		1	
Passenger Car / Taxi	678	693	720
Light Truck	93	105	101
Light Bus	18	21	17
Medium Bus	10	13	9
Medium Truck	27	35	31
Heavy Bus	29	31	35
Heavy Truck		1	

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 1 / 8 / 2025 Project TC (2) From Yan Shin Street To (No.1) Industrial Road.

Vehicle Name	1:00PM –2:00PM	2:00PM –3:00PM	3:00PM –4:00PM
Bicycle / Tricycle	97	102	100
Motorcycle	3	2	2
Motor-tricycle			
Passenger Car / Taxi	706	752	795
Light Truck	109	113	106
Light Bus	20	27	23
Medium Bus	11	13	15
Medium Truck	35	37	30
Heavy Bus	32	36	33
Heavy Truck			1

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 1 / 8 / 2025 Project TC (2) From Yan Shin Street To (No.1) Industrial Road.

Vehicle Name	4:00PM –5:00PM	5:00PM –6:00PM	6:00PM –7:00PM
Bicycle / Tricycle	107	113	99
Motorcycle	2	5	4
Motor-tricycle		2	
Passenger Car / Taxi	805	785	797
Light Truck	108	103	114
Light Bus	30	35	27
Medium Bus	15	20	18
Medium Truck	37	39	34
Heavy Bus	38	40	35
Heavy Truck		1	1

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 1 / 8 / 2025 Project TC (2) From (No.1) Industrial Road To Yan Shin Street.

Vehicle Name	7:00AM-8:00AM	8:00AM-9:00AM	9:00AM–10:00AM
Bicycle / Tricycle	58	73	87
Motorcycle	2	3	1
Motor-tricycle	1	1	
Passenger Car / Taxi	503	594	620
Light Truck	49	70	75
Light Bus	9	13	10
Medium Bus	7	10	9
Medium Truck	21	25	24
Heavy Bus	23	28	25
Heavy Truck		1	1

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 1 / 8 / 2025 Project TC (2) From (No.1) Industrial Road To Yan Shin Street.

Vehicle Name	10:00AM-11:00AM	11:00AM-12:00PM	12:00PM –1:00PM
Bicycle / Tricycle	92	99	103
Motorcycle	3	3	2
Motor-tricycle	2		1
Passenger Car / Taxi	653	690	702
Light Truck	82	87	93
Light Bus	18	23	20
Medium Bus	12	15	13
Medium Truck	31	35	33
Heavy Bus	29	27	31
Heavy Truck	1		

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 1 / 8 / 2025 Project TC (2) From (No.1) Industrial Road To Yan Shin Street.

Vehicle Name	1:00PM –2:00PM	2:00PM –3:00PM	3:00PM –4:00PM
Bicycle / Tricycle	105	100	107
Motorcycle	2	1	2
Motor-tricycle		1	2
Passenger Car / Taxi	720	696	709
Light Truck	97	96	92
Light Bus	27	25	23
Medium Bus	16	13	14
Medium Truck	30	32	29
Heavy Bus	30	31	28
Heavy Truck			1

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 1 / 8 / 2025 Project TC (2) From (No.1) Industrial Road To Yan Shin Street.

Vehicle Name	4:00PM –5:00PM	5:00PM –6:00PM	6:00PM –7:00PM
Bicycle / Tricycle	103	105	98
Motorcycle	1	3	5
Motor-tricycle	2	1	1
Passenger Car / Taxi	720	753	762
Light Truck	98	103	99
Light Bus	25	26	23
Medium Bus	15	17	19
Medium Truck	36	37	35
Heavy Bus	32	35	34
Heavy Truck		1	

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 18 / 8 / 2025 Project TC (1) From Down Town To Kabaraye Pagoda Road.

Vehicle Name	7:00AM-8:00AM	8:00AM-9:00AM	9:00AM–10:00AM
Bicycle / Tricycle	25	37	65
Motorcycle	2	4	2
Motor-tricycle			
Passenger Car / Taxi	1687	1697	1763
Light Truck	55	51	48
Light Bus	20	27	35
Medium Bus	27	25	31
Medium Truck	31	36	39
Heavy Bus	21	29	37
Heavy Truck		1	2

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 18 / 8 / 2025 Project TC (1) From Down Town To Kabaraye Pagoda Road.

Vehicle Name	10:00AM-11:00AM	11:00AM-12:00PM	12:00PM –1:00PM
Bicycle / Tricycle	63	75	82
Motorcycle	5	2	
Motor-tricycle			
Passenger Car / Taxi	1842	1897	1990
Light Truck	120	117	142
Light Bus	34	30	25
Medium Bus	37	41	26
Medium Truck	46	42	57
Heavy Bus	42	45	43
Heavy Truck		3	

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 18 / 8 / 2025 Project TC (1) From Down Town To Kabaraye Pagoda Road.

Vehicle Name	1:00PM –2:00PM	2:00PM –3:00PM	3:00PM –4:00PM
Bicycle / Tricycle	87	82	91
Motorcycle	1	2	
Motor-tricycle			
Passenger Car / Taxi	1939	1973	1854
Light Truck	148	159	145
Light Bus	33	26	32
Medium Bus	46	38	25
Medium Truck	49	51	57
Heavy Bus	37	45	43
Heavy Truck			2

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 18 / 8 / 2025 Project TC (1) From Down Town To Kabaraye Pagoda Road.

Vehicle Name	4:00PM –5:00PM	5:00PM –6:00PM	6:00PM –7:00PM
Bicycle / Tricycle	85	97	99
Motorcycle	1	3	5
Motor-tricycle			
Passenger Car / Taxi	1850	1921	1976
Light Truck	162	155	173
Light Bus	37	39	33
Medium Bus	27	31	29
Medium Truck	49	52	56
Heavy Bus	48	45	43
Heavy Truck		1	

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 18 / 8 / 2025 Project HAGL TC (1) From Kabaraye Pagoda Road To Down Town

Vehicle Name	7:00AM-8:00AM	8:00AM-9:00AM	9:00AM–10:00AM
Bicycle / Tricycle	20	28	40
Motorcycle		1	5
Motor-tricycle			
Passenger Car / Taxi	1603	1705	1830
Light Truck	45	51	78
Light Bus	10	13	20
Medium Bus	21	17	31
Medium Truck	15	21	40
Heavy Bus	27	33	35
Heavy Truck			

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 18 / 8 / 2025 Project TC (1) From Kabaraye Pagoda Road To Down Town

Vehicle Name	10:00AM-11:00AM	11:00AM-12:00PM	12:00PM –1:00PM
Bicycle / Tricycle	45	43	63
Motorcycle	3	1	2
Motor-tricycle			
Passenger Car / Taxi	1875	1917	1932
Light Truck	98	85	105
Light Bus	18	25	28
Medium Bus	40	43	37
Medium Truck	48	62	51
Heavy Bus	39	35	41
Heavy Truck	1		2

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 18 / 8 /2025 Project TC (1) From Kabaraye Pagoda Road. To Down Town

Vehicle Name	1:00PM –2:00PM	2:00PM –3:00PM	3:00PM –4:00PM
Bicycle / Tricycle	75	83	87
Motorcycle	1	3	2
Motor-tricycle			
Passenger Car / Taxi	1809	1949	1735
Light Truck	152	175	160
Light Bus	18	43	30
Medium Bus	15	22	27
Medium Truck	38	40	50
Heavy Bus	27	32	41
Heavy Truck	1		1

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 18 / 8 /2025 Project TC (1) From Kabaraye Pagoda Road To Down Town

Vehicle Name	4:00PM –5:00PM	5:00PM –6:00PM	6:00PM –7:00PM
Bicycle / Tricycle	96	87	90
Motorcycle	5	3	4
Motor-tricycle	1	2	
Passenger Car / Taxi	1666	1720	1836
Light Truck	161	123	152
Light Bus	31	39	37
Medium Bus	45	42	49
Medium Truck	42	57	52
Heavy Bus	48	53	49
Heavy Truck		2	1

Remark -

APPENDIX F-2
Traffic Counting Results (Weekend)

TRAFFIC COUNTING SHEET

D/M/Y- 23 / 8 / 2025 Project TC (1) From Down Town To Kabaraye Pagoda Road.

Vehicle Name	7:00AM-8:00AM	8:00AM-9:00AM	9:00AM–10:00AM
Bicycle / Tricycle	30	33	47
Motorcycle		3	2
Motor-tricycle			
Passenger Car / Taxi	1530	1620	1656
Light Truck	60	65	73
Light Bus	18	23	29
Medium Bus	30	33	37
Medium Truck	29	35	32
Heavy Bus	23	27	30
Heavy Truck			

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 23 / 8 / 2025 Project TC (1) From Down Town To Kabaraye Pagoda Road.

Vehicle Name	10:00AM-11:00AM	11:00AM-12:00PM	12:00PM –1:00PM
Bicycle / Tricycle	44	34	40
Motorcycle	6	5	2
Motor-tricycle			
Passenger Car / Taxi	1722	1740	1697
Light Truck	100	113	117
Light Bus	30	35	33
Medium Bus	39	37	42
Medium Truck	40	39	47
Heavy Bus	33	35	26
Heavy Truck		2	

Remark -

TRAFFIC COUNTING SHEET

D/M/Y-___/___/_____ Project TC (1) From Down Town To Kabaraye Pagoda Road.

Vehicle Name	4:00PM –5:00PM	5:00PM –6:00PM	6:00PM –7:00PM
Bicycle / Tricycle	75	82	77
Motorcycle	1	2	1
Motor-tricycle			
Passenger Car / Taxi	1880	1872	1850
Light Truck	140	145	137
Light Bus	35	32	37
Medium Bus	25	27	32
Medium Truck	43	49	45
Heavy Bus	32	35	31
Heavy Truck	2		2

Remark -

TRAFFIC COUNTING SHEET

D/M/Y-23/8/2025 Project TC (1) From Down Town To Kabaraye Pagoda Road.

Vehicle Name	1:00PM –2:00PM	2:00PM –3:00PM	3:00PM –4:00PM
Bicycle / Tricycle	65	70	79
Motorcycle	3	1	2
Motor-tricycle			
Passenger Car / Taxi	1880	1795	1821
Light Truck	120	135	129
Light Bus	37	35	42
Medium Bus	36	41	33
Medium Truck	40	47	49
Heavy Bus	33	35	31
Heavy Truck			

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 23/8/2025 Project TC (1) From Kabaraye Pagoda Road To Down Town

Vehicle Name	10:00AM-11:00AM	11:00AM-12:00PM	12:00PM –1:00PM
Bicycle / Tricycle	39	45	42
Motorcycle	2	1	3
Motor-tricycle			
Passenger Car / Taxi	1725	1768	1751
Light Truck	103	116	110
Light Bus	27	33	35
Medium Bus	21	29	32
Medium Truck	35	39	43
Heavy Bus	32	37	41
Heavy Truck	1		2

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 23/8/2025 Project TC (1) From Kabaraye Pagoda Road To Down Town

Vehicle Name	7:00AM-8:00AM	8:00AM-9:00AM	9:00AM–10:00AM
Bicycle / Tricycle	23	25	36
Motorcycle	1	2	1
Motor-tricycle			
Passenger Car / Taxi	1509	1666	1683
Light Truck	50	61	58
Light Bus	18	23	26
Medium Bus	22	29	32
Medium Truck	26	30	29
Heavy Bus	23	27	30
Heavy Truck			

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 23/ 8 / 2025 Project TC (1) From Kabaraye Pagoda Road. To Down Town

Vehicle Name	4:00PM –5:00PM	5:00PM –6:00PM	6:00PM –7:00PM
Bicycle / Tricycle	72	65	83
Motorcycle	2	5	3
Motor-tricycle			
Passenger Car / Taxi	1809	1949	1735
Light Truck	152	165	160
Light Bus	37	43	32
Medium Bus	35	31	38
Medium Truck	62	50	48
Heavy Bus	45	47	41
Heavy Truck	1	2	1

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 23/ 8 / 2025 Project TC (1) From Down Town To Kabaraye Pagoda Road.

Vehicle Name	1:00PM –2:00PM	2:00PM –3:00PM	3:00PM –4:00PM
Bicycle / Tricycle	65	70	79
Motorcycle	3	1	2
Motor-tricycle			
Passenger Car / Taxi	1880	1795	1821
Light Truck	120	135	129
Light Bus	37	35	42
Medium Bus	36	41	33
Medium Truck	40	47	49
Heavy Bus	33	35	31
Heavy Truck			

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 2 / 8 / 2025 Project TC (2) From Yan Shin Street To (No.1) Industrial Road.

Vehicle Name	10:00AM-11:00AM	11:00AM-12:00PM	12:00PM –1:00PM
Bicycle / Tricycle	80	79	87
Motorcycle	2	1	1
Motor-tricycle			
Passenger Car / Taxi	659	682	690
Light Truck	82	87	85
Light Bus	20	22	21
Medium Bus	9	7	8
Medium Truck	26	28	27
Heavy Bus	29	27	30
Heavy Truck	1		1

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 2 / 8 / 2025 Project TC (2) From Yan Shin Street To (No.1) Industrial Road.

Vehicle Name	7:00AM-8:00AM	8:00AM-9:00AM	9:00AM–10:00AM
Bicycle / Tricycle	53	75	78
Motorcycle	2	1	3
Motor-tricycle	1	2	
Passenger Car / Taxi	420	570	613
Light Truck	65	75	79
Light Bus	19	20	18
Medium Bus	8	10	12
Medium Truck	25	29	28
Heavy Bus	20	25	27
Heavy Truck	1		1

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 2 / 8 / 2025 Project TC (2) From Yon Shin Street To (No.1) Industrial Road.

Vehicle Name	4:00PM –5:00PM	5:00PM –6:00PM	6:00PM –7:00PM
Bicycle / Tricycle	97	95	99
Motorcycle	2		3
Motor-tricycle			
Passenger Car / Taxi	693	708	720
Light Truck	85	93	97
Light Bus	20	17	22
Medium Bus	12	13	15
Medium Truck	35	39	37
Heavy Bus	34	35	38
Heavy Truck		1	

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 2 / 8 / 2025 Project TC (2) From Yon Shin Street To(No.1) Industrial Road.

Vehicle Name	1:00PM –2:00PM	2:00PM –3:00PM	3:00PM –4:00PM
Bicycle / Tricycle	95	97	99
Motorcycle	3	1	1
Motor-tricycle		2	
Passenger Car / Taxi	682	695	702
Light Truck	90	87	89
Light Bus	19	20	18
Medium Bus	12	10	9
Medium Truck	30	33	31
Heavy Bus	31	35	32
Heavy Truck			1

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 2 / 8 / 2025 Project TC (2) From (No.1) Industrial Road. To Yan Shin Street.

Vehicle Name	10:00AM-11:00AM	11:00AM-12:00PM	12:00PM –1:00PM
Bicycle / Tricycle	82	89	93
Motorcycle	1		
Motor-tricycle			1
Passenger Car / Taxi	653	692	685
Light Truck	79	81	78
Light Bus	20	23	25
Medium Bus	13	15	12
Medium Truck	27	32	30
Heavy Bus	25	29	28
Heavy Truck	1		

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 2 / 8 / 2025 Project TC (2) From (No.1) Industrial Road. To Yan Shin Street.

Vehicle Name	7:00AM-8:00AM	8:00AM-9:00AM	9:00AM–10:00AM
Bicycle / Tricycle	55	69	73
Motorcycle	1	3	2
Motor-tricycle	1	1	1
Passenger Car / Taxi	432	563	599
Light Truck	67	73	77
Light Bus	18	19	22
Medium Bus	7	9	10
Medium Truck	27	25	29
Heavy Bus	18	22	20
Heavy Truck			

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 2 / 8 / 2025 Project TC (2) From (No.1) Industrial Road. To Yan Shin Street.

Vehicle Name	4:00PM –5:00PM	5:00PM –6:00PM	6:00PM –7:00PM
Bicycle / Tricycle	97	99	95
Motorcycle	1	3	3
Motor-tricycle	1	2	3
Passenger Car / Taxi	712	720	735
Light Truck	93	99	97
Light Bus	25	29	32
Medium Bus	13	15	19
Medium Truck	35	39	41
Heavy Bus	33	31	38
Heavy Truck	1	1	

Remark -

TRAFFIC COUNTING SHEET

D/M/Y- 2 / 8 / 2025 Project TC (2) From (No.1) Industrial Road To Yan Shin Street.

Vehicle Name	1:00PM –2:00PM	2:00PM –3:00PM	3:00PM –4:00PM
Bicycle / Tricycle	95	93	96
Motorcycle	1	2	1
Motor-tricycle	2	1	
Passenger Car / Taxi	690	673	706
Light Truck	89	85	90
Light Bus	23	21	27
Medium Bus	10	9	15
Medium Truck	29	32	37
Heavy Bus	30	32	34
Heavy Truck			1

Remark -

APPENDIX G - 1
List of Participants of Public Consultation Meeting (PCM)

HAGL Myanmar Center စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေးစီမံကိန်း၏ ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့် အစီရင်ခံစာအတွက် အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးပွဲ

၂၃ ရက်၊ ဒီဇင်ဘာလ၊ ၂၀၂၅ ခုနှစ်

ဌာနဆိုင်ရာများ

စဉ်	အမည်	ရာထူး	ဌာနအမည်	ဖုန်းနံပါတ်	လက်မှတ်
၁	[illegible]	[illegible]	[illegible]	[illegible]	
2	[illegible]	[illegible]	[illegible]	[illegible]	
3	[illegible]	[illegible]	[illegible]	09-960055494	
4.	[illegible]	[illegible]	[illegible]	09-254707205	
5	[illegible]	[illegible]	[illegible]	09.263686353	
6	[illegible]	[illegible]	[illegible]	09.401647666	
7	[illegible]	[illegible]	[illegible]	[illegible]	
၈	[illegible]	[illegible]	[illegible]	09 899933161	
၉	[illegible]	[illegible]	[illegible]	09-455714124	
10	[illegible]	[illegible]	[illegible]	09-432642119	
	[illegible] + 2	[illegible]	[illegible]	09.961308159	
12.	[illegible]	[illegible]	[illegible]	09-507833261.	

HAGL Myanmar Center စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေးစီမံကိန်း၏ ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့် အစီရင်ခံစာအတွက် အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးပွဲ

၂၃ ရက်၊ ဒီဇင်ဘာလ၊ ၂၀၂၅ ခုနှစ်

ဒေသခံပြည်သူများ

စဉ်	အမည်	အလုပ်အကိုင်	လိပ်စာ	ဖုန်းနံပါတ်	လက်မှတ်
၁	[illegible]	Engineer	17/11 [illegible]	095156623	
၂	[illegible]				
၃	[illegible]				
၄	[illegible]	[illegible]	13/2 [illegible]	09250528341	
၅	[illegible]	[illegible]	[illegible]	095033810	
၆	[illegible]	[illegible]	[illegible]	09779600266	

HAGL Myanmar Center စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေးစီမံကိန်း၏ ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့် အစီရင်ခံစာအတွက် အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးပွဲ

၂၃ ရက်၊ ဒီဇင်ဘာလ၊ ၂၀၂၅ ခုနှစ်

ဒေသခံပြည်သူများ

စဉ်	အမည်	အလုပ်အကိုင်	လိပ်စာ	ဖုန်းနံပါတ်	လက်မှတ်
၁.	ဒေါ်ဆောဝန္ဓာ	ဒီဇိုင်	16/17 ခက်မွှန်ကိမ်ကွက်	09254064105	
၂.	ဒေါ်နီကာဝင်း	"	16/18 "	09766955837	
၃.	ရေဦးဆော်ဘွေး		"		
၄.	ဒေါ်ခင်နှာဇိုး	"	"	09796409984	

APPENDIX G - 2
Presentation Slides and Suggestion Letters of PCM

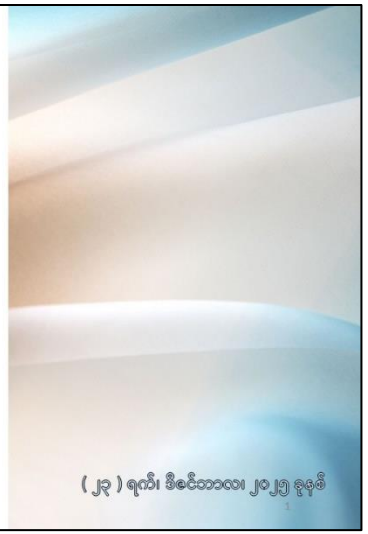
Hoang Anh Gia Lai Myanmar Co., Ltd.

HAGL Myanmar Centre စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေး စီမံကိန်း

ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း(EIA) ဆိုင်ရာ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအဆင့် အစီရင်ခံစာအတွက်

အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်း

Environmental Compliance Consultancy Co., Ltd. (EnvCC)



ဆွေးနွေးတင်ပြမည့် အကြောင်းအရာများ

- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA Report) အစီအရင်ခံစာကို ပြုလုပ်ရခြင်း၏ ရည်ရွယ်ချက်ကို တင်ပြခြင်း။
- စီမံကိန်းနှင့် အဓိကသက်ဆိုင်သောဥပဒေ မူဘောင်များ တင်ပြခြင်း။
- စီမံကိန်းအကြောင်းအရာကို တင်ပြခြင်း။
- ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်များ လေ့လာခြင်းနှင့် တွေ့ရှိချက်များကို တင်ပြခြင်း။
- စီမံကိန်းကြောင့် ပတ်ဝန်းကျင်အပေါ်အကျိုးသက်ရောက်မှုများအား အကဲဖြတ်ဆန်းစစ်ခြင်းနှင့် သက်ရောက်မှုများအား လျှော့ချခြင်း အစီအစဉ်များကို တင်ပြခြင်း။
- လုပ်ငန်းခွင်ဆိုင်ရာ ဘေးအန္တရာယ် ဆန်းစစ်ခြင်းနှင့် လျှော့ပါးစေရေးနည်းလမ်းများ တင်ပြခြင်း။
- ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း။
- လူမှုအကျိုးတူပူးပေါင်းပါဝင်မှု (CSR) အစီအစဉ်များကို တင်ပြခြင်း။
- စောင့်ကြပ်ကြည့်ရှုမှု အစီအစဉ်များကို တင်ပြခြင်း။

အစီရင်ခံစာရေးဆွဲရခြင်း၏ ရည်ရွယ်ချက်

- အဆိုပြုစီမံကိန်းကြောင့် ဖြစ်ပေါ်နိုင်သော ပတ်ဝန်းကျင် နှင့် လူမှုရေးဆိုင်ရာ သက်ရောက်ထိခိုက်မှုများကို သိပ္ပံနည်းကျ ခန့်မှန်းအကဲဖြတ်နိုင်ခြင်း။
- ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ ကိစ္စရပ်များအပေါ် သက်ရောက်နိုင်မည့် ဆိုးကျိုးများလျှော့ချနိုင်ရန် အစီအစဉ်များ ရေးဆွဲနိုင်ခြင်း။
- စီမံကိန်းဧရိယာနှင့် စီမံကိန်းအနီးဝန်းကျင်တွင် ပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးတိုင်းတာမှုများ ပြုလုပ်ပြီး ရရှိလာသည့် ရလဒ်များကို အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု)လမ်းညွှန်ချက်များ (၂၀၁၅) ဖြင့် နှိုင်းယှဉ်၍ လိုအပ်သော ပတ်ဝန်းကျင်ထိခိုက်မှု လျှော့ပါးရေးအစီအစဉ်များ စီမံဆောင်ရွက်နိုင်ခြင်း။
- အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းများ ပြုလုပ်ပြီး အကြံပြုချက်သဘောထားများကို ရယူနိုင်ခြင်း။

စီမံကိန်းနှင့် အဓိကသက်ဆိုင်သော ဥပဒေမူဝါဒများ

စီမံကိန်းနှင့်အဓိကသက်ဆိုင်သောဥပဒေမူဘောင်များ

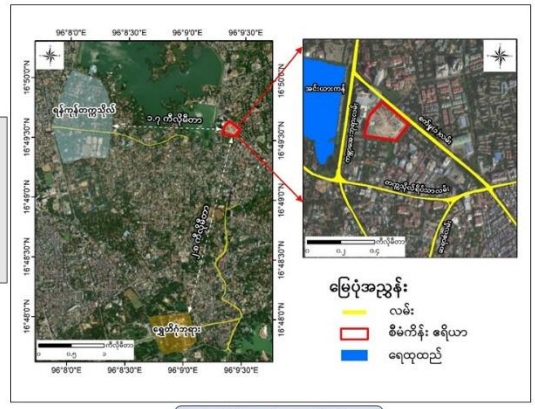
- မြန်မာနိုင်ငံ အမျိုးသားပတ်ဝန်းကျင်ရေးရာ မူဝါဒ (၅ ရက်၊ ဇွန်လ၊ ၂၀၁၉ ခုနှစ်)
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ (၃၀ ရက်၊ မတ်လ၊ ၂၀၁၂ ခုနှစ်)
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေများ (၅ ရက်၊ ဇွန်လ၊ ၂၀၁၄ ခုနှစ်)
- ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၉ ရက်၊ ဒီဇင်ဘာလ၊ ၂၀၁၅ ခုနှစ်)
- အမျိုးသားသောက်သုံးရေ အရည်အသွေးစံချိန်စံညွှန်း (၂၀၁၉-မူကြမ်း)
- အမျိုးသား မြေပေါ်ရေ စံချိန်စံညွှန်း (၂၀၂၄)
- အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး ထုတ်လွှတ်မှု လမ်းညွှန်ချက်များ (၂၉ ရက်၊ ဒီဇင်ဘာလ၊ ၂၀၁၅ ခုနှစ်)

စီမံကိန်းအကြောင်းအရာများ

စီမံကိန်းတည်နေရာ

အမှတ် ၁၉၂ ကမ္ဘာအေး ဘုရားလမ်း၊ ဗဟန်းမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး။

- မြောက်လတ္တီကျူ ၁၆ ဒီဂရီ ၄၉ မိနစ် ၃၇.၉ စက္ကန့်
- အရှေ့လောင်ဂျီကျူ ၉၆ ဒီဂရီ ၀၉ မိနစ် မှ ၁၈.၇ စက္ကန့်


96°8'0"E
96°8'30"E
96°9'0"E
96°9'30"E
16°50'0"N
16°49'30"N
16°49'0"N
16°48'30"N
16°48'0"N
ရန်ကုန်တက္ကသိုလ်
၁၇ လီလိုမီတာ
ရေကန်ကြီး
ရေကန်ကြီး
ရေကန်ကြီး

စီမံကိန်းအကြောင်းအရာအကျဉ်းချုပ်

- စီမံကိန်းအဆင့် (၂) တွင်
  - High-rise Residential
    - ✓ Residential Block (B1) – 33 Storey
    - ✓ Residential Block (B2, B3) – 30 Storey
    - ✓ Service Apartment (A1, A2) – 30 Storey
    - ✓ High-Rise Serviced Apartment (A3, A4) & Commercial Centre No.2 (30 Storeys)
  - စိမ်းလန်းနယ်မြေများ
  - မြေအောက်ကား ကားရပ်နားရန်နေရာ (၄ထပ်) နှင့်
  - အခြားသောမြေပိုဧရိယာ
- ၆ ထပ်အမြင့်ရှိသော Commercial Centre အမှတ် ၂ သည် စီမံကိန်းအဆင့် ၁ မှ Commercial Centre ၁ နှင့် တွဲဆက်၍ တည်ဆောက်မည်ဖြစ်သည်။

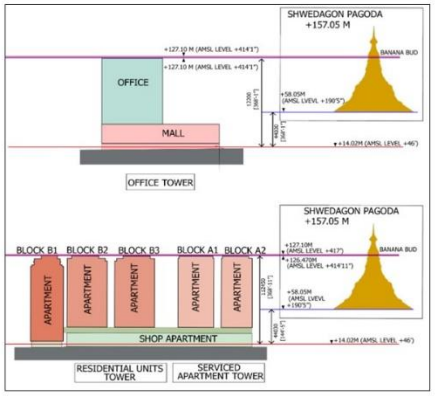
စီမံကိန်း အဆင့် ၂ ၏ အဆောက်အဦတည်ဆောက်မည့် ပုံစံပြပုံ

စီမံကိန်းအကောင်အထည်ဖော်ဆောင်မှုအခြေအနေ

- Residential Units Block များဖြစ်သည့် B1 တည်ဆောက်မှုကို ဧပြီလ ၁ ရက်၊ ၂၀၂၄ ခုနှစ်တွင် တရားဝင်ဖွင့်လှစ်ခဲ့ပြီး B2 နှင့် B3 ကို ဒီဇင်ဘာလ၊ ၂၀၃၀ ခုနှစ်တွင် ပြီးစီးတည်ဆောက်ရန် မျှော်မှန်းထားပါသည်။
- Service Apartment A1, A2, Commercial နှင့် Office Building များကို ဒီဇင်ဘာလ၊ ၂၀၃၆ ခုနှစ်တွင် ပြီးစီးမည်ဟု မျှော်မှန်းထားပါသည်။
- Commercial နှင့် Serviced Apartment A3, A4 Building များကို ဒီဇင်ဘာလ၊ ၂၀၃၃ ခုနှစ်တွင် ပြီးစီးမည်ဟု မျှော်မှန်းထားပါသည်။
- သို့သော်လည်း မြန်မာနိုင်ငံရှိ စီးပွားရေး အခြေအနေများအပေါ်မူတည်၍ စီမံကိန်းအကောင်အထည်ဖော် ဆောင်ရွက်မှု အစီအစဉ်များသည် အချိန်နှင့်အမျှ ပြောင်းလဲနိုင်ပါသည်။

ရွှေတိဂုံစေတီတော်နှင့် မြင်ကွင်းဆိုင်ရာ သက်ရောက်မှု

- ရွှေတိဂုံစေတီတော်နှင့်စီမံကိန်းနေရာ အကွာအဝေးမှာ ၂.၈ ကီလိုမီတာ ကျော်ရှိပါသည်။
- အဆောက်အဦအားလုံး၏ အမြင့်ဆုံးနေရာမှာ ၁၂၇.၁ မီတာရှိပြီး ရွှေတိဂုံစေတီတော်မှာ ၁၅၇.၀၅ မီတာခန့် ရှိပါသည်။
- ထို့ကြောင့် စီမံကိန်း ဆောင်ရွက်ခြင်းကြောင့် ရွှေတိဂုံစေတီတော်အပေါ်တွင် မြင်ကွင်းဆိုင်ရာသက်ရောက်မှု တစ်စုံတစ်ရာမှ မရှိနိုင်ပါ။



ရွှေတိဂုံစေတီတော်နှင့် အမြင့် နှိုင်းယှဉ်မှုပြပုံ

ကားရပ်နားရန်နေရာနှင့် ဓာတ်လှေကားစနစ်

- စီမံကိန်း အဆင့် ၂ ရှိ အဆောက်အဦတိုင်း၏ Basement ၄ ထပ်တွင် စီမံကိန်းဧရိယာ တစ်ခုလုံးအတွက် လုံလောက်သော ကားရပ်နားရန်နေရာများကို တည်ဆောက်မည် ဖြစ်သည်။
- စီမံကိန်းအတွက် လိုအပ်သော ကားရပ်နားရန်နေရာမှာ ခန့်မှန်း ၂,၈၂၁ နေရာ ဖြစ်ပါသည်။
- စုစုပေါင်း ကားရပ်နားရန် နေရာကို ရန်ကုန်မြို့တော် စည်ပင်သာယာရေးကော်မတီ ဥပဒေ နှင့် ညွှန်ကြားချက်များအား အခြေခံပြီး တွက်ချက်ခဲ့ပါသည်။
- ထို့အပြင် အနာဂတ်စီမံကိန်း တိုးချဲ့မှုအတွက် ကားရပ်နားရန်နေရာနေရာ ၂၀% ကိုထည့်သွင်းတွက်ချက်ခဲ့ပါသည်။
- ဓာတ်လှေကားစနစ်အနေဖြင့် မီးဒဏ်ခံနိုင်သည့် အစီးရေ (၂၄) စီး တပ်ဆင်မည်ဖြစ်ပြီး တစီးလျှင် ၁,၁၅၀-၂,၀၀၀ ကီလိုဂရမ် တင်ဆောင်နိုင်မည် ဖြစ်ပါသည်။

ယာဉ်ကြောစနစ်

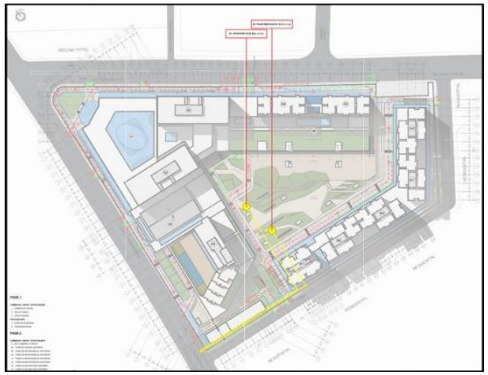
စဉ်	အဓိကလမ်းများ	အရေအတွက်
စီမံကိန်းသို့ အဝင်လမ်း		
၁။	အမှတ် ၁ စက်မှုလမ်း (Commercial Centre သို့ ဝင်ထွက်သည့် ဧည့်သည်ကားများအတွက်)	၂
၂။	ကမ္ဘာအေးဘုရားနှင့် အမှတ် ၁ စက်မှုလမ်းကြား၌ ဆက်သွယ်ထားသော အတွင်းလမ်း	၄
စီမံကိန်းမှ အထွက်လမ်း		
၁။	Residential Block တွင်နေသူများနှင့် ဧည့်သည်များ ဝင်ထွက်ရန် (နေရာ)	၃

ယာဉ်သွားလာမှုအစီအစဉ်ပြပုံ

- ယာဉ်ကြောပိတ်ဆို့မှုအတွက် သက်သာစေရန် အရံလမ်းများ စီစဉ်ထားပါသည်။
- ထို့ကြောင့် စီမံကိန်းဧရိယာသည် Residential Block တွင် နေထိုင်သူများနှင့် ဧည့်သည်များ သွားလာရန် အဆင်ပြေပါသည်။

စွမ်းအင်ရရှိမှု

- လျှပ်စစ်ဓာတ်အား ရရှိရန် အတွက် ၁,၆၀၀ မှ ၅,၀၀၀ ကေဗွီအေအားရှိသော ထရန်စဖော်မာ ၁၀ လုံးကို စီစဉ်ထားပါသည်။
- စီမံကိန်းအတွက် လျှပ်စစ်ဓါတ်အားကို အစိုးရ လျှပ်စစ်ဓါတ်အားလိုင်းမှ ရယူမည်ဖြစ်သည်။



ဓာတ်အားရယူ အသုံးပြုသည့် နေရာပြပုံ

ရေအရင်းအမြစ်၊ လိုအပ်ချက်နှင့် သုံးစွဲမှု

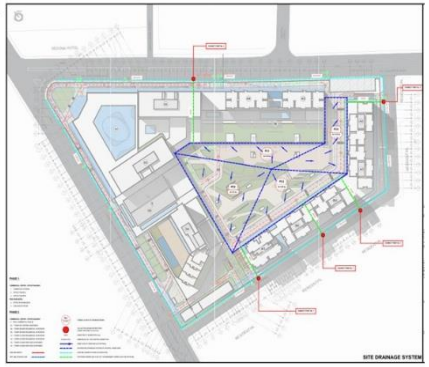
- စီမံကိန်းတွင် အသုံးပြုရန် ရေသိုလှောင်ကန်၏ ထုထည်ပမာဏမှာ ၁,၈၇၅ ကုဗမီတာဖြစ်ပါသည်။
- မီးသတ်ရေကန်ကို Service Apartment - Residential unit များ (စီမံကိန်း အဆင့် ၂) ၏ Basement ၂ ထပ် နှင့် ၃ ထပ်တွင် တည်ဆောက်မည်ဖြစ်ပြီး ထိုရေလှောင်ကန်မှာ ရေ ၁,၀၀၀ ကုဗမီတာ သိုလှောင်နိုင်မည် ဖြစ်ပါသည်။
- ရေအသုံးပြုမည့် စနစ်အား ရန်ကုန်မြို့တော် စည်ပင်သာယာရေးကော်မတီ၏ ရေပေးဝေရေးစနစ်မှ ရယူမည်ဖြစ်ပြီး စနစ်အားလုံးတွင် အစိုးရ၏ နည်းလမ်းနှင့် လမ်းညွှန်ချက်များကို လိုက်နာပြီး ဆောင်ရွက်မည်ဖြစ်သည်။
- စီမံကိန်းဧရိယာတွင် ရေအသုံးပြုမှု အရံအနေဖြင့် အဝီစီရေတွင်းများကို အသုံးပြုမည် မဟုတ်ပါ။

စဉ်	အကြောင်းအရာ	တနေ့လျှင် ခန့်မှန်းရေသုံးစွဲမှု ပမာဏ(ကုဗမီတာ)
၁။	စီမံကိန်းတည်ဆောက်စဉ်ကာလ	၆၄ မှ ၉၅
၂။	စီမံကိန်းလည်ပတ်စဉ်ကာလ (စီမံကိန်းအဆင့် ၂ ရှိ အဆောက်အဦ အားလုံး)	၁,၈၀၀
၃။	ရေကူးကန် B2 နှင့် A1	၅၅၂

ရေနှင့် မိလ္လာစနစ်ပြမြေပုံ

စွန့်ပစ်ရေပမာဏနှင့် ရေစီးဆင်းမှုစနစ်

- စီမံကိန်းတည်ဆောက်စဉ်ကာလတွင် စွန့်ပစ်ရေထွက်ရှိမှုပမာဏမှာ ခန့်မှန်းခြေအရ တစ်နေ့လျှင် ၂၀၀ ကုဗမီတာ ခန့် ရှိနိုင်ပါသည်။
- စီမံကိန်း ပြင်ပရိုဂ်ိုက်များကို အဓိကရေမြောင်းမှတဆင့် စည်ပင်ပိုက်လိုင်းဖြင့် ဆက်သွယ်မည် ဖြစ်သည်။
- ပန်းခြံနေရာ၏ ရေဆင်းစနစ်မှ တိုးချဲ့ထားသော ရေမြောင်းအခွဲနှင့် အဆောက်အဦများ၏ ရေမြောင်းအခွဲများကို အဓိကရေမြောင်းဖြင့် တိုက်ရိုက် ဆက်သွယ်ထားမည် ဖြစ်သည်။
- စီမံကိန်း အဆင့် ၁ ၏ အပြင်ဘက်ရှိ အရွယ်အစား ၉၀၀ x ၉၀၀ မီလီမီတာ ရှိသော မိလ္လာပိုက်သည် စီမံကိန်း အဆင့် ၂ ရှိ အရွယ်အစား ၁၂၀၀ x ၁၂၀၀ မီလီမီတာ ရှိသော မိလ္လာပိုက်အတွင်းသို့ စီးဝင်မည်ဖြစ်သည်။
- Residential Building၊ Service Apartment နှင့် ပန်းခြံအလယ်ရှိ အချင်းဝက် ၄၀၀ မှ ၂၀၀ မီလီမီတာရှိသော မိလ္လာပိုက်မှ အရွယ်အစား ၁၂၀၀ x ၁၂၀၀ မီလီမီတာ ရှိသော မိလ္လာပိုက်အတွင်းသို့ စွန့်ထုတ်မည် ဖြစ်သည်။
- Commercial နှင့် Office Buildingများ မှ အချင်းဝက် ၂၀၀ မီလီမီတာရှိ မိလ္လာပိုက်သည် ပန်းခြံနှင့် အဆောက်အဦများမှ စီးဝင်သည့် အရွယ်အစား ၉၀၀ x ၉၀၀ မီလီမီတာ ရှိသော မိလ္လာပိုက်နှင့် ဆက်သွယ်မည် ဖြစ်သည်။
- မိုးရေဆင်းမှုစနစ်ကို အဆောက်အဦပြင်ပရှိ ပိုက်လိုင်းတစ်လျှောက်တွင် မိုးရေရစ်ဆောင်းသည့်နေရာများ ထည့်သွင်းတည်ဆောက်ပါမည်။ ပန်းခြံနှင့် အဆောက်အဦများမှ မိုးရေရစ်ဆောင်းရန် အဓိက ၅ နေရာရှိပါသည်။ ထိုနေရာအားလုံးမှ မိုးရေများကို ရန်ကုန်မြို့တော် စည်ပင်သာယာရေးကော်မတီ၏ ရေထွက်ပေါက်အတွင်းသို့ အဓိက စီးဆင်းစေမည် ဖြစ်သည်။

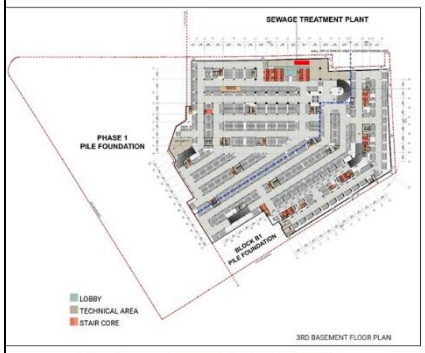


စီမံကိန်း၏ရေဆင်းစနစ်ပြပုံ

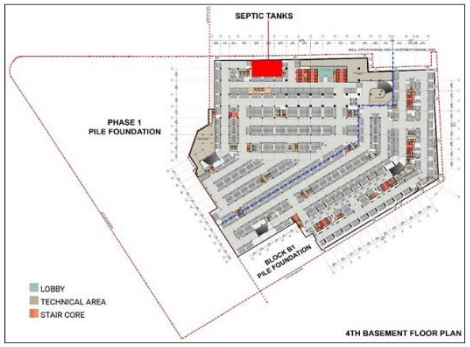
စွန့်ပစ်ရေနှင့် မိလ္လာသန့်စင်ကန်

- အဆောက်အဦအားလုံးမှ စွန့်ပစ်ရေများကို မိလ္လာနှင့် ရေဆိုးစွန့်ပစ် သိုလှောင်ကန်ထဲသို့ စွန့်ပစ်မည် ဖြစ်ပါသည်။
- သိုလှောင်ကန်၏ ထုထည်ပမာဏမှာ တစ်နေ့လျှင် ၂,၄၀၀ ကုဗမီတာ ဖြစ်ပြီး သတ်မှတ်ထားသော BOD စံချိန်စံညွှန်း ပမာဏရှိသော စွန့်ပစ်ရေကို ပြင်ပသို့ စနစ်တကျ စွန့်ထုတ် ပါမည်။
- ရေဆိုးစွန့်ပစ် သိုလှောင်ကန်ကို Office Building နှင့် Service Apartment A2 ကြားရှိ Basement ၄ ထပ် တွင် ထားရှိမည်ဖြစ်သည်။
- ဆောက်လုပ်ရေးလုပ်ငန်းမှ စွန့်ထုတ်သော ရေဆိုးများကို သန့်စင်ရန် ကိုယ်ပိုင်ရေဆိုးသန့်စင်စနစ် ရှိပါသည်။
- စီမံကိန်းဧရိယာမှ စွန့်ပစ်ရေ သန့်စင်ရန်အတွက် equalization, anoxic and aeration tank အသုံးပြုထားသော စွန့်ပစ်ရေသန့်စင်ကန်ကို ထားရှိမည်ဖြစ်သည်။
- ထို စွန့်ပစ်ရေသန့်စင်ကန်ကို စီမံကိန်းဧရိယာနှင့် အိမ်သုံးစွန့်ပစ်ရေ သန့်စင်ရန် နှစ်မျိုးလုံးအတွက် ဆောင်ရွက်ထားခြင်း ဖြစ်သည်။
- စွန့်ပစ်ရေသန့်စင်ကန်သိုလှောင်နိုင်မှုပမာဏမှာ ၇၁၈ ကုဗမီတာဖြစ်ပြီး တစ်နေ့လျှင် ၁,၂၅၀ ကုဗမီတာ သန့်စင်နိုင်ပါသည်။
- သန့်စင်ပြီးသော စွန့်ပစ်ရေကန် သိုလှောင်နိုင်မှုပမာဏမှာ ၂၀၅.၇၈ ကုဗမီတာ ဖြစ်ပါသည်။

စွန့်ပစ်ရေနှင့် မိလ္လာသန့်စင်ကန်



မြေအောက်သုံးလွှာရှိ မိလ္လာကန်နှင့် ရေဆိုးသန့်စင်သည့်ကန်နေရာပြပုံ



မြေအောက်လေးလွှာရှိ မိလ္လာကန်နေရာပြပုံ

အမှိုက်အခဲစွန့်ပစ်ပစ္စည်းစီမံခန့်ခွဲမှု

- **အမှိုက်အခဲစွန့်ပစ်မှုစနစ်**

Second Basement တွင် အရွယ်အစား ၁၃၀ စတုရန်းမီတာ နှင့် ၁၃၅ စတုရန်းမီတာ အသီးသီးရှိသော အမှိုက်စွန့်ပစ်သည့်နေရာ ၂ နေရာ ရှိပါသည်။

စီမံကိန်းနေရာတွင် အမှိုက်ပုံးများ လုံလောက်စွာရှိမည် ဖြစ်ပြီး ထိုအမှိုက်များကို စနစ်တကျ စုဆောင်းထားပြီး ရန်ကုန်မြို့တော် စည်ပင်သာယာရေးကော်မတီ၏ လမ်းညွှန်ချက်များအတိုင်း စွန့်ပစ်မည်ဖြစ်သည်။

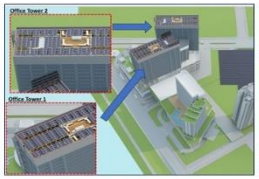
- **စွန့်ပစ်အမှိုက်ပမာဏ**

IGES (၂၀၁၆) အရ လူတစ်ယောက်၏ အမှိုက်စွန့်ပစ်မှုမှာ တစ်နေ့လျှင် ၀.၄ ကီလိုဂရမ်ခန့် ရှိနိုင်ပါသည်။ တည်ဆောက်စဉ်ကာလတွင် လုပ်သားဦးရေ ၃၉၂ ယောက် ခန့်ထားမည်ဖြစ်ပြီး အမှိုက်ထွက်ရှိမှုမှာ တစ်နေ့လျှင် ၁၅၆.၈ ကီလိုဂရမ်ခန့် ရှိနိုင်ပါသည်။

စီမံကိန်းလည်ပတ်စဉ်ကာလတွင် အမှိုက်ထွက်ရှိမှာ တစ်နေ့လျှင် ၂၁၀ ကုဗမီတာခန့် ထွက်ရှိနိုင်ပါသည်။

အမှိုက်စွန့်ပစ်သည့်နေရာပြပုံ

လက်ရှိစီမံကိန်းအခြေအနေ



- ဆောက်လုပ်ရန်ကျန်ရှိနေသည့် အဆောက်အဦများကို မြန်မာနိုင်ငံရှိ စီးပွားရေး အခြေအနေများ အပေါ်မူတည်၍ ၂၀၃၀ခုနှစ်နှင့် ၎င်းနောက်ပိုင်းနှစ်များမှသာ ဆောက်လုပ်ပြီးစီးရန် မျှော်မှန်းထားသည့်အတွက် ယခုကာလတွင် တည်ဆောက်ရေးလုပ်ငန်းများ စတင်ခြင်း မရှိသေးပါ။
- စွမ်းအင်အသုံးပြုမှု နှင့် CO_2 ထွက်ရှိမှုကိုအတော်အသင့် လျှော့ချနိုင်စေရန် ရည်ရွယ်၍ ယင်းအဆောက်အဦ တည်ဆောက်မည့်နေရာတွင် ဆိုလာစနစ်ကို ယာယီတပ်ဆင် ထားပါသည်။
- ဆောက်လုပ်ရေးလုပ်ငန်းများ စတင်ခဲ့လျှင် ၎င်းတို့ကို ယခင်ဆောက်လုပ်ပြီးစီးခဲ့သော အဆောက်အဦများပေါ်တွင် အသီးသီးတပ်ဆင်သွားမည် ဖြစ်ပါသည်။

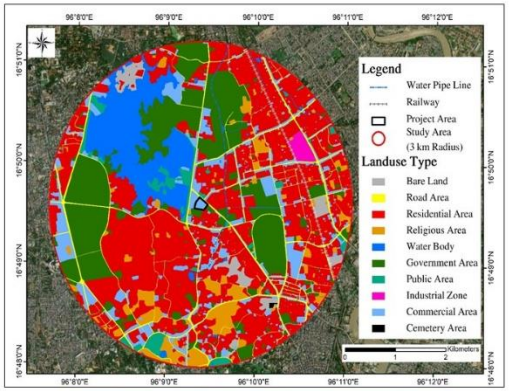
ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်များကို တင်ပြခြင်း

ပတ်ဝန်းကျင်အရည်အသွေးတိုင်းတာသည့်နယ်ပယ်များ

- မြေအသုံးချမှုအခြေအနေလေ့လာခြင်း
- လူမှုစီးပွားဆိုင်ရာ အချက်အလက်များ လေ့လာခြင်း
- လေထုအရည်အသွေး တိုင်းတာခြင်း
- ရေထုအရည်အသွေး တိုင်းတာခြင်း
- ဆူညံသံ တိုင်းတာခြင်း
- တုန်ခါမှု တိုင်းတာခြင်း
- ဇီဝမျိုးစုံမျိုးကွဲများကိုလေ့လာခြင်း

JJ

စီမံကိန်းပတ်ဝန်းကျင်ရှိမြေအသုံးချမှုလေ့လာခြင်း



စီမံကိန်းအနီးဝန်းကျင်ရှိ မြေအသုံးချမှု အခြေအနေပြ မြေပုံ

မြေအသုံးချမှု	ဧရိယာ (ဟက်တာ)	ရာခိုင်နှုန်း
လူနေဧရိယာ	၁,၂၃၃.၅၇	၄၃.၃
အစိုးရနယ်မြေ	၅၈၆	၂၀.၇၄
စီးပွားရေးနယ်မြေ	၂၈၆.၅၂	၁၀.၁၄
ရေထုထည်	၂၈၆.၄၈	၁၀.၁၄
ဘာသာရေးနယ်မြေ	၁၆၂.၀၁	၅.၇၃
လမ်းမြေ	၁၃၅.၆၆	၄.၈
အများပိုင်နယ်မြေ	၇၀.၁၉	၂.၄၈
မြေလွတ်မြေရိုင်း	၅၅.၅၇	၁.၉၇
စက်မှုနှုန်နယ်မြေ	၁၉	၀.၆၇
သုသာန်နယ်မြေ	၀.၉၉	၀.၀၃
စုစုပေါင်း	၂,၈၂၆.၀၀	၁၀၀

JR

လူမှုစီးပွားဆိုင်ရာ အချက်အလက်များ လေ့လာခြင်း

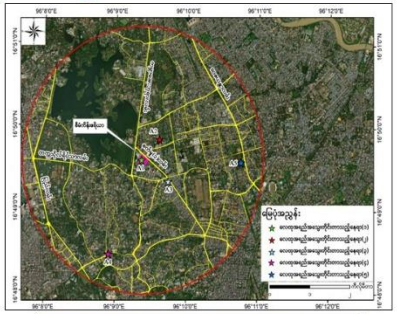
စဉ်	အကြောင်းအရာ	ဖော်ပြချက်
၁။	တိုင်းဒေသကြီးခရိုင်၊ မြို့နယ်	ရန်ကုန်တိုင်းဒေသကြီး၊ ဗဟန်းမြို့နယ်။
၂။	လေ့လာခဲ့သည့် ဧရိယာ	၁ ကီလိုမီတာ
၃။	ပါဝင်သည့်မြို့နယ်များ	ဗဟန်း၊ မရမ်းကုန်းနှင့် ရန်ကင်းမြို့
၄။	လူဦးရေ	၃၃၈,၁၂၈ဦး
၅။	အိမ်မြေ	(၄၀,၀၀၀) ကျော်
၆။	နေထိုင်သည့်လူမျိုး	တိုင်းရင်းသား (ကရင်၊ ကယား၊ ကချင်၊ ချင်း၊ မွန်၊ ဗမာ၊ ရခိုင်၊ ရှမ်း)
၇။	ကိုးကွယ်သည့်ဘာသာ	ဗုဒ္ဓ/ခရစ်ယာန်/ဟိန္ဒူ/နတ်/အခြား
၈။	အလုပ်လုပ်သည့်ဦးရေ	၂၂၃,၇၅၆
၉။	အလုပ်လက်မဲ့ဦးရေ	၆,၇၈၈
၁၀။	လမ်းပန်းဆက်သွယ်ရေး	ရထားလမ်း၊ ကားလမ်း

စဉ်	အကြောင်းအရာ	ဖော်ပြချက်
၁၁။	ပညာရေး (မူလတန်းကြို/ကျောင်း မူလတန်းကျောင်း/အလယ်တန်း ကျောင်း/ အထက်တန်းကျောင်း)	၁၉/၅၂/၁၅/၁၁
၁၂။	စီးပွားရေး	ပုဂ္ဂလိကဝန်ထမ်း၊ အစိုးရဝန်ထမ်း၊ ကုန်သွယ်၊ စက်ရုံအလုပ်ရုံ၊ ဝန်ဆောင်မှုလုပ်ငန်းနှင့် အခြား
၁၃။	လူမှုအဆောက်အဦများ	ဈေး/ဈေးဝယ်စင်တာ/ကုမ္ဗဏီ/စက်ရုံအလုပ်ရုံ/ဘဏ်/ဟိုတယ်
၁၄။	ကျန်းမာရေး (အစိုးရ/ပုဂ္ဂလိက)	ဆေးရုံ (၆/၈)၊ ဆေးခန်း (၄/၂၃၀)
၁၅။	သမိုင်းဝင်ထင်ရှားသည့် အဆောက်အဦနှင့် နေရာ	ငါးထပ်ကြီးဘုရား၊ ခြောက်ထပ်ကြီးဘုရား၊ ဖိုလ်ချုပ်အောင်ဆန်းပြတိုက်၊ အာစာနည်ဓိမာန်၊ မဟာပါသာဏလိုဏ်ဂူသိမ်တော်ကြီး၊ ကမ္ဘာအေးဘုရား၊ အမျိုးသားပြတိုက်။

JS

လေအရည်အသွေးတိုင်းတာခြင်း

တိုင်းတာသည့်နေရာများ	ကိုဩဒိနိတ်အမှတ်များ	တိုင်းတာသည့်နေ့ရက်များ
A1 - စီမံကိန်းနေရာ	၁၆° ၄၉' ၃၄.၇၄" N ၉၆° ၉' ၂၁.၀၁" E	၂၇-၂၈ ဧရိယိုင်လ ၂၀၂၅
A2 - မဂ်လာဓေယျုကျောင်းတိုက်	၁၆° ၄၉' ၅၀.၅၉" N ၉၆° ၉' ၃၇.၀၇" E	၁၀-၁၁ နိုဝင်ဘာလ ၂၀၂၅
A3 - နီဗွာန်ကျောင်းတိုက်	၁၆° ၄၉' ၂၀.၀၀" N ၉၆° ၉' ၄၄.၆၇" E	၂၈-၂၉ ဧရိယိုင်လ ၂၀၂၅
A4 - မိုးညင်းဝိပဿနာ ကျောင်းတိုက်	၁၆° ၄၈' ၂၆.၈၆" N ၉၆° ၈' ၅၅.၀၀" E	၃၀-၃၁ ဧရိယိုင်လ ၂၀၂၅
A5 - လူနေဧရိယာ	၁၆° ၄၉' ၃၃.၅၆" N ၉၆° ၁၀' ၄၆.၉၄" E	၅-၆ ဩဂုတ်လ ၂၀၂၅


96°8'0"E
96°9'0"E
96°10'0"E
96°11'0"E
96°12'0"E
16°51'0"N
16°50'0"N
16°49'0"N
16°48'0"N
16°47'0"N
Hoang Anh Gia Lai Myanmar Co. Ltd
Kyaw Ywa Road
Kyaw Ywa Road
Kyaw Ywa Road

ရေအရည်အသွေး တိုင်းတာခြင်း

တိုင်းတာသည့် နေရာ	တိုင်းတာသည့်နေ့ရက်	ကိုဩဒိနိတ်အမှတ်များ
ဂျိုးဖြူရေ	၂၅ နိုဝင်ဘာလ, ၂၀၂၅	၁၆° ၄၉' ၃၇.၃၁"N ၉၆° ၉' ၂၅.၆၈" E
စီမံကိန်းအနီးရှိစွန့်ပစ်ရေ	၂၅ နိုဝင်ဘာလ, ၂၀၂၅	၁၆° ၄၉' ၃၃.၁၂" N ၉၆° ၉' ၂၀.၀၄" E

ရေနမူနာကောက်ယူတိုင်းတာခြင်း

Shwe Pyi Aye Road
Pyi Ye Road
Pyi Ye Road
Shwe Pyi Aye Road
Pyi Ye Road
Pyi Ye Road
Pyi

ဆူညံသံ တိုင်းတာခြင်း ရလဒ်များ

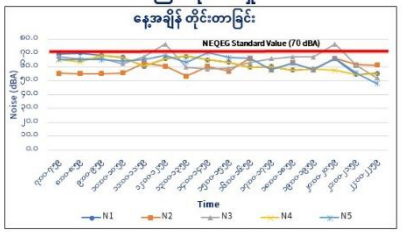
	ပထမအကြိမ်တိုင်းတာရလဒ်				ဒုတိယအကြိမ်တိုင်းတာရလဒ်	
		One Hour LAeq (dBA)			One Hour LAeq (dBA)	
တိုင်းတာသည့် အမှတ်	တိုင်းတာသည့်နေ့ ရက်များ	နေ့အချိန်	ညအချိန်	တိုင်းတာသည့်နေ့ ရက်များ	နေ့အချိန်	ညအချိန်
		၇:၀၀ မှ ၂၂:၀၀	၂၃:၀၀ မှ ၇:၀၀		၇:၀၀ မှ ၂၂:၀၀	၂၃:၀၀ မှ ၇:၀၀
N1	၂၅ - ၂၆ ဩဂုတ်လ ၂၀၂၀	၇၀.၁	၇၀.၃၆	၂၇-၂၈ ဇူလိုင်လ ၂၀၂၅	၅၅.၅	၆၆.၄
N2	၂၆ - ၂၇ ဩဂုတ်လ ၂၀၂၀	၆၆.၄၄	၅၉.၇၈	၁၀-၁၁ ဧပြီလ ၂၀၂၅	၅၂.၄	၄၃.၄
N3	၂၇ - ၂၈ ဩဂုတ်လ ၂၀၂၀	၇၁.၅၇	၆၂.၂၈	၂၈-၂၉ ဇူလိုင်လ ၂၀၂၅	၅၄.၆	၄၄.၉
N4	၂၀-၂၁ စက်တင်ဘာလ ၂၀၂၁	၆၈.၇၃	၆၂.၃၆	၃၀-၃၁ ဇူလိုင်လ ၂၀၂၅	၅၂.၄	၄၃.၄
N5	၂၁-၂၂ စက်တင်ဘာလ ၂၀၂၁	၇၀.၅၁	၅၉.၃၈	၅-၆ ဩဂုတ်လ ၂၀၂၅	၅၃.၆	၄၃.၁
NEQEG (၂၀၁၅)	Residential, institutional, education	၅၅	၄၅		၅၅	၄၅
	Industrial, commercial	၇၀	၇၀		၇၀	၇၀

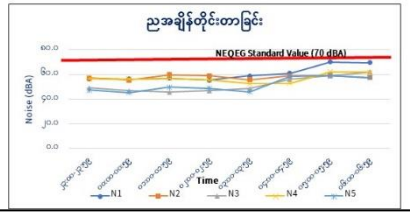
*အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များအရ နေ့အချိန်မှာ မနက် ၇နာရီမှ ည ၁၀နာရီအထိဖြစ်ပြီး ရုံးပိတ်ရက်များတွင် မနက်၁၀နာရီမှ ည ၁၀ နာရီအထိ ဖြစ်သည်။

**အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များအရ ညအချိန်မှာ ည ၁၀နာရီမှ မနက် ၇နာရီအထိဖြစ်ပြီး ရုံးပိတ်ရက်များတွင် ည၁၀ နာရီမှ မနက်၇ နာရီအထို ဖြစ်သည်။

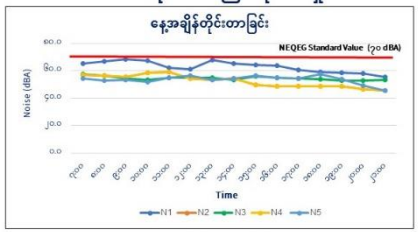
ဆူညံသံ တိုင်းတာခြင်း ရလဒ်များ

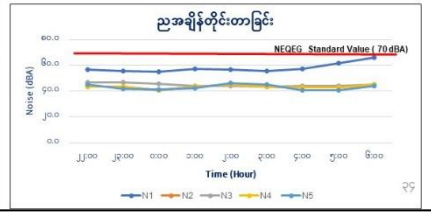
ပထမအကြိမ်တိုင်းတာမှု





ဒုတိယ အကြိမ်တိုင်းတာမှု





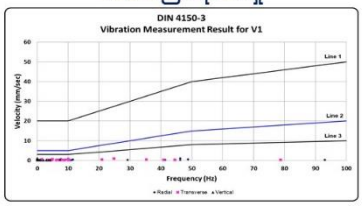
တုန်ခါမှုတိုင်းတာခြင်း

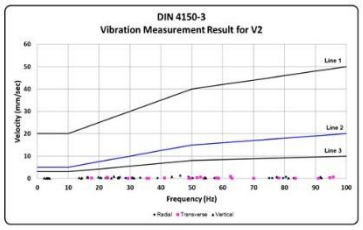
အမျိုးအစားများ	ကျာမန်စံသတ်မှတ်ချက် (DIN 4150-3) Peak particle velocity (mm/s)		
	၁-၁၀ Hz	၁၀-၅၀ Hz	၅၀-၁၀၀ Hz
စီးပွားရေးဆိုင်ရာဒုံနှင့် စက်မှုလုပ်ငန်းဆိုင်ရာ အဆောက်အဦ (Line 1)	၂၀	၂၀-၄၀	၄၀-၅၀
လူနေထိုင်ရာ အဆောက်အဦ (Line 2)	၅	၅-၁၅	၁၅-၂၀
ထိခိုက်လွယ်သော အဆောက်အဦ (Line 3)	၃	၃-၈	၈-၁၀

တုန်ခါမှုတိုင်းတာသည့်ပုံ

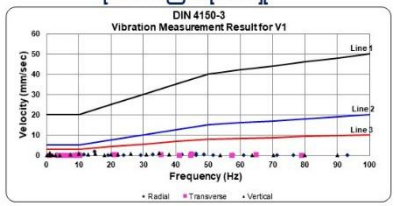
တုန်ခါမှု တိုင်းတာခြင်း ရလဒ်များ

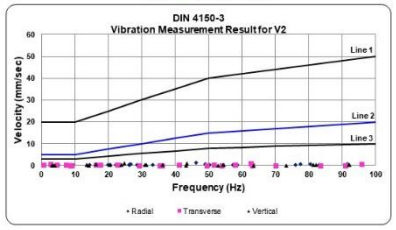
ပထမအကြိမ်တိုင်းတာမှု



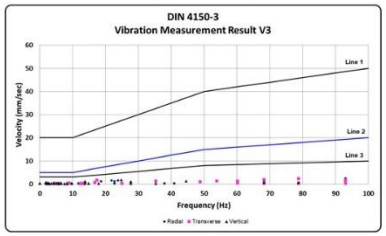


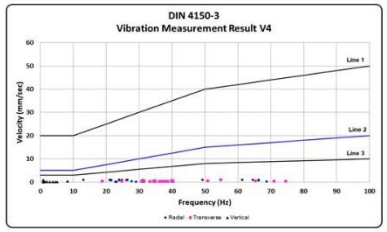
ဒုတိယ အကြိမ်တိုင်းတာမှု



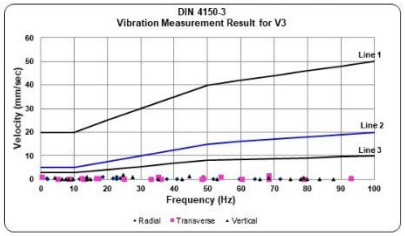


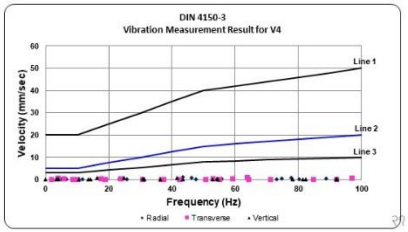
ပထမအကြိမ်တိုင်းတာမှု





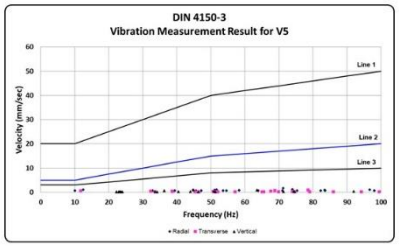
ဒုတိယ အကြိမ်တိုင်းတာမှု



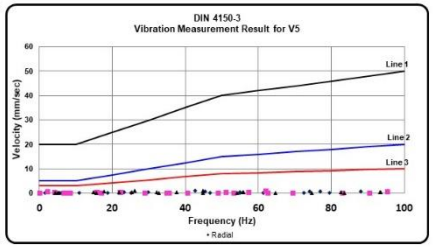


တုန်ခါမှု တိုင်းတာခြင်း ရလဒ်များ

ပထမအကြိမ်တိုင်းတာမှု



ဒုတိယအကြိမ်တိုင်းတာမှု



❖ ရရှိလာသောရလဒ်များကို ဂျာမန်စံသတ်မှတ်ချက် (DIN 4150-3) နှင့် နှိုင်းယှဉ်ရာတွင် စံသတ်မှတ်ချက်အတွင်းတွင်ရှိနေပြီး ပတ်ဝန်းကျင်အပေါ်တွင် ထိခိုက်သက်ရောက်မှု မရှိနိုင်ကြောင်း တွေ့ရပါသည်။

ယာဉ်သွားလာမှုအခြေအနေလေ့လာခြင်း

စဉ်	တိုင်းတာသည့် အမှတ်	နေရာ	ကိုဩဒိနိတ်အမှတ်များ
၁။	TC 1 (A)	စက်မှု (၁) လမ်း - ကမ္ဘာအေးဘုရားလမ်း	16°49'39.54"N 96° 9'23.80"E
၂။	TC 1 (B)	ကမ္ဘာအေးဘုရားလမ်း – စက်မှု (၁) လမ်း	16°49'38.50"N 96° 9'23.82"E
၃။	TC 2 (A)	ကမ္ဘာအေးဘုရားလမ်း – မြို့ထဲသို့သွားရာလမ်း	16°49'38.93"N 96° 9'15.34"E
၄။	TC 2 (B)	မြို့ထဲသို့သွားရာလမ်း– ကမ္ဘာအေးဘုရားလမ်း	16°49'39.04"N 96° 9'16.18"E

ယာဉ်သွားလာမှုလေ့လာသည့်ပုံ

ယာဉ်သွားလာမှုအခြေအနေလေ့လာခြင်းရလဒ်

ယာဉ်သွားလာမှုလေ့လာသည့်နေရာပြဖြေပုံ

❖ ယာဉ်သွားလာမှုများကို ရုံးဖွင့်ရက်နှင့် ရုံးပိတ်ရက် များတွင် လေ့လာသည့် ဇရိယာ၌ ၃ နေရာ ကောက် ယူခဲ့ပါသည်။

❖ ရလဒ်များမှာ TC-1တွင် သင့်လျော်သော ယာဉ်သွား လာမှု အခြေအနေတွင်ရှိပါသည်။

❖ ရုံးဖွင့်ရက်နှင့် ရုံးပိတ်ရက်များတွင် TC-2၌ ပုံမှန်မဟုတ် သော ယာဉ်သွားလာမှု များရှိပါသည်။

ဧီဝမျိုးစုံမျိုးကွဲများကို လေ့လာခြင်း

- အပင်မျိုးစိတ်များ လေ့လာရာတွင် ၃၁ မျိုး
- ငှက်မျိုးစိတ် ၂၁ မျိုး
- အခြားမျိုးစိတ်များတွင် နို့တိုက်သတ္တဝါများ၊ တွားသွား သတ္တဝါများ၊ ကုန်းနေရေနေ သတ္တဝါများ၊ အင်းစက်များ လေ့လာတွေ့ရှိခဲ့ပါသည်။

ဧီဝမျိုးစိတ်များလေ့လာသည့်နေရာပြမြေပုံ

စီမံကိန်းကြောင့် ပတ်ဝန်းကျင် ထိခိုက်မှု အကဲဖြတ်ဆန်းစစ်ခြင်း၊ ဘေးအန္တရာယ် ဆန်းစစ်ခြင်းနှင့် ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း

ပတ်ဝန်းကျင် သက်ရောက်မှုအဆင့်သတ်မှတ်ခြင်း

အုပ်စု	အမျိုးအစား	အဆင့်	ဖော်ပြချက်
က	ပြောင်းလဲနိုင်ချေ	၄	အပြည်ပြည်ဆိုင်ရာ
		၃	နိုင်ငံလုံးဆိုင်ရာ
		၂	မြို့နယ်ဆိုင်ရာ (စီမံကိန်းပြင်ပ)
		၁	စီမံကိန်း အနီးအဝိုက်
		၀	ပြောင်းလဲနိုင်ခြင်းမရှိသော
	ပမာဏ	+၃	များစွာသော အကျိုးသက်ရောက်မှု
		+၂	သိသာသော ကောင်းကျိုးရှိခြင်း
		+၁	ကောင်းကျိုးရှိခြင်း
		၀	ပြောင်းလဲနိုင်ခြင်းမရှိသော
		-၁	ဆိုးကျိုးရှိခြင်း
		-၂	သိသာသော ဆိုးကျိုးရှိခြင်း
		-၃	များစွာသော ဆိုးကျိုးသက်ရောက်မှု

အုပ်စု	အမျိုးအစား	အဆင့်	ဖော်ပြချက်
ခ	အချိန်ကာလ	၀	ပြောင်းလဲခြင်းမရှိသော
		၂	ယာယီ
		၃	ရေရှည်
	ပြန်လည်ထူထောင်ခြင်း	၀	ပြောင်းလဲခြင်းမရှိသော
		၂	ပြန်လည်ထူထောင်နိုင်သော
		၃	ပြန်လည်ထူထောင်၍မရနိုင်သော
	စုပေါင်းသက်ရောက်နိုင်ချေ	၀	ပြောင်းလဲခြင်းမရှိသော
		၂	စုပေါင်းသက်ရောက်ခြင်းမရှိသော
		၃	စုပေါင်းသက်ရောက်မှု ရှိခြင်း

သက်ရောက်မှုအဆင့်သတ်မှတ်ခြင်း

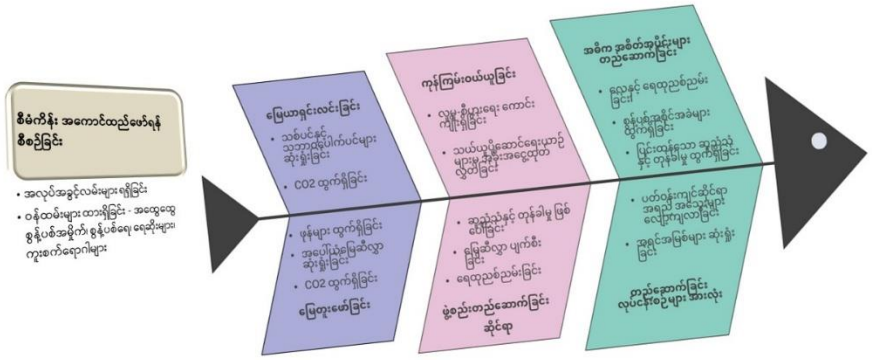
အုပ်စု (က)	အုပ်စု (ခ)
(အရည်အသွေးပြောင်းလဲခြင်း) (ပမာဏ) = သိသာထင်ရှားသည့် သက်ရောက်မှု	ကာလ + ပြန်လည်ထူထောင်နိုင်ချေ + စုပေါင်းသက်ရောက်မှု = ဖြစ်နိုင်ချေ

အဆင့်သတ်မှတ်ချက် = (သိသာထင်ရှားသည့် သက်ရောက်မှု) (ဖြစ်နိုင်ချေ)

အဆင့်သတ်မှတ်ချက်	အဆင့်သတ်မှတ်ချက်ရလဒ်	အဆင့်သတ်မှတ်ချက်ရလဒ် (ကိန်းဂဏန်း)	ဖော်ပြချက်
၁၀၈ မှ ၇၂	+c	+၅	များစွာသော အကျိုးသက်ရောက်မှု
၃၆ မှ ၇၁	+ယ	+၄	သိသာသော ကောင်းကျိုးသက်ရောက်မှု
၁၉ မှ ၃၅	+ဂ	+၃	ကောင်းကျိုးသက်ရောက်မှု (အသင့်အတင့်)
၁၀ မှ ၁၈	+ခ	+၂	ကောင်းကျိုးသက်ရောက်မှု (အနည်းငယ်)
၁ မှ ၉	+က	+၁	ကောင်းကျိုးသက်ရောက်မှု (လျော့နည်းလာခြင်း)
၀	မျှချေ	၀	ပြောင်းလဲမှု မရှိခြင်း
-၁ မှ -၉	- က	-၁	ဆိုးကျိုးရှိခြင်း (လျော့နည်းလာခြင်း)
-၁၀ မှ -၁၈	- ခ	-၂	ဆိုးကျိုး အနည်းငယ်ရှိခြင်း
-၁၉ မှ -၃၅	- ဂ	-၃	ဆိုးကျိုးသက်ရောက်မှု (အသင့်အတင့်)
-၃၆ မှ -၇၁	- ယ	-၄	သိသာသော ဆိုးကျိုးသက်ရောက်မှု
-၇၂ မှ -၁၀၈	- c	-၅	များစွာသော ဆိုးကျိုးသက်ရောက်မှု

Source : Kuitunen et al., 2007; Pastakia & Jensen, 1998

စီမံကိန်း တည်ဆောက်စဉ်ကာလ (ကောင်းကျိုး/ဆိုးကျိုးသက်ရောက်နိုင်ချေ)



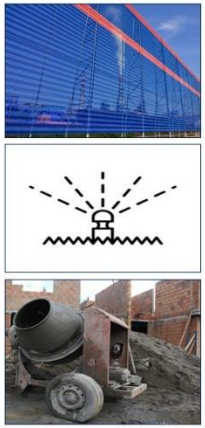
စီမံကိန်းတည်ဆောက်စဉ်ကာလ သက်ရောက်မှုအဆင့်သတ်မှတ်ခြင်း

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ		အုပ်စု (က) ပြောင်းလဲနိုင်ချေ x ပမာဏ	အုပ်စု (ခ) ကာလ+ဖြန့်လည်ထူထောင်+ စုပေါင်းသက်ရောက်ခြင်း	အရည်အသွေးရလဒ် သိသာသည့်သက်ရောက်မှု x ဖြစ်နိုင်ချေ	အမျိုးအစား/ အဆင့်သတ်မှတ်ချက်	ရှင်းလင်းဖော်ပြချက်
၁။	လေ		-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၂။	ဆူညံသံ/တုန်ခါမှု		-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၃။	ရေ		-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၄။	အတွေ့အတွေ့ စွန့်ပစ်အပို့ဂ်	ဆောက်လုပ်ရေး ဆိုင်ရာ အိမ်သုံးစွန့်ပစ် ပစ္စည်း	-၁	၆	-၆	-၁	ဆိုးကျိုး သက်ရောက်မှုလျော့နည်းလာခြင်း
၅။	အန္တရာယ်ရှိ ပစ္စည်းများ		-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၆။	မြေဆီလွှာ		-၄	၈	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၇။	လမ်းပိုင်းဆိုင်ရာ ကြွေခိုင်မှု		-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၈။	ဂေဟစနစ်		-၄	၈	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၉။	လူမှုစီးပွားရေးဆိုင်ရာ		၂	၇	၁၄	+၂	အနည်းငယ် ကောင်းကျိုးသက် ရောက်မှု

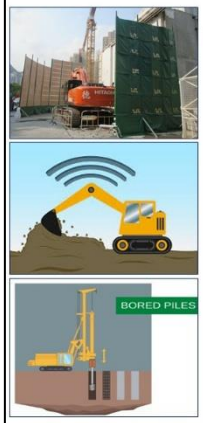
ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုကို လျှော့ချရမည့်အစီအစဉ်များ

တည်ဆောက်စဉ်ကာလ

- လေထုအရည်အသွေး တိုင်းတာချက် ရလဒ်အရ- လေအရည်အသွေးမှာ NEQEG (2015) သတ်မှတ်စံချိန်စံညွှန်းများနှင့် ကိုက်ညီမှုရှိပြီး ရေရှည်ကာလများ တွင်လည်း ၎င်းအရည်အသွေးကို ထိန်းထားနိုင်ရန်အတွက် -
  - ဘိလပ်မြေ၊ သဲစသည်တို့ကို အမိုးအကာအောက်တွင် ထားရှိကာ လုပ်ငန်းခွင် အတွင်း သိုလှောင်ထားပါမည်။
  - တည်ဆောက်နေသည့် အဆောက်အဦ ဘေးပတ်လည် တွင်လည်ကောင်း လုပ်ငန်းခွင် ဇရိယာနယ်နမိတ်စသည့် နေရာများတွင် ဖုန်နှင့် သဲပျံ့နှံ့မှုကို ကာကွယ်ပေးနိုင်သည့် ပိုက်ကွန်ကဲ့သို့သော ဇကာများတပ်ဆင်ပါမည်။
  - လုပ်ငန်းခွင်အတွင်းတွင် ရေဖြန်းသည့်စနစ်တပ်ဆင်ထားပါမည်။
  - အမှုန်နှင့် ဖုန်များထွက်ရှိနိုင်သည့် စက်ယန္တရားများအသုံးပြုရာတွင် လေကာသည့် နေရာတွင်ထားရှိကာ အသုံးပြုပါမည်။
  - $PM_{2.5}$ နှင့် PM_{10} ထွက်ရှိမှု လျှော့နည်းစေရန် ကားအိတ်ဇောပိုက်များကို မကြာခဏ သန့်ရှင်းရေး ပြုလုပ်ပါမည်။

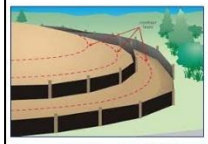


တည်ဆောက်စဉ်ကာလ

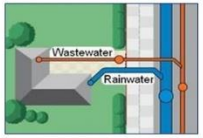


- လက်ရှိကာလတွင် တည်ဆောက်ရေးလုပ်ငန်းများ လုပ်ဆောင်နေခြင်း မရှိသေး သော်လည်း ဆူညံသံနှင့် တုန်ခါမှုထွက်ရှိနိုင်ခြင်းအတွက် အောက်ပါလျှော့ပါးရေး အစီအစဉ်များကို လုပ်ဆောင်ပါမည်။
  - စက်ယန္တရားများကို အသုံးပြုရာတွင် အသံထွက်ရှိမှုကို လျှော့ချပေးနိုင်သည့် အကာကွယ်များကို ကာရံ၍ စက်လည်ပတ်ခြင်းကို လုပ်ဆောင်ပါမည်။
  - ဆူညံသံထွက်ရှိသည့် ယန္တရားများကို နေ့အချိန်တွင်သာ အသုံးပြုပါမည်။
  - လွန်ဖြင့်တူး၍ တိုင်စိုက်ခြင်း (piling) ပြုလုပ်ရာတွင် drill piling စက်အမျိုး အစားကိုသာ အသုံးပြုခြင်းဖြင့် ဆူညံသံနှင့် တုန်ခါမှုကို လျှော့ပါးစေနိုင် သောကြောင့် ၎င်းကိုအသုံးပြုပါမည်။
  - စက်ယန္တရားများကို အသုံးပြုရာတွင် လေကာသည့် နေရာတွင်ထားရှိခြင်းဖြင့် ပတ်ဝန်းကျင်သို့ ဆူညံသံရောက်ရှိမှုကို လျှော့နည်းစေ နိုင်ပါသည်။
  - မီးစက်အသုံးပြုရာတွင် ဆူညံသံထိန်းသည့် အကာအကွယ်များနှင့် တုန်ခါမှု ထွက်ရှိခြင်းကို လျှော့ချပေးနိုင်သည့် ကိရိယာများ တပ်ဆင်၍ အသုံးပြု ပါမည်။
  - တုန်ခါမှုကို ထိန်းပေးသော ကိရိယာ (damper) ကို စက်ယန္တရားများတွင် တပ်ဆင်၍ အသုံးပြုပါမည်။

တည်ဆောက်စဉ်ကာလ



- လုပ်ငန်းလည်ပတ်ရာမှ စွန့်ပစ်ရေ ထွက်ရှိနိုင်ခြင်းအတွက် အောက်ပါလျော့ပါးရေး အစီအစဉ်များကို လုပ်ဆောင်ပါမည်။
  - မြေဆီလွှာတိုက်စားခြင်းနှင့် သဲမှုန်၊ စိုင်းကြွအနည်များ စီးဆင်းခြင်းကို ကာကွယ်ရန် သဲမှုန်များကို စစ်ပေးနိုင်သည့် အကာများကို ခြံစည်းရိုး သက္ကာန် ကာရံထားပါမည်။
  - လုပ်ငန်းခွင်မှ ထွက်ရှိလာသည့် စွန့်ပစ်ရေများကို စည်ပင်ရေမြောင်းသို့ မစွန့်ခင် အနည်စစ်ကန်စသည်တွင် အနည်ထိုင်စေကာ အပေါ်ယံရှိ ရေကြည်ကို သာ စွန့်ထုတ်ပါမည်။
  - လောင်စာသိုလှောင်ရာတွင် ပြင်းထန်သည့် ရာသီဥတုဒဏ်ကို ခံနိုင်သည့် ပစ္စည်းများနှင့် ပြုလုပ်ထားသည့် လောင်စာသိုလှောင်ကန်ကိုသာ အသုံးပြုပါမည်။
  - လုပ်ငန်းခွင်မှ ထွက်ရှိသည့် စွန့်ပစ်ရေနှင့် မြေပေါ်စီးဆင်းရေတို့ကို သီးခြားရေနွတ်မြောင်း ထားရှိကာ စီးဆင်းစေပါမည်။
  - အန္တရာယ်ရှိ စွန့်ပစ်အစိုင်အခဲနှင့် အထွေထွေ စွန့်ပစ်အမှိုက်များ ရေထုအတွင်း သို့ စိမ့်ဝင်စီးဆင်းခြင်းမရှိစေရန် မြို့တော်စည်ပင်နှင့် ချိတ်ဆက်၍ ၎င်းတို့ကို စွန့်ပစ်ပါမည်။



တည်ဆောက်ရေးကာလ

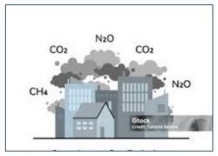
- လုပ်ငန်းလည်ပတ်ရာမှ စွန့်ပစ်အစိုင်အခဲများ ထွက်ရှိနိုင်ခြင်းအတွက် အောက်ပါလျော့ပါးရေး အစီအစဉ်များကို လုပ်ဆောင်ပါမည်။
  - ဆောက်လုပ်ရေးဆိုင်ရာ အထွေထွေစွန့်ပစ်အမှိုက်များကို သတ်မှတ်ထားသည့် နေရာတွင်သာ စုပုံပါမည်။
  - ထိုသို့ စုပုံရာတွင် ပြန်လည်အသုံးပြု၍ရသော (သို့) အသုံးပြု၍ မရသော ပစ္စည်း ဟူ၍လည်း ခွဲခြားစွန့်ပစ်ပါမည်။
  - အန္တရာယ်ရှိ ပစ္စည်းများ ပါဝင်သည့် အနည်အနှစ် (ဘိလပ်မြေစသည်) ဓာတ်ကူပစ္စည်းများဖြင့် ပြုပြင်ပြီးမှသာ လမ်း (သို့) မြေဖို့ရာတွင် အသုံးပြုပါမည်။
  - သို့မဟုတ်လျှင် မြို့တော်စည်ပင်၏ လမ်းညွှန်ချက်အတိုင်း စွန့်ပစ်ပါမည်။
  - အန္တရာယ်ရှိ ပစ္စည်းများကို စွန့်ပစ်ရာတွင် သီးသန့်နေရာတွင် ယာယီထားရှိပြီးနောက် မြို့တော်စည်ပင်၏ လမ်းညွှန်ချက်အတိုင်း စွန့်ပစ်ပါမည်။
  - ဝန်ထမ်းများမှ ထွက်ရှိသည့် စွန့်ပစ်ပစ္စည်းများကို အမျိုးအစားခွဲခြားကာ လုပ်ငန်းခွင်အတွင်း ယာယီစွန့်ပစ်စေပြီးနောက် မြို့တော်စည်ပင်နှင့်သာ ချိတ်ဆက် ၍ စွန့်ပစ်မည် ဖြစ်ပါသည်။

တည်ဆောက်စဉ်ကာလ

- မြေတူးရာတွင် လိုအပ်သည့် မြေစရိယာကိုသာ ပိုင်းခြားသတ်မှတ်၍ တူးဖော်ရေး လုပ်ငန်းများကို လုပ်ဆောင်ပါမည်။
- လမ်းမကြီးဘေးပလက်ဖောင်းများ၊ လူသွားလမ်းများနှင့် ပင်မလျှပ်စစ်/ရေ/ပိုက်လိုင်းမြောင်းများစသည်တို့ ပျက်စီးခြင်းမှ ကာကွယ်ရန် ၎င်းတို့မှ ၅ ပေ အကွာမှသာ ဆောင်ရွက်ပါမည်။
- မြေဆီလွှာတိုက်စားမှု မရှိစေရန် ယာယီရေမြောင်းများ ထားရှိရပါမည်။
- မြေဆီလွှာကို အလွှာလိုက် စနစ်တကျတူးဖော်၍ စုဆောင်းထား ရှိပြီး စီမံကိန်းတွင် ပန်းခြံကဲ့သို့ အပန်းဖြေရိယာ ပါဝင်သည့်အတွက် ထိုနေရာတွင် တူးဖော်ထားသည့် မြေများကို ပြန်လည် အသုံးပြုပါမည်။
- မြေဆီလွှာတွင် ဆီ၊ အဆီနှင့် ဓာတုပစ္စည်းများ ယိုဖိတ်/ စိမ့်ခြင်းဆိုင်ရာ လျော့ပါးရေး နည်းလမ်းများကို **လုပ်ငန်းပိတ်သိမ်းစဉ်ကာလ**တွင် ဆက်လက်ဖော်ပြပါမည်။
- ပစ္စည်းတင်/ချ ယာဉ်များသည် တရားဝင်သတ်မှတ်ထားသည့် ဝန်အားအတွင်းသာ ပစ္စည်းများကို တင်ဆောင်ပါမည်။
- ပစ္စည်းတင်/ချ ယာဉ်များကို တတ်နိုင်သမျှ ယာဉ်သွားလာမှု နည်းပါးသည့် နေ့လည်ခင်းအချိန်တွင် သွားလာခြင်း ပြုလုပ်ပါ မည်။
- လုပ်ငန်းခွင်အတွင် ဝင်ပေါက်/ထွက်ပေါက်များ၊ လူသွားလမ်း စသည်ကို ခွဲခြားထားပါမည်။

စီမံကိန်း လည်ပတ်စဉ်ကာလ (ကောင်းကျိုး/ဆိုးကျိုးသက်ရောက်နိုင်ချေ)

လေထုဆိုင်ရာ



ဆူညံသံနှင့် တုန်ခါမှု

ရေထုဆိုင်ရာ

စွန့်ပစ်ပစ္စည်း

မြေဆီလွှာ

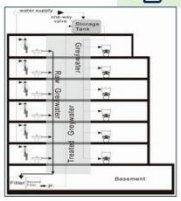
စီမံကိန်းလည်ပတ်စဉ်ကာလ သက်ရောက်မှုအဆင့်သတ်မှတ်ခြင်း

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	အုပ်စု (က)	အုပ်စု (ခ)	အရည်အသွေးရလဒ်	အမျိုးအစား/ အဆင့်သတ်မှတ်ချက်	ရှင်းလင်းဖော်ပြချက်
		ပြောင်းလဲနိုင်ချေ x ပမာဏ	ကာလ+ပြန်လည်ထူထောင်+ စုပေါင်းသက်ရောက်ခြင်း	သိသာသည့်သက်ရောက်မှု x ဖြစ်နိုင်ချေ		
၁။	လေ	-၆	၈	-၄၈	-၄	ထင်ရှားသည့် ဆိုးကျိုးသက်ရောက်မှု
၂။	ဆူညံသံ/တုန်ခါမှု	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၃။	ရေ	-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၄။	အထွေထွေ စွန့်ပစ်အမှိုက်	-၂	၆	-၁၂	-၂	ဆိုးကျိုးသက်ရောက်မှု အနည်းငယ်ရှိခြင်း
၅။	အန္တရာယ်ရှိ ပစ္စည်းများ	-၁	၇	-၇	-၁	ဆိုးကျိုး သက်ရောက်မှုလျော့နည်းလာခြင်း
၆။	မြေဆီလွှာ ကျွန်းမာရေး	+၂	၈	+၁၆	+၂	ကောင်းကျိုးသက်ရောက်မှု အနည်းငယ်ရှိခြင်း
၇။	ဂေဟာစနစ်	+၁	၈	+၈	+၁	ကောင်းကျိုးသက်ရောက်မှု လျော့နည်းလာခြင်း
၈။	လူမှု-စီးပွား	+၄	၈	၃၂	+၃	အလယ်အလတ် ကောင်းကျိုးသက်ရောက်မှု ရှိခြင်း

လည်ပတ်စဉ်ကာလ

- CO_2 ထွက်ရှိမှုကို တစိတ်တပိုင်း လျှော့ချရန် အဆောက်အဦတွင် အပင်များကို ထည့်သွင်းစိုက်ပျိုးပါမည်။
- စွမ်းအင်အသုံးပြုခြင်းမှလည်း CO_2 ထွက်ရှိနိုင်သည့်အတွက် နေရောင်ခြည်စွမ်းအင်ကို အစားထိုးအသုံးပြုနိုင်စေရန် အဆောက်အဦတွင် စီစဉ်ထားရှိပါမည်။
- ထိုသို့စီမံထားသည့်အတွက် မီးစက်အသုံးပြုမှုကိုလျှော့ချနိုင်သည့်အတွက် လေထုညစ်ညမ်းနိုင်ချေကိုလည်း လျော့ပါးစေနိုင်ပါသည်။
- စီမံကိန်းအတွင်းတွင် အပင်စိုက်ပျိုးမည့် ဧရိယာပါဝင်သည့်အတွက် ၎င်းမှလည်း CO_2 ထွက်ရှိမှု လျှော့ချနိုင်မည် ဖြစ်ပါသည်။
- အဆောက်အဦ တည်ဆောက်စဉ်တည်းက လူနေအခန်းများ စသည်တို့တွင် ဆူညံသံကို တားဆီးပေးနိုင်သည့် ပစ္စည်းများဖြင့် ဖွဲ့စည်းတည်ဆောက်ထားပါမည်။
- မီးစက် ထားရှိရာတွင်လည်း အသံလုံသည့် အမိုးအကာများဖြင့် ဖုံးအုပ်၍ အသုံးပြုပါမည်။
- အသေးစား အခန်းတွင်းပြုပြင်ခြင်းများ ပြုလုပ်ရာတွင် အိမ်ယာဝန်းစည်ပင်သာယာရေး ကဲ့သို့သော သက်ဆိုင်ရာ အဖွဲ့အစည်းကို အကြောင်းကြားဖြီးမှသာ ခွင့်ပြုချက်ဖြင့် ပြုလုပ်ရမည် ဖြစ်ကြောင်းကို ကနဦးကတည်းက စည်းမျဉ်းစည်းကမ်းများ ထုတ်ပြန်ထားမည် ဖြစ်ပါသည်။

လည်ပတ်စဉ်ကာလ



- စီမံကိန်း ဧရိယာအတွင်း ရေနူတ်မြောင်းများကို စနစ်တကျ တည်ဆောက်ထားပါမည်။
- ထိုသို့ တည်ဆောက်ရာတွင် ရေကောင်းမွန်စွာ စီးဆင်းနိုင်သည့် နေရာနှင့် ရေတိုက်စားမှုဒဏ်စသဖြင့် အကြွမ်းခံနိုင်သည့် အရေအသွေးမြင့် ပစ္စည်းများဖြင့်သာ တည်ဆောက်ပါမည်။
- မြေပေါ်ရေများကို ရေနူတ်မြောင်းများမှတဆင့် စည်ပင်ရေနူတ်မြောင်းသို့ တိုက်ရိုက် စီးဆင်းစေပါမည်။
- စွန့်ပစ်ရေနှင့် မိလ္လာရေဆိုးများကို သီးခြား ရေသန့်စင်စနစ် ထားရှိ ကာ သန့်စင်ပြီး စွန့်ပစ်ရေများကို ပြန်လည် အသုံးပြုစေခြင်းဖြင့် ရေအရင်းအမြစ် ဆုံးရှုံးခြင်းကို လျှော့ပါသက်သာစေနိုင်မည် ဖြစ်ပါသည်။
- အသိပညာပေးဆောင်ပုဒ်များကို လူအသွားအလာများသည့် ဓာတ်လှေ ကားနှင့် လျှောက်လမ်းများတွင် သတိပြုမိစေရန် ကပ်ထားပါမည်။
- အိမ်ယာဝန်းအတွင်း အရောင်ခွဲခြားထားသော အမှိုက်ပုံးများကို အိမ်ယာဝန်းအနှံ့တွင် ထားရှိပေးပါမည်။
- အန္တရာယ်ရှိ စွန့်ပစ်အမှိုက်များကို စွန့်ပစ်ရန်အတွက် သီးခြားနေရာ ထားရှိပေးပါမည်။
- အထွေထွေအမှိုက်များနှင့် အန္တရာယ်ရှိ အစိုင်အခဲများကို ယာယီသာ သက်ဆိုင်ရာနေရာများတွင် ထားရှိရမှာဖြစ်ပြီး မြို့တော်စည်ပင်နှင့် သာ ချိတ်ဆက်၍ စွန့်ပစ်ပါမည်။

စီမံကိန်း ပိတ်သိမ်းစဉ်ကာလ (ကောင်းကျိုး/ဆိုးကျိုးသက်ရောက်နိုင်ချေ)

လေထုဆိုင်ရာ

ရေထုဆိုင်ရာ

ဆူညံသံနှင့် တုန်ခါမှု

စွန့်ပစ်ပစ္စည်း

မြေဆီလွှာနှင့် ပြန်လည်ထူထောင်ရေး

စီမံကိန်းပိတ်သိမ်းစဉ်ကာလ သက်ရောက်မှုအဆင့်သတ်မှတ်ခြင်း

စဉ်	ဖြစ်ပေါ်နိုင်သော သက်ရောက်မှုများ	အုပ်စု (က)	အုပ်စု (ခ)	အရည်အသွေးရလဒ်	အမျိုးအစား/ အဆင့်သတ်မှတ်ချက်	ရှင်းလင်းဖော်ပြချက်
		ပြောင်းလဲနိုင်ချေ x ပမာဏ	ကာလ+ပြန်လည်ထူထောင်+ စုပေါင်းသက်ရောက်ခြင်း	သိသာသည့်သက်ရောက်မှု x ဖြစ်နိုင်ချေ		
၁။	လေ	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၂။	ဆူညံသံ/တုန်ခါမှု	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၃။	ရေ	-၄	၈	-၃၂	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၄။	အထွေထွေ စွန့်ပစ်အမှိုက်	-၂	၆	-၁၂	-၂	ဆိုးကျိုး သက်ရောက်မှု အနည်းငယ်ရှိခြင်း
၅။	အန္တရာယ်ရှိ ပစ္စည်းများ	-၁	၇	-၇	-၁	ဆိုးကျိုး သက်ရောက်မှုလျော့နည်းလာခြင်း
၆။	မြေဆီလွှာ	-၄	၈	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု
၇။	ပြန်လည်ထူထောင်ခြင်း	+၆	၈	၄၈	+၄	ထင်ရှားသည့် ကောင်းကျိုးသက်ရောက်မှု

ပိတ်သိမ်းစဉ်ကာလ

- အဆောက်အဦ ဖြိုဖျက်ချိန်သည် ဖုန်နှင့် အမှုန် အများဆုံး ထွက်ရှိသည့် ကာလဖြစ်သည့်အတွက် ရေဖြန်းပေးပါမည်။
- ရေဖြန်းရာတွင် ရေနှင့် ဖုန်ထွက်ရှိမှု ပမာဏတို့သည် မျှတမှုရှိစေရန် ပြုလုပ်မည် ဖြစ်ပါသည်။
- ဖြိုဖျက်ရေး ပစ္စည်းများနှင့် ကြိုးပဲ့စာများ သယ်ဆောင်သည့် ယာဉ်များကို လုံခြုံစွာ ဖုံးအုပ်၍သာ သွားလာမည် ဖြစ်ပါသည်။
- တည်ဆောက်စဉ် ကာလကဲ့သို့ ဆူညံသံနှင့် တုန်ခါမှု ထွက်ရှိနိုင်သည့် အတွက် ၎င်းကာလတွင် ပြုလုပ်သော လျော့ပါးရေး နည်းလမ်းများ နည်းတူပြုလုပ်ပါမည်။

ပိတ်သိမ်းစဉ်ကာလ

- တည်ဆောက်စဉ် ကာလနည်းတူ သဲနှင့် အမှုန်များကို စစ်ပေးနိုင်သည့် ဇကာများ တပ်ဆင်ထားပြီးနောက် သီးသန့် ယာယီရေနွှတ်မြောင်းကို ပြုလုပ်ထားပါမည်။
- ထိုရေနွှတ်မြောင်း ထဲရှိရေ၏ pH levelကို စစ်ဆေးပြီး ပုံမှန် pH level (၆.-၇.၅) ရှိမှသာ စည်ပင်ရေနွှတ်မြောင်းသို့ စွန့်ထုတ်ပါမည်။
- (သို့) ယာယီအနည်စစ်ကန် တည်ဆောက်၍ pH Regulator ခတ်ပြီး ရေအရည်အသွေးကောင်းမွန်မှသာ စွန့်ထုတ်ပါမည်။
- မိလ္လာကန်များ ဖြိုဖျက်ရာတွင်လည်း ရေဆိုးနှင့် စွန့်ပစ်ရေများ ရောနှောစီးဆင်းခြင်း မရှိစေရန် စနစ်တကျ ပြုလုပ်ပါမည်။
- အုတ်/ဘိလပ်မြေ ကြိုးပဲ့စာများကို ပြန်လည်ရောင်းချခြင်း သို့လမ်းခင်းရာတွင် ပြန်လည်၍ အသုံးပြုပါမည်။
- ထို့အပြင် အခြားပြန်လည် အသုံးပြုရသော ပစ္စည်းများ (စတီး၊ ပိုက်၊ မှန်နှင့် သစ်သား) တို့ကို ရောင်းချပါမည်။
- အန္တရာယ်ရှိ စွန့်ပစ်အမှိုက်များကို စွန့်ပစ်ရန်အတွက် သီးခြားနေရာ ထားရှိပေးပါမည်။
- ကျန်ရှိသည့် အထွေထွေအမှိုက်များနှင့် အန္တရာယ်ရှိ အစိုင်အခဲများကို ယာယီသာ သက်ဆိုင်ရာနေရာများတွင် ထားရှိရမှာဖြစ်ပြီး မြို့တော်စည်ပင်နှင့် သာ ချိတ်ဆက်၍ စွန့်ပစ်ပါမည်။

ပိတ်သိမ်းစဉ်ကာလ

- ဆီနှင့် ဓာတုပစ္စည်းများ ယိုဖိတ်ခဲ့လျှင် အဆီကို စုပ်ယူပေးနိုင်သည့်အပြင် ၎င်းတို့စီးဆင်းခြင်းကို ထိန်းချုပ်ပေးနိုင်သည့် အတားအဆီးများကို ဦးစွာ အသုံးပြုပါမည်။
- ဆီနှင့် ဓာတုပစ္စည်းများ မြေဆီလွှာပေါ်တွင် ယိုဖိတ်ခဲ့လျှင် အင်ဇိုင်းကို အခြေခံ၍ ထုတ်လုပ်ထားသည့် ၎င်းတို့ကိုသန့်စင်ပေးနိုင်သည့် ဆေးရည်ကို အသုံးပြုပါမည်။
- အဆီစုပ်ပေးနိုင်သည့် အမှုန်ကိုလည်း မြေဆီလွှာပေါ်တွင် သာမက သမံတလင်းပေါ်တွင်လည်းကောင်း ယိုဖိတ်မှုပမာဏများလျှင် အဆီကိုစုပ်ယူပေးနိုင်သည့် အခင်းစသဖြင့် အသုံးပြုမည် ဖြစ်ပါသည်။
- လုပ်ငန်းများ ပြီးဆုံးသည့်နောက်တွင် မြေအရည်အသွေးကို လိုအပ်သည့် အာဟာရများနှင့် အဏုဇီဝပိုးမွှားများကို အသုံးပြု၍ မြေဆီလွှာကို ပြုပြင်ပါမည်။
- အုတ်နှင့် ဘိလပ်မြေ ကြိုးပဲ့စာများစသဖြင့် ပြန်၍အသုံးပြုနိုင်သည့် ပစ္စည်းများကို ပြန်လည်အသုံးပြုခြင်းနှင့် ရောင်းချပါမည်။
- ထိုမြေနေရာတွင် တည်ဆောက်ရေးလုပ်ငန်းများ ထပ်မံ၍ ပြုလုပ်ခြင်း မရှိခဲ့လျှင် အပင်များပြန်လည်စိုက်ပျိုးဖြင့် မြေဆီလွှာအရည်အသွေးကိုသာမက ဇီဝမျိုးစိတ်မျိုးကွဲများကိုပါ ပြန်လည် ထိန်းသိမ်းမည် ဖြစ်ပါသည်။

ဘေးအန္တရာယ်ဆန်းစစ်ခြင်း

လုပ်ငန်းလည်ပတ်ရာမှ ဖြစ်ပေါ်နိုင်သော ဘေးအန္တရာယ်	လေညစ်ညမ်းခြင်း၊ ရေညစ်ညမ်းခြင်း၊ စွန့်ပစ်အစိုင်အခဲ
သဘာဝဘေးအန္တရာယ်	ရေကြီးခြင်း၊ မုန်တိုင်းဖြစ်ပေါ်ခြင်း၊ ငလျင်
သဘာဝကြောင့် မဟုတ်သော ဘေးအန္တရာယ်	ရုပ်ပိုင်းဆိုင်ရာ ဘေးအန္တရာယ်၊ လျှပ်စစ်နှင့်ဆိုင်သော ဘေးအန္တရာယ်၊ မီးဘေးအန္တရာယ်

ပြင်းထန်မှု	အဓိပ္ပါယ်ဖွင့်ဆိုချက်	ကိန်းဂဏန်း
ကပ်ဘေး	❖ ဂေဟာဒိုယာများ ပျက်စီးနေနိုင်ခြင်း ❖ သေဆုံးမှုအများအပြား ဖြစ်နိုင်ခြင်း	၈
အန္တရာယ်ရှိသော	❖ ပြင်းထန်သော ဒဏ်ရာရစိမ့် ❖ အဓိက ဂေဟာဒိုယာများ ပျက်စီးခြင်း	၅
အဓိကဖြစ်သော	❖ ပြင်းထန်သော အမြေအနေဖြစ်ပွားခြင်း ❖ လူအများကို ထိခိုက်ဒဏ်ရာ ဖြစ်စေနိုင်ခြင်း	၈
အသေးအဖွဲ	❖ စိတ်အနေကာအယုဒ်ဖြစ်ခြင်း ❖ လည်ပတ်မှုကန့်သတ်ချက်များ ❖ အရေးပေါ်လုပ်ငန်းစဉ်များ အသုံးပြုခြင်း ❖ အသေးအဖွဲ အမြေအနေဖြစ်ပွားခြင်း	၁
မပြောပလောက်သော	❖ အကျိုးဆက်နည်းခြင်း	၀

ဖြစ်နိုင်ခြေ	အဓိပ္ပါယ်ဖွင့်ဆိုချက်	ကိန်းဂဏန်း
မကြာခဏ	❖ ဘေးအန္တရာယ် ဖြစ်နိုင်ခြေ အလွန်များပါသည်။	၅
ရံဖန်ရံခါ	❖ ဘေးအန္တရာယ် တစ်ခါတစ်ရံသာ ဖြစ်နိုင်ပါသည်။	၄
ခဲယဉ်းသော	❖ ဘေးအန္တရာယ် ဖြစ်နိုင်ခြေမရှိသော်လည်း ချွင်းချက်အခြေအနေများတွင် ဖြစ်နိုင်ပါသည်။	၃
ဖြစ်နိုင်ခြေမရှိသော	❖ ဘေးအန္တရာယ်မှာ အလွန် ဖြစ်နိုင်ခြေမရှိပါ။	၂
အလွန် ဖြစ်နိုင်ခြေမရှိသော	❖ ဘေးအန္တရာယ် ဖြစ်နိုင်ခြေမှာ စိတ်ကူးယဉ်ပင် မရနိုင်အောင် နည်းပါးပါသည်။	၁

ဘေးအန္တရာယ်ဆန်းစစ်ခြင်း

ဘေးအန္တရာယ် ဖြစ်နိုင်ခြေ	ဘေးအန္တရာယ် ပြင်းထန်မှု				
	ကပ်ဘေး-(က)	အန္တရာယ်ရှိသော-(ခ)	အဓိကဖြစ်သော-(ဂ)	အသေးအဖွဲ-(ဃ)	မပြောပလောက်သော-(c)
မကြာခဏ-၅	၅ (က) (ခံနိုင်ရည်မရှိသော)	၅ (ခ) (ခံနိုင်ရည်မရှိသော)	၅ (ဂ) (ခံနိုင်ရည်မရှိသော)	၅ (ဃ) (ခံနိုင်ရည်ရှိသော)	၅ (c) (ခံနိုင်ရည်ရှိသော)
ရံဖန်ရံခါ-၄	၄ (က) (ခံနိုင်ရည်မရှိသော)	၄ (ခ) (ခံနိုင်ရည်မရှိသော)	၄ (ဂ) (ခံနိုင်ရည်ရှိသော)	၄ (ဃ) (ခံနိုင်ရည်ရှိသော)	၄ (c) (ခံနိုင်ရည်ရှိသော)
ခဲယဉ်းသော-၃	၃ (က) (ခံနိုင်ရည်မရှိသော)	၃ (ခ) (ခံနိုင်ရည်ရှိသော)	၃ (ဂ) (ခံနိုင်ရည် ရှိသော)	၃ (ဃ) (ခံနိုင်ရည်ရှိသော)	၃ (c) (လက်ခံနိုင်သော)
ဖြစ်နိုင်ခြေမရှိသော-၂	၂ (က) (ခံနိုင်ရည် ရှိသော)	၂ (ခ) (ခံနိုင်ရည်ရှိသော)	၂ (ဂ) (ခံနိုင်ရည် ရှိသော)	၂ (ဃ) (လက်ခံနိုင်သော)	၂ (c) (လက်ခံနိုင်သော)
အလွန်ဖြစ်နိုင်ခြေမရှိသော-၁	၁ (က) (ခံနိုင်ရည် ရှိသော)	၁ (ခ) (လက်ခံနိုင်သော)	၁ (ဂ) (လက်ခံနိုင်သော)	၁ (ဃ) (လက်ခံနိုင်သော)	၁ (c) (လက်ခံနိုင်သော)

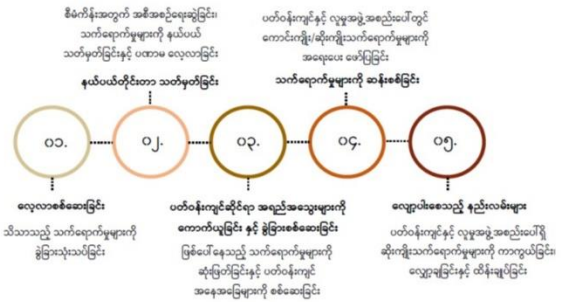
သဘာဝဘေးအန္တရာယ်နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ထိန်းချုပ်/လျှော့ချရေးအစီအစဉ်များ အကျဉ်းချုပ်

သဘာဝဘေးများ	ထိန်းချုပ်ခြင်း/လျှော့ချခြင်း မလုပ်ဆောင်မီ ဖြစ်ပေါ်နိုင်မှုဆန်းစစ်ခြင်း	မလုပ်ဆောင်မီ ရလဒ်	ထိန်းချုပ်ခြင်း/ လျှော့ချခြင်းနည်းလမ်းများ	လုပ်ဆောင်ပြီး ရလဒ်
ရေကြီးခြင်းနှင့် မုန်တိုင်း ဘေးအန္တရာယ်	❖ မြန်မာသဘာဝအုပ်ချုပ်အလက် စီမံခန့်ခွဲမှု ယန္တစ်မ ကိုးကားထားသော အမျက်အလက်များကို အခြေခံ၍ ဆန်းစစ်ထားပါသည်။ ❖ စီမံကိန်းတည်နေရာသည် ဗဟိုနန်းမြို့နယ်တွင် တည်ရှိပြီး မုန်တိုင်းဖြစ်နိုင်ခြေ နည်းသော ဧရာဝေသေတွင် တည်ရှိပါသည်။	၃ (ဂ) (ခံနိုင်ရည် မရှိသော)	❖ သဘာဝဘေးအန္တရာယ်ကြိုတင်သတိပေးချက်များကို အစိုးရမှတ္တမ်းယက် စာမျက်နှာများ၊ ရေဒီယိုနှင့် ရုပ်မြင်သံကြားမှ သတင်းများကို စောင့်ကြည့်ခြင်းဖြင့် ကြိုတင်ပြင်ဆင်နိုင်ခြင်း။ ❖ အရေးပေါ်တုံ့ပြန်ရေးနှင့် ဘေးကင်းရေးအတွက် အရပ်ဝန်းမများ၏ အသိပညာ ပေးသွားခြင်းနှင့် အသင်းပြင် ဆင်ရေး အတွက် သင်တန်းနှင့် အသိပညာပေး အစီအစဉ်များ ထောက်ပံ့ပေးမည်ဖြစ်သည်။ ❖ မုန်တိုင်း၊ ရေကြီးခြင်းနှင့် ငလျင် အရေးသော သဘာဝ ဘေးအန္တရာယ်များအတွက် အရေးပေါ်တုံ့ပြန်ရေးအစီအစဉ်များကို ရေးဆွဲ၍ အကောင်အထည်ဖော်ကာ ဆောင်ရွက်ပြီး အရေးပေါ်ဆက်သွယ်ရန် စာရင်းကို စီမံကိန်း လုပ်ငန်းခွင်တွင် ထားရှိမည်ဖြစ်သည်။	၃ (ဂ) (ခံနိုင်ရည်ရှိ သော)
ငလျင် ဘေးအန္တရာယ်	❖ မြန်မာနိုင်ငံ၏ ငလျင်ဇုန်များပြ ဖြေပုံအရ စီမံကိန်းတည်ရှိရာ ရန်ကုန်တိုင်းသည် ငလျင်နှုန်း (၇) ဒုနှစ်အနက် ခုနှစ် (၃) ဖျက်စီးမှုများခုနှစ်တွင်းတည်ရှိသည်ကို တွေ့ရှိရပါသည်။	၇ (ဃ) (ခံနိုင်ရည်မရှိ သော)		၃ (c) (လက်ခံနိုင်ရှိ သော)
ရေရည် ရာသီဥတု ပြောင်းလဲခြင်း	❖ လေထုညစ်ညမ်းခြင်းသည် ရာသီဥတုများပြောင်းလဲ၏ အဓိကအကြောင်းအရင်း ဖြစ်ပြီး ရေရည်ရာသီဥတုပြောင်းလဲမှုကို ဖြစ်ပေါ်စေပါသည်။ ❖ လူတို့၏ လုပ်ဆောင်ချက်များဖြစ်သော- ကျောက်ဖြစ်ရေပ်ကြွေး လောင်စာများ သုံးခွဲခြင်း၊ မော်တာယာဉ်များ၊ သစ်တောများ ပြန်လည်တိုးခြင်း စသည်တို့သည် ကမ္ဘာအပူစွန်ဓာတ်များလောပြီး ကမ္ဘာကြီးပူ ဆေးသည် ဖြစ်စဉ်ကို ဖြစ်ပေါ်စေပြီး ရေရည်ရာသီဥတုပြောင်းလဲခြင်းကို ဖြစ်ပေါ်စေနိုင်ပါသည်။	၃ (ဂ) (ခံနိုင်ရည်မရှိ သော)	❖ ဒီဇယ်လောင်စာသုံး ယာဉ်များအစား လျှပ်စစ်ဖြင့် အသုံးပြုနိုင်သည့် ယာဉ်များဖြင့် အစားထိုးအသုံးပြုခြင်း။ ❖ (သို့) အဖွဲ့အစည်းများအနေဖြင့် ယာဉ်အသုံးပြုရာရေး သတိမှတ်၍ အများပြည်သူသုံး သယံဇာတပို့ဆောင်ရေးယာဉ်များကို အသုံးပြုခြင်း။ ❖ ကျောက်ဖြစ်ရုပ်ကြွေး လောင်စာများ သုံးခွဲခြင်းကို လျှော့ချခြင်းနှင့် သစ်တောခုတ်ထွင်မှုကို တားဖြစ်ခြင်း။ ❖ အသိပညာပေးအစီအစဉ်များကျင်းပခြင်း။ ❖ သစ်ပင်များ စိုက်ပျိုးခြင်း။	၃ (ဂ) (ခံနိုင်ရှိ သော)

လုပ်ငန်းခွင်ဆိုင်ရာ ဘေးအန္တရာယ်ဆန်းစစ်ခြင်းနှင့် ထိန်းချုပ်/လျှော့ချရေးအစီအစဉ်များ အကျဉ်းချုပ်

လုပ်ငန်းတည်ဆောက်ခင် နှင့် ပြီးတိုင်းမိမိ၏ ကာလ	ထိန်းချုပ်ခြင်း/လျှော့ချခြင်း မလုပ်ဆောင်မီ ဖြစ်ပေါ်နိုင်မှုဆန်းစစ်ခြင်း	မလုပ်ဆောင်မီ ရလဒ်	ထိန်းချုပ်ခြင်း/ လျှော့ချခြင်းနည်းလမ်းများ	လုပ်ဆောင်ပြီး ရလဒ်
ဓာတုဆိုင်ရာ ဘေးအန္တရာယ်	➢ အန္တရာယ်ဖြစ်စေသော အမှုန်များ ($PM_{2.5}$/ PM_{10})၊ ဓာတ်သတ္တုများ mercury (Hg), lead (Pb) စသဖြင့် ထွက်ရှိခြင်း ➢ ဆီယိုစိမ်းခြင်း-	၃ (ဂ) (ခံနိုင်ရည် မရှိသော)	✓ အန္တရာယ်ရှိပုံစံများအား နွန့်ပစ်မည်ဆိုလျှင် ဖြို့နယ်ရည်ပင်သာယာရေး ကော်မတီမှ ချမှတ်ထားသော စည်းမျဉ်းစည်းကမ်းများအတိုင်း လိုက်နာ ဆောင်ရွက်ခြင်း။	၃ (ဂ) (ခံနိုင်ရှိ သော)
ရပ်ပိုင်းဆိုင်ရာ ဘေးအန္တရာယ်	✓ ခိုင်နဲ့သည့် လှေကားစသည့် ဘေး အန္တရာယ်ကင်းရေး ပစ္စည်းများ အသုံးပြုစေခြင်း။ ✓ PPE ဝတ်ဆင်စေခြင်း။ ✓ အလှည့်ကျ တာဝန်သမ်းဆောင် စေခြင်း။ ✓ သတိပေး ဆိုင်းဘုတ်များ ထားရှိ ပေးခြင်း။	၃ (ဂ) (ခံနိုင်ရည် မရှိသော)		၂ (ခ) (ခံနိုင်ရည်ရှိ သော)
ဇီဝဆိုင်ရာဘေး အန္တရာယ်	➢ ဆေးဘက်ဆိုင်ရာ ပစ္စည်းများနှင့် ဇရေကင်းစင်ကျန်းမာ ကို ဂရုစိုက်ကာ မစွန့်ပစ်ခြင်း	၃ (ခ) (ခံနိုင်ရည် ရှိသော)		၂ (ဃ) (လက်ခံနိုင်သော)

ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း အဆင့်ဆင့်



ဆက်စပ်သက်ရောက်မှု ဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်

လေ့လာဆန်းစစ်ခြင်း (Screening)

- လေ့လာဆန်းစစ်ခြင်းကို မြို့နယ်ဒေသဆိုင်ရာ၊ သန်းခေါင်စာရင်းဆိုင်ရာနှင့် လူမှု စစ်တမ်းကောက် ယူခြင်းမှ ရရှိလာသည့် သတင်းအချက်အလက်များကို အခြေခံ၍ တွက်ချက်ထားပါသည်။
- စီမံကိန်းသည် ဗဟန်းမြို့နယ်တွင် တည်ရှိပြီး ရန်ကင်းမြို့နယ်ရှိ ရပ်ကွက် ၅ / ၆ တို့နှင့် နီးကပ်စွာတည်ရှိသောကြောင့် လေ့လာဆန်းစစ်ခြင်းပြုလုပ်ရာတွင် စီမံကိန်းတည်ရှိရာ မြို့နယ်သာမက အနီးဝန်းကျင်ရှိ ဧရိယာများတွင် ၎င်းစုပေါင်းသက်ရောက်မှုများကို သိရှိရန်ထည့်သွင်း တွက်ချက်ခြင်း ဖြစ်ပါသည်။

ဆက်စပ်သက်ရောက်မှု ရလဒ် = (ညစ်ညမ်းမှုဒဏ် ရလဒ်) x (လူဦးရေဆိုင်ရာ အချက်အလက်များ ရလဒ်)

မြို့နယ်	ဗဟန်းမြို့နယ်	ရန်ကင်းမြို့နယ်	
ရပ်ကွက်	ဆရာစံ	၅	၆
လူဦးရေ	၄,၂၁၀	၃,၇၅၆	၂,၅၉၇
အိမ်ခြေ	၃၄၈	၃၁၂	၂၀၉
အိမ်ထောင်စု	၁,၀၀၃	၉၃၄	၆၅၀
ထိတွေ့မှုများ	၆	၇	
အများပြည်သူ ကျန်းမာရေးအပေါ် သက်ရောက်မှုများ	၂	၃	
ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှု များ	၃	၄	
ညစ်ညမ်းမှုဒဏ်	**၁၁**	**၁၄**	
ထိခိုက်လွယ်သော လူဦးရေအုပ်စု	၁	၂	
လူမှု-စီးပွားရေးဆိုင်ရာ အကြောင်းအရင်းများ	၁	၁	
လူဦးရေဆိုင်ရာ အချက်အလက်များ	**၂**	**၃**	
ဆက်စပ်သက်ရောက်မှု ရလဒ်	**၂၂**	**၄၂**	

အဖိုးတန်သော ပတ်ဝန်းကျင်အစိတ်အပိုင်းများ (VEC) နှင့် အခြားပတ်ဝန်းကျင်အကြောင်းအရာများ

- **အခြားပတ်ဝန်းကျင်အကြောင်းအရာများ**

3 km လေ့လာမှုနယ်ပယ်အရ စီမံကိန်းဧရိယာသည်

- လူနေဧရိယာများ
- စီးပွားရေးဆိုင်ရာ အဆောက်အဦးများ
- အစိုးရရုံးများ စသည်တို့ အများဆုံးတွေ့ရှိရပါသည်။

ဆက်စပ်သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း

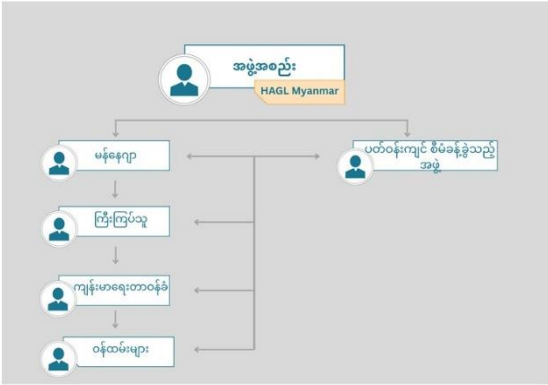
- ထိတွေ့မှုများဆိုသည်မှာ - ညစ်ညမ်းသည့် လေထုကို ရှူသွင်းခြင်း၊ ရေ သို့ သန့်ရှင်းမှုမရှိသည့် အစားအစာ စားသုံးမိခြင်း၊ ကာလရှည်ကြာစွာထားရှိသည့် စွန့်ပစ်အမှိုက်များမှ ပိုးမွှားများ ပေါက်ပွားခြင်းမှတဆင့် ရောဂါများဖြစ်ပွားနိုင်ခြင်းနှင့် အန္တရာယ်ရှိ ဓာတုပစ္စည်းများစသည်တို့နှင့် ထိတွေ့ခြင်းများကို ဆိုလိုခြင်း ဖြစ်ပါသည်။

သက်ရောက်မှု အမျိုးအစား	သက်ရောက်မှုများ ဖြစ်ပေါ်စေသည့် အရင်းအမြစ်	သက်ရောက်မှုများ	ထွက်ရှိသည့် ဒြပ်ပေါင်းများ	ပြင်းထန်မှု	ဖြစ်နိုင်ခြေ	ကြာရှည်သက်ရောက်မှု	ပြည်နယ်တွင်းသက်ရောက်မှု	ဖော်ပြချက်များ	မှတ်ချက်
ထိတွေ့မှုများ	ယာဉ်လမ်းကြောင်း ပိတ်ဆို့မှု	လေအရည်အသွေး	ဖုန်း အမှုန်၊ ကာဗွန်မိုနိုက်အောက်ဆိုဒ်၊ နိုင်ထရိုဂျင်အောက်ဆိုဒ်၊ ကာဗွန်မိုနိုရောက်ဆိုဒ် စသည်	-၄	၇	-၂၈	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	ဤသက်ရောက်မှု အမျိုးအစားသည် စီမံကိန်းဆောင်ရွက်မှုကြောင့် သာမက အနီးဝန်းကျင်တွင်ရှိသည့် အိမ်၊ ဈေးနှင့် အခြားသော အဆောက်အဦးများမှ ထွက်ရှိသည့် သက်ရောက်မှုများ ဖြစ်သောကြောင့် သက်ဆိုင်ရာ အစိုးရအဖွဲ့အစည်းများနှင့် ၎င်း တို့၏ လမ်းညွှန်မှုအောက်တွင် အားလုံးပါဝင်၍ ဆိုးကျိုးသက်ရောက်မှု လျော့ပါးရေး လုပ်ငန်းစဉ်များကို ပြုလုပ်ရပါမည်။
	အန္တရာယ်ရှိ စွန့်ပစ်ပစ္စည်းများ စုပုံထားသည့် နေရာ	မိုးရွာချိန်တွင် ရေစီးနှင့် အတူ ရေစုပ်ပြန်ခြင်းမှ မြေပေါ် ရေညစ်ညမ်းခြင်း	စီမံကိန်းမှ - ဘိလပ်မြေ၊ အိမ်သုတ်ဆေး၊ တင်နာ အကြွင်းအကျန်များ၊	-၃	၇	-၂၁	-၃	အလယ်အလတ် ဆိုးကျိုးသက်ရောက်မှု	
		ဓာတုပစ္စည်းများ စိမ်ပိတ်ထွက်ခြင်းမှ ရေမြေအောက်ရေညစ်ညမ်းခြင်း							
	အတွေ့ထွေ့စွန့်ပစ် အမှိုက်စုပုံထားသည့် နေရာ	မိုးရွာချိန်တွင် ရေစီးနှင့် အတူ ရေစုပ်ပြန်ခြင်းမှ မြေပေါ် ရေညစ်ညမ်းခြင်း	စီမံကိန်းရှိ ဝန်ထမ်းများမှ - စားကြွင်းစားကျန်များ၊ စသည့် အတွေ့ထွေ့ စွန့်ပစ်အမှိုက်များ	-၂	၇	-၁၄	-၂	ဆိုးကျိုးသက်ရောက်မှု လျော့နည်းလာခြင်း	
		အင်းဆက်ပိုးမွှားနှင့် ဘက်တီးရီးယားများ ပေါက်ပွားခြင်း	ဈေးနှင့် အိမ်များ - ဟင်းသီးဟင်းရွက်၊ မီးဖိုချောင်၊ စားကြွင်း စားကျန်များ စသည့် အတွေ့ထွေ့ စွန့်ပစ်အမှိုက်များ						

လူမှုစီးပွားအပေါ် ကောင်းကျိုးသက်ရောက်မှု

- စီမံကိန်းစတင် အကောင်အထည်ဖော်ဆောင်သည့် တည်ဆောက်ရေး ကာလနှင့် ပိတ်သိမ်းရေး ကာလတို့တွင် ယာယီအလုပ်အကိုင် အခွင့်အလမ်းများ ဖန်တီးပေးနိုင်မည်ဖြစ်ပါသည်။
- အဆင့်မြင့်အိမ်ရာများ တည်ဆောက်ပြီးစီးချိန် (လုပ်ငန်းလည်ပတ်ရေးကာလ) တွင်လည်း နိုင်ငံခြားရင်းနှီးမြှုပ်နှံမှု လုပ်ငန်းစုများ၏ အခြေစိုက်တည်နေရာ ဖြစ်လာနိုင်ခြင်းတို့ကြောင့် စီးပွားဆိုင်ရာ အချက်အချာကျသည့် နေရာဖြစ်လာနိုင်ခြင်းနှင့် အလုပ်အကိုင် အခွင့်အလမ်းများ ရရှိနိုင်မည် ဖြစ်ပါသည်။
- ပတ်ဝန်းကျင် ပြည်သူလူထုအတွက် ဒေသအတွင်း လူမှုစီးပွား အခြေအနေများ တိုးတက်လာ နိုင်ပါသည်။
- စီမံကိန်းလုပ်ငန်းမှ နိုင်ငံတော်သို့ ပုံမှန်အခွန်ပေးဆောင်ခြင်းဖြင့် နိုင်ငံဝင်ငွေ တိုးတက် စေနိုင်ခြင်း။
- အရည်အချင်းရှိသော ဝန်ထမ်းများ လေ့ကျင့်ပျိုးထောင်ပေးနိုင်ခြင်း။
- စီးပွားရေး လုပ်ငန်းစုများ တည်ရှိခြင်းကြောင့် လူမှုအကျိုးတူ ပူးပေါင်းပါဝင်မှု (CSR) အစီအစဉ်များ ပြုလုပ်ခြင်းဖြင့် ဒေသဆိုင်ရာ လူမှုဝန်းကျင်အပေါ် ကောင်းကျိုးများ ရရှိစေခြင်း။

ပတ်ဝန်းကျင်၊ ဘေးအန္တရာယ်ကင်းရှင်းရေးအဖွဲ့နှင့် ကျန်းမာရေးဆိုင်ရာ တာဝန်ယူမည့် အဖွဲ့အစည်း



လူမှုအကျိုးတူပူးပေါင်းပါဝင်မှု (CSR) အစီအစဉ်များ

လူမှုအကျိုးတူပူးပေါင်းပါဝင်မှု (CSR) အစီအစဉ်

- မြန်မာ့ရင်းနှီးမြှုပ်နှံမှု ကော်မတီ၏ ချမှတ်ထားသော နည်းလမ်းများအတိုင်း အမြတ်ငွေမှ ၂ % ကို (CSR) အတွက် အသုံးပြုမည် ဖြစ်ပါသည်။

လူမှုအကျိုးတူ ပူးပေါင်းပါဝင်မှု နှင့် ဒေသဖွံ့ဖြိုးရေးအတွက် ပါဝင်မည့် အစီအစဉ်များ

လူမှုအကျိုးတူပူး ပါဝင်မည့် အကြောင်းအရာများ	ဆောင်ရွက် မည့်အရာများ	ရည်ရွယ်ချက်
ကျန်းမာရေး	❖ အလုပ်သမားများနှင့် မိသားစုများအတွက် ကျန်းမာရေး စောင့်ရှောက်မှုများ	❖ လုပ်ငန်းလည်ပတ်ရာတွင် လုပ်ကိုင်သော အလုပ်သမားများနှင့် ဒေသခံများ ကျန်းမာရေးကောင်းမွန်စွာ နေထိုင်နိုင်ရန်၊
ပညာရေး	❖ ပညာရေးအဆင့်အတန်း နှင့် လူအခွင့်ရေးဆိုင်ရာ အသိပညာများ မြှင့်တင်ပေးခြင်း	❖ ပိုမိုကောင်းမွန်သော လူမှုအသိုင်းအဝိုင်း ဖြစ်လာရန်၊ ❖ လူငယ်တိုင်း ပညာသင်ကြားနိုင်စေရန်၊
သဘာဝဘေးအန္တရာယ် ကာကွယ်ရေး	❖ မီးဘေး၊ ရေဘေး၊ ငလျင်၊ မြေပြိုခြင်း အစရှိသည်	❖ သဘာဝဘေးအန္တရာယ်များကြောင့် ဖြစ်ပေါ်လာနိုင်သော ဆုံးရှုံးမှုများကို ကာကွယ်ရန်နှင့် လျော့ချရန်၊ ❖ ပြန်လည်ထူထောင်ရေးလုပ်ငန်းများကို လျှင်မြန်စွာ ဆောင်ရွက်နိုင်ရန်၊

❖ ကုမ္ပဏီအမြတ်ငွေ၏ ၂ ရာခိုင်နှုန်းကို လူမှုအကျိုးပြုလုပ်ငန်းများ (ကျန်းမာရေး၊ ပညာရေးနှင့် သဘာဝဘေးအန္တရာယ် ကာကွယ်ရေးများတွင် အသုံးပြုရန် ရည်ရွယ်ထားပါသည်။

ပတ်ဝန်းကျင် စောင့်ကြပ်ကြည့်ရှုရေးလုပ်ငန်းများ

တိုင်းတာမည့် နယ်ပယ်	တိုင်းတာမည့် အရည်အသွေးများ	တိုင်းတာမည့် နေရာ	တိုင်းတာမည့် အကြိမ်အရေအတွက်	နှစ်စဉ်ခန့်မှန်း အသုံးစရိတ် (ကျပ်)
လေအရည်အသွေး	PM_{10}, $PM_{2.5}$, VOCs ၊ CO_2, CO ၊ CH_4, NO_2, O_3, SO_2	ပတ်ဝန်းကျင် အစီရင်ခံစာတွင် တိုင်းတာ ဖော်ပြထားသည့် နေရာများ အားလုံး	ခြောက်လတစ်ကြိမ် (ECD သို့ တင်ပြရန်)	၆,၀၀၀,၀၀၀
ဆူညံသံ	ဆူညံသံအဆင့် (dB (A) scale, နေ့အချိန်နှင့် ညအချိန် ဆူညံသံ)	ပတ်ဝန်းကျင် အစီရင်ခံစာတွင် တိုင်းတာ ဖော်ပြထားသည့် နေရာများ အားလုံး	ခြောက်လတစ်ကြိမ် (ECD သို့ တင်ပြရန်)	၁,၈၀,၀၀၀
တုန်ခါမှု	Radial, Transverse, Vertical	ပတ်ဝန်းကျင် အစီရင်ခံစာတွင် တိုင်းတာ ဖော်ပြထားသည့် နေရာများ အားလုံး	ခြောက်လတစ်ကြိမ် (ECD သို့ တင်ပြရန်)	၃,၀၀၀,၀၀၀
ရေထုအရည်အသွေး	pH, Temperature, TDS, Conductivity, Salinity, BOD5, COD, Free Cyanide, Phosphorous, Iron, Lead, Total Nitrogen, Oil and grease	ပတ်ဝန်းကျင် အစီရင်ခံစာတွင် တိုင်းတာ ဖော်ပြထားသည့် နေရာများ အားလုံး	ခြောက်လတစ်ကြိမ် (ECD သို့ တင်ပြရန်)	၄,၀၀၀,၀၀၀
စွန့်ပစ်အမှိုက်	စွန့်ပစ်အမှိုက် ပမာဏနှင့် အမျိုးအစား	အမှိုက်ပုံးများ၊ ယာယီအမှိုက် သိုလှောင်ကန်နှင့် စီမံကိန်းဧရိယာအတွင်း သိုလှောင်မည့် နေရာ	အပတ်စဉ်	၂၀၀,၀၀၀
ယာဉ်သွားလာမှု အခြေအနေ	ယာဉ်ကြီးအရေအတွက် တိုးပွားလာခြင်း ယာဉ်လမ်းကြော အခြေအနေ	အဓိက သယ်ယူပို့ဆောင်ရေးလမ်းမနှင့် စီမံကိန်းဧရိယာ ဝန်းကျင်	အပတ်စဉ်	၃၀၀,၀၀၀
ဘေးအန္တရာယ်ကင်းရှင်းရေး နှင့် ကျန်းမာရေး ဆိုင်ရာ ထိခိုက်မှု	လျှပ်စစ်အန္တရာယ်	စီမံကိန်းဧရိယာအတွင်းရှိ မီးကြိုးများ ၎င်းတို့၏ ဆက်စပ်ပစ္စည်းများ	အပတ်စဉ်	၅၀၀,၀၀၀
	မတော်တဆထိခိုက်မှု မှတ်တမ်းများ	စီမံကိန်းဧရိယာအတွင်းရှိ လုပ်ငန်းခွင်နေရာ		

ကျေးဇူးတင်ပါသည်။

Suggestion Letters

HAGL Myanmar Center စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေးစီမံကိန်းလုပ်ငန်းနှင့် ပတ်သက်၍.
အကြံပြုလွှာ

ပထမ စီမံကိန်းအောင် ၁၁ ခု၏ ကရေတမျက်မှား အား မည်မျှ
သိကျမှာ ဆောင်ရွက်သွားမည်။
Phase I. ဖေဖေ့ စီးပွားရေးဝန်ထမ်း ဖြစ်သောကြောင့်
Phase II ဖေဖေ့ လုပ်အားခကို ရေးရှင်းရန် ဆောင်ရွက်ရာတွင်
အများကြီးဝင်ရောက် သိကျမှု မရှိခဲ့ရကြောင်း ဆောင်ရွက်ကျမှု
လည်း အဆင်ပြေ။
အကယ်၍ အခြားအကြံပြုချင်တာ ပတ်ဝန်းကျင်ဆိုင်ရာ
ရေမျက်နှာပြင်များနှင့် အင်္ဂါဂြိုဟ် စောင့်ရှောက်ရေး အပေါ်
သိအောင်မှု မရှိခဲ့ရကြောင်း ကြေးမုံသတင်းစာတွင် ကြော်ငြာပေးပါသည်။

လက်မှတ် ။ -----

အမည် ။ ဒေါ်သက်ဆွေဝင်း

ဖုန်းနံပါတ် ။ ----------

HAGL Myanmar Center စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေးစီမံကိန်းလုပ်ငန်းနှင့် ပတ်သက်၍ -

အကြံပြုလွှာ

- မီးသတ်ဦးစီးဌာန စံချိန်စံညွှန်း သက်ဖက်ချက် (Fire Safety Code 2020) ၊ မြန်မာနိုင်ငံ မီးသတ်တာဝန်ခံ၊ ဥပဒေ၊ နည်းဥပဒေများနှင့် ဘေးဒဏ် ကာလေးတား ရိုက်နှာ ဆောင်ရွက်သွားရန်၊

လက်မှတ် ။ -----

အမည် ။ ဦးဘုဝဇော (မြို့နယ်မီးသတ်ဦးစီးမှူး)

ဖုန်းနံပါတ် ။ 09-43204219

HAGL Myanmar Center စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေးစီမံကိန်းလုပ်ငန်းနှင့် ပတ်သက်၍ .

အကြံပြုလွှာ

- ပဘဉ်ကြောပိတ်အိုးဖုန်ညှိ: အောင်: ကုံ:တက်, ကုံ:ဆင်: ချိန်မှ ကွတ်အောင် ပန္ဒာည်:အာဝင်ဘာတွက် ပြုလုပ်ကိုး-

လက်မှတ် ။ .....

အမည် ။ ခေါ်ခန့်ဘုံ:

ဖုန်းနံပါတ် ။ 09796409984

HAGL Myanmar Center စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေးစီမံကိန်းလုပ်ငန်းနှင့် ပတ်သက်၍ .

အကြံပြုလွှာ

ညတဲ့. ညခင်း တက်မှုကိစ္စက လက်တေး တိုသမျိ.

ဗျာ: မှ ၈ရက်သေ့ စာသောက်စား: ၊ အညစ်အကြေး:ခွဲ.ပစ်မှု

အောင် ကျေးကျည်းရှုပ်:ပါတယ် -

လက်မှတ် ။ .....

အမည် ။ ဒေါ်အေး:ဆွာ

ဖုန်းနံပါတ် ။ 09 897432258

HAGL Myanmar Center စီမံကိန်းအဆင့် ၂ ဆောက်လုပ်ရေးစီမံကိန်းလုပ်ငန်းနှင့် ပတ်သက်၍ .

အကြံပြုလွှာ

တဦးတည်းကျွေးမွေး၊ ချက်ပြုတ်သည့် ကောင်း၊ ဖွင့် ကောင်း၊

အကူပြု ကောင်းခဲ့ပါသည်။

လက်မှတ် ။

အမည် ။ ခိုင်ရယ်ဝေယုဝင်

ဖုန်းနံပါတ် ။ 09250528341

Environmental Compliance Consultancy Co., Ltd

Email: info@emvccmyanmar.com

www.envccmyanmar.com

Keep our planet green.

ကျွန်ုပ်တို့ကမ္ဘာမြေကို စိမ်းလန်းပါစေ။