

# **CHARIS COMPANY LIMITED**

## **Environmental Management Plan**

**Manufacturing of High-Quality Poly Resin Product, Cold  
Cast bronze, Pewter and Collectibles by Using High  
Quality Poly Resin on (CMP basis)**



**Myanwei Environmental Solutions Company Limited**

**09-May-22**

Date: 9, 5, 2022

Attention: Dear Director

Environmental Conservation Department

Subject: Environmental Management Plan (EMP) Report in respect to carry out the Manufacturing of High-Quality Poly Resin Product, Cold Cast bronze, Pewter and Collectibles by Using High Quality Poly Resin on (CMP basis) by Charis Company Limited.

EMP report describes the environmental condition of a project, including significant impact, formulation of mitigation measures and preparation of institutional requirements and environmental monitoring.

Myanwei Environmental Solutions Company Limited has prepared this report with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking into account of the resources devoted to it by agreement with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

We strongly commit that this report was prepared in compliance with Myanmar Environmental Laws and Regulations.

  
  
**LIN HTET SEIN**  
**DIRECTOR**  
**MYANWEI ENVIRONMENTAL SOLUTIONS**  
**COMPANY LIMITED.**



## CHARIS COMPANY LIMITED

Plot No. 103, Myay Taing Block No.14, Shwe Thanlwin Industrial Zone,  
Hlaing Thar Yar Township, Yangon Region, Myanmar

Date: 9, 5, 2022

Dear: Director

Environmental Conservation Department

Nay Pyi Taw

Subject: Environmental Management Plan (EMP) Report in respect to carry out the Manufacturing of High-Quality Poly Resin Product, Cold Cast bronze, Pewter and Collectibles by Using High Quality Poly Resin on (CMP basis)

We refer to the captioned EMP report, which has been prepared by Myanwei Environmental Solutions Co., Ltd. (Third Party Consultant) in compliance with EIA procedure (2015) and other related laws/rules.

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

- The EMP report is accurate and complete
- The EMP report has been prepared in strict compliance with all applicable laws, rules, regulations and procedures in force.

Charis Company Limited. will at all time comply fully with all commitment and obligations in the EMP report.

We acknowledge and understand that

Ms. Kao You-Fen  
Managing Director  
Charis Co., Ltd

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## **Abbreviation**

1. CEMP	= Construction Environmental Management Plan
2. CMP	= Contract Manufacturing Process
3. CSR	= Corporate Social Responsibility
4. ECC	= Environmental Compliance Certificate
5. ECD	= Environmental Conservation Department
6. EIA	= Environmental Impact Assessment
7. EMoP	= Environmental Monitoring Plan
8. EMP	= Environmental Management Plan
9. GIIP	= Good International Industry Practices
10. HSE	= Health, Safety and Environment
11. IEE	= Initial Environmental Examination
12. IFC	= International Finance Corporation
13. NEQG	= National Environmental Quality (Emission) Guidelines
14. YRIC	= Yangon Region Investment Committee
15. MOECF	= Ministry of Environmental Conservation and Forestry
16. MONREC	= Ministry of Natural Resources and Environmental Conservation
17. OEMP	= Operation Environmental Management Plan
18. OSHA	= Occupational Safety and Health Administration
19. PPE	= Personal Protective Equipment
20. WHO	= World Health Organization
21. YCDC	= Yangon City Development Committee
22. YESB	= Yangon City Electricity Supply Board



## အစီရင်ခံစာအကျဉ်းချုပ်

အဆိုပြုလုပ်ငန်းသည် အရည်အသွေးမြင့် Poly Resin အားအခြေခံ၍ အရည်အသွေးမြင့် Poly Resin ထုတ်ကုန်၊ Cold Cast Bronze၊ Pewter ကြွေထည်ရုပ်ထုများနှင့် ပန်းပုရုပ်ထုများ ထုတ်လုပ်ခြင်းလုပ်ငန်းအတွက် ရင်းနှီးမြှုပ်နှံသော ကုမ္ပဏီဖြစ်ပါသည်။ ရင်းနှီးမြှုပ်နှံမှုလိုင်စင်ကို ၂၀၁၈ခုနှစ်၊ ဩဂုတ်လ၊ ၁၀ ရက်နေ့တွင် (ထောက်ခံချက်အမှတ် ၀၇၆/၂၀၁၈)ဖြင့် ရန်ကုန်တိုင်းဒေသကြီး ရင်းနှီးမြှုပ်နှံမှုကော်မတီမှ ရရှိပြီးဖြစ်ပါသည်။ လုပ်ငန်းလည်ပတ်ရန်အတွက် မြန်မာနိုင်ငံသယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာန (MONREC) ၏ အတည်ပြုချက်ရယူရန် လိုအပ်ကြောင်း ကော်မရှင်မှ မှာကြားခဲ့ပါသည်။

ထို့ကြောင့် မြန်မာနိုင်ငံ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၂)အရ၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP) ပြုလုပ်ရန်လိုအပ်ကြောင်း ၂၀၁၈ ခုနှစ်၊ ဇူလိုင်လ၊ ၂၆ ရက်နေ့တွင် (စာအမှတ်၊ ရက-၁/၃/၄ (အီးအိုင်အေ) (၉၁၄/၂၀၁၈) ဖြင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန ရန်ကုန်တိုင်းဒေသကြီးမှ သဘောထားမှတ်ချက် ရရှိပြီးဖြစ်ပါသည်။ ထို့ကြောင့် EMP အစီအရင်ခံစာရေးဆွဲရန် တတိယအဖွဲ့အစည်းဖြစ်သော Myanwei Environmental Solutions Company Limited မှ တာဝန်ယူရေးဆွဲခဲ့ပါသည်။

EMP အစီအစဉ်တွင် စက်ရုံတွင် ဖြစ်ပေါ်စေနိုင်သော ပတ်ဝန်းကျင်နှင့် လူမှုဘဝအပေါ် ဆိုးကျိုးသက်ရောက်မှုများကို လျော့ချရေး၊ စီမံခန့်ခွဲရေးနှင့် စောင့်ကြပ်ကြည့်ရှုရေး အစရှိသည့် အစီအစဉ်များ ပါဝင်ပါသည်။ ၎င်း EMP အစီအစဉ်များကို အကောင်အထည်ဖော်ရန်အတွက် Charis Company Limited သည် စက်ရုံတွင် ကျန်းမာရေး၊ ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ အဖွဲ့အစည်းတစ်ခုထားရှိပြီး လျော့ချရေး၊ စီမံခန့်ခွဲရေးနှင့် စောင့်ကြပ်ကြည့်ရှုရေး အစီအစဉ်များကို ကောင်အထည်ဖော်သွားမည်ဖြစ်သည်။ (အသေးစိတ်ကို အခန်း ၁ တွင် ဖော်ပြထားပါသည်)

EMP ရေးဆွဲခြင်း၏ရည်ရွယ်ချက်မှာ နိုင်ငံတော်နှင့် နိုင်ငံတကာမှ ချမှတ်ထားသော ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးအစီအစဉ်များ၊ စည်းမျဉ်းစည်းကမ်းများ၊ ဥပဒေနှင့် နည်းဥပဒေများကို လိုက်နာပြီး ပတ်ဝန်းကျင်နှင့်လိုက်ရောညီထွေရှိသော ထိခိုက်မှုလျော့ချရေး အစီအစဉ်များပြုလုပ်ရန်ဖြစ်ပါသည်။ ထိုသို့ပြုလုပ်ရန်အတွက် Plan-Do-Check-Act (P D C A) စက်ဝိုင်းဖြင့် အစီစဉ်တကျ ပြုလုပ်သွားမည်ဖြစ်ပါသည်။ အစီအစဉ်တွင် စက်ရုံကြောင့် ဖြစ်ပေါ်စေနိုင်သော ပတ်ဝန်းကျင်နှင့် လူမှုဘဝအပေါ် ဆိုးကျိုးသက်ရောက်မှုများကို လျော့ချရေး၊ စီမံခန့်ခွဲရေးနှင့် စောင့်ကြပ်ကြည့်ရှုရေး အစရှိသည့် အစီအစဉ်များ ပါဝင်ပါသည်။ ၎င်း EMP အစီအစဉ်များကို အကောင်အထည်ဖော်ရန်အတွက် သည် စက်ရုံတွင် ကျန်းမာရေး၊ ဘေးအန္တရာယ်ကင်းရှင်းရေးနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ အဖွဲ့အစည်းတစ်ခုထားရှိပြီး လျော့ချရေး၊ စီမံခန့်ခွဲရေးနှင့် စောင့်ကြပ်ကြည့်ရှုရေး အစီအစဉ်များကို အကောင်အထည်ဖော်သွားမည်ဖြစ်ပါသည်။ (အသေးစိတ်ကို အခန်း ၁ တွင် ဖော်ပြထားပါသည်)

ဥပဒေနှင့် နည်းဥပဒေ အခန်းတွင် MONREC မှ ထုတ်ပြန်ထားသည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ၊ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များအပြင်

စက်ရုံနှင့်ဆက်စပ်သက်ဆိုင်နေပြီး လိုက်နာရမည့် ဥပဒေနှင့် နည်းဥပဒေများ၊ ဒေသတွင်း သို့မဟုတ် အပြည်ပြည်ဆိုင်ရာ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင်ဆိုင်ရာ မူဝါဒများ၊ ဆက်စပ်နေသည့် နိုင်ငံတကာသဘောတူချက်များကို အကျဉ်းချုပ်ရေးသားဖော်ပြထားပါသည်။ စက်ရုံအတွင်းလိုက်နာ ဆောင်ရွက်ရမည့် စည်းမျဉ်းစည်းကမ်းများ၊ လုပ်ငန်းခွင် အန္တရာယ်ကင်းရှင်းရေးနှင့် ကျန်းမာရေးဆိုင်ရာ အခြေခံစည်းမျဉ်းစည်းကမ်းများလည်း ထည့်သွင်းဖော်ပြထားပါသည်။ Charis Company Limited ၏ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ ကတိကဝတ်များအပြင် ပတ်ဝန်းကျင်ထိခိုက်မှုလျော့ချရေး မူဝါဒများကိုလဲ ထည့်သွင်းဖော်ပြထားပါသည်။ (အသေးစိတ်ကို အခန်း ၂ တွင် ဖော်ပြထားပါသည်)

Charis Company Limited စက်ရုံသည် မြေကွက်အမှတ် ၁၀၃၊ မြေတိုင်းအမှတ် ၁၄၊ရွှေသံလွင် စက်မှုဇုန်၊ လှိုင်သာယာမြို့နယ်တွင် တည်ရှိပါသည်။ ကနဦးရင်းနှီးမြှုပ်နှံမှုသက်တမ်း (၃)နှစ်နှင့် (၁၀)နှစ် (၂)ကြိမ် တိုးချဲ့ လုပ်ကိုင်ခြင်းနှင့် သက်တမ်းတိုး (၅) နှစ်(၁) ကြိမ်ဆောင်ရွက်ရမည်ဖြစ်ကာ တည်ဆောက်ရေးကာလ (၁) နှစ် သတ်မှတ်ထားပါသည်။ စက်ရုံ၏ အကျယ်အဝန်း ၂.၁၀၆ ဧက ရှိသော မြေဧရိယာပေါ်တွင် (၄၄,၈၀၀ စတုရန်းပေ) ရှိ စက်ရုံအဆောက်အဦး၊ (၃,၃၇၅-စတုရန်းပေ) ရုံးအဆောက်အဦး (၁)လုံးနှင့် ၁,၂၀၀ စတုရန်းပေရှိသော ဝန်ထမ်းအဆောင် (၁)လုံးတို့အား ဆောက်လုပ်၍ လုပ်ငန်းလုပ်ဆောင်လျက်ရှိပါသည်။ အသုံးပြုသည့် ကုန်ကြမ်းများဖြစ်သော Unsaturated Polyester Resin၊ ကျောက်မှုန့် (Stone Powder)၊ ကြေးနီနှင့် ခဲမဖြူသတ္တုစပ်အမှုန့် (Bronze Powder)၊ သုတ်ဆေးများ (Paint)၊ ဆီလီကွန်၊ သရုပ်အင်္ဂတေ (Plaser) စသည် ကြွေထည်ရုပ်ထုများနှင့် ပန်းပုရုပ်ထုများ ထုတ်လုပ်ခြင်းအတွက် လိုအပ်သော ကုန်ကြမ်း ဆက်စပ်ပစ္စည်းများကို ဟောင်ကောင်မှ တင်သွင်းအသုံးပြုပြီး၊ ထုတ်ကုန်များဖြစ်သော ကြွေထည်ရုပ်ထုများနှင့် ပန်းပုရုပ်ထုများကို ဟောင်ကောင်သို့ပြန်လည် တင်ပို့မည်ဖြစ်သည်။ လုပ်ငန်းအတွက်လိုအပ်သော စက်ပစ္စည်းများကို နိုင်ငံခြားမှတင်သွင်းပြီး အသုံးပြုပါသည်။ ကျန်လုပ်ငန်းသုံးယာဉ်နှင့် ရုံးသုံးပစ္စည်းများကို ပြည်တွင်းမှ ဝယ်ယူအသုံးပြုပါသည်။ ကုန်ထုတ်လုပ်ခြင်းလုပ်ငန်းမှာ automatic machine နှင့် လူစွမ်းအားကို အသုံးပြုသော လုပ်ငန်းမျိုးဖြစ်ပါသည်။ ထုတ်လုပ်ပုံအဆင့်ဆင့်ကို အောက်ဖော်ပြပါ ပုံပြဇယားဖြင့် ဖော်ပြထားပါသည်။



လုပ်ငန်းမှ ပထမနှစ်မှ ၁၀ နှစ်အတွင်း တန်ချိန်အားဖြင့် တန် (၁၀၀) ကျော်ဖြစ်ပြီး အရည်အတွက် (၁,၀၀၀,၀၀၀ မှ ၁,၂၀၀,၀၀၀ အထိ) တိုးမြှင့်ထုတ်လုပ်သွားမည်ဖြစ်သည်။ နိုင်ငံခြားသားလုပ်သား (၁၅)ဦး နှင့် နိုင်ငံသား (ပြည်တွင်း)လုပ်သား (၁၀၀) ဦးဖြင့် ဆောင်ရွက်သွားမည်ဖြစ်သည်။ EMP အတွက်ကွင်းဆင်းလေ့လာချိန်တွင် စက်ရုံတွင် ထုတ်လုပ်မှုအချို့ပြုလုပ်နေပြီး ပြင်ဆင်မှုများလဲပြုလုပ်နေသည်ကို တွေ့ရှိခဲ့ပါသည်။ စက်ရုံ၏ လုပ်ငန်းလည်ပတ်မှုကြောင့်လည်း သဘာဝပတ်ဝန်းကျင်အပေါ် ဆိုးဆိုးဝါးဝါးထိခိုက်မှု မရှိကြောင်း လေ့လာတွေ့ရှိခဲ့ပါသည်။ (အသေးစိတ်ကို အခန်း ၃ တွင် ဖော်ပြထားပါသည်)

လက်ရှိပတ်ဝန်းကျင် အခြေအနေနှင့် အခြေခံ လေ့လာမှုအခန်းကဏ္ဍတွင် ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်နှင့် အခြေခံလေ့လာမှုများဖြစ်သည့် ပတ်ဝန်းကျင်အရည်အသွေးတိုင်းတာခြင်းများကို ၂၀၁၉ ခုနှစ်၊ မေလ၊ ၂၁ ရက်နေ့တွင် ပြုလုပ်ခဲ့ပါသည်။ အဓိကအနေဖြင့် စက်ရုံအတွင်း အပူချိန်နှင့် စိုထိုင်းမှုတိုင်းတာခြင်း၊ ဆူညံသံတိုင်းတာခြင်းနှင့် လုပ်ငန်းခွင် အလင်းအခြေအနေ တိုင်းတာခြင်းများကို ပြုလုပ်ခဲ့ပြီး ရလဒ်များကိုလည်း အမျိုးသားပတ်ဝန်းကျင် အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်၊ နိုင်ငံတကာစံချိန်စံနှုန်းများဖြင့် နှိုင်းယှဉ်၍ ဖော်ပြထားပါသည်။ ထို့အပြင် စက်ရုံတည်နေရာနှင့် သက်ဆိုင်သည့် အချက်အလက်များဖြစ်သော လူမှုစီးပွားအခြေအနေ၊ ရူပပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်များ၊ ဇီဝပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်များ၊ ရာသီဥတုဆိုင်ရာ အချက်အလက်များ အစရှိသည်များကို ရန်ကုန်တိုင်းဒေသကြီး၊လှိုင်သာယာမြို့နယ်ရှိ တရားဝင် ပြဌာန်းထားသော မြို့နယ်ဆိုင်ရာအချက်အလက်များမှ ကိုးကားဖော်ပြထားပါသည်။ (အသေးစိတ်ကို အခန်း ၄ တွင် ဖော်ပြထားပါသည်)

ပတ်ဝန်းကျင်အပေါ်ဆိုးကျိုးထိခိုက်မှုနှင့် လျော့ချရေး အစီအစဉ်များကို ဖော်ပြရာတွင် စက်ရုံအကောင်အထည်ဖော်မှု/ကုန်ထုတ်လုပ်မှုကြောင့် ပတ်ဝန်းကျင်နှင့် လူမှုဘဝအပေါ် ပြောင်းလဲစေနိုင်သော ကောင်းကျိုးနှင့် ဆိုးကျိုးများကိုသိရှိစေရန် စက်ရုံအတွင်း ကွင်းဆင်းလေ့လာခြင်း၊ သက်ဆိုင်ရာစက်ရုံတာဝန်ခံများနှင့် ဆွေးနွေး တိုင်ပင်ခြင်းများအပြင် EMP အတွက်လေ့လာရေးအဖွဲ့မှ ပတ်ဝန်းကျင်အခြေအနေများကို စစ်တမ်းကောက်ယူခြင်းများ ပြုလုပ်ပြီး ပတ်ဝန်းကျင်အခြေအနေများအပေါ် ဆိုးကျိုးထိခိုက်မှုများကို လျော့ချနိုင်ရန် လေ့လာခဲ့ပါသည်။

ပတ်ဝန်းကျင်ထိခိုက်မှုကို လေ့လာဆန်းစစ်ရာတွင် စီမံကိန်းကာလအတွင်း ထိခိုက်မှုတစ်ခုချင်းစီ၏ ပမာဏ၊ ကြာမြင့်ချိန်၊ ကျယ်ပြန့်မှုနှင့် ဖြစ်နိုင်ခြေတို့အား ဖော်ပြထားပါသည်။ အောက်ဖော်ပြပါ ဇယားတွင် စီမံကိန်းကြောင့် ဖြစ်ပေါ်လာနိုင်သော ထိခိုက်သက်ရောက်မှုများကို သက်ဆိုင်ရာကဏ္ဍအလိုက် ခွဲခြား၍ဖော်ပြထားပါသည်။ ဇယားတွင် ဖော်ပြထားသည့်အတိုင်း စီမံကိန်းကာလအတွင်း ထိခိုက်မှုပမာဏ အသင့်အတင့်ရှိ (၁)ခု၊ အနည်းငယ် (၄)ခု နှင့် အလွန်နည်းသောပမာဏ (၁)ခုတို့ဖြင့် လေ့လာတွေ့ရှိခဲ့ပါသည်။ ပတ်ဝန်းကျင်နှင့် လူထုအပေါ် ထိခိုက်မှုနှင့် လျော့ချရမည့်အစီအစဉ်ကို အောက်ဖော်ပြပါဇယားတွင်ဖော်ပြထားပါသည်။

ပတ်ဝန်းကျင် လက္ခဏာ	ထိခိုက်မှု	ထိခိုက်မှုအ ကြောင်းအရာ	အဆိုး အမြင့်	ပမာဏ	ကျယ်ပြန့်မှု	ဖြစ်နိုင်ခြေ	သတ်မှတ်ချက်	ထိခိုက်မှုအဆင့်	လျော့ချရေးနှင့် ထိန်းချုပ်မှု
လေထု	လေထုညစ်ညမ်းမှု	ဘွိုင်လာ၊ မီးစက်နှင့် မော်တော်ယာဉ်တို့မှ ဖုန်မှုန့် နှင့် အနိုးအငွေ့ CO, SO <sub>2</sub> , NO <sub>x</sub> and PM	၄	၃	၂	၃	၂၇	အနည်းငယ်	ဘွိုင်လာနှင့်မီးစက်တို့တွင် မီးခိုးခေါင်းတိုင် တပ်ဆင်ခြင်းဖြင့် အနိုးအငွေ့ကြောင့် ပတ်ဝန်းကျင် ထိခိုက်မှုကို လျော့ချခြင်း၊ စက်ရုံအတွင်းနှင့် အနီးအနားတွင် သစ်ပင်ပန်းမံ စိုက်ပျိုးခြင်းဖြင့် carbon ထွက်ရှိမှုကို လျော့ချပေးခြင်း၊ NOx ထွက်ရှိမှုနည်းသော နည်းပညာဖြင့် စက်ပစ္စည်းများသုံးခြင်း၊ စက်ပစ္စည်းများကို ပုံမှန်ပြုပြင်ထိန်းသိမ်းပေးခြင်း။
ရေ	ရေထုညစ်ညမ်းမှု	ဆွယ်တာလျှော် ဖွတ်ခြင်းမှ	၄	၃	၂	၃	၂၇	အနည်းငယ်	လျှော်ဖွတ်ခြင်းမှ ထွက်ရှိလာသောရေများ

ပတ်ဝန်းကျင် လက္ခဏာ	ထိခိုက်မှု	ထိခိုက်မှုအ ကြောင်းအရာ	အချိန်	ပမာဏ	ကျယ်ပြန့်မှု	ဖြစ်နိုင်ခြေ	သတ်မှတ်ချက်	ထိခိုက်မှုအဆင့်	လျော့ချရေးနှင့် ထိန်းချုပ်မှု
	စိုဉ်းမှု	ထွက်ရှိလာသော လုပ်သားများစွန့်ထုတ်ရေနှင့် ဘွိုင်လာ blow down ရေ						ငယ်	အတွက် စက်ရုံတွင် ရေဆိုးသန့်စင်စနစ်တပ်စ င် အသုံးပြုခြင်း၊ ရေအရည်အသွေးတိုင်း တာခြင်း၊ လက်ရှိရေဆိုးစနစ်ပုံစံ ဖစ်သော မိလ္လာစနစ်ကို ပုံမှန်စစ်ဆေးပေးခြင်း၊ မိလ္လာကန်နှင့် မိလ္လာ စနစ်ကို လူဦးရေနှင့် သင့်တင့်သည့် ပမာဏ ရှိရန် စီစဉ်ထားခြင်း၊ ပုံမှန်သန့်ရှင်းရေးပြုလုပ်ပေး ခြင်း
ဆူညံသံ	ဆူညံသံ ကြောင့် ထိခိုက်မှု	ဘွိုင်လာ၊ မီးစက်၊ လေမှုတ်စက် နှင့် မော်တော် ယာဉ် အသုံးပြု မှုကြောင့် ပတ်ဝန်းကျင် ဆူညံမှု	၄	၂	၁	၃	၂၁	အနည်း ငယ်	ဆူညံသံထွက်သောနေရာ များကို အကာအကွယ် ဖြင့်ထားရှိခြင်း စက်ပစ္စည်းများကို ပုံမှန်ပြုပြင်ပေးခြင်း
အမှိုက်	ပတ်ဝန်းကျင် ညစ်ညမ်းခြင်းနှင့် မြေဆီလွှာ ထိခိုက်မှု	စွန့်ပစ်မှုနှင့် နည်းစနစ်မကျ စုပုံခြင်း မရှိခြင်း၊ သက်ဆိုင်ရာမှ ချမှတ်ထားသော စည်းမျဉ်းစည်း ကမ်းများအား မလိုက်နာခြင်း	၄	၄	၂	၃	၃၀	အသင့် အတင့်	စက်ရုံတွင်ယာယီ အမှိုက်များကို စနစ်တကျ ခွဲခြားထိန်းသိမ်းခြင်း၊ စက်ရုံဝန်ထမ်းများအား စက်ရုံအတွင်း အမှိုက်စွန့်ပစ်မှုကို စည်းစနစ်တကျ ပြုလုပ်စေခြင်း၊ သက်ဆိုင်ရာ အမှိုက် သိမ်းဆည်းသောအဖွဲ့အ စည်းများအား ခေါ်ယူ သိမ်းဆည်းစေခြင်း၊

ပတ်ဝန်းကျင် လက္ခဏာ	ထိခိုက်မှု	ထိခိုက်မှုအ ကြောင်းအရာ	အချိန်	ပမာဏ	ကျယ်ပြန့်မှု	ဖြစ်နိုင်ခြေ	သတ်မှတ်ချက်	ထိခိုက်မှုအဆင့်	လျော့ချရေးနှင့် ထိန်းချုပ်မှု
သက်ရှိသတ္တဝါ (အပင်နှင့် တိရစ္ဆာန်)	အပင်နှင့် တိရစ္ဆာန်များ မျိုးတုန်းပျောက်ကွယ်ခြင်း	ထိန်းသိမ်းမှုမ ကောင်းခြင်း	၄	၁	၂	၂	၁၅	အလွန်နည်း	စက်ရုံအနီးနားတွင် သစ်ပင်ပန်းမံနှင့် ရေမြေ သဘာဝကို ထိန်းသိမ်းစောင့်ရှောက်ခြင်း
လမ်းပန်းဆက်သွယ်မှု	ယာဉ်အန္တရာယ်နှင့် ယာဉ်ကြောပိတ်ဆို့မှု	လုပ်ငန်းသုံးယာဉ်များတိုးလာခြင်း	၄	၃	၂	၃	၂၇	အနည်းငယ်	ယာဉ်စည်းကမ်း၊ လမ်းစည်းကမ်း အသိပညာပေးခြင်း

ပတ်ဝန်းကျင်အပေါ် ဆိုးကျိုးသက်ရောက်မှုများနှင့် လျော့ချရန်နည်းလမ်းများ၏ အသေးစိတ် လေ့လာတွေ့ရှိချက်နှင့် အကြံပြုချက်များကို စာကိုယ်၏ အခန်း ၅ တွင် ဖော်ပြထားပြီး သတ်မှတ်ထားသော အဆင့်သတ်မှတ်ချက်များအလိုက် ဖြေလျော့ရေးနည်းလမ်းများဖြင့် ရှောင်လွှဲရန်နည်းလမ်း များကို အစီရင်ခံစာတွင် ဖော်ပြထားပါသည်။ (အသေးစိတ်ကို အခန်း ၅ တွင် ဖော်ပြထားပါသည်)

သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း အစီအစဉ်ကို ၃၀ ရက်၊ ဧပြီလ၊ ၂၀၁၉ ခုနှစ်တွင် ရွှေလင်ဗန်းစက်မှုဇုန်ကော်မတီရုံး၊ ကနောင်ခန်းမ၊ အစည်းအဝေးခန်းတွင် ပြုလုပ်ခဲ့ပါသည်။ တွေ့ဆုံပွဲ အစည်းဝေးတွင် သက်ဆိုင်ရာ အစိုးရအဖွဲ့ရုံး၏ တာဝန်ရှိပုဂ္ဂိုလ်များ၊ စက်မှုဇုန်စီမံခန့်ခွဲမှုကော်မတီ၏ တာဝန်ရှိပုဂ္ဂိုလ်များမှ လိုအပ်သည်များကို အကြံပေးခြင်း၊ စီမံကိန်း၏ အစီရင်ခံစာတွင် လိုအပ်သည်များကို ဖြည့်စွက်ပေးရန် အကြံပြုချက်များပေးခဲ့ပါသည်။ ပြုလုပ်ခဲ့သည့် အစီအစဉ်အကျဉ်းကို အခန်း ၆ တွင် ဖော်ပြထားပါသည်။ (အသေးစိတ်ကို အခန်း ၆ တွင် ဖော်ပြထားပါသည်)

အဆိုပါစက်ရုံ၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို ရေရှည်ဖွံ့ဖြိုးတိုးတက်ကောင်းမွန်သော ပတ်ဝန်းကျင် အဖြစ် အကောင်အထည်ဖော်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ဆိုင်ရာ ဆိုးကျိုးသက်ရောက်မှုများကို လျော့နည်းစေရန် စီမံခန့်ခွဲမှုအစီအစဉ်များနှင့် စောင့်ကြပ်ကြည့်ရှုရမည့်အစီအစဉ်များကို အောက်ပါအတိုင်းပတ်ဝန်းကျင်ဆိုင်ရာ အကြောင်းအရာတစ်ခုချင်းစီအလိုက် ခွဲခြားမှု ပြုလုပ်ထားပါသည်။

၁။ လေထုညစ်ညမ်းမှုနှင့် ဖုန်မှုန့်ဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်

၂။ ဆူညံမှုထိန်းခြင်းဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်

၃။ အမှိုက်စွန့်ပစ်မှုဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်

၄။ ရေဆိုးစွန့်ပစ်မှုဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်

၅။ စွမ်းအင်အသုံးပြုမှုဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်

၆။ ရေအသုံးပြုမှုဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ်

၇။ အရေးပေါ်တုန့်ပြန်ရေး အစီအစဉ်

၈။ စောင့်ကြပ်ကြည့်ရှုရေး အစီအစဉ်

၉။ လူမှုအကျိုးတူ ပူးပေါင်းပါဝင်မှု အစီအစဉ် CSR Plan

၁၀။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အတွက် ငွေကြေးလျာထားမှုအခြေအနေ

(အသေးစိတ်ကို အခန်း ၇ တွင် ဖော်ပြထားပါသည်)

အကျဉ်းချုပ်အားဖြင့် ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်၏ လမ်းညွှန်ချက်များ၊ ပတ်ဝန်းကျင်ဆိုင်ရာ ဥပဒေ၊ နည်းဥပဒေ၊ စည်းမျဉ်းစည်းကမ်းများနှင့် ချမှတ်ထားသော မူဝါဒလမ်းညွှန်ချက်များအတိုင်း ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှု အလေ့အကျင်များ၊ လုပ်ငန်းစဉ်များနှင့် လိုက်နာဆောင်ရွက်ကျင့်သုံးရန်တာဝန်များကို ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်တွင် ဖော်ပြရှင်းလင်းတင်ပြထားပါသည်။ စီမံကိန်းနှင့် သက်ဆိုင်သူများအား စီမံကိန်းဆိုင်ရာ အကြောင်းအရာများ ရှင်းလင်းတင်ပြခြင်း၊ အကြံပြုချက်များနှင့် ဆွေးနွေးတင်ပြလာသည့် သဘောထား အကြံဉာဏ်များကိုရယူပြီး အစီအရင်ခံစာတွင် ဖော်ပြထားပါသည်။



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## EXECUTIVE SUMMARY

Environment Management Plan is required for ensuring sustainable development. It should not affect the surrounding environment adversely. The management plan presented in this chapter needs to be implemented by the proposed expansion of Charis Manufacturing. The Environment Management Plan (EMP) aims at controlling pollution at source with available and affordable technology followed by treatment measures. Waste minimization and waste recycling measures are emphasized. In addition to the industry specific control measures, the proposed industry should adopt following guidelines.

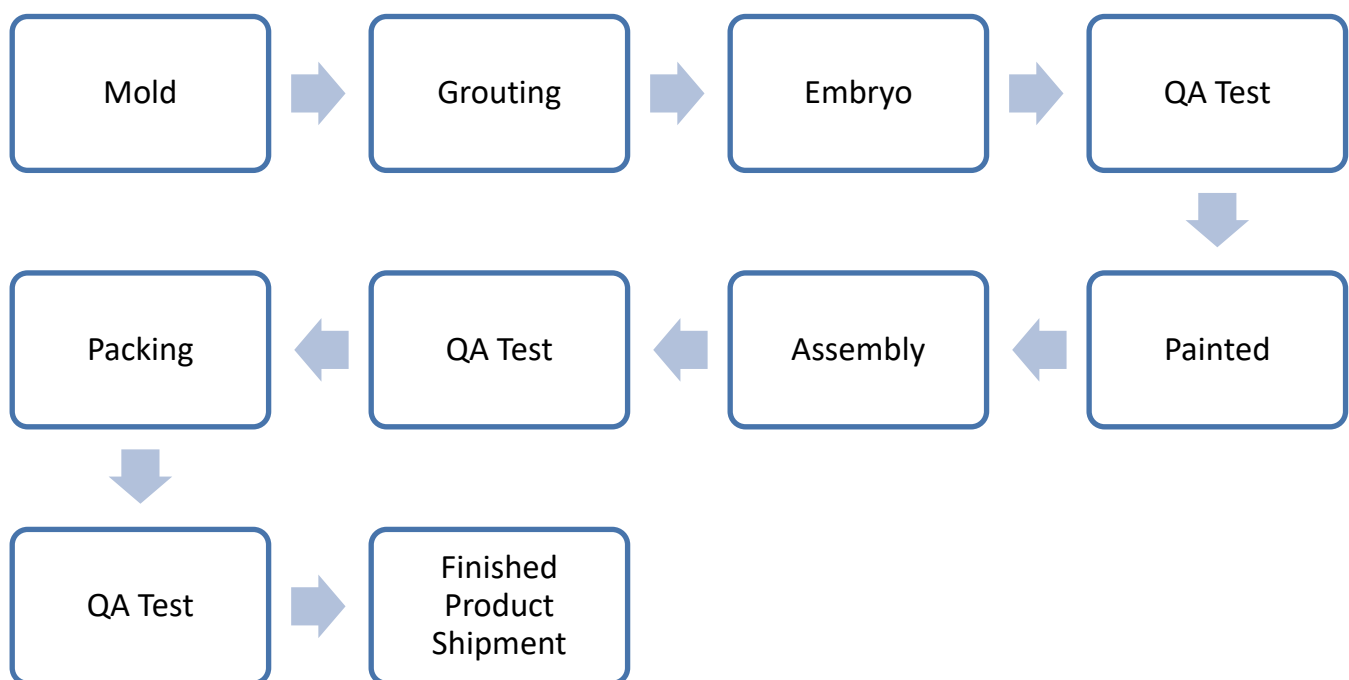
The project is new investment for manufacturing of High-Quality Poly Resin Product, Cold Cast bronze, Pewter and Collectibles by Using High Quality Poly Resin on Contract Manufacturing Process (CMP) basic company from China. The Yangon Region Investment Committee (YRIC) on 10 August 2018 with the Endorsement No. issues the project (YGN-076/2018). Committed asks for the environmental approval and comments of the Ministry of the Natural Resources and Environmental Conservation (MONREC) on the proposed project and had approved the proposal for investment in manufacturing of Manufacturing of High-Quality Poly Resin Product, Cold Cast bronze, Pewter and Collectibles by Using High Quality Poly Resin on CMP basis under the name of Charis Company Limited as a solely owned foreign investment from the China.

According to the Myanmar Environmental Conservation Law (2012), it requires that the proponents of every development project in the country submit either an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) to Ministry of Natural Resources and Environmental Conservation (MONREC). As per the comments of Environmental Conservation Department (ECD), said project requires an Environmental Management Plan (EMP) to meet the environmental assessment requirements of Notification No. Yaka- 1/3/4 (EIA) (914/2018) on 26 July 2018. Therefore, Charis Company Limited commissioned Myanwei Environmental Solutions Company Limited for EMP report study. (*See detail in Chapter 1*)

The next Chapter, provides the brief summary of relevant national environmental legislations such as Environmental Impact Assessment Procedure (2015) and National Environmental Quality (emission) Guidelines, established by the Ministry of Natural Resources and Environmental Conservation (MONREC) and overview of current local and international environmental and social policies including related international or regional convention for the proposed project. And occupational health and safety guideline is referenced from International Finance Corporation (IFC) guidelines. Charis Company Limited is commitment and complied for environmental prevention and EMP. (*See detail in Chapter 2*).

**Charis** factory is located at Plot No. 103, Myay Taing Block No. 14, Shwe Than Lwin Industrial Zone, Hlaing Tar Yar Township, Yangon region. The total area of project site is 2.106 acre (8,522.6796 square meters). Main structure is designed into production area for one building. Transformer room, generator room and water treatment plant are separated by main factory building structure. The factory layout plan can be seen in Figure 3-3. The main product of the **Charis** Company Limited factory is poly resin product. The Utilities for proposed factory include electrical power, fuel oil for emergency used generator and water for domestic use. Electric power is used for the purpose of to run the steam boiler and to provide lighting.





Production rate of Charis factory is produced between first year of operation and ten years operation as 1,000,000 to 1,200,000 pieces annually. It is require of work force (6) foreigners technician and 500 local employees for first year operation to 10 years operation. Moreover, the factory is installed and upgrading for operation during our site survey for EMP report. The factory is not major insignificant effect on environmental and social condition because of the factory operation is simple process of molding, and painting. (**See detail in Chapter 3**)

For environmental baseline, data were collected by onsite measurements analysis during operation phase on 21 May 2019. On-site measurement was taken by indoor temperature, humidity, noise level and operation light condition at the factory. Moreover, secondary data collection of proposed project site area such as socio-economic condition, physical/ biological environment, weather data were collected from official township data was obtained from Regional Data of Hlaing Tar Yar Township. (**See detail in Chapter 4**)

The assessment of each impact is based on consideration of the magnitude, duration, extent and probability of activities, which are going to be carried out during operation phases. In operation phase, there are 1 moderate significance impact on environment and human such as impact of electricity consumption. 4 low significant impacts on environment and human such as impact of wastewater effluents and occupational health and safety of employees, workers and 2 very low significant impact on environment and human such as impact on aquatic lives, air pollution and noise. Significance impacts on environmental and human and detail impact assessment for operation phases can be seen in Table. All of the impacts during operation phases can be minimized by using mitigation measures and implementing Environmental Management Plan.

The development of infrastructure for the proposed project likely to happen changes in the local environment in terms of physical, biological and socio-economic aspects along with the perspective on both positive and negative impacts. The potential environmental impacts brought by various activities of proposed factory project will be identified and judged by site surveying with checklist, meeting with client team, including plant manager and supervisor, representatives from the

factory operators and assessing the environmental baseline information for operation and decommissioning phases along with its mitigation measure.

Environmental Aspects	Potential Impacts	Identified Risk	Evaluation of Risk						Mitigation/Control Measure
			Duration	Magnitude	Extent	probability	Significance point	Significant impact	
Air quality	Air Pollution	Dust and other exhaust gas emission i.e. CO, SO <sub>2</sub> , NO <sub>x</sub> and PM Boiler operation	4	3	2	3	27	Low	<p>The factory uses chimney through which the flue gas are emitted for reducing the impact of stack air emission on environment.</p> <p>The factory has planted trees in its premises to reduce carbon emission and thus minimize air pollution</p> <p>Stack gas emission level can be controlled by using gas generator with low NO<sub>x</sub> technology</p> <p>Ensuring vehicles, generators, compressors and boiler are well maintained</p> <p>Masks are provided to workers to ensure that workers wear mask during working in dusty condition.</p>
Water Quality	Water Contamination	Discharge from boiler blow down and Sewage discharge	4	3	2	3	27	Low	<p>An effective wastewater treatment system for production sector that reduced for BOD, COD, total nitrogen and other organic compound shall be used to reduce the impact on aquatic lives and odor.</p> <p>Currently, practice of the wastewater effluents discharge facilities of sewage for sanitation and septic system</p>
Noise	Noise Pollution	Noise can generate	4	2	1	3	21	Low	Use personal protective equipment

Environmental Aspects	Potential Impacts	Identified Risk	Evaluation of Risk						Mitigation/Control Measure
			Duration	Magnitude	Extent	probability	Significance point	Significant impact	
		from vehicle movement & especially from generator, compressor and boiler							(PPE) like ear plug/ear muffs in the noisy workplace like generator, compressor and boiler area. The factory already has buffer area to reducing noise from operation o generator, compressor and boiler.
Waste Management Disposal	Surrounding environment pollution and soil contamination	Incorrect disposal of waste	4	4	2	3	30	Moderate	Disposal of solid sewage in own septic following the waste management plan Industrial solid waste collect in storage and handed over to registered local waste collector or YCDC The factory already disposes the municipal waste to YCDC dumping site twice a week.
Ecological Environment (Flora & Fauna)	Loss of habitat of some flora & fauna and biodiversity reduction	Inappropriate control of weeds	4	1	2	2	15	Very Low	Maintain maximum vegetation
Traffic Pattern	Increase of vehicular traffic as well as gaseous emission and risk of increasing road accident	Vehicle increase at the factory surrounding area	4	3	2	3	27	Low	Vehicular movement would be restricted at day time

Negative impacts and mitigation measures of the proposed factory were taken into consideration during the study. **(See detail in chapter 5)**

Public participation can be considered as the required element of the EMP process. In this study various stakeholder's participation were made. On 30, July 2019, a public consultation and disclosure ceremony was held at meeting room of Sky Hotel in Hlaing Thar Yar Township . (See detail in Chapter 6)

The EMP for Charis Company Limited has been prepared to address potential issues based upon discussion with factory management, workers, local community's view, stakeholder consultation and from the site visit of experts. The EMP is additional to and compliments the factory's safety management system. The following environmental issues that require environmental management plans based upon the potential impacts of activities by for Charis factory are as follows:

1. Air pollution/Dust Management plan
2. Noise Management
3. Solid Waste Management plan
4. Wastewater Management Plan
5. Energy Consumption Management Plan
6. Water Consumption Management Plan
7. Emergency Response plan
8. Environmental Monitoring and Reporting
9. Corporate Social Responsible (CSR) Plan
10. Budget Plan for Environmental Management Plan (***See details in Chapter 7***)

In Conclusion, the environmental management practices, procedures and responsibilities are defined here in to get full compliance with the existing environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar. All the feed backs, desired and needs of local public recorded in public consultation meetings are well addressed and incorporated in formulation of EMP. It has been figured out that, the proposed Charis factory is going to generate local employment opportunities and enhance capabilities and working skills of employees. Consequently, their socio-economic standard is expected to be improved and undertaking corporate social responsibilities (CSR) as recommended. The study further concluded that positive impacts will be of immense benefit to the local community and national development as well.

This is recommended that;

- All appropriate environmental management measures detailed in this report, together with any other environmental management commitments should be implemented throughout the entire life of the factory
- Solid wastes and liquid wastes need to dispose according to YCDC rules and regulation
- Workers should be provided proper training and it should be ensured that workers use PPE during factory operation area.
- Daily, monthly and annual action plan shall be formulated based on this EMP and practiced at operation level.
- Keep full records of environmental management activities and present to annual independent third party environment audit.

**Environmental Management Plan**

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- Abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar.

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

## 1. INTRODUCTION

Environment Management Plan is required for ensuring sustainable development. It should not affect the surrounding environment adversely. The management plan presented in this chapter needs to be implemented by the proposed expansion of Charis Company Limited. The Environment Management Plan (EMP) aims at controlling pollution at source with available and affordable technology followed by treatment measures. Waste minimization and waste recycling measures are emphasized. In addition to the industry specific control measures, the proposed industry should adopt following guidelines.

### 1.1. AIM OF ENVIRONMENTAL MANAGEMENT PLAN

- Provide environmental management plan that minimize the environmental impact of the works and identify those responsible for its implementation.
- Define the monitoring program, which assess the implementation.

### 1.2. PROJECT BACKGROUND

The project is new investment for manufacturing of High-Quality Poly Resin Product, Cold Cast bronze, Pewter and Collectibles by Using High Quality Poly Resin on Contract Manufacturing Process (CMP) basic company from China. The Yangon Region Investment Committee (YRIC) on 10 August 2018 with the Endorsement No. issues the project (YGN-076/2018). Committee asked for the environmental approval and comments of the Ministry of the Natural Resources and Environmental Conservation (MONREC) on the proposed project and had approved the proposal for investment in manufacturing of Manufacturing of High-Quality Poly Resin Product, Cold Cast bronze, Pewter and Collectibles by Using High Quality Poly Resin on CMP basis under the name of Charis Company Limited as a solely owned foreign investment from the China.

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#### 1.2.1. Project Proponent Profile

This is the information of project proponent from the YRIC's endorsement that is describing in below Table 1-1 and Table 1-2.

**Table 1-1 Information of Investor**

Investor Name:	Ms. Kao You-Fen
ID No:	306327590
Citizenship:	Chinese

Address of Registration office:	Unit 403 A 4/F, Skyway house, No.3, Sham Mong Road, Taikoktsui, Kowloon, Hong Kong, Republic of China
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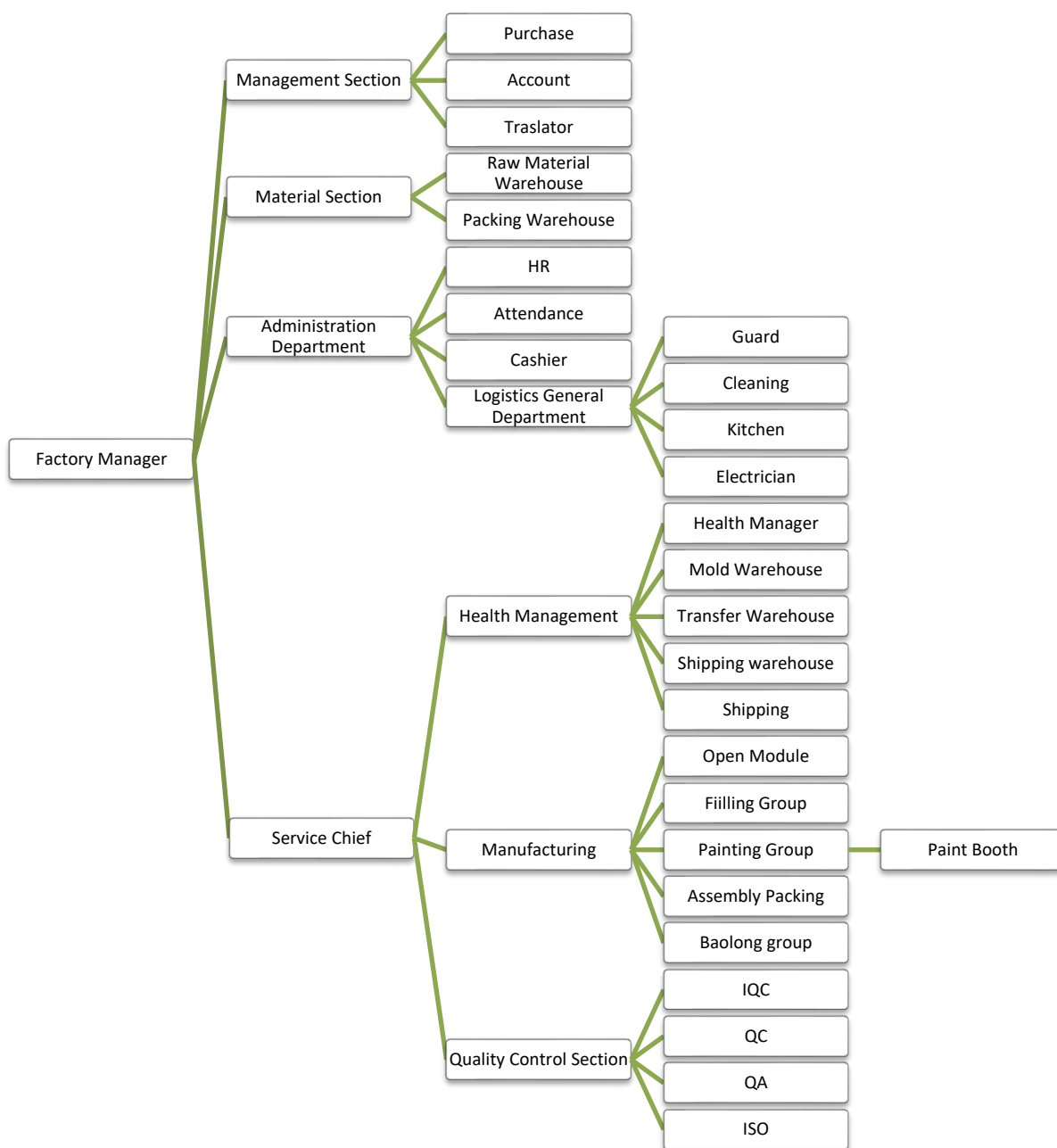
### 1.2.2. Investment Plan and Salient Features of the Project

The estimated authorized capital investment is 1.375 million US Dollar (Table 1-2). Organization chart of Charis Company Limited is presented in

Figure 1-1.

**Table 1-2 Salient features of the project**

Type of Proposed Business	Manufacturing of High-Quality Poly Resin Product, Cold Cast bronze, Pewter and Collectibles by Using High Quality Poly Resin on CMP basic
Type of investment	100% foreign investment
Type of Share	Ordinary Share
Type of land	Industrial Land
Total land area	2.106 acres (8,522.6796 sq m)
Total building area	Three Building (44,800 sq ft) Production building (3,375 sq ft) Office Building (1,200 sq ft) Dormitory
Land lease year	23 years
Construction period	2 years
Operation starting date	23 years investment permit
Address	Plot No. 103, Myay Taing Block No. 14, Shwe Than Lwin Industrial Zone, Hlaing Tar Yar Township, Yangon region
Contact person	Thida Aung (HR) 09422488840 Thidaaung141088@gmail.com



**Figure 1-1 Organization chart of Charis Company Limited**

### 1.2.3. Environmental Consultant Profile

MYANWEI ENVIRONMENTAL SOLUTIONS COMPANY LIMITED prepares the EMP for the proposed project. The field studies were carried out by MYANWEI having experiences in conducting environmental assessments for various types of projects in Myanmar. The MYANWEI team conducted field survey, assessment activities, and prepared the report. A reconnaissance study was performed on the proposed project site and baseline environmental data were also collected from possible sources using the appropriate measuring devices. Data interpretation and analysis were made based on those collected data for the present and potential future conditions. Suitable measures were proposed for the impacts to be mitigated to reduce to acceptable ones. The environmental study was carried out by the study team and the following is a summary of team member's responsibilities during the study period.



Myanwei Environmental Solutions Company Limited	No. 36-38, 9 <sup>th</sup> floor (A), Grand Myay Nu Condo, Myay Nu Street, Sanchaung Township, Yangon, Myanmar.	01-501221 env@myanweiconsulting.com www.myanweiconsulting.com.
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**Table 1-3 Member of EMP Study Team**

<b>Name</b>	<b>Qualification</b>	<b>Responsibility</b>
<b>MYANWEI ENVIRONMENTAL SOLUTIONS Limited</b>	<b>Transition Consultant Registration Certificate No. 0069</b>	<b>EIA Organisation</b>
Mr. Lin Htet Sein	MSc (Regional Geology) BSc (Hons) Geology Dip in Environmental Science Certificate in Environmental & Social Assessment <b>TCR No. 0048</b>	Project Director, Environmental consultant, project management
Dr. Hein Lynn Aung	M.B, B.S (Yangon), Business Management (International Collage of Management Sydney, Australia)	Project Director, Public health consultant, project management
Ms. Wah Wah Zaw	B.E Material and Metallurgy Engineering Diploma in Environmental Planning and Management M.S Environmental Planning and Management	Senior Environmental Consultant, Social and Environmental Research, Quality control, Environmental planning and Management
Ms. Khin Thu Zar Myint	B.E(Materials and Metallurgy) Dip in Environmental Planning and Management	Senior Environmental Consultant, Social Research, Public consultation, social economic investigation
Ms. Su Myat Hlaing	B.E. Civil Engineering B. Tech Civil Engineering	Environmental Engineer
Mr. Kyaw Win Han	B.E. Chemical Engineering B. Tech Chemical Engineering	Junior Environmental Consultant, Team leader of baseline survey, monitoring measure
Mr. Aung Kyaw Moe	B.E. Chemical Engineering B. Tech Chemical Engineering	Junior Environmental Consultant, monitoring measure, document administration
Mr. Saw Yan Naung	B.E. Chemical Engineering B. Tech Chemical Engineering	Junior Environmental Consultant, monitoring measure, document administration
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Name	Qualification	Responsibility
Mr. Si Yan Hein	B. Sc (Geology)	Junior Environmental Consultant, monitoring measure, document administration
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### 1.1. OBJECTIVE OF ENVIRONMENTAL MANAGEMENT PLAN

The objective of the environmental management is to ensure potential environmental issues are managed by proper mitigation measures in compliance with the relevant laws and regulations stipulated by national authorities. Environmental management is based on the basic principles of management known as the P-D-C-A cycle (Figure 1-2). Environmental management consists of four related tasks as described below:

➤ Plan (P) - What need to be done

Mitigation measures for the potential environmental impacts of the factory such as air emission, noise, solid waste, wastewater and health and safety at work are described in this chapter. The Project Proponent will follow the plan for the mitigation measures according to the scheduled time.

➤ Do (D) - Implement the plan

The mitigation measures for the potential environmental impacts will be implemented appropriately by the Project Proponent as described in this chapter.

➤ 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 are noted with reference to the environmental monitoring benchmarks, corrective actions need to be planned to mitigate the existing environmental impacts.

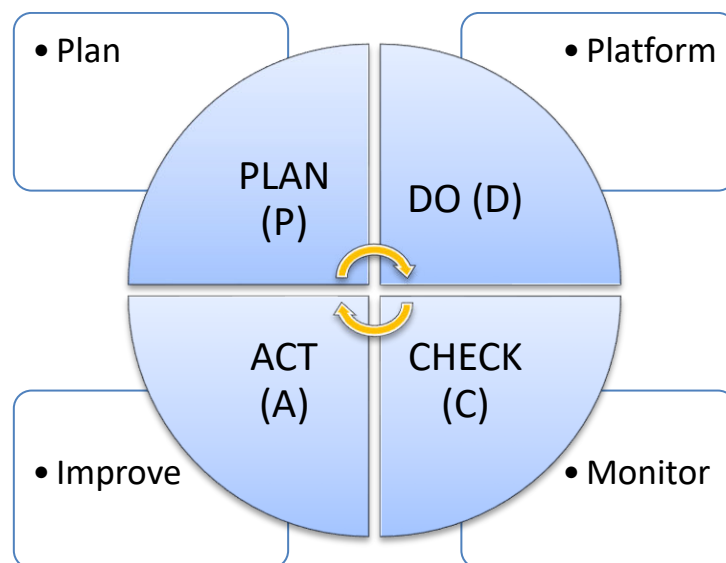


Figure 1-2 PDCA cycle

#### 1.1.1. Institutional Requirement

Charis Company Limited will manage the development of the proposed project. The project proponent should appoint Health, Safety and Environment (HSE) issues throughout the duration of the project phases. HSE team is responsible for implementation and monitoring of EMP and Environmental Monitoring Plan (EMoP) as well as coordination with local authorities and the nearby communities. The HSE Team also makes regular review of EMP to cover all potential impacts, amendments and modifications.

#### 1.1.2. Responsibilities of the EMP

In order to ensure the sound development and effective implementation of the EMP, it will be necessary to identify and define the responsibilities. The environmental management practices, procedures, and responsibilities are defined herein to get full compliance with the existing environmental policy, laws, rules and regulations of the Republic of the Union of Myanmar. The following entities should be involved in the implementation of this EMP:

**Charis Company Limited:** The proponent will be charged with the responsibility for ensuring that the proposed development has been accomplished in an environmentally sound manner. This can be achieved by inclusion of environmental specifications in the tender specifications, selection of environmentally conscious contractors, and supervision to ensure that the objectives of this EMP are met. The implementation of Environmental Management Plan (EMP) process will prepare and follow up by appointed persons for health, safety, and environmental management under the instruction of management team of Charis Company Limited for EMP implementation facilities.

**ECD (Yangon Region):** The responsibility of ECD is to exercise general supervision and coordinating over all matters relating to the environment and to be instrumental in providing guidance for recognized regulatory frameworks.

**Third-Party Environmental Consultant:** The environmental consultant will have to ensure that the proposed EMP is up to date and is being followed properly by the proponent. Periodic audits of the

EMP will have to be done to ensure that its performance is as expected, by comparing with operating standards so that any corrective actions can be taken.

### **1.1.3. Structure and Responsibilities for the EMP Development and Implementation**

The HSE officer is responsible to the HSE components of the project and on matters relating to the implementation of the EMP throughout operation life. The S&E officer will have responsibilities that include:

- Ensure a monitoring system is in place to track and report all health, safety and environmental incidents;
- Carry out a thorough initial site inspection of environmental controls prior to work commencement;
- Record and provide a written report to the General manager and production team of non-conformances with the EMP and require the HR supervisor to undertake mitigation measures to avoid or minimize any adverse impacts on environment or report required changes to the EMP;

The environmental management practices, procedures and responsibilities are defined herein to get full compliance with the existing environmental policy, laws, rules and regulations of the Republic of the Union of Myanmar. The Environmental Management Plan (EMP) is prepared for the proposed project covers the anticipated impacts of the said project, mitigation measures, management and monitoring plans during each of the phases:

- Construction Environmental Management Plan (CEMP)
- Operational Environmental Management Plan (OEMP)

CEMP is developed to ensure that appropriate environmental practices are followed during a project's construction. OMEP is developed to ensure that appropriate environmental practices are followed during a project's operation & decommissioning. As the factory is already built OEMP is designed for this factory.

The primary purpose of the OEMP is to provide an easily Interpreted reference document which ensures that the project environmental commitments, safeguards and mitigation measures from the environmental planning documents, project approvals, and the scope of Works and Technical criteria are implemented It aims to minimize impacts associated with the operation of the project. The purpose of operational EMP is to:

- Define details of who, what, where & when environmental management & mitigation measures are to be implemented.
- Provide government agencies and their contractors, developers & other stakeholder better on-site environmental management control over the life of a project.
- Ensure that the commitments made as a part of the project proponent are implemented throughout the project life.
- Ensure the environmental management detail is captured & documented at all stages of the project

## 2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This section provides a brief summary of relevant national environmental legislations established by the MONREC and overview of current local and international environmental and social policies including related international or regional convention for the proposed project.

### 2.1. MYANMAR REGULATORY FRAMEWORK

Myanmar has 24 ministries under the Office of the President as of May 2016. The leading ministries in-charge of environmental and social considerations is the Environmental Conservation Department (ECD) of the MONREC that was reorganized Ministry of Environmental Conservation and Forestry (MOECF) in April 2016.

#### 2.1.1. Laws and Regulations Related to Environmental and Social Considerations

Requirements related to environmental (and social) impact management for development projects are described in Table 2-1.

**Table 2-1 List of Myanmar's Law relating to environmental management**

Law and Regulation	Description
National Environmental Policy of Myanmar, (Notification No. 26/94 dated 5 December 1994)	To achieve harmony and balance between socioeconomic, natural resources and environment through the integration of environmental considerations into the development process enhancing the quality of the life of all its citizens.
<b>Constitution 2008</b>	
Section 37, (a)	The Union is the ultimate owner of all lands and all-natural resources above and below the ground, above and beneath the water and in atmosphere in the Union.
Section 37, (b)	The Union shall permit citizens rights of private property, right of inheritance, right of private initiative and patent in accord with the laws.
Section 372	The Union guarantees the right to ownership, the use of property and the right to private invention and patent in the conducting of business if it is not contrary to the provisions of this Constitution and the existing laws.
Section 45	The Union shall protect and conserve natural environment.
Section 390, (a),(b),(c),(d)	Every citizen has the duty to assist the Union in preserving and safeguarding the cultural heritage, conserving the environment, striving for the development of human resources, and protecting and preserving the public property.
<b>Environmental Conservation Law, 30 March 2012</b>	
Objectives	to contract a healthy and clean environmental and to conserve natural and cultural heritage for the benefit of present and future generations; to maintain the sustainable development through effective management of natural resources and to enable to promote international, regional and bilateral cooperation in the matters of environmental conversation.
Section 3	c) to enable to emerge a healthy and clean environment and to enable to conserve natural and cultural heritage for the benefit of present and future generations; (d) to reclaim ecosystems as may be possible which are starting to degenerate and disappear; (e) to enable to manage and implement for decrease and loss of natural

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	resources and for enabling the sustainable use beneficially;
Provisions of Duties and Powers relating to the Environmental Conservation of the Ministry: Section 7	<p>(a) To specify categories and classes of hazardous wastes generated from the production and use of chemicals or other hazardous substances in carrying out industry, agriculture, mineral production, sanitation and other activities;</p> <p>(b) To prescribe categories of hazardous substances that may affect significantly at present or in the long run on the environment;</p> <p>(c) To promote and carry out the establishment of necessary factories and stations for the treatment of solid wastes, effluents and emissions which contain toxic and hazardous substances;</p> <p>(j) To prescribe the terms and conditions relating to effluent treatment in industrial estates and other necessary places and buildings and emissions of machines, vehicles and mechanisms;</p> <p>(m) To lay down and carry out a system of EIA and SIA as to whether or not a project or activity to be undertaken by any Government department, organization or person may cause a significant impact on the environment;</p> <p>(o) To manage to cause the polluter to compensate for environmental impact, cause to contribute fund by the organizations which obtain benefit from the natural environmental service system, cause to contribute a part of the benefit from the businesses which explore, trade and use the natural resources in environmental conservation works.</p>
Chapter VI Environmental Quality Standards: Section 10	<p>The Ministry may, with the approval of the Union Government and the Committee, stipulate the following environmental quality standards:</p> <p>(a) suitable surface water quality standards in the usage in rivers, streams, canals, springs, marshes, swamps, lakes, reservoirs and other inland water sources of the public;</p> <p>(b) water quality standards for coastal and estuarine areas;</p> <p>(c) underground water quality standards;</p> <p>(d) atmospheric quality standards;</p> <p>(e) noise and vibration standards;</p> <p>(f) emissions standards;</p> <p>(g) effluent standards;</p> <p>(h) solid wastes standards;</p> <p>(i) other environmental quality standards stipulated by the Union Government.</p>
Section 14	A person causing a point source of pollution shall treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards.
Section 15	The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmentally sound methods.
Section 16	<p>A person or organization operating business in the industrial estate or business in the SEZ or category of business stipulated by the Ministry:</p> <p>(a) is responsible to carry out by contributing the stipulated cash or kind in the relevant combined scheme for the environmental conservation including the management and treatment of waste;</p> <p>(b) shall contribute the stipulated users 'charge s or management fees for the environmental conservation according to the relevant industrial estate, SEZ and business organization;</p> <p>(c) shall comply with the directives issued for environmental conservation</p>

	according to the relevant industrial estate, SEZ or business.
Section 24	The project proponent has to allow relevant governmental organization or department to inspect whether performing is conformity with the terms and condition include in prior permission, stipulated by the ministry, or not.
Section 25	The project proponent has to comply with the terms and conditions include in prior permission.
Section 29	The project proponent has to abide by the stipulations included in the rules, regulations, by-law, order, notification and procedure, which are issued by said law.
<b>Environmental Conservation Rules, 2014</b>	
Rules 58	The Ministry shall form the EIA Report Review Body with the experts from the relevant Government departments, organizations.
Rules 59	The Ministry may assign duty to the Department to scrutinize the report of EIA prepared and submitted by any organization or person relating to EIA and report through the EIA Report Review Body.
Rules 61	The Ministry may approve and reply on the EIA report EMP or EMP with the guidance of the Committee.
Sub-rule (a) of rule 68	The project proponent has to avoid emit, discharge or dispose the materials which can pollute to environment, or hazardous waste or hazardous material prescribed by notification in the place where directly or indirectly injure to public.
Sub-rule (b) of rule 68	The project proponent has to avoid performing to damage to ecosystem and the environment generated by said ecosystem.
<b>Environmental Impact Assessment Procedure (December 2015)</b>	
Objectives	<p>The project proponent has to be liable for all adverse impacts caused by doing or emitting of project owner or contractor, sub-contractor, officer, employee, representative or consultant who is appointed or hired to perform on behalf of project owner, under sub-paragraph (a) of paragraph 102.</p> <p>The project proponent has to support, after consulting with effected persons by project, relevant government organization, government department and other related persons, to resettlement and rehabilitation for livelihood until the effected persons by the project receiving the stable socio-economy which is not lower than the status in pre-project, under sub-paragraph (b) of paragraph 102.</p> <p>The project proponent has to fully implement all commitments of project and conditions included in EMP. Moreover, the project proponent has to be liable for contractor and sub-contractor who perform on behalf of him/her have to fully abide by the relevant laws, rules, this procedure, EMP and all conditions, under paragraph 103.</p> <p>The project proponent has to be liable and fully &amp; effectively implement all requirements included in ECC, relevant laws and rules, this procedure and standards under rule 104.</p> <p>The project proponent has to inform the completed information, after specifying the adverse impacts caused by the project, from time to time, under paragraph 105.</p> <p>The project proponent has to continuously monitor all adverse impacts in the pre-construction phrase, construction phrase, operation phrase, suspension phrase, closure phrase and post-closure phrase, moreover has to implement the EMP with abiding the all conditions included in ECC, relevant laws &amp; rules and this procedure, under paragraph 106.</p> <p>The project proponent has to submit, as soon as possible, the failures of his or her responsibility, other implementation, ECC or EMP. If dangerous impact caused by this failure or failure should be known by the Ministry the project</p>



	<p>proponent has to submit within 24 hours and other than this situation has to submit within 7 days from knowing it, under paragraph 107.</p> <p>The project proponent has to submit the monitoring report dually or prescribed time by Ministry in line with the schedule of EMP, under paragraph 108.</p> <p>The project proponent has to prepare the monitoring report in accord with the rule 109.</p> <p>The project proponent has to show this monitoring report in public place such as library, hall and website and office of project for the purpose to know this report by public within 10 days from the date which the report is submitted to the Ministry. Moreover, has to give the copy of this report, by email or other way which way agreed with the asked person, to any asked person or organization, under paragraph 110.</p> <p>The project proponent has to allow inspector to enter and inspect in working time and if it is needed by Ministry has to allow inspector to enter and inspect in the office and work-place of project and other work-place related to this project in any time, under paragraph 113.</p> <p>The project proponent has to allow inspector to immediately enter and inspect in any time if it is emergency or failure to implement the requirements related to social or environment or caused to it, under paragraph 115.</p> <p>The project proponent has to allow inspector to inspect the contractor and sub-contractor who implement on behalf of project, under paragraph 117.</p>
Screening: Section 23	<p>a) The project proponent shall submit the Project Proposal to the Ministry for Screening.</p> <p>b) The Ministry will send the Project Proposal to the Environmental Conservation Department to determine the need for environmental assessment.</p> <p>c) Following the preliminary Screening and verification that the Project Proposal contains all required documents and related materials, subject to Articles 8, 9, 10, 11, 26 and 27 the Department shall make a determination in accordance with Annex 1 – Categorization of Economic Activities for Assessment Purposes', taking into account Article 25 and the additional factors listed in Article 28 in order to designate the Project as one of the following, and then submit it to the Ministry:</p> <p>i) An EIA Type Project, or</p> <p>ii) An EMP Type Project, or</p> <p>iii) A Non EMP or EIA Type, and therefore not required to</p>
<b>National Environmental Quality (Emission) Guidelines (NEQG) (December 2015)</b>	
Objectives	To provide the basis for regulation and control of noise and vibration, air emissions, and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health.
<b>National Environmental Policy of Myanmar (2019)</b>	
National Environmental Policy Vision & mission	<p>Vision</p> <p>A clean environment, with healthy and functioning ecosystem, that ensures includes development and wellbeing for all people in Myanmar.</p> <p>Mission</p> <p>To establish national environmental policy principle for guiding environmental protection and sustainable development and for mainstreaming environmental consideration into all policies, laws, regulation, plans, strategic, programmes and projects in Myanmar.</p>
<b>Foreign Investment Law, 2012</b>	
Section 8	(a) To support the primary objectives of the national economic development plan, and for businesses that cannot yet be run by the State and citizens or



	<p>businesses that have insufficient funds and technology.</p> <p>(b) Development of employment activities.</p> <p>(l) Protection and conservation of the environment.</p> <p>(q) Appearing the required modern services for the Union and citizens.</p>
Section 17	<p>(a) To abide by the existing laws of the Republic of the Union of Myanmar.</p> <p>(b) To carry out the business by forming a company under the existing laws of Myanmar by the investor.</p> <p>(h) To carry out not to cause environmental pollution or damage in accord with existing laws in respect of investment business.</p> <p>(k) To carry out the systematic transfer of high technology relating to the business which are carried out by the investor to the relevant Basis, departments or organizations in accord with the contract.</p>
<b>Foreign Investment Rule, 2013</b>	
Rule 54	<p>The promoter or investor shall:</p> <p>(a) comply with Environmental Protection Law in dealing with environmental protection matters related to the business;</p> <p>(b) shall carry out socially responsible investment in the interest of the Union and its people;</p> <p>(c) shall co-operate with authorities for occasional or mandatory inspection;</p> <p>(d) shall exercise due diligence to be in conformity and harmony with norms and standards prescribed by relevant Union Ministry in conducting construction of factories, workshops, buildings, and other activities;</p> <p>(e) shall enforce Safety and Health</p>
<b>Myanmar Investment Rules, 2017</b>	
Rule 202	The project proponent has to comply with the conditions of the permit issued by the MIC and applicable laws when making the investment
Rule 203	The project proponent has to fully assist while negotiating with the authority for settling the grievance of the local community which has been affected due to investment
Rule 206.	The project proponent has to submit the passport, expert evidence or document of degree and profile to the MIC office for approval if decide to appoint a foreigner as senior management, technician expert or consultant according to subsection (a) of section 51 of Myanmar Investment Law
<b>Myanmar Insurance Law (1993)</b>	<p>Section 15 - If the project proponent uses the owned vehicles the project owner has to ensure the insurance for the injured person.</p> <p>Section 16 - The project proponent has to ensure insurance to compensate for general damages because the project may cause damages to the environment and injury to the public.</p>
<b>The Minimum Wage Law (2013)</b>	
<p>The minimum wage law, passed in March 2013, was replaced the 1949 Minimum Wage Act. The law provides a framework for minimum wage determination: the presidential office establishing a tripartite minimum wage committee shall decide minimum wage with industrial variation based on a survey on living costs of workers possibly every two years. This also stipulates equal payment.</p>	
Chapter VII The Duties of the Employee Section 12	<p>The employer:</p> <p>(a) shall not pay wage to the worker less than the minimum wage stipulated under this Law</p> <p>(b) may pay more than the minimum wage stipulated under this Law;</p> <p>(c) shall not have the right to deduct any other wage except the wage for which it</p>

	<p>has the right to deduct as stipulated in the notification issued under this Law;</p> <p>(d) Shall pay the minimum wage to the workers working in the commercial, production and service business in cash. Moreover, if the specific, benefits, interests or opportunities are to be paid, it may be paid in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker;</p> <p>(e) In paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local customer desire of the majority of workers or collective agreement. Such payment shall be for any personal use and benefit to the worker and his family and the value shall also be considerable and fair.</p>
Section 13	<p>The employer:</p> <p>(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;</p> <p>(b) shall prepare and maintain the lists, schedules, documents and wages of the workers correctly;</p> <p>(c) shall report the lists, schedules and documents prepared and maintained under subsection (b) to the relevant department in accord with the stipulations;</p> <p>(d) Shall accept the inspection when summoned by the inspection officer. Moreover, he shall produce the said lists and documents upon asking to submit;</p> <p>(e) shall allow the entry and inspection of the inspection officer to the commercial, production and service businesses, agricultural and livestock breeding workplaces and give necessary assistances;</p> <p>(f) if the workers cannot work due to sickness, shall give them holiday for medical treatment in accord with the stipulations;</p> <p>(g) if the funeral matter of the member of the family of worker or his parent occurs, shall give holiday without deducting from the minimum wage, in accord with the stipulations.</p>
Chapter IX Assigning Duty to the Inspection Officer, Inspection and Taking Action Section 18	<p>The inspection officer:</p> <p>(a) has the right to enter and inspect the relevant commercial, production and service work places, agricultural and livestock breeding workplaces and inspect whether or not they comply with and carry out in accord with the rules, notifications, orders, directives and procedures under this Law, whether or not the lists, schedules and documents, wages relating to the workers are prepared correctly, and whether or not such lists, schedules and documents are reported to the Department in accord with the stipulations;</p> <p>(b) May summon, inspect the relevant persons under the assignment of duty by the Department, asking and copying for the relevant lists, schedules and documents.</p> <p>(c) if there are outside workers at employer, has the right to inspect information relating to such outside workers, their names and addresses and the right to ask for and copy their lists and documents and lists relating to minimum wage;</p> <p>(d) in carrying out under sub-section (a), (b) and (c) relating to inspection, if required by the employer to produce the document, shall show the civil service identify car disused by the relevant department;</p> <p>(e) report to the Department in accord with the stipulations relating to the finding under sub-sections (a), (b) and (c), and documents and papers called for.</p>
<b>Payment of Wages Law (2016)</b>	
Section 3 & 4	The project proponent has to pay the wages in accord with section 3 and 4 of said law
Section 5	The project proponent has to submit with the agreements of employees & reasonable ground to the department if it is difficult to pay because of force

	majeure included in a natural disaster
Section 7-13	The project proponent has to abide by the provisions of section 7 to 13 in the chapter (3) in respect of deduction from wages.
Section 14	The project proponent has to pay the overtime fees, prescribed by law, to the employees who work over working hours
<b>The Labor Organization Law (2011)</b>	
Chapter V Rights and responsibilities of the Labour Organization Section 17	The labour organizations shall have the right to carry out freely in drawing up their constitution and rules, in electing their representatives, in organizing their administration and activities or in formulating their programmes. The Labour Organizations have the right to negotiate and settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labour laws and to submit demands to the employer and claim in accord with the relevant law if the agreement cannot be reached.
Section 18	The labour organization has the right to demand the relevant employer to re-appoint a worker if such work is dismissed by the employer 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.
Section 19	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
Section 20	In discussing 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.
Section 21	The labour organizations have the right to participate in solving the collective bargains of the workers in accord with the labour laws.
Section 22	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.
<b>Public Health Law (1972)</b>	
အခန်း (၂) ပြည်သူတို့၏ ကျန်းမာရေးကို ကာကွယ်ခြင်း ဥပဒေပုဒ်မ (၃)	<p>အခြားတည်ဆဲတရားဥပဒေများတွင် မည်သို့ပင်ပါရှိစေကာမူ အစိုးရသည် လုပ်သား ပြည်သူတို့၏ ကျန်းမာရေးကို ပိုမိုတိုးတက်ကောင်းမွန်လာစေရန်လည်းကောင်း၊ လုပ်သား ပြည်သူတို့၏ ကျန်းမာရေးကို ထိခိုက်ခြင်းမှ ကာကွယ်ရန် လည်းကောင်း အောက်တွင် ဖော်ပြသော ကျန်းမာရေးဆိုင်ရာ ကိစ္စရပ်များကို အကြံပေးခြင်း၊ စစ်ဆေးခြင်း၊ ကြီးကြပ်ခြင်း၊ ပြုပြင်ခြင်း၊ တားမြစ်ခြင်း စသည့် လုပ်ငန်းတို့ကို လုပ်ဆောင်ရမည်။</p> <p>(၁) ပတ်ဝန်းကျင်ကျန်းမာရေးဆိုင်ရာလုပ်ငန်းများ</p> <ul style="list-style-type: none"> <li>• (က) လူအများနေထိုင်ရာ ပတ်ဝန်းကျင်တွင် အမှိုက်သရိုက်၊ အညစ်အကြေးများကို သိမ်းဆည်း စွန့်ပစ်ခြင်း</li> <li>• (ခ) လူအများအတွက် သောက်သုံးသောရေများကို အပြည့်ပြည့်ဆိုင်ရာ စံချိန်မှီ သတ်မှတ်ခြင်း နှင့် ကာကွယ်စောင့်ရှောက်ခြင်း</li> <li>• (ဂ) လူအများ နေထိုင်ရာ ပတ်ဝန်းကျင် လေထုတွင် လူတို့ကို ဘေးအန္တရာယ် ဖြစ်စေမည့် အခိုးအငွေ့၊ အနံ့အသက်၊ အမှုန့်အမွှား၊ အသံပလံ နှင့် ဓါတ်ရောင်ခြည်များကြောင့် ညစ်ညမ်းခြင်းမှ ကာကွယ်ခြင်း။</li> </ul>

	<ul style="list-style-type: none"> <li>• (ဃ)မြို့ရွာ စည်ပင်သာယာရေး၊ အိမ်ယာဆောက်လုပ်ရေး နှင့် လုပ်သားပြည်သူတို့ သွားလာနေထိုင်အသုံးပြုသည့် အဆောက်အဦး၊ သို့မဟုတ် နေရာများ၏ ကျန်းမာသန့်ရှင်းရေးအတွက် ဆောင်ရွက်ခြင်း။</li> </ul> <p>(၂) လုပ်သားပြည်သူတို့ထုတ်လုပ်ရောင်းချသော အစားအသောက်နှင့် ပတ်သက်သည့် ကိစ္စများ</p> <ul style="list-style-type: none"> <li>• (က) အစားအသောက်ထုတ်လုပ်ရောင်းချသည့် အလုပ်ရုံ၊စက်ရုံ လုပ်ငန်းဌာနများကို မှတ်ပုံတင်ခြင်း၊ မှတ်ပုံတင်ခြင်းမှ ပယ်ဖျက်ခြင်း နှင့် ပြန်လည်မှတ်ပုံတင်ခြင်း။</li> <li>• (ခ) လုပ်သားပြည်သူသို့ ရောင်းချသော အစားအသောက်တို့ကိုကျန်းမာသန့်ရှင်းစေခြင်း</li> <li>• (ဂ) လုပ်သားပြည်သူသို့ ရောင်းချသော အစားအသောက်များကို အတုအပပြုလုပ်ခြင်း၊ အခြားယုတ်ညံ့သော ပစ္စည်းများနှင့် ရောစပ်ခြင်း၊ အစားအသောက်ထဲတွင် ရှိယင်းစွဲ ဝတ္တုပစ္စည်းများအား ထုတ်နှုတ်ခြင်းတို့မှ ကာကွယ်ခြင်း</li> <li>• (ဃ) အစားအသောက် ထုတ်လုပ်ရောင်းချသော အလုပ်ရုံ၊ စက်ရုံလုပ်ငန်းဌာနတို့ကို ကျန်းမာသန့်ရှင်းစေခြင်း</li> <li>• (င) အစားအသောက်ရောင်းချသော ဥပစာအဆောက်အဦးများကို ကျန်းမာသန့်ရှင်းစေခြင်း။</li> <li>• (စ) လုပ်သားပြည်သူသို့ ရောင်းချသော အစားအသောက်များ ထုတ်လုပ်ရောင်းချသည့်နေရာများတွင် ကူးစက်ရောဂါရှိသူများ ဝင်ရောက်အမှုထမ်းခြင်းမှ ကာကွယ်ခြင်း</li> <li>• (ဆ) ဘေးအန္တရာယ်ဖြစ်စေသော အစားအသောက်များကို သိမ်းဆည်းဖျက်ဆီးခြင်း။</li> <li>• (ဇ) အစားအသောက်နှင့် ပတ်သက်သည့် ကိစ္စရပ်များကို စစ်ဆေးကြည့်ရှု လိုအပ်လျှင် အစိုးရ ဓာတ်ခွဲခန်းများသို့ ပို့၍ စစ်ဆေးခြင်း</li> <li>• (ဈ) အစားအသောက်များကို အစိုးရက အခါအားလျော်စွာသတ်မှတ်ပေးသော စံချိန်နှင့် ကိုက်ညီစေရန် ဆောင်ရွက်ခြင်း</li> </ul> <p>(၃) လုပ်သားပြည်သူများအတွက် အသုံးပြုရန်ဖြစ်သော နေအိမ်သုံးပစ္စည်းများ နှင့် အလှကုန်ပစ္စည်းများ နှင့် ပတ်သက်သည့် ကိစ္စများ</p> <p>(က) နေအိမ်သုံးပစ္စည်းများ နှင့် အလှကုန်ပစ္စည်းများ ထုတ်လုပ်သော အလုပ်ရုံ၊ စက်ရုံများ မှတ်ပုံတင်ခြင်း၊ မှတ်ပုံတင်မှ ပယ်ဖျက်ခြင်း နှင့် ပြန်လည်မှတ်ပုံတင်ခြင်း</p> <p>(ခ) ထုတ်လုပ်သော နေအိမ်သုံးပစ္စည်းများနှင့် အလှကုန်ပစ္စည်းများသည် လုပ်သားပြည်သူတို့အတွက် ဘေးအန္တရာယ်ဖြစ်ပွားနိုင်လျှင်သော်လည်းကောင်း၊ ဘေးအန္တရာယ်ဖြစ်စေတတ်သော ဓါတ်ရောင်ခြည်ပါရှိလျှင်သော်လည်းကောင်း၊ ငှင်းကုန်ထုတ်လုပ်ခြင်းကိုတားမြစ်ခြင်း။</p> <p>(ဂ) ဘေးအန္တရာယ်ရှိသော ထုတ်လုပ်ပြီးသည့် နေအိမ်သုံးပစ္စည်းများ နှင့် အလှကုန်ပစ္စည်းများ နှင့် အလှကုန်ပစ္စည်းများကို လုပ်သား ပြည်သူများအား ဘေးအန္တရာယ်မရှိစေသောနည်း ဖျက်ဆီးခြင်း</p> <p>(ဃ) ကုန်ရောင်းဆိုင်များ မှ ဘေးအန္တရာယ်ရှိစေသော နေအိမ်သုံး ပစ္စည်းများ နှင့် အလှကုန်ပစ္စည်းများကို သိမ်းဆည်းဖျက်ဆီးခြင်း</p> <p>(င) နေအိမ်သုံးပစ္စည်းများ နှင့် အလှကုန်ပစ္စည်းများကို အစိုးရက အခါအားလျော်စွာ သတ်မှတ်ပေးသော စံချိန် နှင့် ကိုက်ညီစေရန်ဆောင်ရွက်ခြင်း။</p>
ဥပဒေပုဒ်မ (၅)	<p>ကိုယ်ပိုင်ဆေးကုဂေဟာများ နှင့် ပတ်သက်သည့် ကိစ္စများ</p> <p>(က) ကိုယ်ပိုင်ဆေးကုဂေဟာများ နှင့် ပတ်သက်၍ လိုအပ်သည့် စည်းကမ်းချက်များကို သတ်မှတ်ခြင်း</p> <p>(ခ) ကိုယ်ပိုင်ဆေးကုဂေဟာအားလုံးကို မှတ်ပုံတင်ခြင်း၊ မှတ်ပုံတင်မှ ပယ်ဖျက်ခြင်းနှင့်</p>

	ပြန်လည်မှတ်ပုံတင်ခြင်း။
<b>Yangon City Development Committee Law (2018)</b>	
Section (317)	The proponent shall not block the natural river channel, change the course, and disrupt the water channel, filling with soil within the city boundaries without the consent of the Committee
Section (318)	The project proponent shall not construct buildings, factories, and industries without sewage, toilet, septic tanks, and wastewater treatment system
Section (322)	The project proponent is not allowed to make activities that will produce noise pollution, water pollution, air pollution, and soil pollution to impact the environment within the city's boundaries
<b>The Amended Law for Factories Act, 1951 (2016)</b>	
Hygiene in Working Environment: Section 3	Mentions responsibilities of employer and manager regarding waste disposal, ventilation, extreme temperature, dust and gas generation, minimum space for each worker, lighting, portable drinking water and toilets for employees.
Safety in Working Environment: Section 4	States responsibilities of employer and manager concerning with machine guarding, personal protective equipment, housekeeping, aisles and exits, chemical storage and fire protection system to avoid accident.
<b>The Private Industrial Enterprise Law, 1990</b>	
Basic Principles: Section 3	Private Industrial Basis shall be conducted in accordance with the following basic principles: - (a) to enhance the higher proportion of the manufacturing value added in the gross national product and value of services, and to increase the production of the respective economic Basis which are related to the industrial enterprise; (b) to acquire modern technical know-how for raising the efficiency of industrial Basis and to establish the sale of finished goods produced by the industrial enterprise not only in the local market, but also in the foreign market; (d) to cause narrowing down of the gap between rural development and urban development by causing the development and improvement of industrial Basis; (e) to cause opening up of more employment opportunities; (f) to cause avoidance of or reduction of the use of technical know-how which cause environmental pollution; (g) to cause the use of energy in the most economical manner.
<b>The Export and Import Law (2012)</b>	
Objectives	The objectives of this law are as follows: a) To enable to implement the economic principles of the State successfully. b) To enable to lay down the policies relating to export and import that supports the development of the State. c) To cause the policies relating to export and import of the State and activities are to be in conformity with the international trade standards. d) To cause to be streamlined and speedy in carrying out the matters relating to export and import.
Prohibitions: Section 5	No persons shall export or import restricted, prohibited and banned goods.
Prohibitions: Section 6	Without obtaining license, no person shall export or import the specified goods which are to obtain permission.
Prohibitions: Section 5	A person who obtained any license shall not violate the conditions contained in the license.

<b>The Prevention of Hazard from Chemical and Related Substances Law, 2013</b>	
<p>This law was enacted with the objectives of:</p> <ol style="list-style-type: none"> <li>To protect from being damaged the natural environment resources and being hazardous any living beings by chemical and related substances;</li> <li>To supervise systematically in performing the chemical and related substances business with permission for being safety;</li> <li>To perform the system of obtaining information and to perform widely educative and research for using the chemical and related substance systematically;</li> <li>To perform the sustainable development for the occupational safety, health and environmental conservation.</li> </ol> <p>Regarding the chemical management and storage, currently, regulations governing chemicals management are divided between various Acts, mostly dating from colonial times; hence the legislation is in many respects related to the British framework. The Factory Act and the Public Health Act contain the provisions for chemicals management and storage. Some chemicals are likely to require permits.</p>	
<b>Underground Water Act</b>	
<p>The underground water act enacted on the date of 21st June in 1930 whereas it is expedient to conserve and protect underground sources of water supply in the Union of Burma. This act prohibits sinking of a tube for the purpose of obtaining underground water except under and in accordance with the terms of a license granted by the water officer. Township Officer or sub-divisional officer had power to close a license tube after exercising jurisdiction over the local area concerned and the expense of such closure shall be recoverable from the owner of the tube as if it were an arrear of land-revenue.</p>	
<b>Myanmar Fire Brigade Law (2015)</b>	
<p>The Pyidaungsu Hluttaw enacted this law-by-Law No.11/2015 on the date of 17th March, 2015 with the following objectives:</p> <ol style="list-style-type: none"> <li>to take precautionary and preventive measures and loss of state own property, private property, cultural heritage and the live and property of public due to fire and other natural disasters</li> <li>to organize fire brigade systemically and to train the fire brigade</li> <li>to prevent from fire and to conduct release work when fire disaster, natural disaster, epidemic disease or any kind of certain danger occurs</li> <li>to educate, organize and inside extensively so as to achieve public corporation</li> <li>to participate if in need for national security, peace for the citizens and law and order</li> </ol>	
<b>Section-8 Fire Safety Procedures</b>	
Rule17	<p>The relevant Government Department or organization shall, for the purpose of precaution and prevention obtain the approval of the Fire Force Department before granting permission for the following cases:</p> <ol style="list-style-type: none"> <li>Constructing three-storied and above buildings market and condominium buildings,</li> <li>Operating hotel, motel, guest house enterprise</li> <li>Constructing factory, workshop, storage facilities and warehouse</li> <li>Operating business expose to fire hazard by using in inflammable materials or explosive materials</li> <li>Producing and selling fire-extinguishing apparatuses</li> <li>Doing transport business, public utility vehicles train, airplane, helicopter, vessel, ship, tonkin tug</li> </ol>
Rule18	<p>The relevant government department or organization shall obtain the opinion of the Fire Services Department for the purpose of fire precaution and prevention, when laying down plans for construction for town, village and downtown or village development plans</p>
<b>The Electricity Law (2014)</b>	



<p>In 2014, the new Electricity Law, a comprehensive piece of legislation covering licensing, a new regulatory commission, standards, inspection, tariff, and restrictions, replaced the Electricity Law of 1984. The Electricity Law divides projects into “small” (up to 10 MW), “medium” (between 10 MW to 30 MW) and large (upwards of 30 MW); the states and regions can issue permits for small and medium power plants. In case these plants are not connected to the national grid, the Union Government Ministry is not the primary authority involved. The authorities have a legal right to use land for the purpose of power plants under the Electricity Law, and have the right to expand and maintain their facilities. The law also provides that the authorities can build transmission lines in accordance with existing laws.</p>	
<b>Boiler Law (2015)</b>	
Chapter (2) Objective	<p>The objectives of this law are as follows:</p> <ul style="list-style-type: none"> <li>(a) To obtain boilers in compliance with Myanmar Standards or International Standards</li> <li>(b) To prevent the country and citizens from hazards caused by boiler accidents</li> <li>(c) To use boilers in compliance with Myanmar Standards or International Standards within the country</li> <li>(d) To develop boiler technology and to produce experts capable of manufacturing, handling, repair, and maintenance of boilers</li> <li>(e) To optimize the use of boilers through effective utilization of fuel energy</li> <li>(f) To reduce the environmental, social and health impacts through long-lasting use of boilers.</li> </ul>
Chapter (3) 4. With the permission of the Ministry, the inspector general can:	<ul style="list-style-type: none"> <li>(a) Notify the inspection methods and instructions according to the national or international standards for safe operations of boilers in line with this law, procedures and instructions</li> <li>(b) Only the results obtained from the prescribed boiler standards and inspection methods will be approved.</li> </ul>
Chapter (4) Boiler Registration	<p>5. Anybody who would like to use a boiler in any kind of business should be registered.</p> <p>6. Boiler should be manufactured according to Myanmar Standards or International Standards.</p> <p>7. Those who would like to apply for boiler registration according to Section 5 should apply to the inspector with the application, documents and vouchers related to boiler</p> <p>8. If the application regarding registration of boiler according to Section 7, the Registration Officer should conduct necessary inspection and submit results of the findings to the Inspector General.</p> <p>9. The Inspector General should assess and inspect the submission of the Registration Officer according to Section 8 and could allow or reject for registration of the boiler.</p> <p>10. The Inspector General shall define boiler size according to heated surface area in accordance with adopted procedures.</p>
Chapter (13) Prohibitions	<p>59. According to Section 21, nobody must alter, change, deface, deform or make embossed registration unnoticeable illegitimately.</p> <p>60. Nobody is allowed to repair a boiler without boiler repair certificate.</p> <p>61. Nobody is allowed to maintain a boiler without boiler maintenance certificate.</p> <p>62. Nobody must alter safety relief valve in order to exceed the allowable pressure due to his consent or direction given by the owner.</p> <p>63. Nobody must manufacture boilers against Section 25, Subsection 25 (a) and (b) enacted.</p>
Chapter (2) Objective	<p>The objectives of this law are as follows:</p> <ul style="list-style-type: none"> <li>(a) To obtain boilers in compliance with Myanmar Standards or International</li> </ul>

	<p>Standards</p> <p>(b) To prevent the country and citizens from hazards caused by boiler accidents</p> <p>(c) To use boilers in compliance with Myanmar Standards or International Standards within the country</p> <p>(d) To develop boiler technology and to produce experts capable of manufacturing, handling, repair, and maintenance of boilers</p> <p>(e) To optimize the use of boilers through effective utilization of fuel energy</p> <p>(f) To reduce the environmental, social and health impacts through long-lasting use of boilers.</p>
<b>The Social Security Law (2012)</b>	
The Social Security Law, enacted in 2012, was amended the Social Security Act in 1954. It stipulates the formation and implementation of social security systems.	
Section 53(a)	The employers and workers shall co-ordinate with the Social Security Board or insurance agency in respect of keeping plans for safety and health in order to prevent employment injury, contracting disease and decease owing to occupation and in addition to safety and educational work of the workers and accident at the establishment;
<b>Labor Dispute Settlement Law (28 Mar 2012 replacing 1929 version)</b>	
This law was enacted for safeguarding the right of workers or having good relationship between employer and workers and making peaceful workplace or obtaining the rights fairly, rightfully and quickly by settling the dispute of employer and worker justly. It stipulates that employer in which more than 30 workers are employed shall form the workplace coordinating committee consisting of the representatives of workers and the representatives of employer.	
Section 23	A party, employer or worker, may complain individual dispute relating to his grievance to the Conciliation Body and if he is not satisfied with the conciliation of such body in accord with stipulated manners, may apply to the competent court in person or by the legal representative.
Section 24	The relevant Conciliation Body shall, in respect of the collective dispute known or received by the complaint of either party, employer or worker, in respect of the dispute; information sent by the Minister or the Region or State Government or any other means, carry out as follows: (a) conciliating so as to be settled within three days, not including the official holidays, from the day of knowing or receipt of such dispute; (b) concluding mutual agreement if the settlement is reached in conciliating under sub-section (a), before the Conciliation Body.
Section 25	The Conciliation Body shall refer the collective dispute which does not reach settlement to the relevant Arbitration Body and inform the persons relating to the dispute.
Section 38	No employer shall fail to negotiate and coordinate in respect of the complaint within the prescribed period without sufficient cause.
Section 39	No employer shall 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.
Section 40	The project proponent has to not close the work without negotiation, discussion on dispute in accord with this law, decision by Tribunal
Section 51	The project proponent has to pay the compensation decided by Tribunal if violates any act or any emission to omission to damage the interest of labour by reducing of product without efficient cause.
Section 46	Any employer who violates any prohibition contained in sections 38 and 39 shall, on conviction, be punished with a fine for a minimum of one-lakh kyats.



<b>The employment and skill development (2013)</b>	
This law was enacted for safeguarding the right of workers or having skillful of workers and making peaceful workplace or obtaining the rights fairly, rightfully and quickly by settling the dispute of employer and worker justly. Employer shall conduct occupational training to enhance the skills of workers.	
Section 5	The project proponent has to appoint employees with the contract in line with the provision of section 5 of said law.
Section 14	Employer shall conduct occupational training to enhance the skills of workers who are to be employed as well as workers who are presently employed in accordance with the requirements of the enterprise and the policy of the Skills Development Agency.
<b>The Worker's Compensation Act, 1923</b>	It stipulates that employer is required to make payments to employees who become injured or who die in any accidents arising during and in consequence of their employment. Such compensation also must be made for diseases which arise as a direct consequence of employment, such as carpal tunnel syndrome.
<b>The Payment of Wages Act, 1936</b>	The Payment of Wage Act defines the payment obligation to the workers employed in the factories or railway administration. It stipulates the method of payment stating that the payment should be made in cash on a regular payday, and allows legal action against delayed payment or un-agreeable deduction.
<b>The Leave and Holidays Act (1951, partially revised in 2014)</b>	This act has been used as the basic framework for leaves and holidays for workers with minor amendment in 2006 and 2014. This defines the public holidays that every employee shall be granted with full payment. It also defines the rules of leaves for workers including medical leave, earned leave and maternity leave.
<b>The Minimum Wage Law (2013)</b>	The minimum wage law, passed in March 2013, was replaced the 1949 Minimum Wage Act. The law provides a framework for minimum wage determination: the presidential office establishing a tripartite minimum wage committee shall decide minimum wage with industrial variation based on a survey on living costs of workers possibly every two years. This also stipulates equal payment.
<b>Prevention and Control of Communicable Disease Law 1995 (Amendment in 2011)</b>	
Chapter 2 Prevention	4. When a Principal Epidemic Disease of a Notifiable Disease occurs; Immunization and other necessary measures shall be undertaken by the Department of Health, in order to control the spread thereof; The public shall abide by measures undertaken by the Department of Health under sub-section (a).
Chapter 4 Environmental Sanitation	For prevention of the outbreak of Communicable Disease and effective control of Communicable Disease when it occurs, the public shall under the supervision and guidance of the Health Officer of the relevant area, undertake the responsibility of carrying out the following environmental sanitation measures; - Indoor, outdoor sanitation or inside the fence outside the fence sanitation; Well, ponds and drainage sanitation; Proper disposal refuse and destruction thereof by fire; Construction and use of sanitary latrines; Other necessary environmental sanitation measures.
<b>Occupational Safety and Health Law (2019)</b>	
Purpose:	To effectively implement measures related to safety and health in every industry and to set occupational safety and health standards;
Section-26	The project proponent has to provide adequate and relevant personal protective equipment to workers free of charge and make them wear it during work so as

Sub-section (e)	not to expose workers to any serious occupational diseases or hazards.
Section-26 Sub-section (1)	The project proponent has to arrange and display occupational safety and health instructions, warning signs, notices, posters, and signboards.
Section-30 Sub-section (a)	The worker shall wear or use at all times any protective clothes, equipment and tools provided by the employer for the purpose of safety and health.
Section-30 Sub-section (d)	The worker shall proper and systematic use any equipment and tools, machines, any parts of the machines, vehicles, electricity and other substances being used at the workplace.
Section-30 Sub-section (e)	The worker shall take reasonable care for the safety and health of himself/ herself and of other persons who may be affected by his/ her acts or omissions at work.
<b>The law on Standardization</b>	
Objectives	<p>The Objectives of this Law are as follows:</p> <ul style="list-style-type: none"> <li>to enable to determine Myanmar Standard</li> <li>to enable to support export promotion by enhancing quality of production organizations and their product, production processes and services</li> <li>to enable to protect the consumers and user by guaranteeing imports and products are not lower than prescribed standard, and safe from health hazards</li> <li>to enable to support protection of environment related to products, production process and services from impact, and conservation of natural resources</li> <li>to enable to protect manufacturing, distributing and importing the disqualified goods which do not meet the prescribed standard and those which are not safe and endangered to the environment</li> <li>to support on establishing the ASEAN Free Trade Area and to enable to reduce technical barriers to trade</li> <li>to facilitate technological transfer and innovation by using the standards for the development of national economic and social activities in accordance with the national development programme.</li> </ul>
Chapter 7 Taking Action by Committee No. 19	<p>The committee may, if it is found out that holder of certificate of certification violates any term or condition contained in the relevant recommendation, pass any of the following administrative order:</p> <ul style="list-style-type: none"> <li>warning</li> <li>suspending the certificate of certification for limited period</li> <li>cancelling the certificate of certification</li> </ul>
<b>လုပ်ငန်းခွင်သုံးပေါက်ကွဲစေတက်သောဝတ္ထုပစ္စည်းများဆိုင်ရာဥပဒေ (၂၀၁၈)</b>	
ရည်ရွယ်ချက်	<p>လုပ်ငန်းခွင်သုံးပေါက်ကွဲစေတက်သော ဝတ္ထုပစ္စည်းများကို စနစ်တကျပြုလုပ်ခြင်း၊ တင်သွင်းခြင်း၊ သယ်ယူခြင်း၊ သိုလှောင်ခြင်းနှင့် သုံးစွဲခြင်းတို့ပြုနိုင်ရန်၊</p> <p>ယမ်းဘီလူးနှင့် ဆက်စပ်သုံးပစ္စည်းများ အသုံးပြုသည့် လုပ်ငန်းခွင်ဘေးအန္တရာယ် ကင်းရှင်း၍ လုံခြုံမှုရှိစေရန်၊</p> <p>လုပ်ငန်းခွင်သုံး ပေါက်ကွဲစေတက်သော ဝတ္ထုပစ္စည်းများ ပြုလုပ်သုံးစွဲမှုများကို စနစ်တကျ ကြီးကြပ်နိုင်ရန်။</p>
အခန်း ၇ တားမြစ်ချက်များ အမှတ် ၁၈	<p>လိုင်စင်ရရှိသူနှင့် ခွင့်ပြုချက်ရရှိသူ မည်သူမျှ စစ်ဆေးရေးအရာရှိချုပ် သို့မဟုတ် စစ်ဆေးရေးအရာရှိ၏ စစ်ဆေးခြင်းကို ခံယူရန် ငြင်းပယ်ခြင်းမပြုရ။</p>

အမှတ် ၁၉ (ခ)	ပုဒ်မ ၈ အရ ကာကွယ်ရေးဌာနကောင်စီ အမှုဆောင်အဖွဲ့၏ အတည်ပြုချက်မရရှိဘဲ လုပ်ငန်းခွင် ပေါက်ကွဲစေတက်သော ဝတ္ထုပစ္စည်းများကို ဖျက်ဆီးခြင်းမပြုရ။
အမှတ် ၁၉ (ဂ)	ဤဥပဒေအရ ထုတ်ပြန်သည့် နည်းဥပဒေ၊ စည်းမျဉ်း၊ စည်းကမ်း၊ အမိန့်ကြော်ငြာစာ၊ အမိန့်နှင့် ညွှန်ကြားချက်များနှင့်အညီ ဆောင်ရွက်ရန် ပျက်ကွက်ခြင်း မရှိစေရ။
<b>The Motor Vehicles Law (2015)</b>	
Objectives	When the constructions periods and if it is needed in operation and production period for all vehicles <ul style="list-style-type: none"> <li>The project proponent has to promise to abide by the nearly all provisions of said law and rules, especially the provisions related to air pollution, noise pollution and life safety.</li> </ul>
<b>The Conservation of Water Resources and Rivers Law (2006)</b>	
Aims	The aims of this Law are as follows: to conserve and protect the water resources and rivers system for beneficial utilization by the public; to smooth and safety waterways navigation along rivers and creeks; to contribute to the development of State economy through improving water resources and river system; to protect environmental impact.
Chapter 5 Prohibitions No. 8	No person shall: (a) carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks. (b) cause the wastage of water resources wilfully.
No. 10	No person shall anchor the vessels where vessels are prohibited from anchoring in the rivers and creeks.
No.11 (a)	No person shall: 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.
No. 12	No person shall carry out growing of garden, digging, filling, silt trapping, closing pond, dyke building or erecting spur in the river-creek boundary, bank boundary and waterfront boundary without the permission of the relevant government department and organization.
No. 15	No person shall carry out the construction of switchback, dockyard, wet dockyard, water-tight dockyard, building of jetty, pier, landing stage or vessel landing by drainage in the river-creek boundary, bank boundary and waterfront boundary without the permission of the Directorate.
<b>The Commercial Tax Law (1990) Amended 2014</b>	
Chapter 5 Registration and Intimation of Commencement of Enterprise 11 (b)	Any Person who commences operation of a goods production enterprise or service enterprise shall furnish letter of intimation on the commencement of the operation as such to the relevant Township Revenue Officer as stipulated by regulations.
Chapter 6 Monthly Payment of Tax and Sending of Three-Monthly Return 12 (a)	Any person who has taxable proceed of sale or receipt from service within a year, shall pay due monthly tax within ten days after the end of the relevant month. Moreover, a three-monthly return shall be furnished to the relevant Township Revenue Officer within one month after the end of relevant three-month.

12 (b)	The Township Revenue Officer may intimate any person to pay due monthly tax and send three-monthly return if there is cause to consider that he has taxable proceed of sale or receipt from service within a year.
12 (c)	If it is failed to pay tax under sub-section (a) or (b), or if there is cause to consider that the tax paid is less than the tax payable, the Township Revenue Officer may, based on the information received, estimate and claim the tax payable or the additional tax payable.
12 (d)	The tax paid under sub-section (a), (b) or (c) shall be set-off from the tax due in the assessment.
12 (e)	The tax payable on goods imported under sub-section (c) of section 4 of the Law shall be collected together with the customs duties by the Customs Department in accord with the manner of collecting customs duties.

## 2.2. NATIONAL ENVIRONMENTAL QUALITY (EMISSION) GUIDELINES

As specified in the EIA Procedure, all projects are obliged to use, comply with and refer to applicable national guidelines or standards or international standards adopted by the Ministry. As specified in the EIA Procedure, following project approval a project shall commence implementation strictly in accordance with the project EMP and any additional requirements set out in the project ECC, which will encompass conditions relating to emissions. While these Guidelines generally apply to all projects subject to the EIA Procedure, it is the prerogative of the Ministry to decide how the Guidelines should be applied to existing projects as referred to in the EIA Procedure.

According to the Environmental Conservation Law, MOECAP shall set standards of environmental qualities as agreed by the Union Government and the Environmental Conservation Committee to provide the basis for regulation and control of noise and vibration, air emissions and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health.

### 2.2.1. General Guidelines

General guidelines of related environmental impact guideline for proposed project are -

### 2.2.2. Air emission

Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that: (i) emissions do not result in concentrations that reach or exceed national ambient quality guidelines and standards, or in their absence current World Health Organization (WHO) Air Quality Guidelines<sup>1</sup> for the most common pollutants as summarized below; and (ii) emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards (i.e. not exceeding 25 percent of the applicable air quality standards) to allow additional, future sustainable development in the same air shed. Industry-specific guidelines summarized hereinafter shall be applied by all projects to ensure that air emissions conform to good industry practice. Reference should be made to WHO's Air Quality Guidelines for Europe<sup>2</sup> for air pollutants not included in the following Table 2-2.

**Table 2-2 WHO's Air Quality Guideline**

Parameter	Averaging Period	Guideline Value
Nitrogen Dioxide	1-year	40
	1-hour	200
Ozone	8-hour	100
Particulate Matter PM10 <sup>a</sup>	1-year	10
	24-hour	50
Particulate Matter PM2.5 <sup>b</sup>	1-year	10
	24-hour	25
Sulfur dioxide	24-hour	20
	10-minute	500

<sup>a</sup> Particulate matter 10 micrometers or less in diameter

<sup>b</sup> Particulate matter 2.5 micrometers or less in diameter

### 2.2.3. Wastewater

Industry-specific guidelines apply during the operations phase of projects and cover direct or indirect discharge of wastewater to the environment. They are also applicable to industrial discharges to sanitary (domestic) sewers that discharge to the environment without any treatment. Wastewater generated from project operations includes process wastewater, wastewater from utility operations, runoff from process and storage areas, and miscellaneous activities including wastewater from laboratories, and equipment maintenance shops. Projects with the potential to generate process wastewater, sanitary sewage, or storm water should incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety or the environment. Industry-specific guidelines summarized hereinafter shall be applied by all projects, where applicable, to ensure that effluent emissions conform to good industry practice.

For project types where industry-specific guidelines are not set out in these Guidelines, the following general guideline values, or as stipulated on a case-by-case basis, apply during project operations.

**Table 2-3 Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (general application)<sup>1</sup>**

Parameter	Unit	Guideline Values
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

<sup>1</sup> 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.

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
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. <sup>a</sup>	6-9
Phenols	mg/l	0.5
Selenium	mg/l	0.1
Silver	mg/l	0.5
Sulphide	mg/l	1
Temperature increase	°C	<3 <sup>b</sup>
Total coliform bacteria	100 ml	400
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50
Zinc	mg/l	2

<sup>a</sup> Standard Unit

<sup>b</sup> At the edge of a 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

#### 2.2.4. Manufacture of Glass and Ceramics

##### 2.2.4.1. Glass, and Glass and Mineral Fiber Manufacturing<sup>50</sup>

This guideline applies to glass, glass fiber or mineral fiber manufacturing plants. Extraction of raw materials is covered by the guideline for Construction Materials Extraction.

##### 2.2.4.2. Effluent Levels

Parameter	Unit	Guideline Value
Antimony	mg/l	0.3
Arsenic	mg/l	0.1
Boric acid	mg/l	2
Chemical oxygen demand	mg/l	130
Fluorides	mg/l	5

Parameter	Unit	Guideline Value
Lead	mg/l	0.1
Oil and grease	mg/l	10
pH	S.U. <sub>a</sub>	6-9
Temperature increase	°C	<3 <sub>b</sub>
Total suspended solids	mg/l	30

a Standard unit

b At the edge of a 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

#### 2.2.4.3. Air Emission Levels

Parameter	Unit	Guideline Value
Arsenic	mg/Nm <sup>3</sup> <sub>a</sub>	1
Cadmium	mg/Nm <sup>3</sup> <sub>a</sub>	0.2
Fluorides	mg/Nm <sup>3</sup> <sub>a</sub>	5
Hydrogen chloride	mg/Nm <sup>3</sup> <sub>a</sub>	30
Lead	mg/Nm <sup>3</sup> <sub>a</sub>	5
Nitrogen oxides	mg/Nm <sup>3</sup> <sub>a</sub>	1,000
Other heavy metals (total)	mg/Nm <sup>3</sup> <sub>a</sub>	5 <sub>b</sub>
Particulates	Natural gas	100 <sub>c</sub>
	Other fuels	50 <sub>c</sub>
Sulfur dioxide	mg/Nm <sup>3</sup> <sub>a</sub>	700 -1,500 <sub>d</sub>

a Milligrams per normal cubic meter at specified temperature and pressure

b 1 mg/Nm<sup>3</sup> for Selenium

c Where toxic metals are present, not to exceed 20 mg/Nm<sup>3</sup>; to achieve dust emissions of 50 mg/Nm<sup>3</sup> installation of secondary treatments (bag fillers or electrostatic precipitators) is necessary

d 700 mg/Nm<sup>3</sup> for natural gas firing, 1,500 mg/Nm<sup>3</sup> for oil firing

#### 2.2.5. IFC EHS Guidelines

The EHS Guidelines<sup>1</sup> by International Finance Cooperation (IFC) are technical reference documents with general and industry-specific examples of Good International Industry practice (GIIP), as defined in IFC's Performance Standard 3: Resources Efficiency and Pollution Prevention. The EHS Guidelines contain the performance levels and measures that are normally acceptable to IFC and that are generally considered to be achievable in new facilities at reasonable costs by existing technology.

There are two kinds of guidelines, General EHS Guidelines and Industry Sector Guidelines. The General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors in the following section: (1) Environment, (2) Occupational Health and Safety, (3) Community Health and Safety and (4) Construction and Decommissioning. Table 2-4 shows the contents of the section of Community Health and Safety.



**Table 2-4 Community health and safety contents**

<b>Contents</b>	<b>Brief Description</b>
Water Quality and Availability	Drinking water sources should at all times be protected so that they meet or exceed applicable national acceptability standards or in their absence the current edition of WHO Guidelines for Drinking-Water Quality. Project activities should not compromise the availability of water for personal hygiene needs and should take account of potential future increases in demand. The overall target should be the availability of 100 liters per person per day.
Structural Safety of Project Infrastructure	Reduction of potential hazards is best accomplished during the design phase when the structural design, layout and site modifications can be adapted more easily. The following issues should be considered and incorporated as appropriate into the planning, siting, and design phases of a project (1) inclusion of buffer strips or other methods of physical separation around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure (2) incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, tsunamis, wind, flooding, landslides and fire, and (3) application of locally regulated or internationally recognized building codes, standards and regulations, and mitigation measures.
Traffic Safety	Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during operation of project equipment on private or public roads. Prevention and control of traffic related injuries and fatalities should include the adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents.
Transport of Hazardous Materials	Projects should have procedures in place that ensure compliance with local laws and international requirements applicable to the transport of hazardous materials.
Disease Prevention	Recommended interventions against the communicable diseases at the project level include (1) providing surveillance and active screening and treatment of workers, (2) preventing illness among workers in local communities by undertaking health awareness and education initiatives, training health workers in disease treatment and conducting immunization programs for workers, and (3) providing treatment through standard case management in on-site or community health care facilities.
Emergency preparedness and Response	All projects should have an Emergency preparedness and Response Plan that is commensurate with the risks of the facility and that includes the following basic elements: (1) Administration (policy, purpose, distribution, definitions, etc.) (2) Organization of emergency areas (command centers, medical stations, etc. (3) Roles and responsibilities, (4) Communication systems, (5) Emergency response procedures, (6) Emergency resources, (7) Training and updating, (8) Checklists (role and action list and equipment checklist), and (9) Business Continuity and Contingency.

Source: IFC, Environmental, Health, and Safety (EHS) Guidelines, General EHS Guidelines: Community Health and Safety (April 30.20070)

### 2.3. INSTITUTIONAL ARRANGEMENT

The Ministry of Environmental Conservation and Forestry (MOECF) was reformed as the Ministry of Natural Resources and Environmental Conservation (MONREC) on 30th March, 2016 in order to undertake both environmental and natural resources conservation and management more effectively. Under Section 3 of the Environmental Impact Assessment Procedure (2015), pursuant to section 21 of the law and Articles 52, 53 and 55 of the Environmental Conservation Rules, all projects and project expansions undertaken by any organization, which may cause impact on environmental quality that, are required to obtain prior permission. This is to be in accordance with section 21 of the Environmental Conservation Law, and Article 62 of the Environmental Conservation Rules, having the



potential to cause adverse impacts, that are required to undertake IEE or EIA or to develop an EMP, and to obtain an Environmental Compliance Certificate (ECC) in accordance with this EIA procedure.

#### **2.4. COMMITMENT OF CHARIS COMPANY LIMITED**

Charis Company Limited shall be responsible for the preservation of the environment at and around the area of project site. In addition to this, it shall carry out as per instructions made by Ministry of Natural Resources and Environmental Conservation (MONREC) in which to conduct an EMP which describe the measure to be taken for preventing, mitigation and monitoring significant environment impacts resulting from the implementation and operation of proposed project or business or activity has to be prepared and submitted and to perform activities in accordance with this EMP and be abided by the environment policy, Environmental Conservation Law and other environmental related rules and procedures.

- a) The accuracy and completeness of the EMP,
- b) That the EMP has been prepared in strict compliance with applicable laws including this Procedure
- c) That the Project will at all times comply fully with the commitments, mitigation measures, and plans in the EMP Report.

Charis shall be responsible for the environmental assessment of factory development as follows:

- Monitoring the factory area operations according to EMP and Environmental Monitoring Plan (EMoP)
- Submitting environmental monitoring reports to ECD
- Planning and implementation of CSR activities
- To set up welfare plan such as staff medical checkup, training program and Public talk for getting knowledge, risk prevention, bonus and social security service
- To carry out fire safety assessment and ensure adequate and appropriate fire safety measures for employees

### 3. PROJECT DESCRIPTION

#### 3.1.1. Location

Charis factory is located at Plot No. 103, Myay Taing Block No. (14), Shwe Than Lwin Industrial Zone, Hlaing Thar Yar Township, Yangon region. Location map is as shown in Figure 3-1.

#### 3.2. SITE DESCRIPTION

The total area of project site is 2.106 acre (8,522.6796 square meters). Main structure is designed into production area for one building. Transformer room, generator room and water treatment plant are separated by main factory building structure. The factory layout plan can be seen in Figure 3-3.

**Table 3-1 Charis Company Limited's Project Life Span**

Phase	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041		
Construct ion Phase	→																									
Operatio n Phase																										
Decommi ssioning Phase																									→	

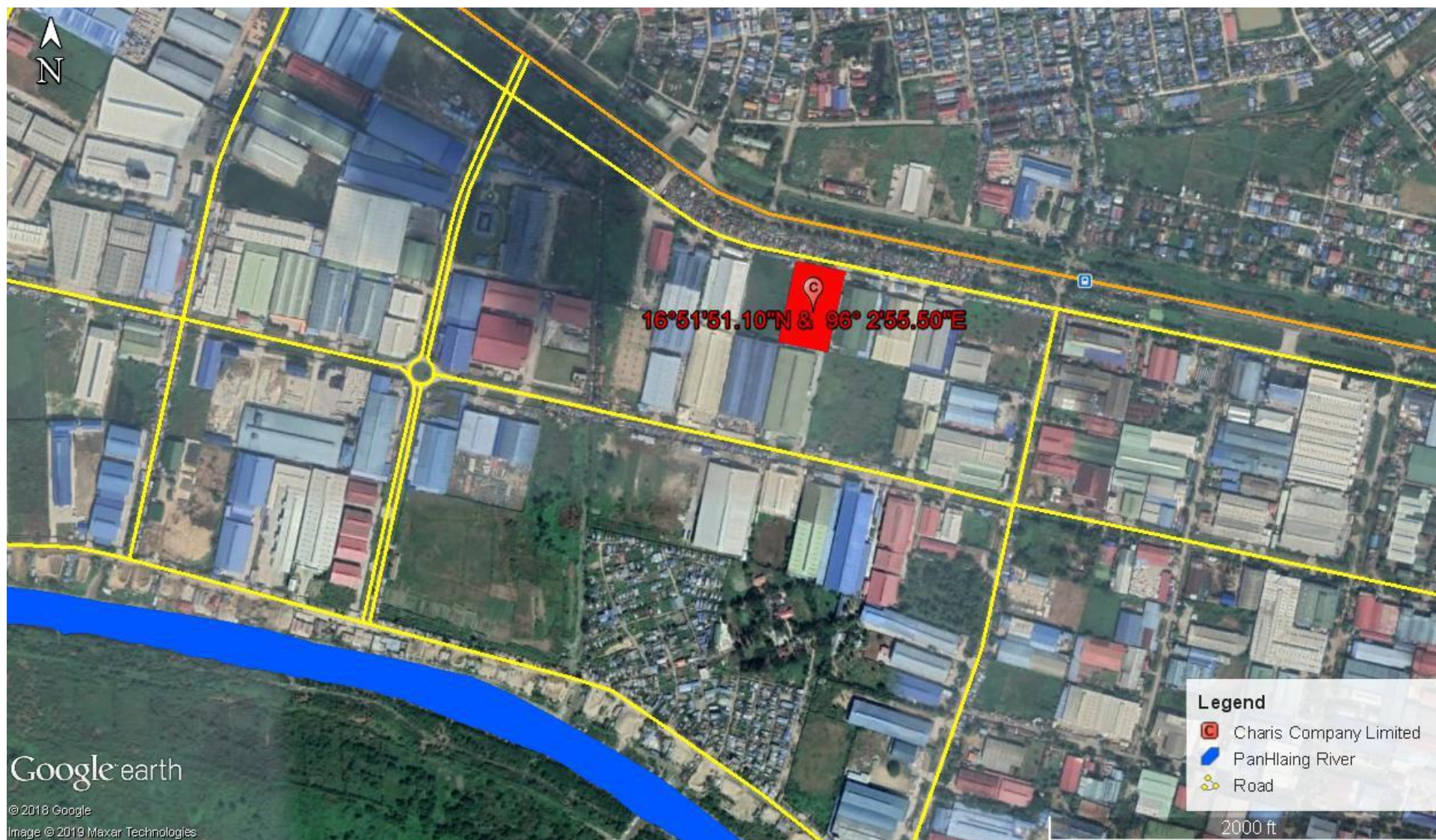


Figure 3-1 Location map (Google source)





**Figure 3-2 Factory layout map**

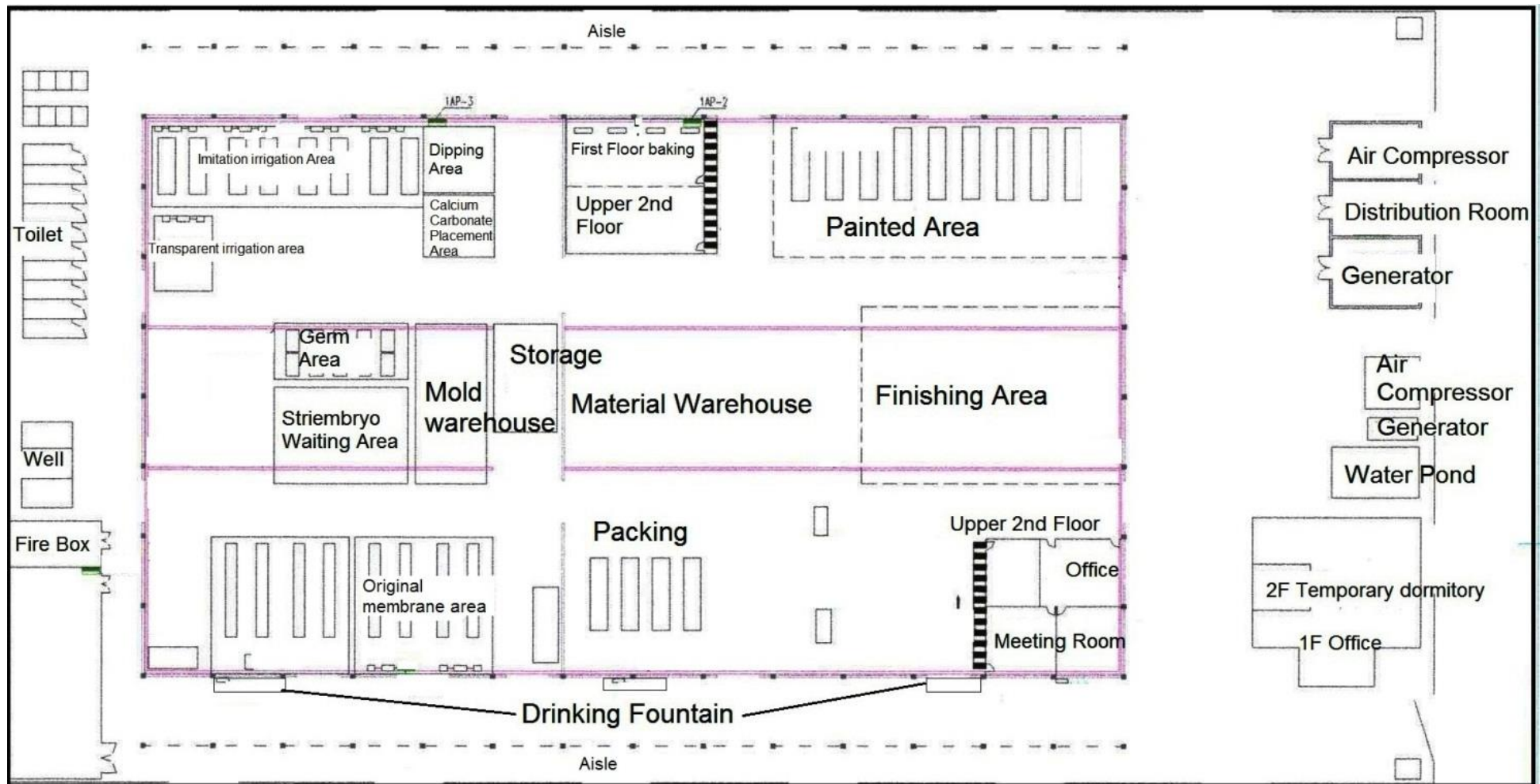


Figure 3-3 Factory layout drawing

### 3.3. PROJECT OPERATION

#### 3.3.1. Machinery and equipment

Lists of machinery and equipment required for the Charis factory is following in Table 3-2. The machinery running day is 262 days in a year.

**Table 3-2 List of machinery**

No.	Machinery Name	Asset	Quantity
1	Generators	Pc	1
2	Switch Box	Set	1
3	Voltage Regulator	Pc	1
4	Air Compressor Pump	Pc	1
5	Air Compressor Tank	Pc	1
6	Dehydrator	Pc	1
7	Vacuum Pump	Pc	5
8	Vacuum Chamber	Pc	10
9	Grinding Belt Machine	Pc	2
10	Press Machine	Pc	1
11	Packing Machine	Pc	1
12	Pad Printing Machine	Pc	1
13	Polisher	Pc	4
14	Mixing Machine	Pc	2
15	Vacuum Cleaner	Pc	4
16	Water Curtain Cabinet	Pc	3
17	Fettling Pen	Pc	20
18	Spray Gun	Pc	3
19	Small Airbrush	Pc	15
20	Electric Oven	Pc	2
21	Grinder	Pc	1
22	Dehumidifier	Pc	2
23	UV Curing Machine	Pc	1
24	Foam Cutting Machine	Pc	3
25	Flat Bed Die-Cutting Machine	Pc	1
26	Drilling Bench	Pc	2
27	Water Fountain	Pc	2
28	Computer	Pc	6

No.	Machinery Name	Asset	Quantity
29	Copy Machine	Pc	1
30	Electronic Scale (Large)	Pc	1
31	Electronic Scale (Medium)	Pc	600
32	Electronic Scale (Small)	Pc	600
33	Weighing Scale	Pc	600
34	Blower	Pc	8
35	Glue Gun	Pc	4
36	Electric Pot	Pc	1
37	Pneumatic Chisel	Pc	3
38	Time Clock	Pc	3
39	Small Dolly	Pc	8
40	Heat Shrink Film Machine	Pc	2
41	Security Monitor System	Pc	1
42	Projector	Pc	1
43	Printer	Pc	1
44	Fax Machine	Pc	2
45	Color Controller Box	Pc	2
46	Bench Polishing Machine	Pc	1
47	Measuring Tools	Pc	1
48	Hydraulic Pallet Jack	Pc	1
49	Forklift	Pc	4
50	Power Saw	Pc	1
51	Washer	Pc	1
52	Plastic Container	Pc	100
53	Air Condition System	Pc	2
54	Network Router	Pc	1
55	Network Server	Pc	1
56	Network Switchboard	Pc	1
57	Telephone	Pc	20
58	Group Telephone System	Pc	1
59	UPS Power System	Pc	2
60	Manetic Switch (36-45 A)	Pc	8
61	Manetic Switch (8-16 A)	Pc	15
62	Cable (4mm <sup>2</sup> *3+2.5mm*1)	M	300

No.	Machinery Name	Asset	Quantity
63	Cable	M	200
64	Scaling Strip	Kg	100
65	Rubber Hose	M	200
66	Drill	Pc	100
67	Bearings	Pc	30
68	Heating Wire	Kg	300
69	Air Tube	Pc	500
70	Screws	Pc	200
71	Electric Screw Driver	Pc	15
72	Surgical Blade	Pc	1160
73	Metal Saw Blade	Pc	500
74	Utility knife	Pc	100
75	Utility knife blade	Pc	5000
76	Scraper	Pc	150
77	Scissor	Pc	60
78	Pliers	Pc	40
79	Electric Welding Machine	Pc	10
80	Sandpaper	Pc	10000
81	Sanding wheel	Pc	500
82	Sanding belt	Pc	2000
83	Polishing wax	Pc	300
84	Buffing wheel	Pc	1000
85	Nylon wheel	Pc	300
86	Steel Wheel	Kg	1000
87	V-belt	Pc	50
88	Coloring pen	Pc	60000
89	Air Pressure Gun nozzle	Pc	2000
90	Air Pressure Gun	Pc	30
91	Isoamyl Acetate Container	Pc	600
92	Water ladle	Pc	600
93	Plastic Cup	Pc	600
94	Syringe	Pc	700
95	Rubber Ring	Kg	500
96	Rubber wheel	Pc	500



No.	Machinery Name	Asset	Quantity
97	16W LED Light Pipe	Pc	1000
98	16W LED Light Double Base	Pc	500
99	Ceiling fan	Pc	200
100	Industrial powder detergent	Kg	2000
101	Copy paper	Pc	600
102	Ink	Kg	200
103	Gloves	Pc	16000
104	Mask	Pc	50000
105	Sheath	Pc	3000
106	Apron	Pc	3000
107	Black rubber gloves	Pc	600
108	Goggle	Pc	60
109	Plastic Finger Cot	Kg	100
110	Plastic Glove	Pc	40000
111	Uniform	Pc	800
112	Activated Carbon Mask	Pc	100000
113	Caliper	Pc	10
114	Set square	Pc	3
115	Square ruler	Pc	5
116	Lever ruler	Pc	5
117	Tape measure reel	Pc	10

### 3.3.2. Work force

Human resource required by foreign experts/technicians and local persons for administrative and production process are about 90 persons (Table 3-3).

**Table 3-3 Employment Schedule of Charis Company Limited**

No	Particular	Local	Foreign
1	Manager	1	
2	Production Manager	1	1
3	Accounting/ Bookkeeping	1	
4	Shipping clerk	1	
5	Personnel supervisor	1	
6	Quality Controller	5	

7	Warehouse clerk	2	
8	Driver	1	
9	Security personnel	4	
10	Cleaning personnel	3	
11	Skilled labor	4	4
12	General labor	460	
13	Translator	3	
14	Production technician	1	
15	Mechanic	1	
16	Section leader	10	
17	Office clerk	1	
18	Supervisor		1
		<b>500</b>	<b>6</b>
<b>Total</b>		<b>506</b>	

### 3.3.3. Raw Material

The main Raw Materials are poly resin, which are imported from Korea, China, Japan. Raw materials require for a piece of product is described in Table 3-4.

**Table 3-4 List of Raw Material Requirement**

No	Particular	Unit	1 pc of Polyester resin product	Annual Requirement
1	Primary Material: Unsaturated polyester resin	Kg	0.5	500,000
2	Stone powder	Kg	0.47	470,000
3	Bronze powder	Kg	0.02	20,000
4	Paint	Kg	0.0102	10,200
5	Color box	Kg	0.03	30,000
6	Cardboard box	Kg	0.05	50,000
7	Packaging tape	Kg	0.001	1,000
8	Bubble bag	Kg	0.002	2,000
9	Sponge foam	Kg	0.001	1,000
10	Foam padding	Kg	0.03	30,000
11	Silicone	Kg	0.012	12,000
12	Plaster	Kg	0.14	140,000
13	Tape	Kg	0.0006	600

No	Particular	Unit	1 pc of Polyester resin product	Annual Requirement
14	Transparent tape	Kg	0.0004	400
15	Steel rod	Kg	0.0005	500
16	Aluminium oxide powder	Kg	0.0008	800
17	Silicone oil	Kg	0.0008	800
18	Fiber	Kg	0.002	2,000
19	Gauze	Kg	0.0001	100
20	Modeling clay	Kg	0.001	1,000
21	Hardener	Kg	0.001	1,000
22	Resin color cream	Kg	0.0005	500
23	Copper foil	Kg	0.00005	50
24	Acetone water	Kg	0.02	20,000
25	Isoamyl acetate	Kg	0.015	15,000
26	Mineral oil	Kg	0.0012	1,200
27	Turpentine	Kg	0.002	2,000
28	Sodium hydroxide	Kg	0.0008	800
29	Ethylene vinyl acetate	Kg	0.00065	650
30	Super glu	Kg	0.002	2,000
31	Epoxy / hardener two-component adhesives	Kg	0.0002	200
32	Sticker	Kg	0.0005	500
33	Barcode	Kg	0.0005	500
34	Foam double sided tape	Kg	0.0003	300
35	Masking tape	Kg	0.0008	800
36	Double sided tape	Kg	0.0005	500
37	Polyester bag	Kg	0.0005	500
38	Hardware accessories	Kg	0.0003	300
39	Metal wire	Kg	0.004	4,000
40	Magnet	Kg	0.0005	500
41	Tag	Kg	0.0005	500
42	Instruction manual	Kg	0.00043	430
43	Backboard	Kg	0.001	1,000
44	Velvet	Kg	0.0005	500
45	Velvet pad	Kg	0.0002	200
46	Fiber rod	Kg	0.0008	800
47	Water decal	Kg	0.00008	80

### 3.3.4. Production Process

The process flow diagram for high quality poly resin product, cold cast bronze, pewter and collectibles manufacturing is shown in Figure 3-4. Printing is carried out on a roller printing machine. The dye or pigment is thickened with starch or made into emulsion, which in the case of pigment colors is prepared with an organic solvent. The engraved rollers, which print the material, take up this paste or emulsion and the color is subsequently fixed in the ager or curing machine. The printed cloth then receives the appropriate finishing treatment.

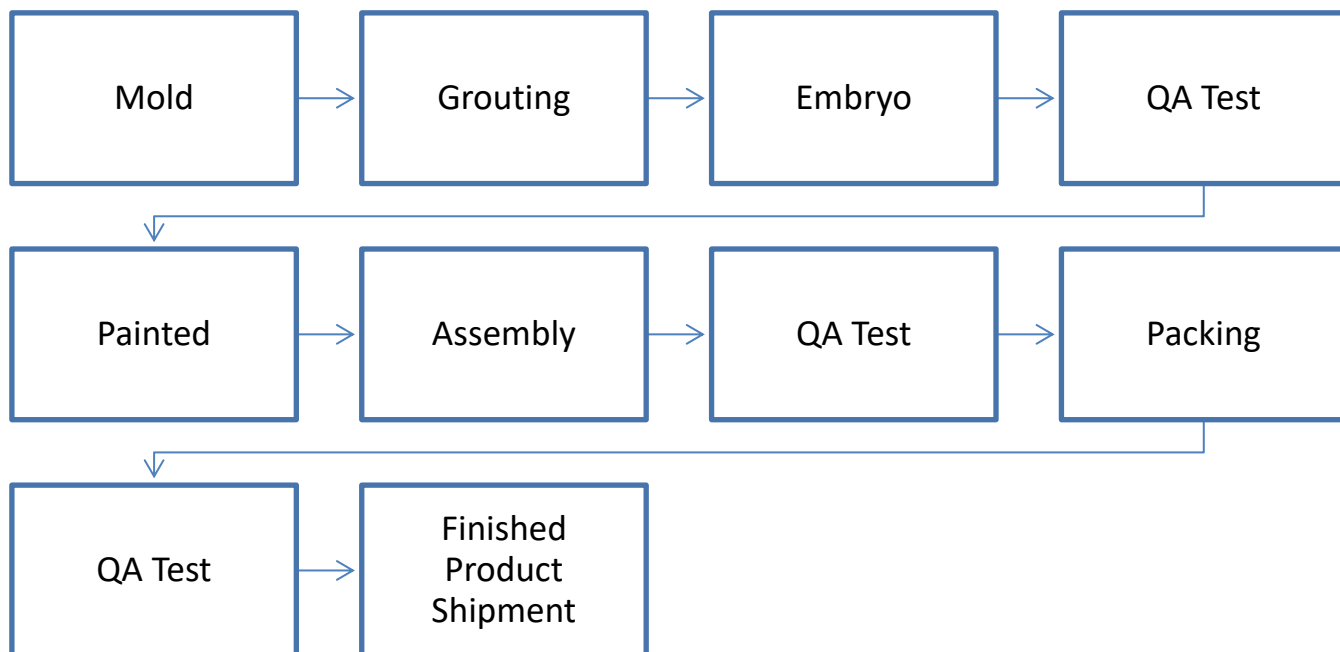


Figure 3-4 Process flow diagram of Charis factory



Molding Area



Grouting Section



Embryo



Painted Section



Assembly section



Packing section

**Figure 3-5 Production process photo of Charis factory**

### 3.3.5. Products

The products of Charis factory are Poly Resin Products. Table 3-5 is described in annual production rate.

**Table 3-5 Annual production rate**

No	Particulars	Unit	Yr - 1	Yr - 2	Yr - 3	Yr 4	Yr 5	Yr 6-10
I	<b>Total Production (Pcs)</b>	<b>Pcs</b>	<b>1,000,000</b>	<b>1,000,000</b>	<b>1,000,000</b>	<b>1,100,000</b>	<b>1,150,000</b>	<b>1,200,00</b>
1	Poly Resin Product	Pcs	1,000,000	1,000,000	1,000,000	1,100,000	1,150,000	1,200,00

### 3.4. UTILITIES AND FACILITIES

The Utilities for proposed factory include electrical power, fuel oil for emergency used generator and water for general uses. Electric power is used for the purpose of to run the machinery and to provide lighting.



### 3.4.1. Water

Shwe Than Lwin industrial zone has no centralized water supply system and the factory gets water from the tube wells installed inside the factory compound. Groundwater from this tube well is pumped in the storage tanks for the factory and domestic use. The main water use in the proposed project is for domestic usage such as for personal washing, food preparation, and washing of utensils. Drinking water will be provided by outsource suppliers. Figure 3-6 is described by water storage tank and drinking water supply for Charis factory.



Figure 3-6 Water storage tank and drinking water supply

### 3.4.2. Electricity and fuel requirement

The proposed project is intended to get required electricity supply form Yangon City Electricity Supply Board (YESB) and distributed by 315 kVA of Transformer. Another sources of energy 100 kVA and 500 KVA generators will also be kept as the emergency generator if normal electricity supply could not provide for the proposed project.



Figure 3-7 Electricity facility at Charis factory

### 3.4.3. Toilet Facilities

Currently toilet facilities have hygienic toilets already provided and categorized by gender, marked distinctly for men and women by signs and symbols. In addition, toilet areas will also be provided with water sinks, necessary toiletries, and hand washing soaps, hand drying facilities, and waste bins. Total numbers of toilet for males are 5 rooms and for females are 5 rooms.



Figure 3-8 Toilet facility photo

### 3.4.4. Firefighting plan of proposed project

The factory is prepared the firefighting for their factory safety.



Figure 3-9 Emergency safety and fire management

## 3.5. GENERATION OF WASTE, EMISSION AND DISTURBANCES

### 3.5.1. Status of the Factory

Charis Company Limited is using ground water for both industrial and household purpose, which is supplied by deep tube well. The factory also has generators for electricity generation. The fuel used in the industry is Diesel and Purchased electricity. The sanitary liquid waste of the factory is stored in septic tank.

The major pollution caused by the factory's operation are water pollution by discharging liquid waste generated in wet process i.e., air pollution by generator's effluent gas emission, noise pollution created during the operation of generator and other machines.

Solid waste (recycle waste) such as sludge, broken machine parts, etc., are hand over to local waste collector. Although the factory causes some pollution but also has a positive side and that is the factory has created employment for many people, due to this factory local community has built up daily.

### **3.5.2. Industrial Wastes**

Total amount of waste about maximum 0.13 ton per day are generated from operation process.

### **3.5.3. Human wastes**

The number of staff and workers required in the day shift for the factory is maximum 90 persons during operation. Solid waste generated from maximum number of operators and office staffs with assumption of waste generation rate at 35.1 kg/day was calculated based on solid waste generation rate of 0.39 kg/person/day<sup>2</sup>.

Domestic wastewater generated by maximum amount of 90 persons with assumption rate at 9 m<sup>3</sup>/day was calculated based on domestic wastewater generated rate of 0.1 m<sup>3</sup>/person/day<sup>3</sup>. This water will be released in operation hour discharge to septic tank or factory drainage.

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<sup>2</sup> The Yangon City solid waste generation rate as of 2012 is 0.39 kg per person per day (Pollution Control and Cleansing Department, Yangon City Development Committee, 2014).

<sup>3</sup> The domestic wastewater generation was based on typical wastewater generation rate of 0.1 m<sup>3</sup> per person per day (Metcalf & Eddy, 2004)



## 4. BRIEF DESCRIPTION OF SURROUNDING ENVIRONMENT

The purpose of this Chapter is to predict how environmental and socio-economic conditions will affect because of the implementation of the proposed Project. This requires a sound understanding of the baseline conditions at the project site, which established through desktop study research, site surveys, primary data collection and projections for future developments. Findings provide the current and future characteristics of the project site and the value and vulnerability of the key environmental and socio-economic resources and receptors. The following sections provide a description of the environmental and socio-economic aspects of the project.

### 4.1. METHODOLOGY FOR DATA COLLECTION AND ANALYSIS

The followings methodologies are used for Environmental Management Plan (EMP) for this report preparation;

- Onsite Measurements and Analysis – Baseline parameters such as Indoor temperature, humidity, operation light conditions, noise and water quality of the project site during operation phase were measured onsite. The analyzed results are mentioned in this chapter.
- Secondary data collection of proposed project site area – Socio economic condition, physical/biological environment, and weather data are collected from official township data of Hlaing Thar Yar Township, Yangon Region.

### 4.2. BASELINE ENVIRONMENTAL MONITORING

The baseline environmental quality at the Project Site and its immediate surroundings was established by groundwater, wastewater and ambient air quality samples; as well as noise measurements at immediate surrounding areas. The data is presented below.

### 4.3. AIR QUALITY STANDARD

National Environmental Quality (Emission) Guideline (NEQG) has set the ambient air quality in Myanmar and World Health Organization (WHO) as shown in Table 4-1.

**Table 4-1 Ambient Air Quality Standard of NEQG and WHO**

Item	Avg period	NEQG	WHO
SO <sub>2</sub>	10 mins	500 µg/m <sup>3</sup>	500 µg/m <sup>3</sup>
	1 hour	-	-
	24 hours	20 µg/m <sup>3</sup>	125 µg/m <sup>3</sup> (Interim target-1) 50 µg/m <sup>3</sup> (Interim target-2) 20 µg/m <sup>3</sup> (Guideline)
	1 year	-	-
NO <sub>2</sub>	1 hour	200 µg/m <sup>3</sup>	200 µg/m <sup>3</sup>
	24 hours	-	-
	1 year	40 µg/m <sup>3</sup>	40 µg/m <sup>3</sup>
CO	1 hour	-	-
	8 hours	-	-

Item	Avg period	NEQG	WHO
	24 hours	-	-
	1 hour	-	-
PM <sub>10</sub>			150 µg/m <sup>3</sup> (Interim target-1) 100 µg/m <sup>3</sup> (Interim target-2) 75 µg/m <sup>3</sup> (Interim target-3) 50 µg/m <sup>3</sup> (Guideline)
	24 hours	50 µg/m <sup>3</sup>	
	1 year	20 µg/m <sup>3</sup>	70 µg/m <sup>3</sup> (Interim target-1) 50 µg/m <sup>3</sup> (Interim target-2) 30 µg/m <sup>3</sup> (Interim target-3) 20 µg/m <sup>3</sup> (Guideline)
PM <sub>2.5</sub>	24 hours	25 µg/m <sup>3</sup>	75 µg/m <sup>3</sup> (Interim target-1) 50 µg/m <sup>3</sup> (Interim target-2) 37.5 µg/m <sup>3</sup> (Interim target-3) 25 µg/m <sup>3</sup> (Guideline)
	1 year	10 µg/m <sup>3</sup>	35 µg/m <sup>3</sup> (Interim target-1) 25 µg/m <sup>3</sup> (Interim target-2) 15 µg/m <sup>3</sup> (Interim target-3) 10 µg/m <sup>3</sup> (Guideline)
O <sub>3</sub>	1 hour	-	-
	8 hours	100 µg/m <sup>3</sup>	160 µg/m <sup>3</sup> (Interim target-1) 100 µg/m <sup>3</sup> (Guideline)

Source: Myanmar: National Environmental Quality (Emission) Guidelines (December, 2015). WHO: WHO Air Quality Guidelines 2005

#### 4.4. NOISE LEVEL STANDARD

In NEQG, the noise level is set as shown in Table 4-2 and noise prevention and mitigation measures should be taken by all projects where the predicted or measured noise impacts from a project facility or operation exceed the applicable noise level guideline at the most sensitive point of reception. Noise impact should not exceed the levels shown below, or result in a maximum increase in background levels of three decibels at the nearest offsite receptor location.

**Table 4-2 Noise Level Standard of NEQG**

Receptor	One Hour LAeq (dBA)	
	Day Time (7:00-22:00) (10:00-22:00 for public holidays)	Night Time (22:00-7:00) (22:00-10:00 for public holiday)
Residential, Institutional, Educational	55	45
Industrial, Commercial	70	70

## 4.5. LIGHT LEVEL STANDARD

Activities of the workers in the garment factory are highly dependent on the quality of light. Therefore, the consultant conducted the light measurement in the garment factory is presented. The illustrates the recommended illumination and limiting glare index applicable to typical works (fairly severe to very severe tasks) in garments factory is provided in Table 4-3.

**Table 4-3 IEESNA Lighting Handbook**

Department	Type of Light	Wattage of Light	Lux Level
Warehouse	Fluorescent tube light	40 W	300
Sewing floor	LED tube light	20 W (T8)	400
Cutting floor	LED tube light	22 W (T8)	1000
Finishing	LED tube light	28 W (T8)	600
Inspection points	LED tube light	28 W (T8)	900 (except 1500 at audit tables)
Sampling	LED tube light	22 W (T8)	500
Office areas	Fluorescent tube light	36 W (T)	300

### 4.5.1. Methodology

The environmental parameters such as ambient air quality, noise level and light level which were measured by using air quality monitoring system (AQM-09), BENETECH (Digital Sound Level Meter) and Unit-T (Luminometer). Measurements were recorded in the operation within duration of working hours between consecutive measurements. The points for measurement are near the operation area and segregated section. Based on the results appropriate interventions are suggested.

## 4.6. SURVEY ITEMS

On 11 November 2020, to determine the existing baseline ambient air quality status within the project site. The baseline environmental quality at the Project Site and its immediate surroundings was established by ambient air quality samples, noise, light, temperature and humidity measurements at immediate surrounding areas.

The overall conditions of air quality, noise level and light level are quoted from the project. The summary of the field survey for overall conditions is shown in Table 4-4.

**Table 4-4 Summary of Environmental Survey**

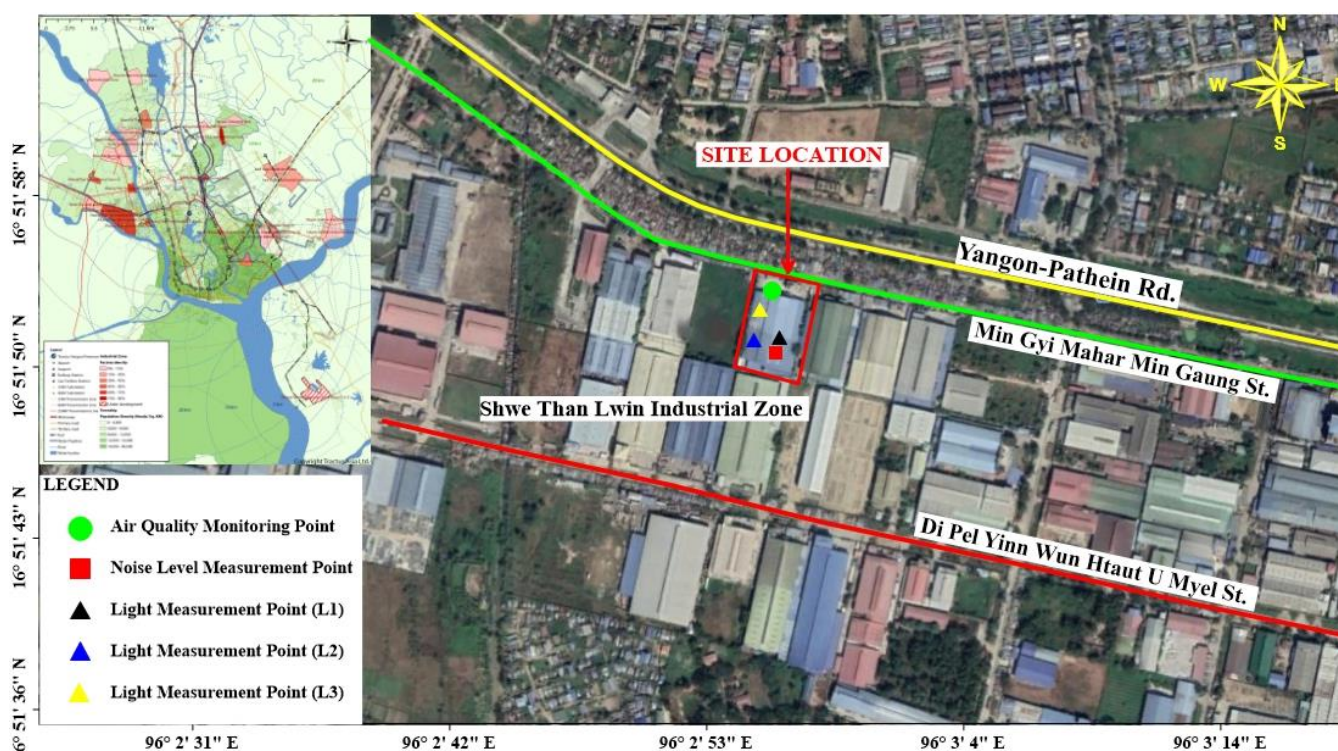
Item	Parameter
Air quality	(1) Sulphur Dioxide (SO <sub>2</sub> ), (2) Nitrogen Dioxide (NO <sub>2</sub> ), (3) Carbon Monoxide (CO), (4) Ozone (O <sub>3</sub> ), (5) Carbon Dioxide (CO <sub>2</sub> ), (6) Volatile Organic Compound (VOC), (7) Total Suspended Particles (TSP), (8) Particulate Matter (PM <sub>10</sub> & PM <sub>2.5</sub> ) and (9) Air Pressure
Noise level	Indoor sound level (LAeq)
Light level	Industry light condition (Lux)

## 4.7. SURVEY LOCATION

This environmental monitoring point was located in Shwe Than Lwin Industrial Zone, Hlaing Thar Yar Township. The details of the location of survey point is presented in Table 4-5 and Figure 4-1.

**Table 4-5 Location of Survey Point**

Survey point	Coordinates	Type of survey point	Description of survey point
Air Quality Monitoring Point (AQM)	16°51'52.91"N 96°2'55.66"E	Project site	Between project site, Yangon-Pathein Road and near Mingyi Mahar Min Gaung Street.
Noise Level (NL)	16°51'50.61"N 96°2'55.73"E	Project site	Between project site, operation area and Mingyi Mahar Min Gaung Street.
Light (L1)	16°51'50.93"N 96°2'55.87"E	Project site	Mould Making Area
Light (L2)	16°51'50.9"N 96°2'54.84"E	Project site	Moulding Area
Light (L3)	16°51'52.25"N 96°2'55.21"E	Project site	Painting Area



**Figure 4-1 Monitoring Location Map**

#### 4.7.1. Air Quality Monitoring Point (AQM)

This station was installed in flat area, located near Pun Hlaing River and about 0.8km away from this river. This survey point is situated about 0.03km from Mingyi Mahar Min Gaung Street, it is also situated 0.08km away from Yangon-Pathein Road and 0.27km from Di Pel Yinn Wun Htaut U Myel Street. Between survey point and Pun Hlaing River, its average elevation is about 21ft, maximum is 34ft and minimum is 8ft. And elevation gain/loss are 28.8ft and -35.8ft. And also, there are many factories around this survey point.

#### 4.7.2. Noise Level (NL)

Survey point is located in an open area inside the project site (0.1km away from the Mingyi Mahar Min Gaung Street). It is also situated 0.13km away from Yangon-Pathain Road and 0.21km away from Di Pel Yinn Wun Htaut U Myel Street. Between survey point and Pun Hlaing River, its average elevation is about 24ft, maximum is 36ft and minimum is 11ft. And elevation gain/loss are 27.8ft and -28.1ft.

#### 4.7.3. Light Level (L1)

Survey point 1 is located in mould making area inside the project site. In this area, the various kinds of moulds are first making before moulding the various kinds of dolls.

#### 4.7.4. Light Level (L2)

Survey point 2 is located in moulding area inside the project site. The various kinds of dolls are making by using with the various kinds of moulds in this area. After that, the dolls are smoothen to become distinct dolls in detailed shaping area.

#### 4.7.5. Light Level (L3)

Survey point 3 is located in painting area inside the project site. In this area, the various kinds of dolls from detailed shaping area are painting finally.

The following table describes the meteorological measurement of the proposed project site on 11 November 2020. According to the data, the indoor temperature and humidity condition shows the average temperature of 37.62°C while the average humidity is 47.46%.

**Table 4-6 Meteorological Measurement at Project Site**

Date and Time	Description	Result value	Environmental parameter air station guideline
November 11, 2020	Air Pressure	1012.28 hPa	Present condition
	Relative Humidity, RH %	47.46 (%)	Present condition
	Temperature	37.62 °C	Present condition

### 4.1. RESULT OF AIR QUALITY (GAS AND DUST PARAMETER)

The observations were tabulated and analyzed section wise to understand the environmental status prevailing in the units considered for the study. It was observed that the air quality of SO<sub>2</sub>, O<sub>3</sub> and NO<sub>2</sub> concentration level and particulate matter (PM<sub>10</sub> & PM<sub>2.5</sub>) are within the National Environmental Quality (Emission) Guideline.

**Table 4-7 Ambient Air Quality at Project Site**

Parameter	Average Period	Result	WHO <sup>2</sup> Value (µg/m <sup>3</sup> )	NEQ <sup>1</sup> Value (µg/m <sup>3</sup> )
Total Suspended Particles (TSP)	-	35.26 µg/m <sup>3</sup>	NG*	NG*
Particulate Matter (PM <sub>10</sub> )	24-hours	27.8 µg/m <sup>3</sup>	50	50



Parameter	Average Period	Result	WHO <sup>2</sup> Value (µg/m <sup>3</sup> )	NEQ <sup>1</sup> Value (µg/m <sup>3</sup> )
Particulate Matter (PM <sub>2.5</sub> )	24-hours	24.37 µg/m <sup>3</sup>	25	25
Sulphur Dioxide (SO <sub>2</sub> )	10-mins	130.9 µg/m <sup>3</sup>	500	500
Nitrogen Dioxide (NO <sub>2</sub> )	1-hour	84.6 µg/m <sup>3</sup>	200	200
Carbon Monoxide (CO)	-	675.3 µg/m <sup>3</sup>	NG*	NG*
Ozone (O <sub>3</sub> )	8-hours	42.3 µg/m <sup>3</sup>	100	100
Carbon Dioxide (CO <sub>2</sub> )	-	601.59 ppm	NG*	NG*
Volatile Organic Compound (VOC)	-	32.3 µg/m <sup>3</sup>	NG*	NG*

1 NEQ = National Environmental Quality (Emission) Guideline 2015

2 WHO = World Health Organization

\* NG = No Guideline

## 4.2. AIR QUALITY INDEX (AQI)

Air impact source of emergency used of generator and vehicle movements and transportation of raw materials may also generate particulate matters and gas particle. However, these anticipated impacts are in manageable limits to control the air pollution with relevant mitigation measures and the proposed factory will be managed by using their HSE guidelines.

The United States Environmental Protection Agency (EPA) has developed an Air Quality Index that is used to report air quality. This AQI is divided into six categories indicating increasing levels of health concern. An AQI value over 300 represents hazardous air quality and below 50 the air quality is good.

AQI Values	Level of Health Concern	Colour
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for sensitive group	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

The air quality index is a piecewise linear function of the pollutant concentration. At the boundary between AQI categories, there is a discontinuous jump of one AQI unit. To convert from concentration to AQI this equation is used;

$$I = \frac{I_{high} - I_{low}}{C_{high} - C_{low}}(C - C_{low}) + I_{low}$$

Where;

I = the (Air Quality) Index

C = the pollutant concentration

$C_{high}$  = the concentration breakpoint that is  $\geq C$   
 $C_{low}$  = the concentration breakpoint that is  $\leq C$   
 $I_{high}$  = the Index breakpoint corresponding to  $C_{high}$   
 $I_{low}$  = the index breakpoint corresponding to  $C_{low}$

Items	O <sub>3</sub> (ppb)	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	CO (ppm)	SO <sub>2</sub> (ppb)	NO <sub>2</sub> (ppb)	AQI value	Level of Health concern
	$C_{low} - C_{high}$ (Avg)	$C_{low} - C_{high}$ (Avg)	$C_{low} - C_{high}$ (Avg)	$C_{low} - C_{high}$ (Avg)	$C_{low} - C_{high}$ (Avg)	$C_{low} - C_{high}$ (Avg)	$I_{low} - I_{high}$	
<b>Monitoring result (Hour)</b>	50 - 81 (8-hr)	15 - 58 (24-hr)	18 - 78 (24-hr)	0.3 - 2.7 (8-hr)	25 - 50 (24-hr)	28 - 76 (1-hr)	51 - 100	
<b>Air Quality Index</b>	74.11	61.68	59	56.92	100	68.32	56.92 - 100	Moderate

#### 4.2.1. AQI and Health Implications

AQI Value (Moderate)	Health Implications	Recommended Precautions
56.92 – 100	Some pollutants may slightly affect very few hypersensitive individuals.	Only very few hypersensitive people should reduce outdoor activities.

### 4.3. NOISE LEVEL

The Noise Level is measured by using Digital Sound Level Meter for working 8 hours on 11 November 2020. The average noise level in the project site area is presented in and compared with NEQ guideline. However, according to the Noise level monitoring at operation area, the levels of this areas are within the acceptable level of National Environmental Quality (Emission) Guideline.

**Table 4-8 Noise Level Measurement Result**

Date/Time	Location	Measurement Result	NEQG (Day)
11 November 2020	NL	65.19 dBA	70 dBA

#### 4.3.1. Exposure of Noise

The Occupational Safety and Health Administration (OSHA) have recommended permissible noise exposure limit for industrial workers, which is based on 90 dB (A) for 8hours exposure a day with 5dB trading rates. The limits are mentioned in Table 5-5. According to OSHA, the maximum allowable noise level for workers is 90 dB (A) for 8hours exposure a day. Thus, adequate protective noise impact measures in the form of ear muffs/ear plugs to the workers working in high noise areas, need to provide if actual noise level monitoring results are more than 90 dB (A) at the work site for working time hours for 8 hours.

**Table 4-9 Permissible Exposure of Noise Limits**

Total Time of Exposure Per Day in Hours	Noise Level dB(A)
8	90
6	92
4	95
3	97
5	100
1	105
1/2	110
1/4	115

#### 4.4. LIGHT LEVEL

Appropriate lighting is the need for every department, irrespective to the task being handled. Although, there are some areas where focus on maintaining proper illumination is very crucial in a garment factory, like the inspection points (on-floor and in stores), sampling, and the finishing section, as these areas are crucial for the quality of the production. The tasks involved in these areas require high levels of worker focus and accurate lighting to ensure lower errors and defects passing on to the next stage. However, according to the result of light measurement at operation area (inside the production sector) is in good condition and at the acceptable level of standard.

**Table 4-10 Result of Light Measurement at Proposed Project**

No.	Location	Measure Value (Lux)	Standard*
1.	Raw Materials Area	141	300
2.	Mould Making Area	221	500
3.	Moulding Area	373	600
4.	Detailed Shaping Area	859	1000
5.	Painting Area	252	400

\* Lighting standards and codes usually provide recommended illuminance ratios between the task area and its surroundings (EN 12464-1 2002) (CIBSE 1997) (IESNA 2000, 676708).

#### 4.5. WASTEWATER QUALITY

Wastewater effluent results of the whole factory water are compared with NEQ (emission) Guidelines for Poultry Production (industries specific guideline). In this project, wastewater from proposed factory's laundry section to treat by wastewater treatment plant before discharge into public drainage were collected on 21 May, 2019.

**Table 4-11 Coordinated point of water and wastewater collection point**

Water Parameter	GPS Value	Location
Wastewater	16°51'51.39"N 96°2'55.63"E	Factory Compound



#### 4.5.1. Wastewater result

According to the wastewater analysis results see in Table 4-12 (**Appendix D**), all of the list's parameter are normal to the limit of NEQ (emission) guideline.

**Table 4-12 Water quality laboratory results**

No	Parameter	Unit	Methods	Water result	Effluent standard	Remark
1	pH		pH meters	6.8	6.0 ~ 9.0	Normal
2	Temperature	°C	Estimate Eco-Lab with Jenway	28	± 3 °C	-
3	Color	HU	Lovibond spectro direct method no.203	45	-	-
4	Turbidity	FAU	Lovibond spectro direct method no.385	<5	NG	Clear
5	Total Dissolve Solid	mg/L	Consort multi parameters conductivity meter	245	≤ 2000 mg/L	Normal
6	Total Suspended Solid	mg/L	Livobond spectro direct method no. 383	5	≤ 50 mg/L	Normal
7	Copper	mg/L	AAS, Shimadzu AA-6200 Cu (324.8 nm)	ND	≤ 0.5 mg/L	Lower limit of detection=0.1 mg/L
8	Dissolved oxygen	mg/L	Jenway Dissolved oxygen meter (model 970)	4.75	NG	Normal
9	Biological Oxygen Demand	mg/L	Estimate Eco-Lab with Jenway Dissolved oxygen meter (model 970)	33	≤ 50 mg/L	Above DW limit
10	Chemical Oxygen Demand	mg/L	Livobond spectro direct method no. 131, 130, 132	78	≤ 250 mg/L	Normal
11	Lead	mg/L	AAS, Shimadzu AA-6200 Pb (283.3 nm)	ND	≤ 0.1 mg/L	Lower limit of detection=0.1 mg/L
12	Ammonia	mg/L	Livobond SpectroDirect Method No. 60	0.1	<10 mg/L	Normal

National Environmental Quality (Emission) Guideline

NG= No guideline



Air Quality Monitoring Photos



Noise Level Monitoring Photos



Light Level Measurement Photos



Water sampling

**Figure 4-2 Site monitoring photo**

## **4.6. PHYSICAL COMPONENT**

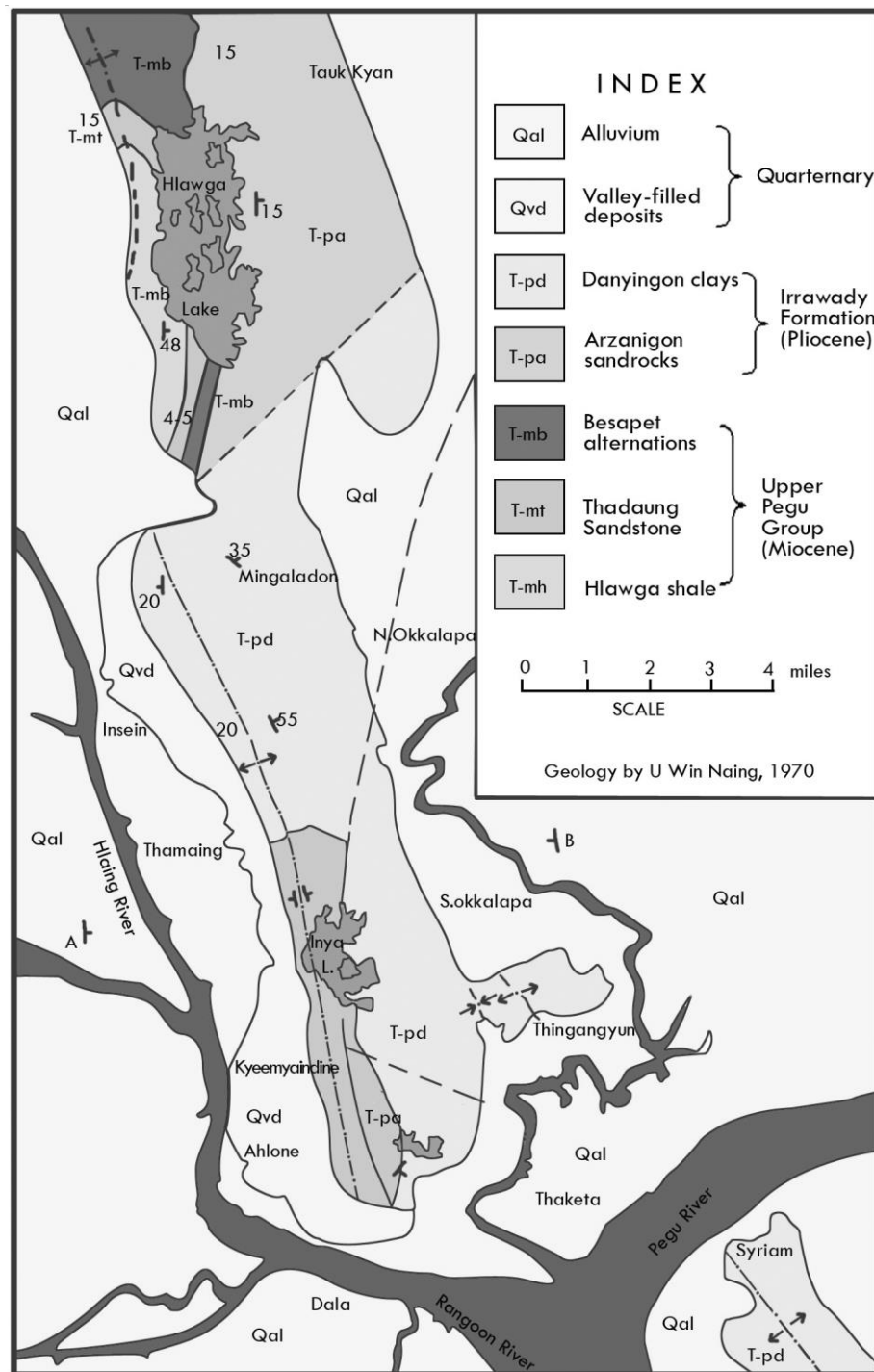
### **4.6.1. Topography**

The proposed project area is situated in Shwe Than Lwin Industrial Zone, Hlaing Thar Yar Township, and its topographic condition is flat. The proposed project site is primarily agricultural land, but now is initiated into the industrial zone area.

### **4.6.2. Geology**

The Yangon area is underlain by alluvial deposits (Pleistocene to Recent), the non-marine fluvial 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 the Irrawaddy formation at 3-4.6 m above mean sea level (MSL). The rock type in Yangon is mainly soft rocks, which consist of sandstone, shale, limestones and conglomerate. Geological map of Yangon Regional area is shown in Figure 4-3.





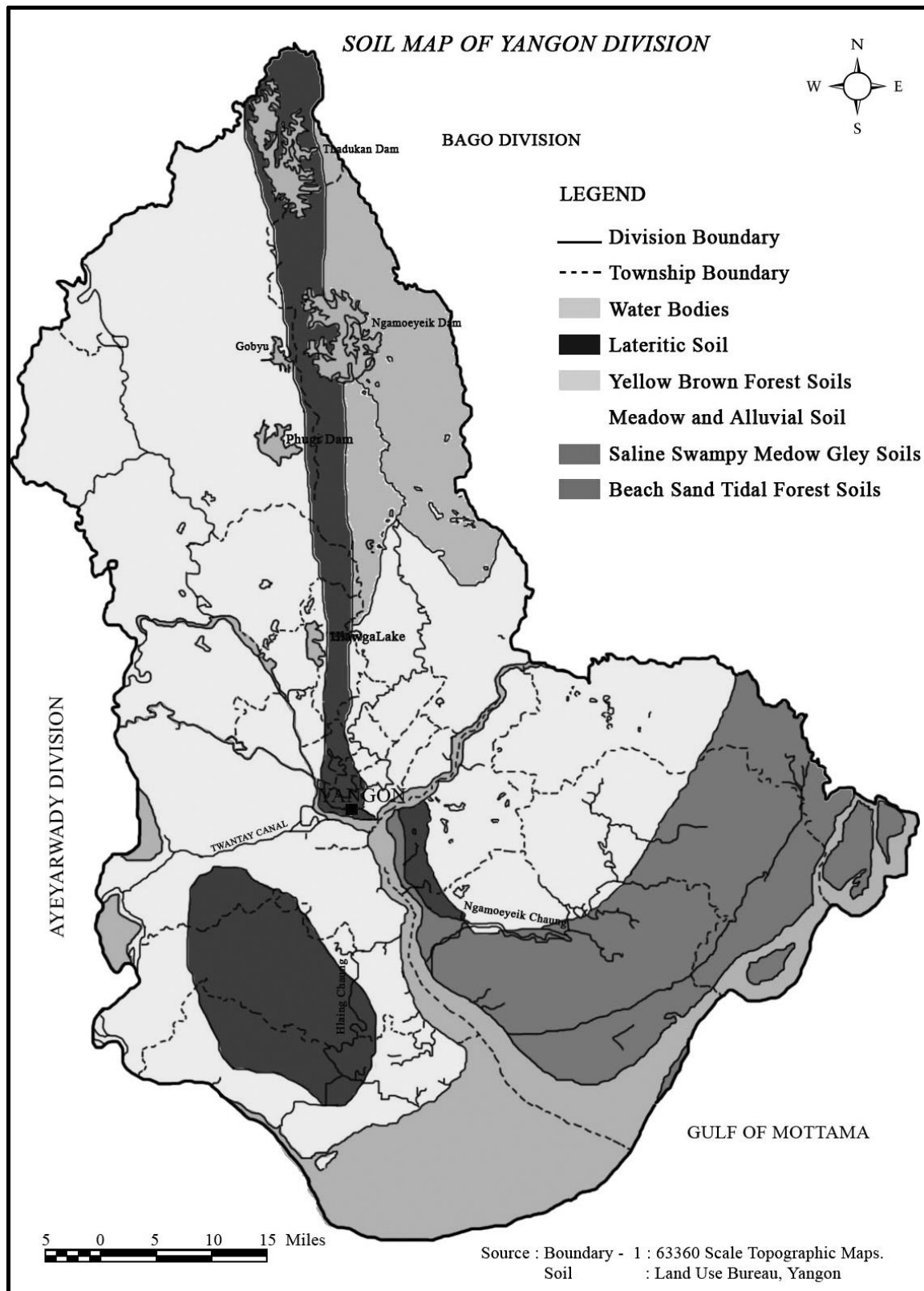
**Figure 4-3 Geological Map of Yangon Region**

#### 4.6.3. Tectonics

Yangon is situated in the southern part of the Central Lowland which is one of the three major tectonic provinces of Myanmar. The Taungnio Range of the Gyophyu catchments area of Taikkyi District, north of Yangon, through the Thanlyin Ridge, south of Yangon forming a series of isolated hills probably resulted from the progressive deformation of the Upper Miocene rocks as the eastern continuation of the subduction or stretching and compression along the southern part of the Central Basin and regional uplifting of the Pegu Yoma (Aung Lwin 2012).

#### **4.6.4. Soil**

The underlying soil type at the Project Site and its surroundings is characterized as the Meadow and Meadow Alluvial Soil. Meadow Soil is soil, which occurs near the river plains exposed to occasional tidal floods, is non-carbonate and usually contains a large amount of salt. Both materials mainly comprise silty clay loam and neutral soil rich in plant nutrient. The upper layers (approximately 0 to 7 m) of the soil at the Project Site comprise largely of cohesive layers with traces of sand and gravel, followed by sand layers with low silt content and trace gravel from 7 to 35 m. The lower layers comprise denser silt layer with traces of sand and gravel from approximately 57 to 70 m. Standard Penetration Test (SPT) results obtained from testing at the Project Site indicate that the soil strength generally increases with depth. The STP results showed that the current soil quality can accommodate the construction of the Project.



**Figure 4-4 Soil map of Yangon (Source: Land use of Bureau of Yangon)**

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#### 4.6.5. Hydrogeology

Yangon is rich in groundwater resources conserved by unconsolidated Tertiary-Quaternary deposits. In Yangon, groundwater is mostly extracted from Valley filled deposits and Ayeyarwady sandstones.

Groundwater: Groundwater availability is generally based on the distribution of permeable and relatively impermeable rocks. The nature of openings in the rocks determines permeability of rocks. 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 areas are areas with those rock units of Hlawga Shale, Thadugan Sandstones and Basepet Alternation of upper Pegu Group (Miocene epoch) and Danyingon Clays of Irrawaddy rocks. These rocks and formations are a dense, massive and consolidated nature and have impervious characteristic. High potential areas are underlain by Pliocene Series and recent Formations. High potential area covers approximately 85 percent of the Yangon city including Pabedan. Stand pipe piezometers were installed at a depth of up to 30 m from the existing ground level while a pumping well was installed upon completion of the soil investigation works. Based on the results recorded up to the 8th of December 2012, stabilized groundwater level was observed to range between 0.49 m MSL to -1.81 m MSL4.

Water Supply: The Yangon City Development Committee (YCDC) has an overall responsibility for the management and distribution of water for Yangon City. Presently, YCDC's water supply is obtained from two main sources: (1) reservoir (Hlawga, Gyobu, Pugyi and Ngameoyeik reservoirs) and, (2) groundwater from YCDC's tube wells. Water from these sources is utilized to varying degrees. Areas not supplied with water from the YCDC rely on shallow surface wells and private boreholes. Water supply for the Project Site will be obtained from onsite borewells for both construction and operations due to the poor reliability of municipal supply. Permitting is part of the Planning Consent Application currently underway. The boreholes will be provided and operated by the Developer.

Hydrology: The Project Site lies along the catchment of the Pazundaung River which flows east of the site in a southerly direction to converge into the Yangon River. The Yangon River (also known as the Rangoon River or Hlaing River) is formed by the confluence of the Pegu and Myitmaka rivers and flows into the Gulf of Martaban which is part of the larger Andaman Sea. The river flows along a 40 km stretch flowing from southern Myanmar as an outlet of the Ayeyarwady River into the Ayeyarwady delta. A small portion of the Bago River (the estuary) lies within the Yangon Division. The Pazundaung Creek and Bago River joins the Yangon River and from there, flow towards the southwestern direction into Andaman Sea.

#### 4.6.6. Climate and Meteorology

Yangon has a tropical monsoon climate under the Koppen climate classification system. The city typically experiences a distinct rainy season from the month of May through to October when a substantial amount of precipitation occurs; and dry season, which commences from November and ends in April. During the course of a year, average temperatures show some variance with average highs ranging from 26 °C to 36 °C and average lows occurring between 18 °C and 25 °C. The hottest period is between February and May, with little or no rain. At the end of this season, generally from March to April, the average monthly temperature reaches the upper 30 °C. The average temperatures in Yangon range from 24 °C to 36 °C in April during the hot season and it ranges from 18 °C to 32 °C in January during the cooler season.



**Rainfall and Relative Humidity:** The climate of Myanmar follows a typical monsoon pattern. Historically, the average annual mean rainfall for Yangon is 2,681 mm with the annual average rainy days of 129.3 days. During the course of 2013, the Department of Meteorology and Hydrology (Myanmar) reported an annual precipitation of approximately 2700 mm. The month with the most precipitation was in July. The relative humidity was generally higher from May to October 2013. The dry season occurs from November to April. Based on the historical weather for the last twelve months in Yangon, no precipitation was observed in December 2012, February 2013 and March 2013. The least humid month of the last 12 months was February 2013 with an average daily low humidity of 34%, and the most humid month was September with an average daily high humidity of 80%.

The proposed project is located at Shwe Than Lwin Industrial Zone, Hlaing Thar Yar Township and Yangon Region. The climate condition of Hlaing Thar Yar Township in which the project lies is the dry season, starts in December and ends in March. The raining season starts in June and ends in September and the cold season follow with the cooler, drier months of October to January. The highest temperature ranging 42°C and low range 27°C reference from Township Meteorology data, Regional Data of Hlaing Thar Yar Township. 2012 to 2017 Yearly data of rainfall and temperature is presented in Table 4-13. The weather condition during 21 May 2019 shows the average temperature of 43.6 °C while the average humidity is 53 percent (Table 4-14).

**Table 4-13 Annual rainfall and temperature**

Year	Rainfall		Temperature	
	Raining day	Rainfall value	Summer season Max (°C)	Winter season Min (°C)
2012-2013	121	53.46	41	27
2013-2014	131	61.25	40	26
2014-2015	128	58.35	39	25
2015-2016	113	48.45	40	26
2016-2017	126	56.97	41	27

Source: Department of Administrative Hlaing Thar Yar Township, Regional data (www.gad.gov.mm.com)

**Table 4-14 Relative humidity and temperature measure at factory**

Date and Time	Description	Result value	Environmental parameter air station guideline
21 March 2019 (8:00 am to 4:00 pm)	Relative Humidity RH %	53 (%)	Present condition
	Temperature	43.6 °C	Present condition

**Wind Speed and Direction.** Based on 2013 data, it was reported that the month with the highest wind speed was April 2013 with an average wind speed of 3 m/s while the least windy month was December 2012 with an average wind speed of 1m/s. The highest sustained wind speed was 54 m/s, occurring on September 19, 2013 and the highest daily mean wind speed was 4 m/s, occurred on May 14, 2013.

**Natural Hazards:** Myanmar is exposed to multiple natural hazards including cyclones, earthquakes, floods and fire. It has been periodically exposed by natural disasters. The Yangon District is in the vicinity of the southern section of the Sagaing Fault which has not been active in the past 50 to

75 years indicating that the faults may be under accumulating stress increasing the potential for an earthquake to occur. The Sagaing Fault is the most prominent active fault in Myanmar trending roughly north to south. It has been the originator of a large proportion of destructive earthquakes in Myanmar. The Project Site is also located in an earthquake zone and therefore the building construction design needs to cater for this hazard with adequate planning on emergency response procedures. Myanmar is exposed to cyclones and associated storm surges from the Bay of Bengal. Annually, there are approximately 10 tropical storms in the Bay of Bengal from April to December. Severe cyclones occur during the pre-monsoon period of April to May and post-monsoon period of October to December. The threat of flooding usually occurs in three waves each year: June, August and late September to October.

#### 4.7. BIOLOGICAL COMPONENT

The proposed project site is not located in or near a sensitive ecosystem as the proposed project area is situated in the Shwe Than Lwin industrial zone. The Project Site is a built-environment and the species of flora surveyed at the site are native species uncommon to the Yangon area. There were no protected species or species of conservation value identified.

#### 4.8. SOCIO-ECONOMIC COMPONENT

##### 4.8.1. Population

Charis factory is located across Hlaing Thar Yar Township in Yangon Region. In 2017, the population of Hlaing Thar Yar Township is about 414,209 people as present in Table 4-15.

**Table 4-15 Population of Males and Females at Hlaing Thar Yar Township (2017)**

Item	Older 18 year			Younger 18 year			Total		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
<b>Urban</b>	105,075	119,903	224,978	44,884	49,782	94,666	149,959	169,685	319,644
<b>Rural</b>	33,257	31,319	64,576	14,953	10,536	29,989	48,210	46,355	94,565
<b>Total</b>	138,332	151,222	289,554	59,837	64,818	124,655	198,169	216,040	414,209

Source: Department of Administrative Hlaing Thar Yar Township, Regional data (www.gad.gov.mm.com)

##### 4.8.2. Religion

The different kinds of religion present in Hlaing Thar Yar Township are shown in Table 4-16. More than 90% of the people living in the township are Buddhists.

**Table 4-16 Religion in Hlaing Thar Yar Township (2017)**

Township	Buddhist	Christian	Hindu	Muslim	Total
Hlaing Tharyar	395,789	6,400	8,320	3,700	414,209

Source: Department of Administrative Hlaing Thar Yar Township, Regional data (www.gad.gov.mm.com)

##### 4.8.3. Local Economy

Among regional towns, Hlaing Thar Yar Township has a variety of businesses and services operating in the community with other businesses/services, based in the region. Most of the source of livelihood in the Township is employment of factory. Services and facilities available include:

- post office
- beauticians
- butcher
- hairdressers
- furniture and electrical store
- restaurants
- cafes
- shoe and clothing shops
- industrial services
- pharmacy
- veterinarian
- bus service
- gift stores
- music store
- pubs and bars
- florist

#### 4.8.4. Public Infrastructure and Access

##### 4.8.4.1. Communication and Transportation

Major transportation route in Hlaing Thar Yar Township are railway, port, and car road as presented in Table 4-17.

**Table 4-17 Transportation route**

Categories	Township		Miles
	From	to	
Sail	Pan hlaing River and Hlaing confluence	Ngwe pin Lae Industrial	8
Bus line (61, 23, 68, 16, 6, 69, 17, 74, 20, 52, 53, 54, 67) City Bus	WYTU	Downtown area	
Car (Yangon - Patheingyi Road)	King BaYin Naung bridge	Mya Sein yaung Stream	5.4
Car (Yangon – Nyaung U Road)	Aung zaya Bridge	BOC traffic circle	3.2
Car (King Anawmyathari Road)	Shwe Pyi Thar Bridge	Thamakone Traffic circle	4.6

Source: Department of Administrative Hlaing Thar Yar Township, Regional data (www.gad.gov.mm.com)

##### 4.8.4.2. Electricity

The electricity demand of Hlaing Thar Yar Township is higher and higher due to the normally increased in population and infrastructure.

#### 4.8.4.3. Education

Location of major schools were situated i.e. basic education primary school (B.E.P.S.), basic education middle school (B.E.M.S), basic education high school (B.E.H.S) and university, in the Hlaing Thar Yar Township. The name and the located village tract/ ward of schools are described in Table 4-18.

**Table 4-18 List of major school in Hlaing Thar Yar Township**

No.	Name of School	Location
1	West Yangon Technological University	Outside Padan Village Tract
2	BEHS (1)	NO (2) ward
3	BEHS (2)	No (12) ward
4	BEHS (3)	NO (17). Ward
5	BEHS (4)	NO (5) ward
6	BEHS (5)	NO (7) ward
7	BEHS (6)	Yae Okken
8	BEHS (7)	NO (16) ward
9	BEHS (8)	NO (20) ward
10	BEMS (Branch) (1)	NO (6). Ward
11	BEMS (Branch) (2)	Nyaung Village Tract
12	BEMS (Branch) (3)	Dine Su, Nyaung Village
13	BEMS (Branch) (4)	NO (6) ward
14	BEMS (Branch) (5)	NO (1) ward
15	BEMS (Branch) (6)	NO (10) ward
16	BEMS (Branch) (7)	Outside Padan Village Tract
17	BEMS (Branch) (8)	NO (18) ward
18	BEMS (Branch) (9)	Shwe Lin Pan Village Tract
19	BEMS (Branch) (10)	NO (9). Ward
20	BEMS (Branch) (11)	NO (12). Ward
21	BEMS (Branch) (12)	NO (18). Ward
22	BEMS (Branch) (13)	NO (15). Ward
23	BEMS (Branch) (14)	NO (14). Ward
24	BEMS (Branch) (15)	NO (13). Ward
25	BEMS (Branch) (16)	NO (11). Ward
26	BEMS (Branch) (17)	NO (7). Ward
27	BEMS (Branch) (18)	NO (11). Ward
14	BEPS (1 to 32)	Hlaing Thar Yar
15	Pre School (1 to 6)	Hlaing Thar Yar

Source: Department of Administrative Hlaing Thar Yar Township, Regional data ([www.gad.gov.mm.com](http://www.gad.gov.mm.com))

#### 4.8.4.4. Health Status

The diseases of high prevalence reported in 2013 are Tuberculosis (TB), followed by Acute Respiratory Infection (ARI), Diarrhea, TB and snakebites. With reference to the Township Health Profile 2014 of Hlaing Thar Yar Township, no accidental work injuries reported to the township hospital in 2013. The common diseases are shown in Table 4-19 and Table 4-20.

**Table 4-19 Common Diseases in the Hlaing Thar Yar Township**

Disease	Hlaing Tharyar	
	Morbidity	Mortality
Malaria (Per 100000P)	-	-
Dysentery	21	-
Diarrhea (Per 100000P)	37	-
TB (Sputum+) (Per 10000P)	67	-
Hepatitis	5	-

**Table 4-20 Lists of hospital in the Hlaing Thar Yar Township**

Hospital Name	Beds/Services	Responsible
Township Hospital	200	Government
Cottage Hospital (Shwe Lin Pan)	16	Government
Pan Hlaing	95	Private
Tun Foundation	20	Private
Total	330	-

Source: Department of Administrative Hlaing Thar Yar, Regional data (www.gad.gov.mm.com)

## 4.9. CULTURAL AND VISUAL COMPONENTS

Hlaing Thar Yar Township is growing into a busy and vibrant community. The population fluctuates; however, there has been steady growth over the last decade. It tends to be a stopover on a journey rather than a destination. It has a number of sites that are interesting; however, there is no main attraction. Visitors to the town are generally visiting for work, investment or family reasons.

## 5. RISK ASSESMENT AND MITIGATION MEASURE PLAN

### 5.1. METHODOLOGY FOR THE ASSESSMENTS

The assessment of each impact is based on consideration of the magnitude, duration, spatial and frequency of activities, which are going to be carried out during three phases and characteristics of the project site. The assessment is qualitative and the significance of each impact is classified into 5 categories in overall.

The following methodology has been applied to assess the environmental impacts of the factory mainly on air, water, land, biodiversity, including human beings. Each source of impact has been assessed by four parameters, magnitude, duration, extent and probability and each assess point have 5 scales as mentioned in Table 5-1:

**Table 5-1 Impact assessment parameters and its scale**

Assessment	Scale				
	1	2	3	4	5
<b>Magnitude (M)</b>	Insignificant	small and will have no effect on working environment	Moderate and will result in minor changes on working environment	High and will result in significant changes on working environment	Very high and will result in permanent changes on working environment
<b>Duration (D)</b>	0 - 1 year	2 - 5 year	6 - 15 year	Life of operation	Post Closure
<b>Extent (E)</b>	Limited to the site	Limited to the local area	Limited to the region	National	International
<b>Probability (P)</b>	Very improbable	Improbable	Probable	Highly probable	Definite

Then, the Significant Point (SP) is calculated by following formula.

$$\text{Significant Point (SP)} = (\text{Magnitude} + \text{Duration} + \text{Extent}) \times \text{Probability}$$

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

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



## 5.2. IMPACT IDENTIFICATIONS

The development of infrastructure for the proposed project likely to happen changes in the local environment in terms of physical, biological and socio-economic aspects along with the perspective on both positive and negative impacts. The potential environmental impacts brought by various activities of proposed factory project will be identified and judged by site surveying with checklist, meeting with client team, including plant manager and supervisor, representatives from the factory operators and assessing the environmental baseline information for operation and decommissioning phases along with its mitigation measure.

## 5.3. IMPACT ON ENVIRONMENTAL RECOURSE

### 5.3.1. Impact on Air Quality

In Charis factory is used the semi-automatic process control system. In which assigned person from the operation line will operate each processing step. The major sources of air emission in the Charis factory are defined as below Table 5-1.

**Table 5-2 Air Quality Impact Sources**

Sources	Emission parameters
Diesel Generator and Vehicle movements for delivering and transporting of the raw materials and final products	CO, SO <sub>2</sub> , PM and NO <sub>x</sub>

Air impact source of emergency used of generator and vehicle movements may also generate particulate matters PM<sub>10</sub>, PM<sub>2.5</sub>, O<sub>3</sub>, CO, SO<sub>2</sub>, NO<sub>2</sub>, and CO<sub>2</sub>. However, it can be concluded as the impact is not sufficient because the generator and vehicle movements will run only as short time. However, these anticipated impacts are in manageable limits to control the air pollution with relevant mitigation measures and the proposed factory will be managed by using their HSE guidelines.

### 5.3.2. Energy Consumption and Related CO<sub>2</sub> (GNG) emission

Though main electricity source for the factory is the national grid line, sound-proof diesel generators will be set-up in case of electricity shortages. So, 110 kVA of standby generator will be used for both operation and administration appliances. The proposed project will use annually 27,473.9 gallons of diesel for vehicles such as transportation vehicle and emergency use of a generator. The following table shows the amount of CO<sub>2</sub> emission coming from the combustion of fuels.

Burning diesel or other fuels creates exhaust gasses. Diesel generators produce carbon dioxide (CO<sub>2</sub>), nitrogen oxide (NO<sub>x</sub>), and particulate matter. These generators release this into the atmosphere and substantially reduce air quality in the nearby regions. Every liter of fuel has 0.73 kg of pure carbon, 2.6 kg of carbon dioxide released per liter of diesel fuel.

**Table 5-3 Category of GHGs Assessment**

Category	Range
Negligible	no GHG assessment necessary

Category	Range
Low	< 20 kt/y CO <sub>2</sub> -equivalent per year
Medium-Low	20 – 100 kt CO <sub>2</sub> - equivalent per year
Medium-High	100 kt – 1 Mt CO <sub>2</sub> - equivalent per year
High	>1 Mt CO <sub>2</sub> -e equivalent per year

Source: EBRD GHG Assessment Methodology, 2010

**Table 5-4 CO<sub>2</sub> Emission by the Uses of Fuel**

No.	Type	Amount (gallon/year)	Equivalent CO <sub>2</sub> emission (Kilotons)	Status
1	Diesel for generator	27,473.9	0.2704	Negligible

According to above conversion, the emission of CO<sub>2</sub> relative to the fuel consumed by the proposed project will not harmfully effect to the environment. However, the proposed Charis factory will use a lot of electrical energy mainly for lighting, running of equipment, running of pumping systems for pumping water into the storage tank. Since electricity generation involves utilization of natural resources, excessive electricity consumption will strain the resource and negatively impact on their sustainability.

### 5.3.3. Impact of Noise

During the operation phase, noise impact may be a significant impact for Charis production sectors. The significant sources of noise impact activities are the operation of various machinery and equipment listed in for (raw mixing machine, mold machine, polishing machine) and the emergency used of generator, vehicles and automobile movements (short-term noise) will be noise impacts sources. According to the noise results of 8 hours continuously measurement, at the source of operation area inside the factory and within the factory area are slightly exceeding the noise level of 70 dB of NEQ (emission) guideline. Therefore, no obvious influence can be caused occupational health and safety of employees during operation.

The Occupational Safety and Health Administration (OSHA) have recommended permissible noise exposure limit for industrial workers, which is based on 90 dB (A) for 8 hours exposure a day with 5dB trading rates. The limits are mentioned in Table 5-5. According to OSHA, the maximum allowable noise level for workers is 90 dB (A) for 8 hours exposure a day. Thus, adequate protective noise impact measures in the form of ear muffs/ear plugs to the workers working in high noise areas, need to provide if actual noise level monitoring results are more than 90 dB (A) at the work site for working time hours for 8 hours.

**Table 5-5 Permissible exposure of noise limits**

Total Time of Exposure Per Day in Hours	Noise Level dB(A)
8	90
6	92
4	95
3	97
5	100

Total Time of Exposure Per Day in Hours	Noise Level dB(A)
1	105
1/2	110
1/4	115

#### 5.3.4. Impact on Water Quality

##### 5.3.4.1. Water Consumption

In the operation phase of Charis manufacturing factory, there is no water use for processing purpose. Tube well is the main source of raw water for factory waster use. The raw water is provided for the whole factory use of general office facilities such as canteen, toilets and kitchen. Estimated water consumption for the whole factory is 462.3 gallons per day and 638.75 cubic meters per year.

#### 5.3.5. Wastewater Effluents

The effluent wastewater will generate from the cleaning of utensil for operational use, domestic wastewater. Amount of liquid effluents discharged from the production process is minimal when compared with other industrial sectors.

#### 5.3.6. Impact on Soil Quality

During the operational phase, there is no significant impact on soil quality due to poly resin product manufacturing activities because concrete road facilities have been implemented at the whole project site area.

#### 5.3.7. Impact of Waste Disposal

Most activities of the Charis factories will generate the relatively low level of waste. Some components of wastes have the beneficial value and can be recycled once correctly recovered. Solid waste from production sector will consists of process waste such as Industrial waste would be generated from operation such as cloth scraps, fabric paper tube, plastic bags, cardboard, paper board, plastic string, etc. and food waste, plastic, paper, glass, metal can, sanitary napkins, tissue paper, garden waste, etc. However, Charis factory have been implemented the solid waste disposal system by the segregation of waste type such as paper waste, food waste, production waste and hazardous waste according to their environmental health and safety guideline. The required rubbish bins have been provided and regularly checked and monitored by assigned person of proposed factory. Before send to YCDC, the proper disposal waste facilities and temporary waste disposal site have been provided in the factory site. Moreover, for the purpose of hygienic canteen, kitchen facilities and standard septic type of toilets, well cleaned and well-maintained already provided for the proposed factory site.

### 5.4. IMPACT ON HUMAN

#### 5.4.1. Socio-economic Benefit

The proposed project is the long-term investment in the industrial sector. Most of the impacts of the proposed project on socio-economic environment may be positive. Implementation of proposed

project may create temporary employment during construction and decommissioning phases and permanent jobs in the operation phase. Subsequently, socio-economic standards of local people will be increased and eventually it may lead to the economic growth at local and regional level.

#### 5.4.2. Occupational Health and Safety

The most significant impact of occupational health and safety hazards will be caused by working at the operation phase of ceramic production and the main issues are as follows:

- ❖ Exposure of Painted Ink to effect workers
- ❖ Exposure of noise to employees and workers
- ❖ Electrical Hazards

During ceramic painting process, employees risk exposure to chemical and physical hazards every day. Spray painting poses health hazards that affect the respiratory, nervous, and circulatory systems. Similarly, using solvents to clean one's hands of paint marks and residue may cause skin irritation or even more serious issues since many are carcinogenic or neurotoxic. There are risks involved in working with substances such as paint and thinner, which contain compounds that are potentially harmful to health, or even fatal.

During the operation phase, employees and workers of Charis Company Limited ceramic manufacturing factory will be endangered or oppressed particularly by noise from factory operation. The noise level results measured in production area during operation phase are not exceeding the NEQ (emission) guideline. For electrical hazards, technicians and workers may expose to electrical hazards due to the presence of electrical equipment throughout the whole ceramic production facilities.

Thus, the appropriate personal protective equipment (PPE) for employee and workers will be provided and environmental, health and safety guideline have been prepared in proposed factory. In addition, for health insurance, health care facilities and first aid training have been provided for all employee and workers.

### 5.5. PROJECT ACTIVITIES AND ITS SIGNIFICANT IMPACTS AND MITIGATION MEASURE

The relative importance of each impact is assessed based on the understanding that general mitigation measures will be integrated into the baseline project. Therefore, when the general mitigation measures reduce impacts to the point of rendering them negligible, they are excluded from further analysis. Once the significance of the impact is established as more than negligible, it is described and additional, specific mitigation measures may be proposed to allow optimal integration of the project into the environment.

**Table 5-6 Evaluation and Perdition of Significant Impacts for Operation Phase**

Environment al Aspects	Potential Impacts	Identified Risk	Evaluation of Risk						Mitigation/Control Measure
			Duration	Magnitude	Extent	probability	Significan ce point	Significant impact	
Air quality	Air Pollution	Dust and other exhaust gas emission	4	3	2	3	27	Low	The factory uses chimney through which the flue gas are

Environment al Aspects	Potential Impacts	Identified Risk	Evaluation of Risk						Mitigation/Control Measure
			Duration	Magnitude	Extent	probability	Significan ce point	Significant impact	
		i.e. CO, SO <sub>2</sub> , NO <sub>x</sub> and PM Boiler operation							<p>emitted for reducing the impact of stack air emission on environment.</p> <p>The factory has planted trees in its premises to reduce carbon emission and thus minimize air pollution</p> <p>Stack gas emission level can be controlled by using gas generator with low NO<sub>x</sub> technology</p> <p>Ensuring vehicles, generators, compressors and boiler are well maintained</p> <p>Masks are provided to workers to ensure that workers wear mask during working in dusty condition.</p>
Water Quality	Water Contaminati on	Discharge from boiler blow down and Sewage discharge	4	3	2	3	27	Low	<p>An effective wastewater treatment system for production sector that reduced for BOD, COD, total nitrogen and other organic compound shall be used to reduce the impact on aquatic lives and odor.</p> <p>Currently, practice of the wastewater effluents discharge facilities of sewage for sanitation and septic system</p>
Noise	Noise Pollution	Noise can generate from vehicle movement & especially from generator, compressor	4	2	1	3	21	Low	<p>Use personal protective equipment (PPE) like ear plug/ear muffs in the noisy workplace like generator, compressor and boiler area.</p>

Environment al Aspects	Potential Impacts	Identified Risk	Evaluation of Risk						Mitigation/Control Measure
			Duration	Magnitude	Extent	probability	Significan ce point	Significant impact	
		and boiler							The factory already has buffer area to reducing noise from operation o generator, compressor and boiler.
Waste Management Disposal	Surrounding environment pollution and soil contamination	Incorrect disposal of waste	4	4	2	3	30	Moderate	Disposal of solid sewage in own septic following the waste management plan Industrial solid waste collect in storage and handed over to registered local waste collector or YCDC The factory already disposes the municipal waste to YCDC dumping site twice a week.
Ecological Environment (Flora & Fauna)	Loss of habitat of some flora & fauna and biodiversity reduction	Inappropriate control of weeds	4	1	2	2	15	Very Low	Maintain maximum vegetation
Traffic Pattern	Increase of vehicular traffic as well as gaseous emission and risk of increasing road accident	Vehicle increase at the factory surrounding area	4	3	2	3	27	Low	Vehicular movement would be restricted at day time

## 5.6. ENVIRONMENTAL IMPACTS MITIGATION MEASURES FOR OPERATION PHASE

The proposed Charis factory has developed the implementing of environmental management plan, appropriate mitigation measures for potential impact occurred in during operation phase, and additional impact mitigation measures shall be seen in following mitigation measures.

### 5.6.1. Recommended Air Impact Mitigation Measures

The significant sources of gas emission from emergency generator and transportation vehicles will be mitigated by using maintaining system in the operation process.



- The factory uses chimney for generator through which the flue gas are emitted for reducing the impact of stack emission on environment
- Monitoring and check installed cyclones and ventilation system
- The factory has planted trees in its premises to reduce carbon emission and thus minimize air pollution
- Ensuring vehicles, compressor and generator are well maintained
- Masks are provided to workers and ensures that wear during working in dusty area

Moreover, Charis factory has also implemented canteen facilities, kitchen ventilation system has already installed and operated in order to remove smoke, heat and odors.

#### **5.6.2. Mitigation Measures for Noise Impact**

The following mitigation measures shall be considered to reduce noise levels in the operation phase of the Charis factory.

- I. Low noise equipment should be used where possible
- II. All preventive measures such as regular operation and maintenance of pump motors, and compressor should be carried out and enclosures will be provided to abate noise levels at source
- III. Noisy equipment should not be permitted during night hours as much as possible

##### **5.6.2.1. For Diesel Generator**

Used of Generator should be housed in a suitable acoustic enclosure. The acoustic insulation should be designed to meet mandatory standards based on a 25 dB insertion loss.

### **5.7. MITIGATION MEASURES FOR WATER CONSUMPTION AND CONTAMINATION**

#### **5.7.1. Recommended Wastewater Effluents Impact Mitigation Measures**

In operation phase, according to the estimated water consumption for the whole factory is 3310.796 cubic meters per annually for the purpose of general office uses. Therefore, the appropriate water conservation plan should be implemented with commensurate with the magnitude and 80 % cost of water use is estimated wastewater effluents about 2,648.6 cubic meter per year. These programs should promote the continuous reduction in water consumption and achieve savings in the water pumping, treatment and disposal costs.

##### **Building Facility Operations**

- ❖ Regularly maintain plumbing, and identify and repair leaks
- ❖ Shut off water to unused areas
- ❖ Install self-closing taps, automatic shut-off valves, spray nozzles, pressures reducing valves and water conserving fixtures (e.g., low flow shower heads, faucets, toilets, urinals and spring loader)
- ❖ Operate dishwashers and laundries on full loads, and only when needed
- ❖ Install water-saving equipment in lavatories, such as low flow toilets

- ❖ Ensure that liquid waste from the proposed site is directed to the appropriate drains
- ❖ Maintain the equipment, pipelines in good working conditions and drainage system to avoid clogging
- ❖ Currently, practice of the wastewater effluents discharge facilities of sewage for sanitation and septic system.

## 5.8. MITIGATION MEASURES FOR WASTE DISPOSAL

At Charis factory, waste categorization has been developed into at least five types of waste that includes iron, compost waste, lubricant waste, recycle waste such as poly propylene bags (PP) and cardboards etc. All of production waste such as fabric scraps, fabric paper tube, plastic bags, cardboard, wood, plastic string and other non-hazardous waste will be collected by designated garbage bins and then sent to the temporary storage areas of solid waste in the project site area, which include 5 compartments for different kinds of waste categories. In addition, pest control program has also implemented at the entrance of rodents and insects. **Charis** also has an agreement service with YCDC for waste disposal facilities to collect the all production waste, office waste and domestic waste. According to the waste management practice, **Charis** has provided the dedicated dustbins for paper waste, plastic waste, production waste and food waste for the proper disposal of waste. Appropriate recycling methods are in practice to dispose of the wastes in the environmental friendly manner.

## 5.9. MITIGATION MEASURES FOR OCCUPATIONAL HEALTH AND SAFETY

### 5.9.1. Preventing Exposures and Lowering Health Risk in Painting area

#### SAFETY:

Appropriate training for personnel who are responsible for conducting the painting procedures is important, which may be from a professional training provider or the product supplier. There are also hazards related to the disposal of wastes and materials that are contaminated with potentially harmful chemicals. Decontamination procedures and Material Safety Data Sheets for various products are important. Safety is improved through:

- Personal protective equipment (PPE) use: PPE must be used when handling spray paint materials, particularly PPE that offers protection to the skin. Some of the essential personal protective equipment is overalls with a hood, protective goggles for the eyes, half-mask respirators, and single use nitrile gloves. One of the most essential types of PPE is respiratory protective equipment (RPE). Nevertheless, it should be noted that basic RPE does not offer ample protection from the negative effects of isocyanates in human tissue. Paint products containing isocyanates must be handled while donning an air-fed RPE that has a 20 or higher APF (assigned protection factor). Air-fed respiratory protective equipment needs extra attention since they provide breathable air to the user. When in use, measures must be implemented to prevent contamination of the air supply since there is a risk of harmful substances entering the intake valve if it is not positioned outside of the spray area.
- Health monitoring: In order to avoid development of illnesses associated with exposure to isocyanates, health authorities recommend that people who use spray paint products that contain the substance provide a urine sample after a work shift at least once a year, with high

frequencies in first few months on the job. A urine sample with ascertain levels of exposure, not the presence of disease associated with harmful chemicals.

- Proper storage: Since, paints and thinners are fire hazards, extra care must be taken not only while they are in use. Fire safety should also be considered when storing paint supplies. In the United States, the Occupational Safety and Health Administration (OSHA) provides guidelines for the proper storage of flammable materials. Many products used in spray painting are flammable such that fire risk is likely within a distance of 15 cm from the nozzle. As such, ignition sources must be placed at a safe distance. In addition, there is a risk of dust explosions when finely-divided paint particles become airborne.
- Proper recordkeeping: One of the basic tenets of risk control is maintenance of updated health records of personnel handling spray paint products. Confidential data on biological monitoring results must be appropriately kept. Records of the schedule and result of testing procedures should also be kept. Some of the most important tests to be conducted on a regular basis are air quality testing, testing of pressure systems and electrical systems, and testing of compressor reservoir air filters.

#### EDUCATION:

- Review the MSDS Sheets for the chemicals and products you work with.
- Do not accept shipments of new chemicals unless MSDS's are provided
- Know the proper procedures for the equipment and materials you use and follow MSDS

#### AWARENESS:

- Inspect your work area and equipment regularly.
- Report unsafe conditions immediately
- Make sure ventilation equipment is on and working properly before beginning painting or finishing.
- Route exhaust from running vehicles outdoors

#### PROTECTION:

- Wear the proper personal protective equipment (PPE) for each activity.
- Consider vacuum systems and using PPE sanding as an alternative to hand sanding.

#### 5.9.2. Recommended Mitigation Measures for Occupational Health and Safety

- Consider the provision of personal protective equipment only after all measures for removing or controlling safety hazards have been provided reasonably impractical
- Ensure that sufficient personal protective equipment is provided and that they are readily available for every person who may need to use them.
- The management should ensure that all persons make full and proper use of the personal protective equipment provided
- Provide instruction and training in the proper use and care of any specific protective equipment where necessary
- Ensure that the personal protective equipment is in good condition. Report immediately any damage to the management for replacement. Always keep the personal protective equipment as clean as possible.

Monitoring should be designed and implemented by accredited professionals, as part of an occupational health and safety-monitoring program. Facilities should also maintain a record of occupational accidents and diseases. Projects should try to reduce the number of accidents among project workers (whether directly employed) to a rate of zero, especially accidents that could result in lost work time, different levels of disability, or even fatalities.

#### **5.9.3. First Aid Guidelines and Facilities**

A well-organized and proper first aid system is implanted to provide immediate first aid to anyone who is injured in the workplace and had also conducted the first aid training by Myanmar Red Cross Society. Adequate number of first-aid kits are listed and made available at all workplaces and contacts of medical providers, hospitals will be notified. The followings are some of the contents in a sample first aid kit.

- Bandage
- Adhesive Tape
- Antiseptic wipe
- Burn dressing and treatment items
- Cold pack
- CPR barrier
- Sterile wound dressings
- Sterile eye coverings
- Scissors, tweezers, compress

## 6. PUBLIC CONSULTATION

### 6.1. PUBLIC CONSULTATION PROCESS

This chapter presents results of public consultation and information disclosure conducted for the Charis factory. Public participation can be considered as the required element of the EMP process. In this study various stakeholder's participation were made.

Public consultation during preparation of EMP report was conducted on 30, July 2019, following the EIA procedure.

The project's stakeholders in this category are key officials or representatives of the regional and local authorities who have direct responsibilities for the administration of the EMP process for environmental and social clearance and issuing operation permits for proposed development projects.

For this factory, relevant key offices at the national level are Environmental Conservation Department (ECD) and Industry Supervision and Inspection Department.

Relevant key office at the regional level is Yangon City Development Committee (YCDC), General Administrative Department, Fire Department, Factories and General Labor Law Inspection Department, Public Health Department, Industrial Supervision and Inspection Department.

Public consultation carried out after the presentation on the project, followed by questions, answers and discussion. Mr. Sai Thiha Maung presented EMP study and findings from Myanmar, after the presentation following question and answer section. Summary of public consultation meeting is presented Table 6-1. Is shown the consultation meeting photo. **(PCM attendant list and presentation power point slide is described in Appendix E)**

**Table 6-1**                      **Summary of public consultation meeting**

Time and Date	Tuesday, 30 July 2019 10:30-12:30
Venue	Meeting room, Sky Hotel, Hlaing Tharyar Township, Yangon.
Agenda	<ul style="list-style-type: none"><li>• Presentation on the Background Information of Project,</li><li>• Project Description,</li><li>• Impact Assessment, Environmental Mitigation</li><li>• Environmental Management Plan and Monitoring Plan</li><li>• Received and Answer from feedback of participants</li></ul>

### 6.2. RECOMMEND SUGGESTION AND COMMENT

After the presentation, the floor opened for questions and answers. There is no question and comment for presentation and EMP draft report, because the project is sample manufacturing of High Quality Poly Resin Product, Cold Cast Bronze, Pewter and collectibles by using High Quality Poly Resin on (CMP basic). In addition, ECD were suggesting for the occupational health and safety, during



project implementation about project planning and environmental issues. The following listed is suggestion of government officer.

U Kyaw Kyaw, Yangon City Development Committee (Cleaning Department and Industrial Zone management office;

- To construct the small pond in front of factory to filter the factory's wastewater before discharging to the surrounding drainage
- To install the boiler chimney at least 80 feet in height
- To store the fuel safely
- To plant the tree
- To get the septic tank capacity sufficiently with the number of employee







**Figure 6-1 Public consultation meeting**

## 7. ENVIRONMENTAL MANAGEMENT PLAN

The EMP for Charis Company Limited has been prepared to address potential issues based upon discussion with factory management, workers, local community's view, stakeholder consultation and from the site visit of experts. The EMP is additional to and compliments the factory's safety management system. The following environmental issues that require environmental management plans based upon the potential impacts of activities by Charis factory are as follows:

### 7.1. AIR POLLUTION/DUST MANAGEMENT PLAN

Objectives:	<ul style="list-style-type: none"> <li>To minimize the adverse impact to air quality caused by stack gas emission from generator and also dust management generated from vehicular movement.</li> <li>To comply with relevant government rules</li> </ul>
Performance Indicator:	<ul style="list-style-type: none"> <li>Nil complaints relating to air quality management</li> <li>Extraction equipment maintained as per maintenance schedule</li> </ul>
Relevant government law and rule	<ul style="list-style-type: none"> <li>National Environmental Quality (Emission) Guidelines (2015)</li> </ul>
Management Plan	<ul style="list-style-type: none"> <li>The factory has planted trees in its premises which reduce the carbon emission by the factory and minimize the air pollution</li> <li>Periodic maintenance of generator is conducted</li> <li>There is no open burning of waste materials at the site</li> <li>Workers are provided mask during working in any dusty area</li> </ul>
Monitoring & Reporting	<ul style="list-style-type: none"> <li>Biannually monitor the ambient air quality including PM<sub>2.5</sub>, PM<sub>10</sub></li> </ul>
Time Frame	Entire life spans of the factory operation
Estimated cost	Approximately 10 million kyats (annually)
Responsibility	Management of the factory; <ul style="list-style-type: none"> <li>Head of maintenance-Total implementation of above of air pollution management plan</li> <li>Production manager-Air quality in the production area is good enough</li> <li>Manager -To hire organization/independent third party testing air quality</li> <li>EHS officer-Monitor the hygiene of ambient air quality in surrounding of the factory</li> </ul>

### 7.2. NOISE MANAGEMENT PLAN

Objectives:	<ul style="list-style-type: none"> <li>To avoid nuisance noise to nearby residents generated from generator and other machineries.</li> <li>To comply with noise standard of National Environmental Quality (Emission) Guideline</li> </ul>
Performance Indicator:	Nil complaints relating to noise nuisance
Relevant	<ul style="list-style-type: none"> <li>National Environmental Quality (Emission) Guidelines (2015)</li> </ul>

government law and rule	
Management Plan	<ul style="list-style-type: none"> <li>• Building noise insulated generator room and ensure satisfactory maintenance of relevant equipment</li> <li>• Impose speed limit to track and vehicles at the transportation route.</li> <li>• Provide sufficient personal protective equipment (PPE) at the work place</li> <li>• All the related personnel will be provided proper training about the relevant issues and ensure PPE wear during working in noisy area.</li> </ul>
Monitoring & Reporting	Monitor the work place noise level (dB) biannually
Time Frame	Throughout the project life
Estimated cost	Approximately 5 million kyats (annually)
Responsibility	<p>Manager</p> <ul style="list-style-type: none"> <li>• To hire organization/independent third party testing noise level</li> <li>• Ensure that all workers use PPE during operation</li> </ul>

### 7.3. SOLID WASTE MANAGEMENT PLAN

Objectives:	<ul style="list-style-type: none"> <li>• To minimize waste generation by developing strategies for the management and disposal of all waste in a manner that is sustainable and sensitive to the environment</li> <li>• To comply government waste management policy</li> </ul>
Performance Indicator:	Nil complaints relating to noise nuisance
Relevant government law and rule	<ul style="list-style-type: none"> <li>• National Waste Management Strategy and Action Plan (Draft 2018)</li> </ul>
Management Plan	<ul style="list-style-type: none"> <li>• The factory does not dispose any kind of solid waste on the factory premises or not dump in the surface water like local pond, canal or river, etc.</li> <li>• The solid wastes are stored properly and separately in a certain location in proper manner such as cloth scrap waste need to collect at one place and poly/carton waste should collect at another place. Metal/Hazardous material waste such as fudge electric bulbs, empty chemical container are stored another in separate place of storage area.</li> <li>• Recycle wastes like cloth scrap, carton box, plastic sheet, etc. are hand over to local buyer for reuse and waste-tracking record shall be kept every day.</li> <li>• The metal or glass waste of electric bulb is taken by the suppliers to recycle them.</li> <li>• The daily domestic waste of workers hand over to YCDC waste collector to collect every day</li> <li>• Daily wastes are stored clearly labeled containers and in such a manner that all related personnel are provided proper training about the relevant issues.</li> </ul>
Monitoring & Reporting	<ul style="list-style-type: none"> <li>• Daily waste have to be collected and hand over to YCDC waste collector</li> <li>• The inventory record of waste disposal will be maintained as proof for proper management as designed</li> </ul>

Time Frame	Entire life spans of the factory operation
Estimated cost	Approximately 24 million kyats (annually)
Responsibility	Manager (HR) <ul style="list-style-type: none"> <li>Responsible for overall site cleanliness and waste management</li> <li>Regular waste collection to minimize excessive waste storage</li> </ul>

#### 7.4. WASTEWATER MANAGEMENT PLAN

Objectives:	<ul style="list-style-type: none"> <li>Prevent pollution underlying groundwater sources</li> </ul>
Performance Indicator:	<ul style="list-style-type: none"> <li>Implement an environmental friendly sewerage system</li> </ul>
Relevant government law and rule	National Environmental Quality (Emission) Guidelines (2015)
Management Plan	<ul style="list-style-type: none"> <li>Ensure that drainage lines and sewage system of factory and the nearest public drainage are watertight and sufficient capacity</li> <li>Regular check and maintain sewerage facility.</li> <li>Clean the factory's drainage to avoid odor emission and to avoid the block of water flow</li> <li>Regularly monitor and check the discharge temperature from boiler wastewater before directly discharge into factory's final drainage</li> </ul>
Monitoring & Reporting	Proper maintenance of drainage and sewerage system will be conducted periodically
Time Frame	Entire life spans of the factory operation
Estimated cost	Approximately 8 million kyats (annually)
Responsibility	<ul style="list-style-type: none"> <li>Manager -To hire organization/independent third party testing wastewater quality</li> <li>EHS officer-Monitor the condition of factory's drainage and sewerage system</li> </ul>

#### 7.5. ENERGY MANAGEMENT PLAN

Objectives:	<ul style="list-style-type: none"> <li>The energy management is aimed at minimizing electricity use results from site equipment and working lighting</li> <li>Comply with the standard of energy use</li> </ul>
Performance Indicator:	<ul style="list-style-type: none"> <li>Annual energy savings for all department facilities</li> <li>Annual fuel saving for generator and vehicle</li> </ul>
Relevant government law and rule	National Energy Management Committee (Myanmar Energy Master Plan 2015)
Management Plan	<ul style="list-style-type: none"> <li>Installation of timers and thermostats to control heating and cooling</li> <li>Energy saving light installed in different area of the factory for saving energy</li> <li>Used of energy saving devices must be installed</li> </ul>

	<ul style="list-style-type: none"> <li>• Ensure that good housekeeping measures such as turning off equipment and lights when not in use</li> </ul>
Monitoring & Reporting	Conduct annual energy efficiency of audit to find out the scope for energy saving
Time Frame	<ul style="list-style-type: none"> <li>• Once in a year throughout the factory life</li> </ul>
Estimated cost	<ul style="list-style-type: none"> <li>• Approximately 5 million kyats (annually)</li> </ul>
Responsibility	<p>Manager</p> <ul style="list-style-type: none"> <li>• To arrange energy audit technical personnel</li> <li>• To monitor and record electricity consumption, other related energy issues and take necessary actions if any problem arises</li> </ul>

## 7.6. WATER CONSUMPTION MANAGEMENT PLAN

Objectives:	<ul style="list-style-type: none"> <li>• The water consumption management is aimed at minimizing ground water use</li> </ul>
Performance Indicator:	<ul style="list-style-type: none"> <li>• Prohibitions on accessing and using underground water without a license</li> <li>• Water consumption saving of general water use from groundwater</li> </ul>
Relevant government law and rule	<ul style="list-style-type: none"> <li>• The Underground Water Act (1930)</li> </ul>
Management Plan	<ul style="list-style-type: none"> <li>• Install water meter for internal control of water consumption</li> <li>• All staff trains and makes aware conservation practices and proper methods of water use must be place in toilets and other areas of water consumption</li> <li>• The contamination of water is avoided by suitable management of oil and fuel used in machineries and vehicles</li> <li>• Trees plantation surrounding the factory</li> </ul>
Monitoring & Reporting	<ul style="list-style-type: none"> <li>• Daily visual inspections</li> </ul>
Time Frame	<ul style="list-style-type: none"> <li>• Once in a year throughout the factory life</li> </ul>
Estimated cost	<ul style="list-style-type: none"> <li>• Approximately 5 million kyats (annually)</li> </ul>
Responsibility	<p>Manager</p> <ul style="list-style-type: none"> <li>• Arrange audit on water usage controls environmental officer</li> </ul>

## 7.7. EMERGENCY RESPONSE AND DISASTER MANAGEMENT PLAN

Objectives:	<ul style="list-style-type: none"> <li>• Reduce the risk of accidents at the factory area</li> </ul>
Performance Indicator:	<ul style="list-style-type: none"> <li>• Establish a safe working environment</li> </ul>
Relevant government law and rule	<ul style="list-style-type: none"> <li>• The Employment and Skill Development Law (August 2013), ILO guide to Myanmar Labour Law (2017)</li> </ul>
Management Plan	<ul style="list-style-type: none"> <li>• The factory management has taken proper measures to handle any emergency situation like fire, earthquake, flood and storm</li> <li>• Provision and inspection of firefighting equipment and fire hydrant system in all</li> </ul>

	<p>the sections</p> <ul style="list-style-type: none"> <li>• A detail evaluation plan (fire exist, emergency exit door, etc.) is established and communicated with workers</li> <li>• Periodic inspection of safety relief valve provided with pressure vessels and equipment, preventive maintenance; aware the workers about electric shock by necessary training.</li> <li>• Regular fire drill operation is conducted</li> <li>• Workers are informed about what to do in earthquake like stay in a safe place such as under table of desk, not to try move outside during earthquake, workers who will be outside during earthquake shall remain stay out of the building, trees, lump post, etc. Other relevant safety instruction of emergency situation it informed to workers by training</li> <li>• Workers are aware of dangers from physical hazards such as obstacles covered by floodwater (storm debris, drainage opening, ground erosion) and from displaced reptiles (Snake) or other animals.</li> <li>• A medical team has been prepared for primary treatment (First Aid)</li> <li>• Prepare an emergency contact directory consisting contact numbers of nearest fire service, local police station, hospitals, etc. and display it in a place that everybody can see it easy.</li> <li>• Build a safety committee which from firefighting team, rescue team. The committee arrange a meeting every month to discuss about safety management</li> <li>• Ensure proper training of the employees about the disaster management, fire safety as well as occupational health and safety</li> </ul>
Monitoring & Reporting	<ul style="list-style-type: none"> <li>• Weekly check fire extinguishers and water hydrant in position</li> <li>• Daily inspect that all fire exist are open</li> <li>• Servicing fire extinguisher and records accidents,</li> </ul>
Time Frame	<ul style="list-style-type: none"> <li>• Entire life spans of the factory operation</li> </ul>
Estimated cost	<ul style="list-style-type: none"> <li>• Approximately 25 million kyats (annually)</li> </ul>
Responsibility	<p>Manager and EHS officer</p> <ul style="list-style-type: none"> <li>• Arrange firefighting training after every 3 months</li> <li>• Responsible for fire control and response</li> <li>• Monitoring daily danger warning and bans</li> </ul>

## 7.8. ENVIRONMENTAL MONITORING SCHEDULE AND REPORTING

The EMoP cell members responsible may conduct daily, weekly or monthly general inspections of the project area and facilities. The objectives are to identify non-compliances to EMoP. Table 7-1 is provided the environmental monitoring schedule for Charis factory. The factory submits monitoring report to the Ministry not less frequently than every six (6) months, as provided in a schedule in the EMP,

**Table 7-1 Environmental monitoring schedule for Charis Company Limited**

Environmental Issues	Parameter	Recommended Monitoring Frequency	Area to be monitored	Responsible section
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Environmental Issues	Parameter	Recommended Monitoring Frequency	Area to be monitored	Responsible section
Air quality	<ul style="list-style-type: none"> <li>PM2.5, PM10</li> </ul>	<ul style="list-style-type: none"> <li>Biannually in operation phase</li> </ul>	Within the factory area	Responsible officer of Charis Company Limited
Water Quality	<ul style="list-style-type: none"> <li>Effluent wastewater quality</li> <li>Wastewater quality from ceramic washing (pH, DO, BOD, COD, TDS, Temp)</li> </ul>	<ul style="list-style-type: none"> <li>Daily in-house check</li> <li>Biannually check by third party</li> </ul>	Final discharge point of factory drainage	Responsible officer of Charis Company Limited
Noise	<ul style="list-style-type: none"> <li>Noise level in decibel</li> </ul>	<ul style="list-style-type: none"> <li>Biannually</li> </ul>	Operation area	Responsible officer of Charis Company Limited
Waste Management	<ul style="list-style-type: none"> <li>Garbage collection</li> <li>Cleaning &amp; Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>Daily</li> <li>Daily</li> </ul>	<ul style="list-style-type: none"> <li>Temporary Storage Sites of proposed factory</li> <li>Record disposed frequency</li> </ul>	Responsible officer of Charis Company Limited
Energy Consumption	<ul style="list-style-type: none"> <li>Liters of Diesel/Fossil fuel for the generator</li> </ul>	<ul style="list-style-type: none"> <li>Monthly monitoring of energy use</li> <li>Daily monitoring of fuel use</li> </ul>	Generator house and fuel storage area	Responsible officer of Charis Company Limited
Water Consumption	<ul style="list-style-type: none"> <li>All water taps shut off when not use</li> <li>Power to unused equipment shut off at the distribution panel</li> </ul>	<ul style="list-style-type: none"> <li>Daily</li> <li>Daily</li> </ul>	Water distribution area	Responsible officer of Charis Company Limited
Emergency Response Equipment	<ul style="list-style-type: none"> <li>Extinguisher's position</li> <li>Water hydrants</li> <li>Fireman switch testing</li> <li>Servicing fire extinguishers</li> <li>Review records of accident</li> <li>OHS training</li> </ul>	<ul style="list-style-type: none"> <li>Daily</li> <li>Daily</li> <li>Monthly</li> <li>Quarterly</li> <li>Quarterly</li> <li>Biannually</li> </ul>	At the factory and production sector	Responsible officer of Charis Company Limited

## 7.9. CORPORATE SOCIAL RESPONSIBILITY (CSR) PLAN

The CSR activities have the objective to uplift quality of life and gain favorable relations from all communities in the operation area. The CSR program for Charis Company Limited textile factory consists of three main sectors; Health, Education and Community Development Sector. CSR activities are conducted in compliance with MIC's guideline for implementation of CSR program.

Charis Company Limited will contribute 2% of our Net Profit to social welfare activities that will help society and country of Myanmar. Our social welfare activities shall include training of our employees such as on job training to be more qualified, language (Chinese) training on weekends with experienced teachers and providing necessary healthcare such as medical checkups and giving proper medical knowledge about diseases and its prevention. Part of our CSR activity such as donations will also contribute to public school around our factory (Table 7-2).

**Table 7-2 CSR plan at Charis Company Limited**

No	Particle	Contribution
1	Public school	0.5%
2	Non-profit training	1
3	Employees healthcare	0.5%

### 7.9.1. Public School

We will contribute 0.5% of our net profit to the public school near the factory to be a part of creating the better community. We will also work together with the school to understand more about the needs and we will also ensure that our contributions will be used in the most effective and efficient way for the society.

### 7.9.2. Non-profit Training

We will contribute 1% of our net profit for the trainings of our Employees. Our trainings include job-related trainings, language trainings and safety trainings. The main objective of our trainings are that we want our company with their work but also improving their other skills such as language and promoting knowledge about safety measures and occupational health employees to be not only become more productive and more qualified.

### 7.9.3. Healthcare

One of our main concerns is the well-being of our employees. We will contribute 0.5% of our net profit for the healthcare which includes medical checkup for the employees and providing health education to our workers.

## 7.10. BUDGET PLAN FOR ENVIRONMENTAL MANAGEMENT AND MONITORING

This section describes the budget plans for the environmental management and environmental monitoring by the project proponent. On the other hand, Charis Company Limited will take necessary environmental mitigation measures and its expenses for the environmental management not only at the construction and operation phases but also at the closing phase in accordance with their responsibility for the studies of recommendation.

The following table shows the expenditures for the implementation of Environmental Management Plan for operation phase annually. Estimation cost for EMP implementation is presented in Table 7-3.

**Table 7-3 Cost estimation for EMP implementation**

No	Item	Frequency/Times	Cost (USD)
Mitigation Plan			
1	Maintenance of air ventilation system	Once per year	200 per year
2	Grass plantation within the area of factory compound	Once per three month	70 per three month
3	Solid waste disposal	12	1000 per year
4	Purchase of Personal Protective Equipment (PPE)	Once per half a year	150 per half a year
5	Medical Check-up and Health Insurances	Once per year	500 per year
Emergency Preparedness			
1	Fire extinguisher	Once per month	300 per month
2	Fire alarm system	Once per month	
3	First Aid Fits	Once per month	
Monitoring Plan			
1	Wastewater	2	200 per year
2	Noise level	2	300 per year
3	Environmental compliance auditing	1	1,000 lump sum

## 8. CONCLUSION

Environmental Management Plan (EMP) has been prepared for Charis Company Limited factory is located at Plot No. 103, Myay Taing Block No.14, Shwe Than Lwin Industrial Zone, Hlaing Thar Yar Township, Yangon region. The main objective of the study is focused specially on the required environmental management measures or creating environmentally friendly workplace. An EMP has been carried out for the factory according to the requirement of the proponent as it has been made for poly resin product manufacturing factory.

Thus, the factory management can take proper mitigation steps against adverse environmental impacts by following this EMP. The necessary measure to mitigate impact regarding different environmental parameter such as air, water, waste, noise has been proposed in this EMP.

However, all necessary implementation measures to mitigate adverse environmental, health and safety impacts have already been taken to meet National Environmental Quality (Emission) Guideline (2015). On the other, the factory has positive impacts in terms of environmental in the operation phase. Further, this will indirectly help in boosting up the national economic condition through foreign investment. An outline of EMP has been given in the present report to mitigate/enhance the impacts, which occurs during operation phase of the factory.

The effective implementation of the mitigation measures proposed will ensure towards good environmental management within the proposed project area. Furthermore, the environmental monitoring plan prepared as part of the EMP will provide adequate opportunities to address any residual impacts during the operation phase.

In conclusion, it has been figured out that, the proposed Charis factory is going to generate local employment opportunities and enhance capabilities and working skills of employees. Consequently, their socio-economic standard is expected to be improved and undertaking corporate social responsibilities (CSR) as recommended. The study further concluded that positive impacts will be of immense benefit to the local community and national development as well.

## 9. RECOMMENDATION


This is recommended that;

- All appropriate environmental management measures detailed in this report, together with any other environmental management commitments should be implemented throughout the entire life of the factory
- Solid wastes and liquid wastes need to dispose according to YCDC rules and regulation
- Workers should be provided proper training and it should be ensured that workers use PPE during factory operation area.
- Daily, monthly and annual action plan shall be formulated based on this EMP and practiced at operation level.
- Keep full records of environmental management activities and present to annual independent third party environment audit.
- Abide environmental policy, laws, rules and instructions of the Republic of the Union of Myanmar.

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

## APPENDIX A

### Company Document's Charis Company Limited



THE REPUBLIC OF THE UNION OF MYANMAR  
YANGON REGION INVESTMENT COMMITTEE  
ENDORSEMENT

Form (5-B)  
No. 462  
Date 10.2.2018  
August 2018

Endorsement No. YGN – 076 /2018 Date 10 August 2018

This endorsement is issued by Yangon Region Investment Committee according to the section 25, sub-section (d) of the Myanmar Investment Law-

(1) Name of Investor MS. KAO, YOU-FEN

(2) Citizenship CHINESE

(3) Residence Address UNIT 403A 4/F, SKYWAY HOUSE, NO.3, SHAM MONG ROAD, TAI KOK TSUI, KOWLOON, HONG KONG, REPUBLIC OF CHINA

(4) Name and Address of Principal Organization WISE UNICORN INDUSTRIAL LIMITED, UNIT 403A 4/F, SKYWAY HOUSE, NO.3, SHAM MONG ROAD, TAI KOKTSUI, KOWLOON, HONG KONG, REPUBLIC OF CHINA

(5) Place of Incorporation REPUBLIC OF CHINA

(6) Type of business MANUFACTURING OF HIGH QUALITY POLY RESIN PRODUCT, COLD CAST BRONZE, PEWTER AND PORCELAIN FIGURINES AND COLLECTIBLES BY USING HIGH QUALITY POLY RESIN ON CMP BASIS

(7) Place(s) of investment Project PLOT NO. 103, MYAY TAING BLOCK NO. 14, SHWE THANLWIN INDUSTRIAL ZONE, HLAING THAR YAR TOWNSHIP, YANGON REGION

(8) Amount of Foreign Capital US\$ 1.375 MILLION

(9) Period for Foreign Capital to be brought in WITHIN TWO YEARS FROM THE DATE OF ISSUANCE OF ENDORSEMENT


(10) Total Amount of Capital (Kyat) EQUIVALENT IN KYAT OF US\$ 1.375 MILLION


(11) Construction/ Preparation Period TWO YEARS

(12) Validity of Endorsement 23 YEARS

(13) Form of Investment WHOLLY FOREIGN OWNED

(14) Name of Company Incorporated in Myanmar CHARIS COMPANY LIMITED



  
Chairman  
Yangon Region Investment Committee





ပုံစံ (၅-ခ)

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်  
ရန်ကုန်တိုင်းဒေသကြီးရင်းနှီးမြှုပ်နှံမှုကော်မတီ  
အတည်ပြုမိန့်

အတည်ပြုမိန့်အမှတ် ရကတ- ၀၇၆ /၂၀၁၈ ၂၀၁၈ ခုနှစ် ဩဂုတ်လ ၁၀ ရက်  
ရန်ကုန်တိုင်းဒေသကြီး ရင်းနှီးမြှုပ်နှံမှု ကော်မတီသည် မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု ဥပဒေ  
ပုဒ်မ-၂၅ ပုဒ်မခွဲ (ဃ) အရ ဤအတည်ပြုမိန့်ကိုထုတ်ပေးလိုက်သည် -

- (၁) ရင်းနှီးမြှုပ်နှံသူအမည် MS. KAO, YOU-FEN
- (၂) နိုင်ငံသား CHINESE
- (၃) နေရပ်လိပ်စာ UNIT 403A 4/F, SKYWAY HOUSE, NO.3, SHAM MONG ROAD, TAI KOK TSUI, KOWLOON, HONG KONG, REPUBLIC OF CHINA
- (၄) ပင်မအဖွဲ့အစည်းအမည်နှင့်လိပ်စာ WISE UNICORN INDUSTRIAL LIMITED, UNIT 403A 4/F, SKYWAY HOUSE, NO.3, SHAM MONG ROAD, TAI KOK TSUI, KOWLOON, HONG KONG, REPUBLIC OF CHINA
- (၅) ဖွဲ့စည်းရာအရပ် REPUBLIC OF CHINA
- (၆) ရင်းနှီးမြှုပ်နှံသည့်လုပ်ငန်းအမျိုးအစား CMP စနစ်ဖြင့် အရည်အသွေးမြှင့် Poly Resin အား အခြေခံ၍ အရည်အသွေးမြှင့် Poly Resin ထုတ်ကုန်, Cold Cast Bronze, Pewter ကြွေထည်ရုပ်ထုများ နှင့် ပန်းပုရုပ်ထုများ ထုတ်လုပ်ခြင်း လုပ်ငန်း
- (၇) ရင်းနှီးမြှုပ်နှံသည့်အရပ်ဒေသ(များ) မြေကွက်အမှတ် ၁၀၃ ၊ မြေတိုင်းရပ်ကွက် အမှတ် ၁၄၊ ရွှေသံလွင် စက်မှုဇုန်၊ လှိုင်သာယာမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး
- (၈) နိုင်ငံခြားမတည်ငွေရင်း ပမာဏ အမေရိကန်ဒေါ်လာ ၁.၃၇၅ သန်း
- (၉) နိုင်ငံခြားမတည်ငွေရင်းယူဆောင်လာရမည့်ကာလ အတည်ပြုမိန့် ရရှိသည့် နေ့မှ ၂ နှစ် အတွင်း
- (၁၀) စုစုပေါင်း မတည်ငွေရင်းပမာဏ(ကျပ်) အမေရိကန်ဒေါ်လာ ၁.၃၇၅ သန်းနှင့် ညီမျှသော မြန်မာကျပ်ငွေ
- (၁၁) တည်ဆောက်မှု/ ပြင်ဆင်မှုကာလ ၂ နှစ်
- (၁၂) အတည်ပြုမိန့်သက်တမ်း ၂၃ နှစ်
- (၁၃) ရင်းနှီးမြှုပ်နှံမှုပုံစံ ရာခိုင်နှုန်းပြည့် နိုင်ငံခြားရင်းနှီးမြှုပ်နှံမှု
- (၁၄) မြန်မာနိုင်ငံတွင် ဖွဲ့စည်းမည့် ကုမ္ပဏီအမည် CHARIS COMPANY LIMITED



*(Signature)*  
ဥက္ကဋ္ဌ

ရန်ကုန်တိုင်းဒေသကြီးရင်းနှီးမြှုပ်နှံမှုကော်မတီ

Confidential



THE REPUBLIC OF THE UNION OF MYANMAR  
YANGON REGION INVESTMENT COMMITTEE

Plot No. 49, Seinlae May Street,  
Kabar Aye Road Yankin Township, Yangon



Tel: 01- 658263

Our ref :YRIC-1/E-076/2018( 462 )

Fax: 01-658264

Date : 10 August 2018

**Subject:** Decision of the Yangon Region Investment Committee on the Endorsement for manufacturing of high quality poly resin product, cold cast bronze, pewter and porcelain figurines and collectibles by using high quality poly resin on CMP basis under the name of Charis Company Limited

**Reference:** Charis' s letter dated 24<sup>th</sup> July 2018

1. The Yangon Region Investment Committee, at its meeting (10/2018) held on 25<sup>th</sup> July 2018, approved the Endorsement for manufacturing of high quality poly resin product, cold cast bronze, pewter and porcelain figurines and collectibles by using high quality poly resin on CMP basis under the name of Charis Company Limited submitted by Wise Unicorn Industrial Limited (99%) from Republic of China and Ms. Lee Hyun Kyu (1%) from Republic of Korea as a wholly foreign owned investment in accordance with the Myanmar Investment Law and Rules.
2. The terms and conditions of the "Endorsement" are stated in the following paragraphs:
  - (a) The term of an Endorsed project shall be twenty-three (23) years commencing from the date of the issuance of the Endorsement by the Yangon Region Investment Committee.
  - (b) The term of the Lease Agreement for land and buildings shall be (23) years commencing from the date of signing of the Lease Agreement between U Yinn Maung Thein (Lessor) and Charis Company Limited (Lessee).

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- (c) The annual rent for the land and buildings shall be US\$ 142224.00 (United States Dollar one hundred and forty-two thousand, two hundred and twenty- four only)calculated at the rate of US\$ 17.00 per square meter per year for the total land measuring 8522.6796 square meter (2.106 acres).
- (d) Charis Company Limited, which has obtained the Endorsement for enjoyment of exemptions and reliefs under sections 75, 77 and 78 of the Chapter XVIII of Myanmar Investment Law, may submit the application form.
- (e) Charis Company Limited shall use its best efforts to achieve a timely realization of the work stated in the Endorsement application.
- (f) Charis Company Limited shall obey and respect the responsibilities of investors under section 65 of Myanmar Investment Law and Chapter XX of Myanmar Investment Rules.
- (g) Charis Company Limited shall carry out prevention, mitigation and monitoring of significant environmental impacts according to the type of investment activities in accordance with the relevant laws, rules, regulations and procedures.
- (h) Charis Company Limited shall submit to the Myanmar Investment Commission any transfer of shares or transfer of the business to any person during the investment period in accordance with section 72 of Myanmar Investment Law and rule 191of Myanmar Investment Rules.
- (i) Charis Company Limited which has benefitted from the Endorsement or enjoyment of exemptions or reliefs shall submit an annual report in the prescribed form to the Myanmar Investment Commission within three (3) months at the financial year in accordance with rule 196 of Myanmar Investment Rules and shall publish a summary of the report on its website or the Myanmar Investment Commission's website.

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- (j) Charis Company Limited must, during the operation period under the Endorsement of the Yangon Region Investment Committee, submit its operating report quarterly in the prescribed form in accordance with rule 197 of Myanmar Investment Rules.
3. Charis Company Limited shall carry out in accordance with the stipulations of the relevant Union Ministries, governmental department and governmental organizations to obtain license, permit or registration as per section 65(d) of Myanmar Investment Law.
4. Charis Company Limited shall submit five (5) copies of all approvals, licences, permits and similar authorizations relevant to the initial implementation of the investment and the Lease Agreement for land and buildings to the Yangon Region Investment Committee.



(Phyto Min Thein)

Chairman 

Charis Company Limited

- cc: 1. Ministry of Home Affairs  
2. Ministry of Office of the Union Government  
3. Ministry of Natural Resources and Environmental Conservation  
4. Ministry of Labour, Immigration and Population  
5. Ministry of Industry  
6. Ministry of Commerce  
7. Ministry of Planning and Finance  
8. Office of the Myanmar Investment Commission  
9. Chairman, CMP Enterprises Supervision Committee  
10. Director General, Department of Environmental Conservation  
11. Director General, Directorate of Labour  
12. Director General, Department of Immigration  
13. Director General, Directorate of Industrial Supervision and Inspection

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14. Director General, Department of Trade
15. Director General, Directorate of Investment and Company Administration
16. Director General, National Archives Department
17. Director General, Customs Department
18. Director General, Internal Revenue Department
19. Monitoring and Supervision Division , Directorate of Investment and Company Administration

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## APPENDIX B

### Transitional Consultant Registration Certificate



THE REPUBLIC OF THE UNION OF MYANMAR  
Ministry of Natural Resources and Environmental Conservation  
Environmental Conservation Department



CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION  
(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 10068 Date 24 MAY 2019

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၆၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို ထုတ်ပေးလိုက်သည်။)

- |  |  |
|--|--|
| (a) Name of Organization<br>(အဖွဲ့အစည်းအမည်)   | Myanwei Consulting Co., Ltd.   |
| (b) Name of the representative in the organization<br>(အဖွဲ့အစည်းကိုယ်စားလှယ်၏အမည်)  | U Nyan Lynn Aung   |
| (c) Citizenship of the representative in the organization<br>(အဖွဲ့အစည်းကိုယ်စားလှယ်နိုင်ငံသား)  | Myanmar  |
| (d) Identity Card /Passport Number of the representative person in the organization<br>(အဖွဲ့အစည်းကိုယ်စားလှယ်၏ မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်) | 12/Sakhana(N)056196  |
| (e) Address of organization<br>(ဆက်သွယ်ရန်လိပ်စာ)  | No. 28, Myay nu street, Sanchaung Township,<br>Yangon, Myanmar.<br>Mobile phone: 09440251888<br>E mail: <a href="mailto:ceo@myanweiconsulting.com">ceo@myanweiconsulting.com</a> |
| (f) Type of Consultancy<br>(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)   | Organization   |
| (g) Duration of validity<br>(သက်တမ်းကုန်ဆုံးရက်)   | 31 December 2019   |



Director General  
Environmental Conservation Department  
Ministry of Natural Resources and Environmental Conservation



**Areas of Expertise Permitted**  
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

**1. Geology and Soil**

**EXTENSION**  
သက်တမ်းတိုးမြှင့်ခြင်း  
The VALIDITY of this certificate is extended for six month from (1.1.2021) to (30.6.2021)  
ဤလက်မှတ်အား (၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁) ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။  
*Soe Naing*  
For Director General  
(Soe Naing, Director)  
Environmental Conservation Department

**EXTENSION**  
သက်တမ်းတိုးမြှင့်ခြင်း  
The VALIDITY of this certificate is extended for six months from (1.7.2021) to (31.12.2021)  
ဤလက်မှတ်အား (၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁) ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။  
*Soe Naing*  
For Director General  
(Soe Naing, Director)  
Environmental Conservation Department

**EXTENSION** (သက်တမ်းတိုးမြှင့်ခြင်း)  
The VALIDITY of this certificate is extended for one year from (1.1.2022) to (31.12.2022)  
ဤလက်မှတ်အား (၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂) ရက်နေ့အထိ တစ်နှစ် သက်တမ်းတိုးမြှင့်သည်။  
*Soe Naing*  
For Director General  
(Soe Naing, Director)  
Environmental Conservation Department

**EXTENSION**  
သက်တမ်းတိုးမြှင့်ခြင်း  
The VALIDITY of this certificate is extended for nine months from (1.4.2019) to (31.12.2019)  
ဤလက်မှတ်အား (၁-၄-၂၀၁၉) ရက်နေ့မှ (၃၁-၁၂-၂၀၁၉) ရက်နေ့အထိ (၉)လ သက်တမ်းတိုးမြှင့်သည်။  
*Soe Naing*  
For Director General  
(Soe Naing, Director)  
Environmental Conservation Department

**EXTENSION**  
သက်တမ်းတိုးမြှင့်ခြင်း  
The VALIDITY of this certificate is extended for one year from (1.1.2020) to (31.12.2020)  
ဤလက်မှတ်အား (၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀) ရက်နေ့အထိ တစ်နှစ် သက်တမ်းတိုးမြှင့်သည်။  
*Soe Naing*  
For Director General  
(Soe Naing, Director)  
Environmental Conservation Department



REPUBLIC OF THE UNION OF MYANMAR  
Ministry of Natural Resources and Environmental Conservation  
CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION  
(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

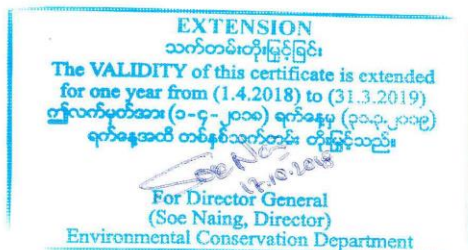


No. 0048 Date

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the person under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၅၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို လူပုဂ္ဂိုလ်အားထုတ်ပေးလိုက်သည်။)

- |   |   |
|---|---|
| (a) Name of Consultant<br>(အကြံပေးပုဂ္ဂိုလ်အမည်)                            | U Lin Htet Sein   |
| (b) Citizenship<br>(နိုင်ငံသား)   | Myanmar   |
| (c) Identity Card / Passport Number<br>(မှတ်ပုံတင်/နိုင်ငံကူးလက်မှတ် အမှတ်) | 7/ Tha Ka Na (N) 101377   |
| (d) Address<br>(ဆက်သွယ်ရန်လိပ်စာ)   | No.54, Room No.704, Waizayantar Tower,<br>Waizayantar Road, Thingangyun Township,<br>Yangon.<br><a href="mailto:lin.tbs@gmail.com">lin.tbs@gmail.com</a> , 09 421137569 |
| (e) Organization<br>(အဖွဲ့အစည်း)  | Total Business Solution Co., Ltd.   |
| (f) Type of Consultancy<br>(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)                  | Person  |
| (g) Duration of validity<br>(သက်တမ်းကုန်ဆုံးရက်)                            | 31 March 2018   |



Director General

Environmental Conservation Department  
Ministry of Natural Resources and Environmental Conservation

Areas of Expertise Permitted  
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Facilitation of meeting,
2. Land use,
3. Legal analysis,
4. Geology and soil,
5. Occupational Safety and Health,
6. Public Health



**EXTENSION**  
သက်တမ်းတိုးမြှင့်ခြင်း  
The VALIDITY of this certificate is extended  
for one year from (1.1.2020) to (31.12.2020)  
ဤလက်မှတ်အား (၁-၁-၂၀၂၀) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၀)  
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။  
*Soe Naing*  
For Director General  
(Soe Naing, Director)  
Environmental Conservation Department

**EXTENSION**  
သက်တမ်းတိုးမြှင့်ခြင်း  
The VALIDITY of this certificate is extended  
for six month from (1.1.2021) to (30.6.2021)  
ဤလက်မှတ်အား (၁-၁-၂၀၂၁) ရက်နေ့မှ (၃၀-၆-၂၀၂၁)  
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။  
*Soe Naing*  
For Director General  
(Soe Naing, Director)  
Environmental Conservation Department



**EXTENSION**  
သက်တမ်းတိုးမြှင့်ခြင်း  
The VALIDITY of this certificate is extended  
for six months from (1.7.2021) to (31.12.2021)  
ဤလက်မှတ်အား (၁-၇-၂၀၂၁) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၁)  
ရက်နေ့အထိ (၆)လ သက်တမ်းတိုးမြှင့်သည်။  
*Soe Naing*  
For Director General  
(Soe Naing, Director)  
Environmental Conservation Department

**EXTENSION (သက်တမ်းတိုးမြှင့်ခြင်း)**  
The VALIDITY of this certificate is extended  
for one year from (1.1.2022) to (31.12.2022)  
ဤလက်မှတ်အား (၁-၁-၂၀၂၂) ရက်နေ့မှ (၃၁-၁၂-၂၀၂၂)  
ရက်နေ့အထိ တစ်နှစ်သက်တမ်းတိုးမြှင့်သည်။  
*Soe Naing*  
For Director General  
(Soe Naing, Director)  
Environmental Conservation Department



# APPENDIX C

## Chemical Safety Certificate

**ကျန်းမာရေးဘေးအန္တရာယ်ကင်းရှင်းကြောင်း ထောက်ခံချက်လက်မှတ်**

၂၀၁၈ ခုနှစ်၊ ရန်ကုန်မြို့တော်စည်ပင်သာယာရေးဥပဒေပုဒ်မ-၁၇၃၊ ၁၇၆၊ ၁၈၁ တို့အရ အများပြည်သူတို့အား ကျန်းမာရေးဘေးအန္တရာယ်ဖြစ်စေတတ်သော လုပ်ငန်းကို စစ်ဆေးရာတွင် ဥပဒေပါစည်းကမ်းချက်များနှင့် ကိုက်ညီကြောင်း စစ်ဆေးတွေ့ရှိရသဖြင့် အောက်ဖော်ပြပါ လုပ်ငန်းအား အများပြည်သူအတွက် ကျန်းမာရေး ဘေးအန္တရာယ်ကင်းရှင်းကြောင်း ထောက်ခံချက်လက်မှတ်ကို ထုတ်ပေးလိုက်သည် -

လုပ်ငန်းအမျိုးအစား : CHARLES CO., LTD မြေထဲမှ ရွှေဖွင့်

လုပ်ငန်းပိုင်ရှင်အမည် : Mr. MAO YOUN FENG

လုပ်ငန်းလိပ်စာ : ၁၀၃ / ရွှေသိင်္ဃာတန်း  
မြို့နယ်သာယာမြို့နယ်

ထောက်ခံချက်အမှတ် : ၂၀၁၈ / လယ်ယာ (စား) ၂၀၁၈ - ၂၀၁၉

ထောက်ခံချက်လက်မှတ် :

ထုတ်ပေးသည့်ရက်စွဲ : ၂၀၁၉ ခုနှစ်၊ မေ လ ၁၀ ရက်

ထောက်ခံချက်လက်မှတ်သက်တမ်း : ဘဏ္ဍာရေးနှစ် (၁) အတွက်သာ  
( . . ) မှ ( . . ) အထိ  
(၁-၁၀-၂၀၁၈) မှ (၃၀-၉-၂၀၁၉) အထိ

ဝန်ဆောင်ခန့်မှန်းထား

(၁) အဆင့် / ခြေလှမ်းကျပ် (ယ) အဆင့် ၆၀၀၀ကျပ်

(၂) အဆင့် ၁၂၀၀၀ကျပ် (၃) အဆင့် ၃၀၀၀၀ကျပ်

(၄) အဆင့် ၉၀၀၀၀ကျပ်

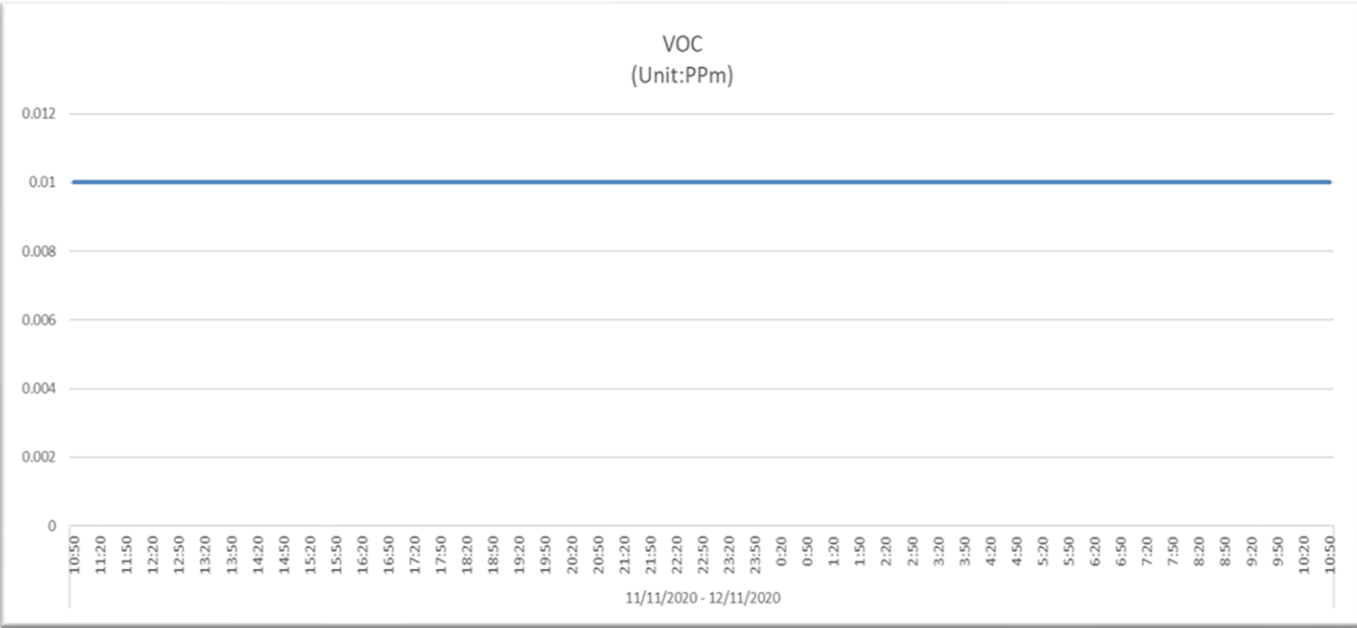
No. 0175188

ဌာနမှူး (ကိုယ်စား) \_\_\_\_\_  
 ကျန်းမာရေးဌာန  
 ရန်ကုန်မြို့တော်စည်ပင်သာယာရေးကော်မတီ

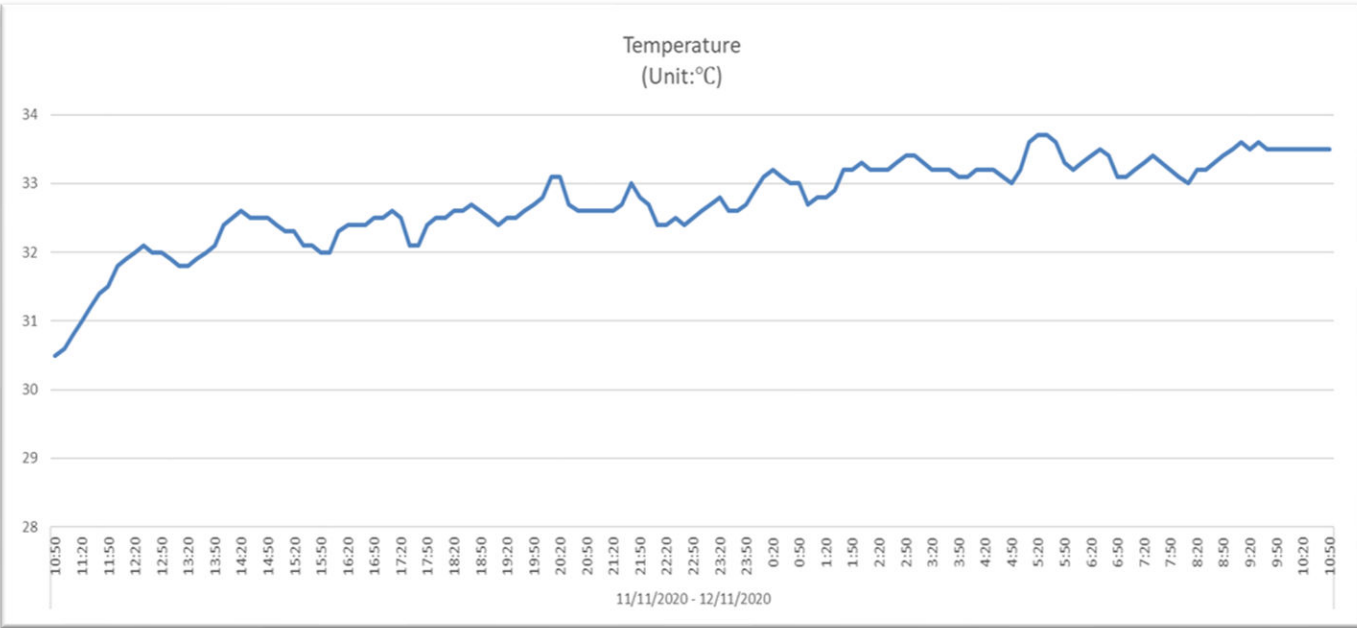
# APPENDIX D

## Mornitoring Result

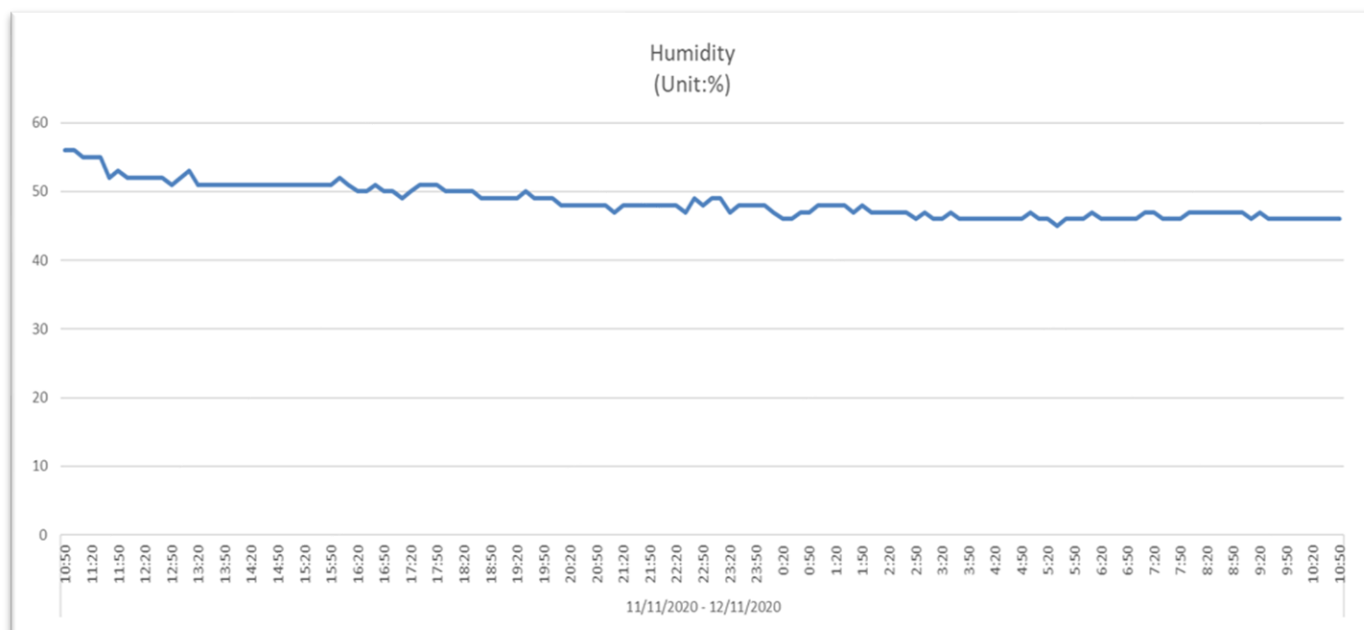
Air Quality Monitoring Graph



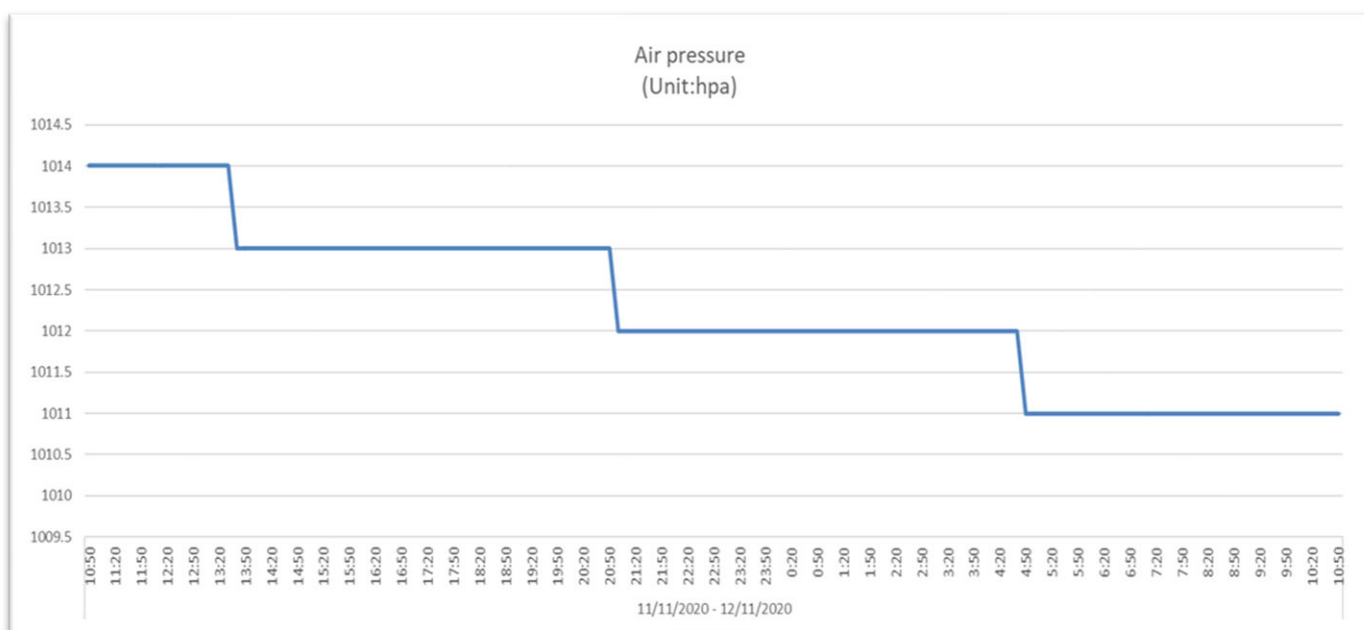
Volatile Organic Compound (VOC)



Temperature (°C )

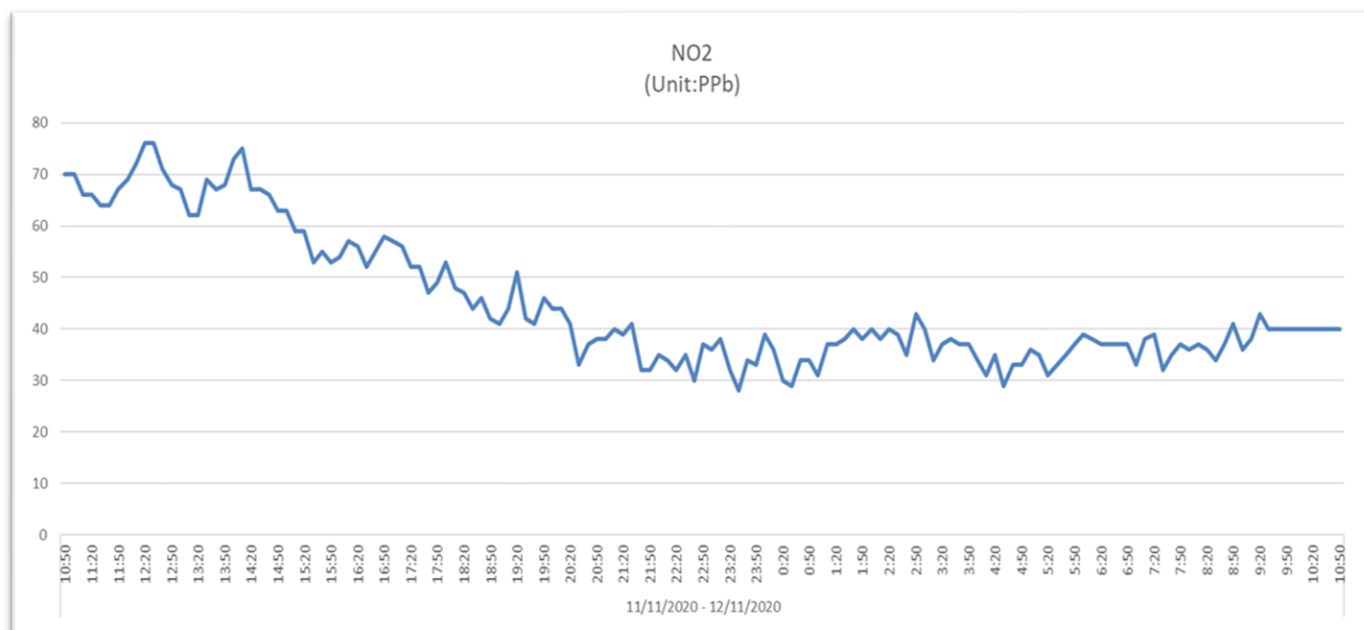


### Relative Humidity (%)

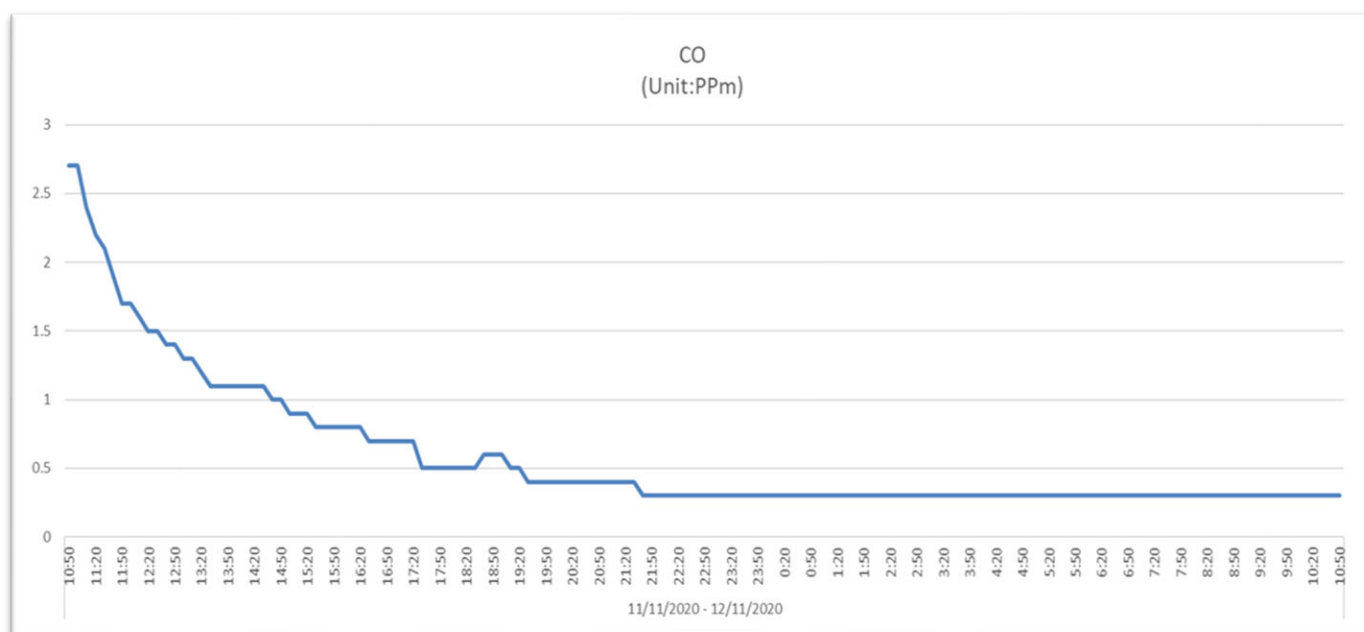


### Air Pressure (hPa)

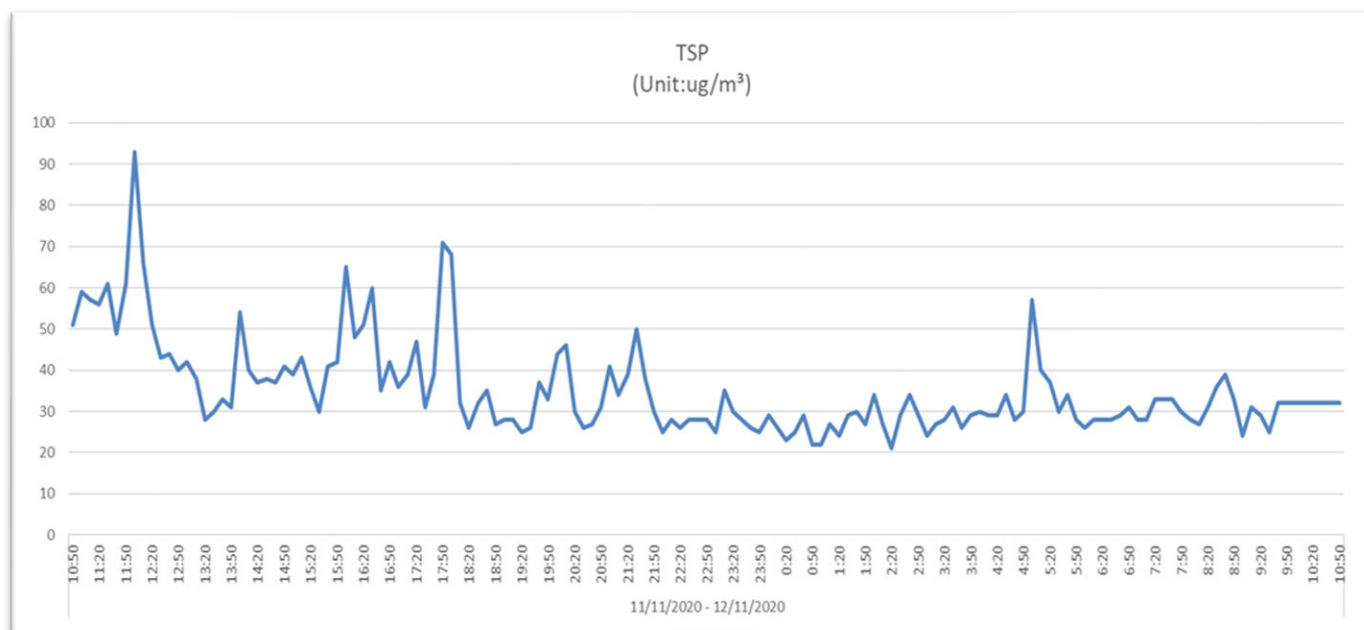




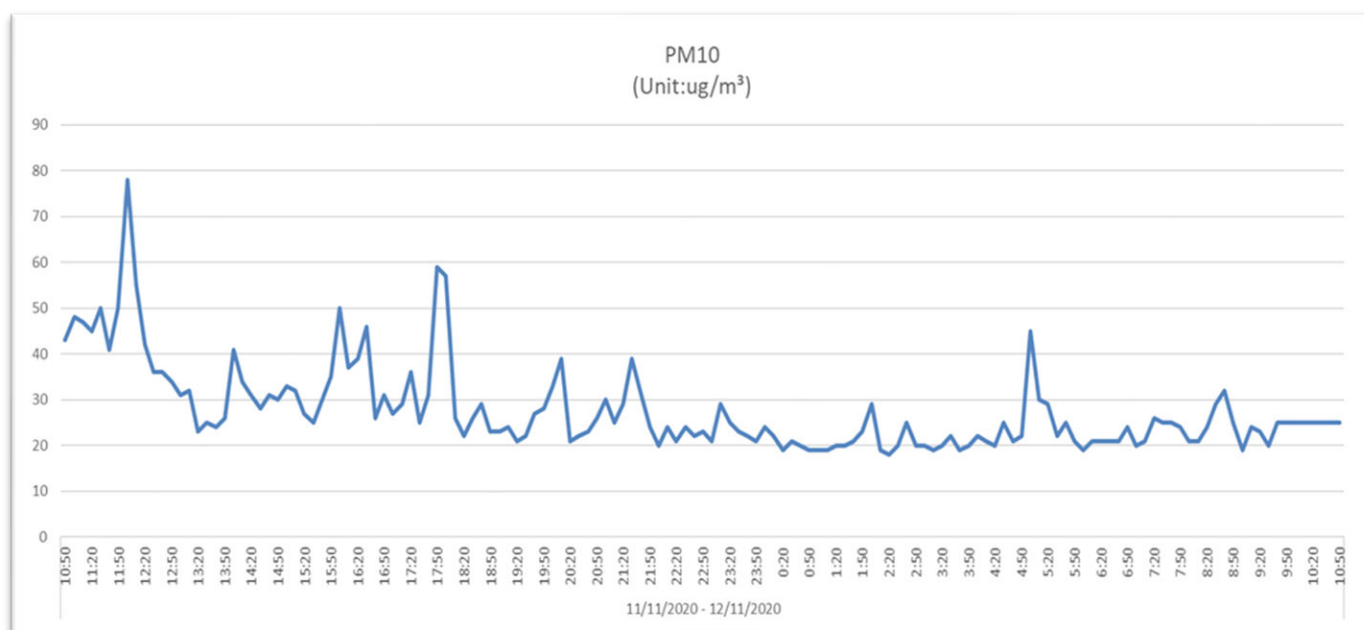
### Nitrogen Dioxide (NO<sub>2</sub>)



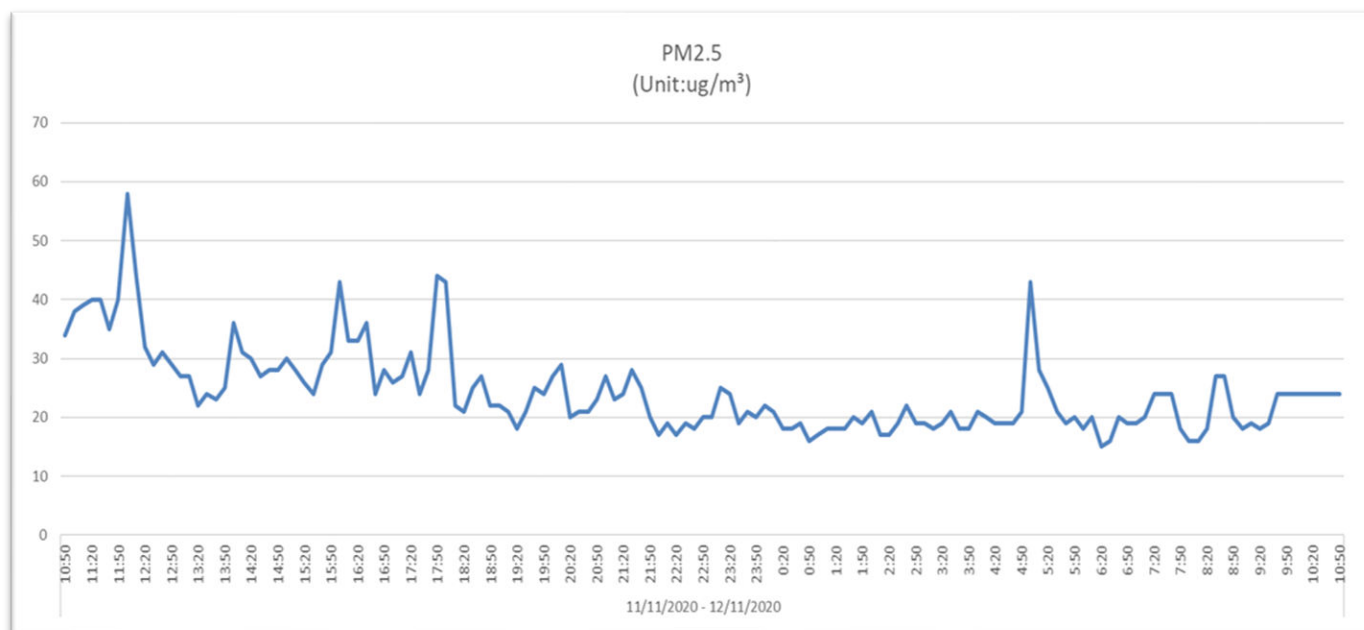
### Carbon Monoxide (CO)



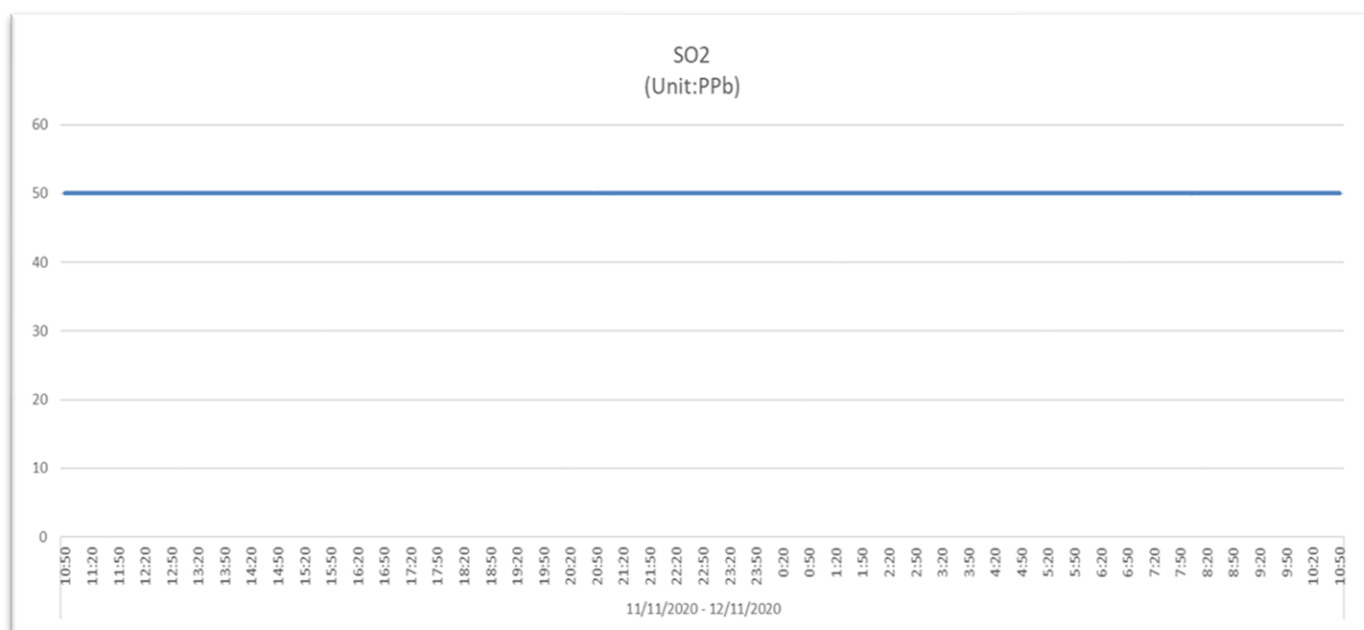
**Total Suspended Particles (TSP)**



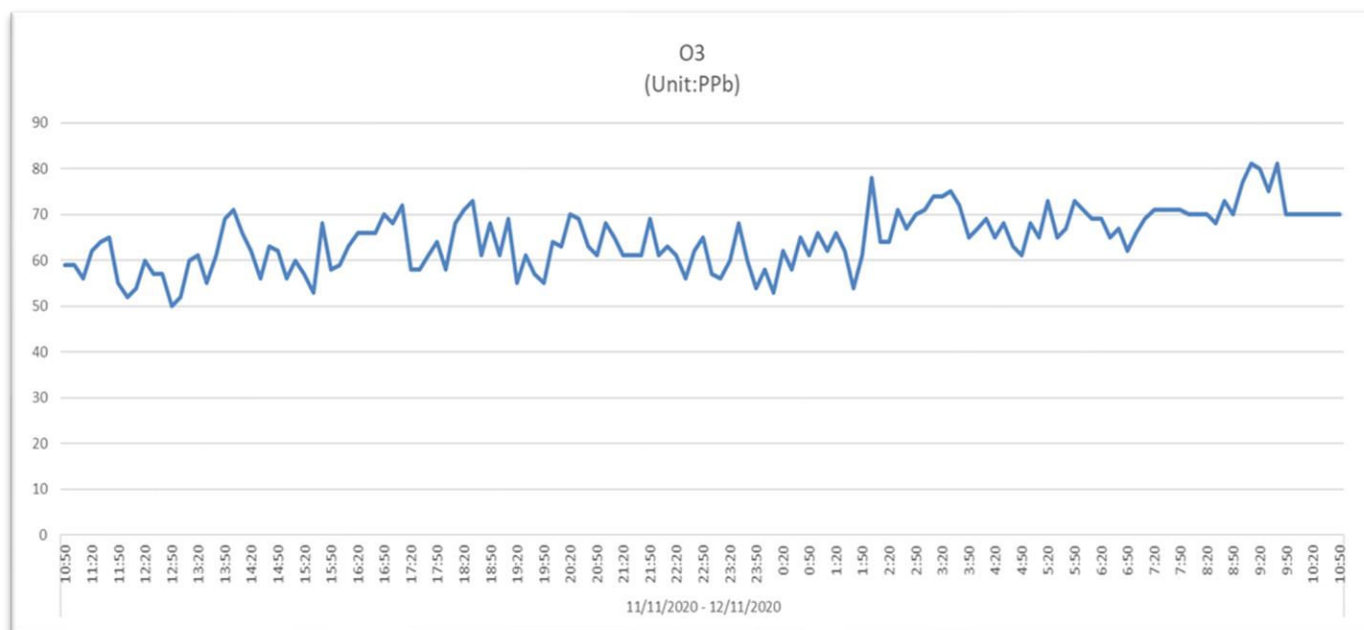
**Particulate Matter (PM<sub>10</sub>)**



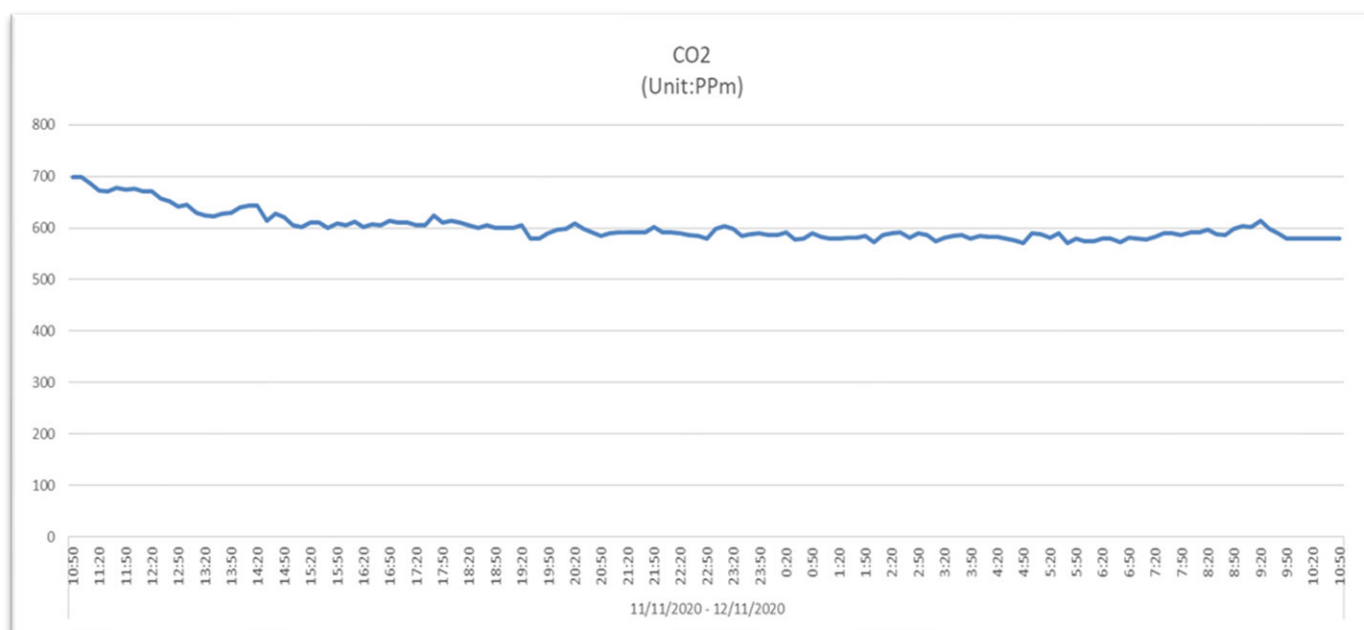
### Particulate Matter (PM<sub>2.5</sub>)



### Sulphur Dioxide (SO<sub>2</sub>)






### Ozone (O<sub>3</sub>)



### Carbon Dioxide (CO<sub>2</sub>)

## Calibrate report

Product	Air Quality Monitor System	Model	AQM-09
Quantity	1pcs	Cali date	JUNE , 24 , 2020
Product No.	OC20200624484527		
Appearance	<input checked="" type="checkbox"/> Clean <input checked="" type="checkbox"/> Non corrosive <input checked="" type="checkbox"/> No damage		
Gas type	O <sub>3</sub> :ppb   NO <sub>2</sub> :ppb   SO <sub>2</sub> :ppb   CO: ppm   CO <sub>2</sub> :ppm   VOC:ppm PM10:ug/m <sup>3</sup> PM2.5:ug/m <sup>3</sup> TSP:ug/m <sup>3</sup> Atmospheric : hpa   Wind veloci: m/s   Wind direct: ° Temperature and humidity: °C/%RH		
Accuracy	± 3%F.S		
resolution	1 ppb   0.1ppm   0.01ppm		
Response time	≤ 30S		
Survey range	O <sub>3</sub> :0-2000ppb   NO <sub>2</sub> :0-2000ppb   SO <sub>2</sub> :0-2000ppb   CO:0-200ppm CO <sub>2</sub> :0-5000ppm   VOC:0-50ppm PM2.5:0-1000ug/m <sup>3</sup> PM10:0-1000ug/m <sup>3</sup> TSP:0-1000ug/m <sup>3</sup> Atmospheric:600-1100hpa   Windveloci:0-60m/s   Winddirect:0-360 ° Temperature: -20-50 °C , Humidity:0-100%RH		
Signal output mode	4G LTE		
Power supply voltage	AC 220V/50Hz		
Power dissipation	≤ 30W		
Working temperature and humidity range	-20 °C -50 °C / 5%RH-95%RH		
Testing condition indoor	Temperature: 30 °C   Humidity: 60%RH		
Calibration gas	O <sub>3</sub> NO <sub>2</sub> SO <sub>2</sub> CO   CO <sub>2</sub> VOC		
Cali gas test	1. O <sub>3</sub> : Cali gas concentration: <u>2000ppb</u> Inspect concentration: <u>1995 ppb</u> 2. NO <sub>2</sub> : Cali gas concentration: <u>1260ppb</u> Inspect concentration: <u>1261 ppb</u> 3. SO <sub>2</sub> : Cali gas concentration: <u>1200ppb</u> Inspect concentration: <u>1202 ppb</u> 4. CO: Cali gas concentration: <u>100ppm</u> Inspect concentration: <u>98.6 ppm</u> 5. CO <sub>2</sub> : Cali gas concentration: <u>5000ppm</u> Inspect concentration: <u>4989 ppm</u> 6. VOC: Cali gas concentration: <u>48.3 ppm</u> Inspect concentration: <u>48.36 ppm</u> 7. PM2.5: Measured value: <u>41 ug/m3</u> PM10: Measured value: <u>47 ug/m3</u> TSP: Measured value: <u>55 ug/m3</u> 8. Atmospheric: Measured value: <u>100 hpa</u> 9. Wind veloci: Measured value: <u>0.5</u> Wind direct: Measured value: <u>0</u> 10. Temperature: Measured value: <u>24.2</u> Humidity: Measured value: <u>45.2%</u>		
Test result	Qualified		
Remark			

Check: Approval: Tester: 

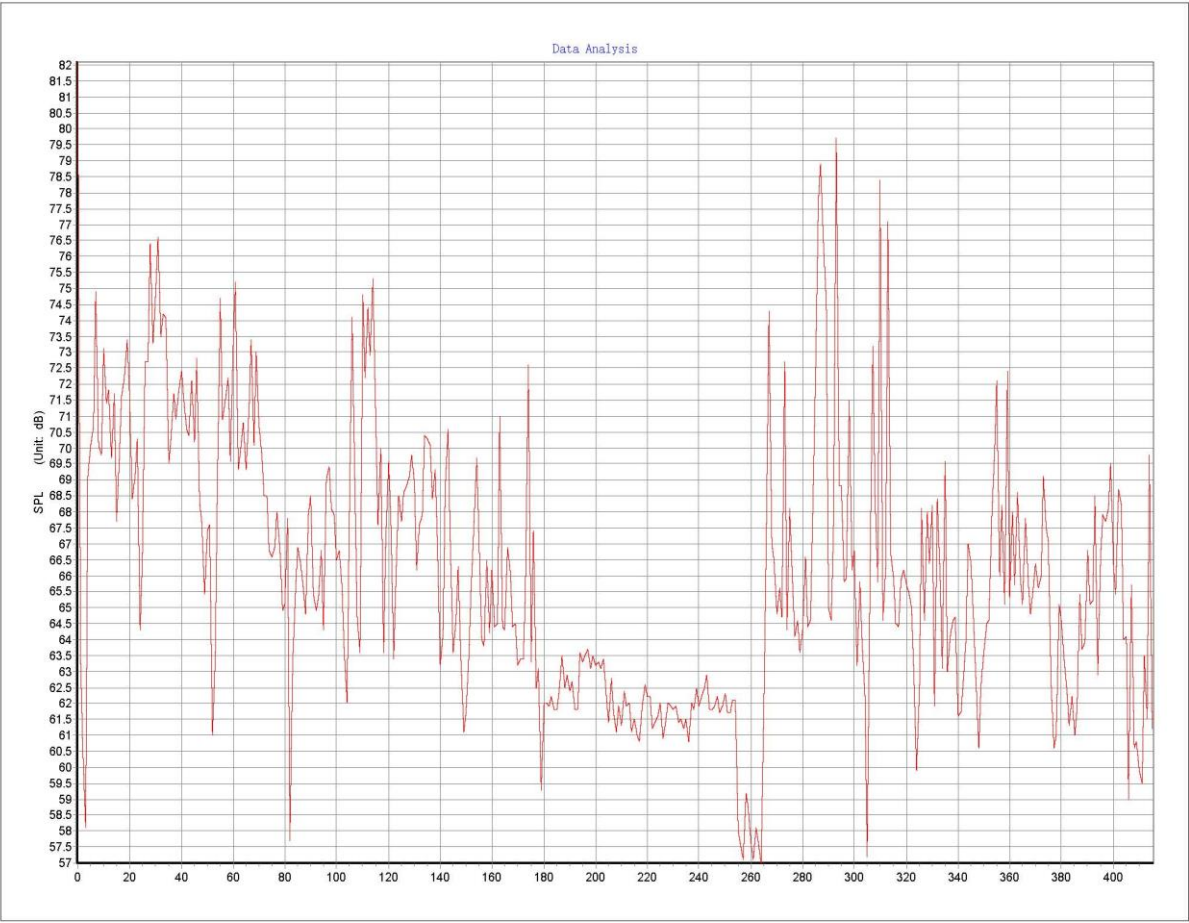
Company: Henan Oceanus Import &amp; Export Co., Ltd.

Date: JUNE , 24 , 2020

Email: [info@china-oceanus.com](mailto:info@china-oceanus.com)

Telephone: +86-0371-6099-8169

Noise Monitoring Graph







# ပတ်ဝန်းကျင်ရေးရာဓာတ်ခွဲခန်း Ecological Laboratory



စိမ်းလန်းအိမ်ခြေပွင့်၊ ပြီးတိုးတက်ရေးအသင်း (Advancing Life and Regenerating Motherland, ALARM)

Reference Number/ စာအမှတ်: EL-R / 03316

Date / နေ့စွဲ: 31 May, 2019

## Laboratory Analysis Report /ဓာတ်ခွဲစစ်ဆေးမှုအစီအရင်ခံစာ

### Sample Profilesနမူနာရာဇဝင်

နမူနာအမည် / Sample Name	Wastewater	နမူနာအမှတ် / Sample ID	5106
နေရာ (မြို့နယ်) Location (Township)	Shwe Than Lwin Industrial Zone, Hlaingtharyar Tsp	လတ္တီတွဒ် Latitude	-
နေရာ (တိုင်း/ပြည်နယ်) Location (Division/State)	Yangon	လောင်ဂျီတွဒ် Longitude	-
ပေးပို့သူအမည် Sender Name	Charis Company Limited	နမူနာကောက်ယူချိန် (နေ့၊ နာရီ) Sampling Time (Date, Time)	21.5.2019 -
အဖွဲ့အစည်း Organisation	-	နမူနာရောက်ရှိချိန် (နေ့၊ နာရီ) Arriving Time (Date, Time)	21.5.2019 3:43 pm
ဆက်သွယ်ရန် Contact			

(This laboratory analysis report is based solely on the sample submitted by the customer)

(ဤဓာတ်ခွဲစစ်ဆေးမှုအစီအရင်ခံစာသည် ပေးပို့သူမှပို့ဆောင်ခဲ့သည့်နမူနာကိုသာအခြေခံထားပါသည်။)

### Analysis Results စမ်းသပ်ချက်အဖြေ

စဉ် Sr.	အရည်အသွေးညွှန်းကိန်း Quality Parameter	ရလဒ် အဖြေ Results		နည်းစဉ် Method	စံသတ်မှတ်ချက် Drinking Standard	စွန့်စေရ စံနှုန်း Effluent Standard	မှတ်ချက် Remarks
1	အမိုးနီးယား (Ammonia)	0.1	mg/L	Lovibond SpectroDirect Method No. 60	< 0.5 mg/L	< 10 mg/L	Normal
2	ဝီဝဲဆိုင်ရာ အောက်ဆီဂျင်လိုအပ်ချက် (BOD <sub>5</sub> )	33	mg/L	Estimated by Eco-Lab with Jenway Dissolved Oxygen Meter (Model 970)	≤ 3 mg/L	≤ 50 mg/L *	Above DW limit
3	ဓာတ်ဆိုင်ရာ အောက်ဆီဂျင်လိုအပ်ချက် (COD)	78	mg/L	Lovibond SpectroDirect Method No. 130, 131, 132	NG	≤ 250 mg/L *	Normal
4	အရောင် (Colour)	45	HU	Lovibond SpectroDirect Method No. 203	-	-	-
5	ကြေးနီ သတ္တုဓာတ် (Copper)	ND	mg/L	AAS, Shimadzu AA-6200 Cu (324.8 nm)	≤ 0.05 mg/L	≤ 0.5 mg/L *	Lower limit of detection = 0.1 mg/L
6	အောက်ဆီဂျင် ပျော်ဝင်မှု (Dissolved Oxygen)	4.75	mg/L	Jenway Dissolved Oxygen Meter (Model 970)	≥ 3 mg/L	NG	Normal
7	ခဲ သတ္တုဓာတ် (Lead)	ND	mg/L	AAS, Shimadzu AA-6200 Pb (283.3 nm)	≤ 0.01 mg/L	≤ 0.1 mg/L *	Lower limit of detection = 0.1 mg/L
8	ချဉ်ဖန်တိန်း (pH)	6.8		pH meters	6.5 – 8.5	6.0 – 9.0 *	Normal
9	အပူချိန် (Temperature)	28	°C	Estimated by Eco-Lab with Jenway Dissolved Oxygen Meter (Model 970)	-	±3°C	-
10	ပျော်ဝင်အနည်များ (Total dissolved solids)	245	mg/L	Consort Multi-parameters Conductivity meter	NG	≤ 2000 mg/l *	Normal
11	ဆိုင်းကြွအနည် (TSS)	5	mg/L	Lovibond SpectroDirect Method No. 383	NG	≤ 50 mg/L *	Normal

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(ခွဲစိတ်ခွင့်မရှိ။ စာဖြင့်ရေးသားသောသဘောတူညီချက်မရရှိပါကအစီအရင်ခံစာကိုအပြည့်အစုံမူလ၌ တစ်စိတ်တစ်ပိုင်း ဖြတ်ယူအသုံးပြုခြင်း မိတ္တူကူးခြင်းမပြုရ။)

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# APPENDIX E

## Safety Data Sheet

广东省惠州市质量计量监督检测所

共 2 页第 2 页

### 检 验 结 果

No: 食品 181228-06932

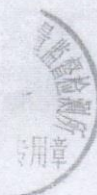
序号	检 验 项 目	标 准 要 求	单 位	检 测 标 准	检 验 结 果	单 项 结 论
1	汞	$\leq 0.001$	mg/L	GB/T 5750.6-2006	$<0.001^*$	合格
2	镉	$\leq 0.005$	mg/L		$<0.003^*$	合格
3	铅	$\leq 0.01$	mg/L		$<0.01^*$	合格
4	菌落总数	$\leq 100$	CFU/mL	GB/T 5750.12-2006	未检出	合格
5	总大肠菌群	不得检出	MPN/100mL	GB/T 5750.12-2006 (2.1 多管发酵法)	未检出	合格
6	耐热大肠菌群	不得检出	MPN/100mL	GB/T 5750.12-2006 (3.1 多管发酵法)	未检出	合格
7	大肠埃希氏菌	不得检出	MPN/100mL	GB/T 5750.12-2006 (4.1 多管发酵法)	未检出	合格

备注: 带“\*”数据为检出限 (或定量限、测定低限), 小于检出限 (或定量限、测定低限) 表示未检出。

结束

审核: 李淑芳

编制: 李淑芳




No.食品190123-00385



广东省惠州市质量计量监督检测所

## 检验报告

共 2 页 第 1 页

样品名称 (型号、规格、商标、等级)	生活饮用水 ---	生产日期	---
		编号或批号	---
		抽送样单号	6009054---
受检单位 及地址	---	检验类别	委托检验
委托单位 及地址	志麟艺品实业(惠阳)有限公司 惠阳区秋长街道将军路	样品数量	2L
生产单位 及地址	---	抽样基数	---
来样方式/ 抽送样者	送样 宋小供	抽送样日期	2019年01月23日
抽样地点	---	验讫日期	2019年01月30日
检验依据	GB/T 5750.4-2006、GB/T 5750.6-2006等		
判定依据	GB 5749-2006《生活饮用水卫生标准》		
样品的状态 描述	外观正常		
检测环境说明	按标准要求		
检 验 结 论	该样品按上述依据进行检验, 所检项目结果见下页。 		
备注			

批准: 胡敏

审核: 何海新

编制: 李润娟



广东省惠州市质量计量监督检测所

第 2 页第 2 页

检 验 结 果

No: 食品 190123-00385

序号	检 验 项 目	标 准 要 求	单 位	检 测 标 准	检 验 结 果	单 项 结 论
1	浑浊度 (散射浑浊度单位)	≤1, 水源与净水技术 条件限制时为 3	NTU	GB/T 5750.4-2006	0.26	合格
2	pH	6.5~8.5	—		6.56	合格
3	耗氧量(COD <sub>Mn</sub> 法以 O <sub>2</sub> 计)	≤3 水源限制, 原水 耗氧量>6mg/L 时为 5	mg/L	GB/T 5750.7-2006	0.32	合格
4	总硬度 (以 CaCO <sub>3</sub> 计)	≤ 450	mg/L	GB/T 5750.4-2006	12	合格
5	氟化物	≤ 1.0	mg/L	GB/T 5750.5-2006	0.012	合格
6	氟化物	≤ 0.05	mg/L		<0.002*	合格
7	硝酸盐 (以 N 计)	≤10, 地下水源限制 时为 20	mg/L		1.7	合格
8	硫酸盐	≤ 250	mg/L		2.4	合格
9	三氯甲烷	≤ 0.06	mg/L	GB/T 5750.8-2006	<0.0002*	合格
10	四氯化碳	≤ 0.002	mg/L		<0.0001*	合格
11	铁	≤ 0.3	mg/L	GB/T 5750.6-2006	<0.01*	合格
12	锰	≤ 0.1	mg/L		<0.05*	合格
13	铜	≤ 1.0	mg/L		<0.05*	合格
14	锌	≤ 1.0	mg/L		0.0460	合格
15	砷	≤ 0.01	mg/L		<0.01*	合格
16	铝	≤ 0.2	mg/L		<0.01*	合格
17	汞	≤ 0.001	mg/L		<0.001*	合格
18	硒	≤ 0.01	mg/L		<0.01*	合格

备注: 带 "\*" 数据为检出限 (或定量限、测定低限), 小于检出限 (或定量限、测定低限) 表示未检出。

结束

审核:

*李梅*

编制:

*李梅*

No.食品181228-06932



广东省惠州市质量计量监督检测所

## 检验报告

共 2 页 第 1 页

样品名称 (型号、规格、商标、等级)		生活饮用水 ---		生产日期	---
				编号或批号	---
				抽送样单号	6001883 ---
受检单位 及地址	---		检验类别	委托检验	
委托单位 及地址	志麟艺品实业(惠阳)有限公司 惠阳区秋长街道将军路		样品数量	500mL	
生产单位 及地址	---		抽样基数	---	
来样方式/ 抽送样者	送样 宋小供		抽送样日期	2018年12月28日	
抽样地点	---		验讫日期	2019年01月08日	
检验依据	GB/T 5750.6-2006、GB/T 5750.12-2006等				
判定依据	GB 5749-2006《生活饮用水卫生标准》				
样品的状态 描述	外观正常				
检测环境说明	按标准要求				
检 验 结 论	该样品按上述依据进行检验, 所检项目结果见下页。 检验报告专用章: 2019年01月08日				
备注					

批准: 胡明

审核: 李朋

编制: 李朋