NGWE YI PA LÈ

ENVIRONMENTAL IMPACT ASSESSMENT
of
The Construction and Operation
of
Sinn Shwe Li Sugar Factory (3)
at
Inn Wine Village Area, Naunghkio Township, Shan State
by
Ngwe Yi Pale' Sugar Co., Ltd

MYANMAR ENVIRONMENT SUSTAINABLE CONSERVATION
MESC

(Myanmar Environment Sustainable Conservation)

January, 2022

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ACRONYMS AND ABBREVIATION

ADB	Asian Development Bank
ASEAN	Association of South-East Asian Nations
BAT	Best Available Technology
BOD	Biochemical Oxygen Demand
CHS	Community Health and Safety
CGM	Complaints and Grievances Mechanism
CIA	Cumulative Impact Assessment
CIM	Cumulative Impact Management
COD	Chemical Oxygen Demand
CSR	Corporate Social Responsibility
dBA	Decibel A- weighting
ECD	Environmental Conservation Department
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EITI	Extractive Industry Transparency Initiative
EMP	Environmental Management Plan
EPS	Environmental Performance Standards
ESP	Electro Static Precipitator
EU	European Union
FD	Forest Department
FGD	Focal Group Discussion
GBH	Girth at Breast Height
GDP	Gross Domestic Products
GHGs	Green House Gases (Glass House Gases)
GIS	Geographic Information System
ID	Identity Card
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IEA	International Energy Agency
ILO	International Labour Organization
ISO	International Standard Organization
IUCN	International Union for Conservation of Nature and Natural Resources

KII	Key Informant Interview
kWh	Kilo Watt Hour
L&FS	Life & Fire Safety
MESC	Myanmar Environment Sustainable Conservation
MIC	Myanmar Investment Commission
MMSP	Management and Monitoring Sub-Plans
MOECAF	Ministry of Environmental Conservation and Forestry
MONREC	Ministry of Natural Resources and Environmental Conservation
MP	Monitoring Plan
NCEA	National Commissions of Environmental Affairs
NECC	National Environmental Conservation Committee
NECCCCC	National Environmental Conservation and Climate Change Central Committee
NEQ	National Environmental Quality
NGO	Non-Government Organization
NO_2	Nitrogen Dioxide
OEHD	Occupational Environmental Health Division
OHS	Occupational Health and Safety
PEB	Payment for Ecosystem Benefits
PES	Payment for Ecosystem Services
PM	Particulate Matter
$PM_{2.5-10}$	Particulate Matter between 2.5-10 microns
PPE	Personnel Protection Equipment
RSPM	Respiratory Suspended Particulate Matter
5Rs	Reduce, reuse, recover, recycle and redesign
SIA	Social Impact Assessment
SO_2	Sulphur Dioxide
SPM	Suspended Particulate Matter
SS	Secondary Source
STD	Sexually Transmitted Diseases
TDS	Total Dissolved Solids
TSS	Total Suspended Solid
TSPM	Total Suspended Particulate Matter
VESC	Valued Environmental and Social Component
WHO	World Health Organization

အခန်း(၁)

အကျဉ်းချုပ်အစီရင်ခံစာ

ဤပတ်ဝန်းကျင်ထိခိုက်မှုအစီရင်ခံစာသည် ငွေရည်ပုလဲသကြားကုမ္ပဏီလီမိတက်မှ ဆင်းရွှေလီသကြားစက်ရုံ အမှတ်(၃) တည်ဆောက်ခြင်းနှင့် စီမံကိန်းလည်ပတ်ခြင်းအတွက် ဖြစ်သည်။

ကုမ္ပဏီသည် မြန်မာ့ရင်းနှီးမြှုပ်နှံမှု ကော်မရှင် (MIC) မှ ခွင့်ပြုမိန့်အမှတ် ၁၂၆/၂၀၁၈ ရက်စွဲ-၁၉.၁၁.၂၀၁၈ ရက်စွဲဖြင့် ခွင့်ပြုမိန့် ရရှိပြီး ဖြစ်ပါသည်။

နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ခြင်း အစီရင်ခံစာကို တာဝန်ရှိသူမှ ခွင့်ပြုချက် ရရှိပြီးနောက် ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာကို ပြင်ဆင်၍ တင်ပြခြင်းဖြစ်ပါသည်။ စာအမှတ် (သစ်တော)၃ (၂)/၁၆(ဃ)(၁၈၀၃/၂၀၂၁)၊ ရက်စွဲ ၂၀၂၁ ခုနှစ်၊ ဇူလိုင်လ ၂ ရက် (နောက်ဆက်တွဲတွင် ဖော်ပြထားပါသည်)

စီမံကိန်းအဆိုပြုတင်ပြသူ

ငွေရည်ပုလဲသကြားကုမ္ပဏီလီမိတက်သည် ၃-၃-၂၀၁၄ ခုနှစ်တွင် တရားဝင် မှတ်ပုံတင်ထားသော ကုမ္ပဏီတစ်ခု ဖြစ်သည်။ (ကုမ္ပဏီမှတ်ပုံတင်အမှတ်- ၅၆၆၅/၂၀၁၃-၁၄ ရင်းနှီးမြှုပ်နှံမှုနှင့် ကုမ္ပဏီများ ညွှန်ကြားမှုဦးစီးဌာန၊ အမျိုးသားစီမံကိန်းနှင့် စီပွားရေးဖွံ့ဖြိုးတိုးတက်မှုဝန်ကြီးဌာန)။ မှတ်ပုံတင်အမှတ် အသစ်မှာ ၁၅၅၇၆၉၃၁၄ ဖြစ်သည်။

စီမံကိန်းအဆိုပြုတင်ပြသူ	-	ငွေရည်ပုလဲသကြားကုမ္ပဏီလီမိတက်
ရုံးချုပ် (မန္တလေး)	-	အမှတ် ၄၁၄/၁၊ ၃၅×၃၆ လမ်းထောင့်၊ မန္တလေးမြို့
ဖုန်း	-	၀၂- ၃၁၉၄၁၊ ၀၂- ၃၄၀၁၅
ဖက်စ်	-	၀၂- ၄၀၇၁၄၂၄
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ဝဘ်ဆိုဒ်	-	www.ngweyipale.com
ဆက်သွယ်ရန်လူပုဂ္ဂိုလ်	-	ဦးလင်းသိန်းအောင် (အုပ်ချုပ်မှုမန်နေဂျာ)
ဖုန်း	-	၀၉-၉၇၇၁၅၀၃၆၆၊ ၀၉-၄၄၄၀၀၂၆၀၀
အီးမေးလ်	-	lintheinaung777@gmail.com

စီမံကိန်းတည်နေရာ - ဦးပိုင်အမှတ် ၁၂၁-၁၂၃၊ ၁၂၉၊ ၁၆၀-၁၆၃၊ ကွင်းအမှတ်(၂)၊ အင်းပိုင်းကျေးရွာ၊ ကုန်းကြီးကျေးရွာအုပ်စု၊ နောင်ချို မြို့နယ်၊ ရှမ်းပြည်နယ်

ကုမ္ပဏီတွင် အလုပ်အမှုဆောင်နှင့် အုပ်ချုပ်မှုအဖွဲ့များ (၁၁)ယောက် ပါဝင်သည်။ ဦးသိန်းမြင့် (အုပ်ချုပ်မှု ဒါရိုက်တာ)၊ ဦးမောင်ရွှေ၊ ဦးထွန်းဝင်း၊ ဦးကျော်ရှိန်၊ ဦးမျိုးမြင့်အောင်၊ ဦးတင်မောင်ဦး၊ ဦးရှင်းစီ၊ ဦးရှိပြင်ရင်၊ ဦးဇော်နိုင်မြင့်၊ ဦးအိုက်မောင်းနှင့် ဦးစိန်မျိုးအောင် တို့မှာ ဒါရိုက်တာများ ဖြစ်ကြသည်။

အတိုင်ပင်ခံအဖွဲ့အစည်း Myanmar Environment Sustainable Conservation (MESC) Co., Ltd အကြောင်း

မြန်မာ့ပတ်ဝန်းကျင် ရေရှည်တည်တံ့ရန်ထိန်းသိမ်းရေး ကုမ္ပဏီလီမိတက် (MESC)သည် အမျိုးသား စီမံကိန်းနှင့် စီးပွားရေးဖွံ့ဖြိုးတိုးတက်မှုဝန်ကြီးဌာနတွင် --- စာအမှတ်။ ရက-၈(၀)၀၀၁/၂၀၁၄ (၀၀၄၇၂၀)၊ ရက်စွဲ။ ၆-၆-၂၀၁၄၊ မှတ်ပုံတင်လက်မှတ်အမှတ် ၈၃၀/၂၀၁၄-၂၀၁၅ (၂၀-၅-၂၀၁၄)ဖြင့် ၂၀၁၄ ခုနှစ်၌ တရားဝင်မှတ်ပုံတင်ထားသော အတိုင်ပင်ခံအဖွဲ့အစည်းတစ်ခု ဖြစ်သည်။

အတိုင်ပင်ခံအဖွဲ့အစည်း မြန်မာ့ပတ်ဝန်းကျင် ရေရှည်တည်တံ့ရန် ထိန်းသိမ်းရေးကုမ္ပဏီလီမိတက် (MESC)၏ ကြားကာလ ယာယီလိုင်စင်အမှတ်သည် ၀၀၀၃ ဖြစ်သည်။ (ရက်စွဲ။ ၁-၇-၂၀၁၇၊ ECD)

ဆက်သွယ်ရန်လိပ်စာ - အခန်း(၅-ခ)၊ တိုက်အမှတ်(၆၇/၆၉)၊ ပါရမီလမ်း၊ (၁၆)ရပ်ကွက်၊ လှိုင်မြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး

ဆက်သွယ်ရန် ပုဂ္ဂိုလ် - ဦးမြင့်ကျော်သူရ

ဖုန်း - +၉၅ ၉ ၄၂၀၀၅၅၀၇၁

ဆက်သွယ်ရန် ဖုန်းနံပါတ် - +၉၅ ၉ ၇၃၀၄၄၉၀၃

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ဤပတ်ဝန်းကျင်ထိခိုက်မှု စီမံကိန်းတွင်ပါဝင်သော MESC ၏ အဖွဲ့ဝင်များမှာ အောက်ပါအတိုင်း ဖြစ်သည် -

အမည်	နိုင်ငံသားနှင့် နိုင်ငံသား မှတ်ပုံတင် အမှတ်	ECD မှတ်ပုံတင် အမှတ်	ကျွမ်းကျင်ဘာသာရပ်
ဦးမြင့်ကျော်သူရ	မြန်မာ ၁၂/ ဒဂတ(နိုင်) ဝ၂၈၃၄၉	ဂဂဂ၆	အုပ်ချုပ်မှုဒါရိုက်တာ၊ ဇီဝမျိုးစုံမျိုးကွဲပညာရှင်၊
ဦးစောဟန်ရှိန်	မြန်မာ ၁၀/ မလမ(နိုင်) ဂဂစ၁၇၃	ဂဂဂ၇	အငြိမ်းစားပါမောက္ခ၊ EIA ပညာရှင်
ဒေါက်တာ သီရိဒေဂီအောင်	မြန်မာ ၁၂/ ဒလန(နိုင်) ဝ၂၉၄၃၃	ဂဂဂစ	ဇီဝမျိုးစုံမျိုးကွဲပညာရှင်(ငှက်)
ဦးတင်ထွန်းအောင်	မြန်မာ ၁၂/ ဥတမ(နိုင်) ၁၇၂၁၁၁	ဂဂဂ၉	အင်ဂျင်နီယာ၊ EIA ပညာရှင်
ဒေါ်ခင်နွေနိုင်	မြန်မာ ၉/ ပခက(နိုင်) ဂဂ၁၂၅၂	ဂဂဂ၁ဂ	ဇီဝမျိုးစုံမျိုးကွဲပညာရှင်(အပင်)၊ ပတ်ဝန်းကျင်သုတေသနလေ့လာရေးပညာရှင်
ဦးသန်းစိုးဦး	မြန်မာ ၉/ မနမ (နိုင်) ဂ၅ဂစဂစ	ဂဂဂ၁၁	EIA ပညာရှင်
ဦးဥက္ကာကျော်သူ	မြန်မာ ၇/ ရတရ (နိုင်) ဂ၉ဂ၃၇၁	ဂဂဂ၁၂	ဘူမိဗေဒပညာရှင်
ဒေါ်သင်းသင်းရီ	မြန်မာ ၁၂/ သဃက(နိုင်) ဂ၃၉၂၉၂	ဂဂဂ၁၃	ဓါတုပတ်ဝန်းကျင်ဆိုင်ရာသုတေသနပညာရှင်၊ ကွန်ပျူတာ

အတိုင်ပင်ခံအဖွဲ့အစည်း MESC အဖွဲ့ဝင်များသည် IEE/EIA ပညာရှင်များဖြစ်ကြပြီး ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာတွင် ပါဝင်ကြပါသည်။

ဦးမြင့်ကျော်သူရ (အုပ်ချုပ်မှုဒါရိုက်တာ)၊ ဦးစောဟန်ရှိန်၊ ဒေါက်တာသီရိဒေဝီအောင်၊ ဦးတင်ထွန်းအောင်၊ ဒေါ်ခင်နွေနိုင်၊ ဦးသန်းစိုးဦး၊ ဦးဥက္ကာကျော်သူနှင့် ဒေါ်သင်းသင်းရီ တို့ဖြစ်ကြသည်။

MESCတွင် အချိန်ပိုင်း ဝန်ထမ်းများလည်း ပါရှိသည်။ စီမံကိန်းအဆိုပြုတင်ပြသူနှင့် အတိုင်ပင်ခံအဖွဲ့ အစည်းအကြောင်းများကို မိတ်ဆက်ခြင်းအခန်းတွင် ပြည့်စုံစွာတင်ပြမည်ဖြစ်သည်။

မူဝါဒ၊ တရားရေးရာနှင့် ဖွဲ့စည်းပုံမူဘောင်

အစိုးရ၏ပတ်ဝန်းကျင်ဆိုင်ရာ မူဝါဒသည် ပတ်ဝန်းကျင်ကိုထိန်းသိမ်းရန်နှင့် ကာကွယ်ရန်ဖြစ်ပြီး တိုင်းပြည်ဖွံ့ဖြိုးရန်အား လိုက်လျောညီထွေရှိသော ဖွံ့ဖြိုးမှုဖြစ်စေရန် ရည်ရွယ်ပါသည်။

ဤအခန်း(၃)တွင် စီမံကိန်းအဆိုပြုတင်ပြသူ၏ ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာမူဝါဒအားလုံးကို ရှင်းပြထားပါသည်။ ပထမဦးဆုံးနှင့် အရေးကြီးသောမူဝါဒသည် ရုပ်ပိုင်းဆိုင်ရာနှင့် လူမှုရေးရာဆိုင်သော ပတ်ဝန်းကျင်နှင့် စပ်လျဉ်းသော ဥပဒေများ၊ နည်းဥပဒေများ နှင့် စည်းမျဉ်းများကို လိုက်နာမည်။ ကုမ္ပဏီသည် စီမံကိန်းအား ပတ်ဝန်းကျင်နှင့် လူမှုရေးရာ လိုက်လျောညီထွေဖြစ်သော စီးပွားရေးကိုလုပ်ဆောင်မည်။

သက်ဆိုင်သောဥပဒေနှင့် နည်းဥပဒေ(၄၆)ခုကို စားရင်းပြုစုထားပြီး ပုဒ်မအချို့ကို ကောက်နှုတ်တင်ပြထားပါသည်။ အပြည်ပြည်ဆိုင်ရာ ကွန်ဗင်းရှင်းနှင့် သဘောတူညီချက်များကိုလည်း စာရင်းပြုစုတင်ပြထားပါသည်။

ပိုမိုသက်ဆိုင်သော ဥပဒေများ၊ နည်းဥပဒေများ နှင့် စည်းမျဉ်းစည်းကမ်းများမှာ-

- ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဥပဒေ(၂၀၁၂)၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေ(၂၀၁၄)၊ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း (၂၀၁၅)၊ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးထုတ်လွှတ်မှု လမ်းညွှန်ချက်(၂၀၁၅) စက်ရုံအက်ဥပဒေ (၁၉၉၅)၊ ဘွိုင်လာဥပဒေ (၂၀၁၅)၊ ရေအရင်းအမြစ်နှင့် ရေကြောင်းထိန်းသိမ်းရေးဥပဒေ(၂၀၁၆)၊ ပြည်သူ့ကျန်းမာရေးဆိုင်ရာ ဥပဒေ (၁၉၇၂)၊ နှင့် လုပ်ငန်းခွင် ဘေးအန္တရာယ် ကင်းရှင်းရေး နှင့် ကျန်းမာရေးဆိုင်ရာ ဥပဒေ (၂၀၁၉)၊

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန (ECD)မှ ချမှတ်ထားသော အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးလမ်းညွှန်ချက်များ (လေထုတ်လုပ်မှု၊ ဆူညံသံ၊ အနံ့) တင်ပြထားပါသည်။

(က) လေထု အရည်အသွေး ထုတ်လွှတ်ခြင်း

ငွေရည်ပုလဲ ကုမ္ပဏီလီမိတက်သည် လေအရည်အသွေးအတွက် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန မှ ချမှတ်ထားသော (ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နှင့် သစ်တောရေးရာ ဝန်ကြီးဌာန (MOECAF)၊ ယခုအခါ MONREC လက်အောက်ရှိ ECD မှ အမိန့်ကြော်ငြာစာအမှတ် ၆၁၅/၂၀၁၅၊ ဒီဇင်ဘာ ၂၀၁၅၊ ကုဒ်အမှတ် ၁.၁ မှ) အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးထုတ်လွတ်မှု ယေဘုယျ လမ်းညွှန်ချက် တန်ဖိုး ကို လိုက်နာပါမည်။

တိုင်းတာသည့် အရာဝတ္ထု	ပျမ်းမျှယူသည့် အချိန်ကာလ	လမ်းညွှန်ချက် တန်ဖိုးများ µg/m^3
Nitrogen dioxide	၁ နှစ် ၁ နာရီ	၄၀ ၂၀၀
Ozone	၈ နာရီ နေ့စဉ် အများဆုံး	၁၀၀
Particulate matter PM_{10}[a]	၁ နှစ် ၂၄ နာရီ	၂၀ ၅၀
Particulate matter $PM_{2.5}$[b]	၁ နှစ် ၂၄ နာရီ	၁၀ ၂၅
Sulfur dioxide	၂၄ နာရီ ၁၀ မိနစ်	၂၀ ၅၀၀

[a] အချင်း ၁၀ မိုက်ခရိုမီတာ သို့မဟုတ် ၁၀ မိုက်ခရိုမီတာ ထက်သေးသော အမှုန်အမွှား

[b] အချင်း ၂.၅ မိုက်ခရိုမီတာ သို့မဟုတ် ၂.၅ မိုက်ခရိုမီတာ ထက်သေးသော အမှုန်အမွှား

(ခ) စွန့်ထုတ်မှုများ

ငွေရည်ပုလဲ ကုမ္ပဏီလီမိတက်သည် စွန့်ထုတ်မှုအဆင့်အတွက် သကြားထုတ်လုပ်ခြင်း ဆိုင်ရာ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးထုတ်လွတ်မှု လမ်းညွှန်ချက် တန်ဖိုး ကို လိုက်နာပါမည်။ (MONREC၊ ECD မှ အမိန့်ကြော်ငြာစာအမှတ် ၆၁၅/၂၀၁၅၊ ဒီဇင်ဘာ ၂၀၁၅) ကုဒ်အမှတ် ၂.၃.၁.၇။

စွန့်ထုတ်မှု အဆင့်များ

တိုင်းတာသည့် အချက်များ (parameter)	Unit	လမ်းညွှန်ချက် တန်ဖိုးများ
5 day biochemical oxygen demand	mg/l	၅၀
Active ingredients/Antibiotics	တိကျသော ကိစ္စရပ်တစ်ခုအပေါ် အခြေခံ၍ ဆုံးဖြတ်ရန်	
Biocides	mg/l	၀.၀၅
Chemical oxygen demand	mg/l	၂၅၀

Oil and grease	mg/l	၁၀
pH	S.U.[a]	၆-၉
Temperature increase	ºC	<၃[b]
Total coliform bacteria	၁၀၀ ml	၄၀၀
Total nitrogen	mg/l	၁၀
Total phosphorus	mg/l	၂
Total suspended solids	mg/l	၅၀

[a] = စံတိုင်းတာစနစ်

[b] = အနီးပတ်ဝန်းကျင်ရှိ ရေအရည်အသွေး၊ ရရှိသော ရေကို အသုံးပြုမှု၊ အလားလာရှိသော လက်ခံနေရာများ၊ တသားတည်းဖြစ်သော စွမ်းဆောင်ရည် အစသည်တို့ကို ထည့်သွင်းစဉ်းစား၍ သိပ်ပံနည်းကျ တည်ဆောက်ထားသည့် ရောနှောဇုန်၏ အစွန်းဘ၌ရှိသော အပူချိန်ဖြစ်သည်၊ ဇုန်ကို အဓိက အဓိပ္ပါယ်သတ်မှတ်ခြင်း မရှိသေးပါက စွန့်ပစ်သည့်အမှတ်မှ ၁၀၀ မီတာ အကွာအဝေးကို အသုံးပြုပါ။

WHO သောက်သုံးရေ စံသတ်မှတ်ချက်

တိုင်းတာသည့် အချက်များ (parameter)	**Unit**	**လမ်းညွှန်ချက် တန်ဖိုးများ**
pH	S.U	၆.၅-၈.၅
Chloride	mg/l	၂၅၀
Total Hardness as $CaCO_3$	mg/l	၅၀၀
Total Iron	mg/l	၀.၃
Sulphate	mg/l	၂၅၀
Temperature increase	ºC	<၃
Turbidity	NTU	၅
Manganese	mg/l	၀.၄
Total dissolved solids	mg/l	၆၀၀
Copper	mg/l	၂
Arsenic	mg/l	၀.၀၁
Cyanide	mg/l	၀.၀၇
Zinc	mg/l	၃

(ဂ) <u>ဆူညံသံအဆင့်</u>

ဆူညံသံအတွက် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေးထုတ်လွှတ်မှု လမ်းညွှန်ချက် ယေဘုယျတန်ဖိုး (MOECAF မှ အမိန့်ကြော်ငြာစာအမှတ် ၆၁၅/၂၀၁၅၊ ဒီဇင်ဘာ ၂၀၁၅) ကုဒ်အမှတ် ၁.၃)

လက်ခံနေရာ	One Hour LAeq (dBA)[a]	
	နေ့အချိန် ၀၇:၀၀ - ၂၂:၀၀ (အများပြည်သူ ပိတ်ရက်များ အတွက် ၁၀:၀၀ -၂၂:၀၀)	ညအချိန် ၂၂:၀၀ - ၀၇:၀၀ (အများပြည်သူ ပိတ်ရက်များ အတွက် ၂၂:၀၀-၁၀:၀၀)
လူနေအိမ်၊ အဖွဲ့အစည်း၊ ပညာရေး နှင့်သက်ဆိုင်သော နေရာများ	၅၅	၄၅
စက်မှု၊ စီးပွားနေရာ	၇၀	၇၀

[a] ညီမျှပြီး အဆက်မပြတ်ဖြစ်နေသော အသံအဆင့် decibelsဖြင့်

သကြားစက်ရုံများ စီမံကိန်းလည်ပတ်ခြင်းအတွက် အပြည်ပြည်ဆိုင်ရာ စံချိန်စံညွှန်းနှင့် လမ်းညွှန်ချက်များကို အင်တာနက်မှဒေါင်း လုတ်ချ၍ တင်ပြထားပါသည်။

စီမံကိန်းအဆိုတင်ပြသူနှင့် အတိုင်ပင်ခံအဖွဲ့အစည်း၏ ကတိကဝတ်များကို တင်ပြထားပါသည်။ ကုမ္ပဏီသည် CSR လုပ်ဆောင်ခြင်းအတွက် အသားတင်အမြတ်၏ ၂- ရာခိုင်နှုန်းကို သုံးစွဲမည်ဟု ကတိကဝတ်ပြုပါသည်။ ကုမ္ပဏီသည် အမြတ်မရခင်ကတည်းက ဒေသဖွံ့ဖြိုးရေးလုပ်ငန်းများကို လုပ်ကိုင်နေပါသည်။ ငွေရည်ပုလဲကုမ္ပဏီအုပ်စုသည် အမျိုးမျိုးသော CSR လုပ်ငန်းများအတွက် ကျပ် ၇,၁၀၅,၅၇၀,၈၂၅ ကို သုံးစွဲပြီးဖြစ်ပါသည်။ ငွေရည်ပုလဲသကြားကုမ္ပဏီလီမိတက်သည် CSR လုပ်ငန်းများအတွက် ထိုဧရိယာတွင် ကျပ် ၂,၈၃၇,၂၁၀,၄၀၀ သုံးစွဲပြီးဖြစ်ပါသည်။

အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာထိန်းသိမ်းရေးနှင့် ရာသီဥတုပြောင်းလဲခြင်းဆိုင်ရာ ဗဟိုကော်မတီ (NECCCCC)၏ ဖွဲ့စည်းပုံနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ ကိစ္စရပ်များတွင် အဓိကတာဝန်ယူလှုပ်ရှားနေသော ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန (ECD)၏ ဖွဲ့စည်းပုံကို ပုံစံကားချပ်ဖြင့် ဖော်ပြထားပါသည်။

အပြည်ပြည်ဆိုင်ရာ ဘဏ္ဍာရေးကော်ပိုရေးရှင်း (IFC) မှ ချမှတ်ထားသော ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ စံချိန်စံညွှန်းများကို အကျဉ်းချုပ် ဖော်ပြထားပါသည်။

နောက်ဆုံးတွင် ပတ်ဝန်းကျင်ဆိုင်ရာ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး (EHS)၊ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးစီမံကိန်း (OHS) နှင့် အများပြည်သူကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး (CHS) တို့ကို လိုက်နာရန် အကျဉ်းချုပ်ရှင်းပြထားပါသည်။

မူဝါဒ၊ တရားရေးရာနှင့် ဖွဲ့စည်းပုံမူဘောင်များကို အခန်း(၃)တွင် အသေးစိတ် ဖော်ပြထားပါသည်။

စီမံကိန်းဆိုင်ရာ သေးစိတ်အကြောင်းအရာနှင့် အခြားဆောင်ရွက်နိုင်သော ကိစ္စရပ်များ ရွေးချယ်ခြင်း

အဆိုပြုတင်ပြသောစီမံကိန်းသည် ဦးပိုင်အမှတ် ၁၂၁-၁၂၃၊ ၁၂၉၊ ၁၆၀-၁၆၃၊ ကွင်းအမှတ်(၂)၊ အင်းပိုင်းကျေးရွာ၊ နောင်ချိုမြို့နယ်၊ ရှမ်းပြည်နယ်တွင် တည်ရှိပါသည်။ ကိုဩဒိနိတ်များမှာ မြောက်လတ္တီတွဒ် ၂၂ ဒီဂရီ ၁၁ မိနစ် ၀၀.၂၂ စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၃ မိနစ် ၅၀.၅၆ စက္ကန့်နှင့် ပင်လယ်ရေမျက်နှာပြင်အထက် ၁၈၇၂ ပေဖြစ်သည်။

အဆိုပြုတင်ပြသော စက်ရုံသည် ၄၉.၇၅ ဧကရှိပါသည်။ အဆိုပြုတင်ပြသော သကြားစက်ရုံ(၃) သည် တစ်နေ့ကို ကြံတန်ချိန် ၁၂၀၀၀ တန် ကြိတ်မည်ဖြစ်ပြီး တစ်နေ့လျှင် သကြား ၁၂၀၀ တန် ထွက်ရှိမည်။

ခန့်မှန်းဘတ်ဂျက်သည် ကျပ်သန်းပေါင်း ၁၆၃,၂၆၃.၃၉ ဖြစ်သည်။ တည်ဆောက်ရေးကာလသည် (၃) နှစ်ဖြစ်ပြီး စီမံကိန်းလည်ပတ်ချိန်သည် နှစ်(၃၀) ဖြစ်သည်။

အဓိကအဆောက်အဦများမှာ ကြံစုပုံကွင်း၊ အဓိကကြံကြိတ်ရုံ၊ ဘွိုင်လာအဆောက်အဦ၊ ပြာကန်၊ အမျိုးအစားခွဲခြားသော လုပ်ငန်းစဉ်နေရာများ၊ စစ်ထုတ်ခြင်းအပိုင်း သကြားအခြောက်ခံ အဆောက်အဦ၊ ပါကင်အပိုင်းနှင့် အခြားအဆောက်အဦးတို့ ပါဝင်ပါသည်။

ရေကို အနီးရှိ ဒိုးကုန်ချောင်းရေမှ ရယူသုံးစွဲမည်။

လျှပ်စစ်ကို အစိုးရလျှပ်စစ်မှ ရယူပြီး ကိုယ်ပိုင်မီးစက်နှင့် ဘွိုင်လာမှ ရယူသုံးစွဲမည်။

နှစ်စဉ်ကုန်ကြမ်း (ကြံ)လိုအပ်ချက်မှာ ၁၈,၀၀၀,၀၀၀ တန် ဖြစ်သည်။ တစ်နှစ်တွင် စီမံကိန်းလည်ပတ်ချိန်မှာ ရက်ပေါင်း (၁၅၀) ဖြစ်သည်။ အသုံးပြုမည့် ဓါတုပစ္စည်းများမှာ ဆာလဖာ၊ ထုံးမှုန့်၊ ဖော်စဖောရစ်အက်စစ်၊ kurifloc ၊ အဝတ်လျှော်ဆိုဒါ၊ ဆိုဒီယမ်ကလိုရိုက် အစရှိသည်တို့ဖြစ်သည်။

တည်ဆောက်ရေးကာလအတွင်းတွင် ဝန်ထမ်း(၃၅၀)၊ စီမံကိန်းလည်ပတ်ချိန်အတွင်းတွင် ပြည်တွင်းဝန်ထမ်း (၅၀၃)ဦး ခန့်အပ်မည်ဖြစ်ပြီး နိုင်ငံခြားသားဝန်ထမ်း (၃၅)ဦး မှာ ယာယီ သာဖြစ်သည်။

စီမံကိန်း လုပ်ကွက်၏ စုစုပေါင်း ဧရိယာမှာ ၇၀.၉၁ ဧက၊ စက်ရုံဝန်းအတွက် ၄၉.၇၅ ဧက၊ရုံးခန်း နှင့် အုပ်ချုပ်ရေး ဆိုင်ရာ အဆောက်အအုံများ အတွက် ၁၃.၆၇ ဧက၊ နှင့် လူနေအိမ် ဧရိယာ အတွက် ၇.၄၉ ဧက ဖြစ်ပါသည်။ (လူနေအိမ် ဧရိယာသည် စက်ရုံ အမှတ် ၂ ဧရိယာ အတွင်း တွင် တည်ရှိပါသည်။)

အလုပ်လုပ်ချိန်မှာ တစ်နေ့ (၈)နာရီ၊ တစ်ပတ် (၄၈) နာရီ ဖြစ်သည်။

နည်းပညာအနေဖြင့် "ကြိတ်"၊ "ညှစ်" စနစ်ကို အသုံးပြုမည်ဖြစ်ပြီး ကြံကို တလိုမ့်တုံးများဖြင့်ကြိတ်ပြီး အရည်ထွက်လာအောင် ဖိညှစ်ရသည်။ သကြားထုတ်လုပ်ခြင်းလုပ်ငန်းစဉ်ကို အခန်း(၄)တွင် အသေးစိတ် ရုပ်ပုံကားချပ်ဖြင့် ဖော်ပြထားပါသည်။

ထွက်ရှိမည့်စွန့်ပစ်ပစ္စည်းများမှာ ကြံကြိတ်ဖတ်၊ တင်လဲရည်၊ ပြာ၊ စွန့်ပစ်ရေ၊ လေစွန့်ထွက်မှု (ပြာ၊ မီးခိုး၊ အမှုန် အစရှိသော) တို့ဖြစ်ကြသည်။ သကြားစက်ရုံတစ်ခုတွင် ကြံကြိတ်ဖတ်သည် မြောက်များစွာထွက်ရှိသည်။ သို့ပေမယ့် ကြံကြိတ်ဖတ်အားလုံးကို ဘွိုင်လာတွင် လောင်စာအဖြစ် ပြန်လည်အသုံးပြုမည်။ တင်လဲရည်ကို အခြားနည်းလမ်းဖြင့် အသုံးပြုနိုင်သည်။ ဤအကြောင်းအရာများကို အခန်း(၄)တွင် အသေးစိတ် ဖော်ပြထားပါသည်။

စီမံကိန်းအခြားဆောင်ရွက်နိုင်သော နည်းလမ်းများ

ပတ်ဝန်းကျင်ဆိုင်ရာ အမြင်ဘက်မှ ဆောင်ရွက်နိုင်သော နည်းလမ်းများကို ဆောင်ရွက်ရသည်။ အမြင်များမှာ စီမံကိန်းနေရာရွေးချယ်ခြင်း၊ ပြန်လည်နေရာချထားခြင်း၊ အရာဝတ္ထုပစ္စည်းများ၊ စွမ်းအင်၊ နည်းပညာ/နည်းစနစ်၊ လိုအပ်ချက်၊ ဆောင်ရွက်မှုများအား အခြားဆောင်ရွက်နိုင်သော နည်းလမ်းများနှင့် "ဘာမျှမလုပ်လျှင်" "ဘာမှမဖြစ်ဘူး" ဟူ၍ဖြစ်သည်။

စီမံကိန်းတည်နေရာအတွက် ဒီထက်ကောင်းသောနေရာမတွေ့ပေ။ လုပ်ကွက်အတွက် ပိုမိုကောင်းမွန်သော အခြားရွေးချယ်စရာ မတွေ့ပါ။ ကုန်ကြမ်း လွယ်ကူစွာ ရရှိနိုင်ရန်အတွက် အနီးနားနှင့် အဝေးပတ်ဝန်းကျင်တွင် ကြံခင်းများ ရှိသည်။ နောင်ချိုမြို့နယ် ဇရိယာ ရှိ ကြံစိုက်ခင်းများမှ ကုန်ကြမ်းကြံကို ဝယ်ယူရရှိသည်။ နည်းပညာ အနေဖြင့် ဖိခြင်း (သို့မဟုတ်) အရည်ညစ်ခြင်းဖြစ်ပြီး အဆိုပါနည်းပညာသည် သကြားထုတ်လုပ်ခြင်းအတွက် အကောင်းဆုံး နည်းပညာ ဖြစ်သည်။

အခြားဆောင်ရွက်နိုင်သော နည်းလမ်းများအကြောင်းကို အခန်း(၄)တွင် အကျဉ်းချုပ်ဖော်ပြ ထားပါသည်။

ပတ်ဝန်းကျင်အခြေအနေ

အခန်း(၅)သည် ပတ်ဝန်းကျင်အခြေအနေအကြောင်းအရာဖြစ်သည်။ အနီးအနားရှိပတ်ဝန်းကျင် ဇရိယာတွင် အဓိကအားဖြင့် စိုက်ပျိုးမြေများ၊ လယ်ကွင်းများ၊ ယာများနှင့် လူနေဇရိယာများဖြစ်သော ကျေးရွာ (၆)ရွာ ပါဝင်သည်။ ဇရိယာတစ်ခုလုံးအနေဖြင့် မြေမျက်နှာသွင်ပြင်အနေအထားမှာ လှိုင်းပမာ မို့မောက်နိမ့်ဖွံ့မ်းဖြစ်ပါသည်။

အနီးနားရှိကျေးရွာ (၆)ရွာ၏အမည်များမှာ အင်းဝိုင်း၊ တောင်ကျ၊ ထုံးကုန်း၊ တဲတိုက်၊ ပလောင်ကုန်းနှင့် ပါဟဲ တို့သည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လေ့လာမည့်ဇရိယာတွင် ပါဝင်သည်။ ဆင်းရွှေလီ သကြားစက်ရုံ(၂)လည်းပဲ အနီးနားတွင်ရှိသည်။

ပတ်ဝန်းကျင်၏ ရုပ်ပိုင်းဆိုင်ရာ၊ ဇီဝပိုင်းဆိုင်ရာ၊ လူမှုစီးပွားရေးဆိုင်ရာ၊ ယဉ်ကျေးမှုဆိုင်ရာနှင့် မျက်စိပဒေသာဖြစ်သော ရှုခင်းရှုကွက်ဆိုင်ရာတို့ကို အခြေခံအချက်အလက်များအနေဖြင့် ကောက်ယူခဲ့ ပါသည်။

မိုးလေဝသအချက်အလက်များကို နောင်ချိုမိုးလေဝသဌာနမှ ရရှိပါသည်။ လအလိုက် အမြင့်ဆုံးအပူချိန်မှာ ၂၀၁၀ ခုနှစ် ဧပြီလတွင် (၃၃.၈°C) ဖြစ်ပြီး အနိမ့်ဆုံးအပူချိန်မှာ ၂၀၁၉ ခုနှစ် ဇန်နဝါရီလတွင် (၆.၈°C) ဖြစ်သည်။ အမြင့်ဆုံးမိုးရေချိန်မှာ ၂၀၁၀ ခုနှစ်တွင် (၅၉.၂ လက်မ) ဖြစ်ပြီး အနိမ့်ဆုံးမိုးရေချိန်မှာ ၂၀၁၉ ခုနှစ်တွင် (၀.၁ လက်မ) ဖြစ်သည်။

အခြားရုပ်ပိုင်းဆိုင်ရာအနေဖြင့် ဥပမာ-မြေမျက်နှာသွင်ပြင်၊ ဘူမိဗေဒ၊ ထိတွေ့ဝန်းကျင် လေ၊ ဆူညံသံ၊ ရေ အစရှိသည်တို့ကိုလည်း လေ့လာမှတ်တမ်းတင်ခဲ့ပါသည်။ ဘူမိဗေဒနှင့်ဆိုင်သော အချက်အလက်ကို ကုမ္ပဏီဘူမိဗေဒပညာရှင်ဆီမှ ရရှိပါသည်။ စီမံကိန်းတည်နေရာသည် ထုံးကျောက်အခြေခံရှိသော နေရာဖြစ်သည်။ ဇလဗေဒအနေဖြင့် ချောင်းငယ်တစ်ခုရှိ၍ အမည်မှာ ဒိုးကုန်ချောင်းဖြစ်ပြီး မြောက်မှတောင်သို့ စီးဆင်းပါသည်။

ထိတွေ့ဝန်းကျင်ဆိုင်ရာ လေ၊ ဆူညံသံနှင့်ရေအရည်အသွေးကို အခြေခံအချက်အလက်အဖြစ် လေ့လာမှတ်တမ်းတင်ခဲ့ပါသည်။ ကောက်ယူလာသောဇရိယာရှိ တန်ဖိုးများကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန (ECD) မှချမှတ်ထားသော NEQE လမ်းညွှန်ချက်နှင့်အတူ ယှဉ်တွဲဖော်ပြပါသည်။

ပတ်ဝန်းကျင် လေထု အရည်အသွေး

ကွင်းဆင်းလေ့လာနေစဉ်အတွင်း တင်ပြထားသော စီမံကိန်း လုပ်ကွက်နှင့် အင်းဝိုင်းကျေးရွာတွင် လေအရည်အသွေးကို တိုင်းတာခဲ့ပါသည်။ ကိုဩဒိနိတ် တည်နေရာ မှာ မြောက်လတ္တီတွဒ် ၂၂ ဒီဂရီ ၁၁ မိနစ် ၆.၇၆ စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၃ မိနစ် ၁၇.၈၇ စက္ကန့် နှင့် မြောက်လတ္တီတွဒ် ၂၂ ဒီဂရီ ၁၀ မိနစ် ၅၃.၄၇ စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၂ မိနစ် ၅၁.၇၁ စက္ကန့် ဖြစ်ပါသည်။ ရလဒ်များကို အောက်ဖော်ပြ ဇယားတွင် ဖော်ပြထားပါသည်။

တိုင်းတာသည့် အရာဝတ္ထု	**လုပ်ကွက်ရှိ လက်ရှိ တန်ဖိုး ($\mu g/m^3$)**	**အင်းဝိုင်း ကျေးရွာတွင် ($\mu g/m^3$)**	**ပျမ်းမျှယူသည့် အချိန်ကာလ**	**NEQEG လမ်းညွှန်ချက် တန်ဖိုးများ ($\mu g/m^3$)**
Nitrogen dioxide	၅၃ (၁ နာရီ)	၂၂ (၁ နာရီ)	၁ နာရီ	၂၀၀
Ozone	၇၁ (၈ နာရီ)	၂၀ (၈ နာရီ)	၈ နာရီ နေ့စဉ် အများဆုံး	၁၀၀
Particulate matter PM_{10}[a]	၃၉ (၂၄ နာရီ)	၃၈ (၂၄ နာရီ)	၂၄ နာရီ	၅၀
Particulate matter $PM_{2.5}$[b]	၃၄ (၂၄ နာရီ)	၃၁ (၂၄ နာရီ)	၂၄ နာရီ	၂၅
Sulfur dioxide	၃၄.၂ (၂၄ နာရီ)	၃၀ (၂၄ နာရီ)	၂၄ နာရီ	၂၀

[a] အချင်း ၁၀ မိုက်ခရိုမီတာ သို့မဟုတ် ၁၀ မိုက်ခရိုမီတာ ထက်သေးသော အမှုန်အမွှား

[b] အချင်း ၂.၅ မိုက်ခရိုမီတာ သို့မဟုတ် ၂.၅ မိုက်ခရိုမီတာ ထက်သေးသော အမှုန်အမွှား

တန်ဖိုး ၂ ခုမှာ လမ်းညွှန်ချက် တန်ဖိုးအောက်တွင် ရှိပြီး PM_{10}၊ $PM_{2.5}$ နှင့် SO_2 သည် လမ်းညွှန်ချက် တန်ဖိုးထက် မြင့်နေပါသည်။ ဤအရာသည် အနီးနားရှိသကြားစက်ရုံ၊ အမှတ်-၂ ၏လုပ်ဆောင်ချက်များနှင့် ယာဉ်သွားလာမှုများပါဝင်သော တည်ဆောက်ရေးလုပ်ငန်းများကြောင့် ဖြစ်နိုင်ပါသည်။

ဆူညံသံ အဆင့်

ဆူညံသံ အဆင့်ကို portable noise detector, EXTECH ဖြင့် တိုင်းတာခဲ့သည်။ ကိုဩဒိနိတ် တည်နေရာ မှာ မြောက်လတ္တီတွဒ် ၂၂ ဒီဂရီ ၁၁ မိနစ် ၆.၇၆ စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၃ မိနစ် ၁၇.၈၇ စက္ကန့် နှင့် မြောက်လတ္တီတွဒ် ၂၂ ဒီဂရီ ၁၀ မိနစ် ၅၃.၄၇ စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၂ မိနစ် ၅၁.၇၁ စက္ကန့် ဖြစ်ပါသည်။

စီမံကိန်း နာမည်/ စတင်မည့် အချိန် နှင့် ရက်စွဲ	**L_{eq} in dBA**			**L_{max} in dBA**			**NEQEG လမ်းညွှန်ချက် တန်ဖိုးများ**	
	နေ့	**ည**	**စုစုပေါင်း**	**နေ့**	**ည**	**စုစုပေါင်း**	**နေ့**	**ည**
စီမံကိန်း လုပ်ကွက် (၃.၁၂.၂၀၁၈) ၁၀:၁၈ နာရီမှ (၄.၁၂.၂၀၁၈) ၁၀:၁၈ နာရီ	၄၁	၃၈	၄၀	၂၉	၂၉	၂၉	၇၀	၇၀
အင်းဝိုင်းကျေးရွာအတွင်း တန်ဖိုးများ (၄.၁၂.၂၀၁၈) ၁၂:၂၀ နာရီမှ (၅.၁၂.၂၀၁၈) ၁၂:၂၀ နာရီ	၅၅	၃၀	၅၃	၂၇	၂၀	၂၅	၅၅	၄၅

စီမံကိန်းသည် ယခုအချိန်အထိ မစတင်ရသေးသောကြောင့် ဆူညံသံ အဆင့် တန်ဖိုးသည် လမ်းညွှန်ချက် တန်ဖိုးများထက် နိမ့်ပါသည်။

ရေအရည်အသွေး

ဒိုးကုန် ချောင်းနှင့် အင်းဝိုင်းရေတံခွန်မှ ရေကို ရန်ကုန်သို့ ပြန်လည်ပို့ဆောင်ပြီး ISO မာတ်ခွဲခန်း (အသိမှတ်ပြု မာတ်ခွဲခန်း) အင်းစိန်တွင် ရေအရည်အသွေးကို စစ်ဆေးခဲ့ပါသည် (နောက်ဆက်တွဲတွင် ကြည့်ရှုပါ)။ ရေနမူနာ ကောက်ယူသော ကိုဩဒိနိတ် တည်နေရာ မှာ မြောက်လတ္တီတွဒ် ၂၂ ဒီဂရီ ၁၁ မိနစ် ၇.၆၉ စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၃ မိနစ် ၂၂.၈၀ စက္ကန့် ဖြစ်ပါသည်။

စဉ်	တိုင်းတာသည့် အချက်များ (parameter)	ဒီးကုန်ချောင်းရှိ လက်ရှိတန်ဖိုးများ	ရေတံခွန်ရှိ လက်ရှိတန်ဖိုးများ	ကမ္ဘာ့ ကျန်းမာရေး အဖွဲ့၏ စံချိန်စံနှုန်း လမ်းညွှန်ချက် တန်ဖိုးများ
၁	pH	၇.၆	၈.၀	၆.၅- ၈.၅
၂	Temperature	၂၅.၀ °C	၂၅.၀ °C	<၃
၃	Turbidity	၁၀ NTU	၁၈ NTU	၅ NTU
၄	Total Hardness	၁၅၀ mg/l	၁၆၀ mg/l	၅၀၀ mg/l
၅	Iron	၀.၃၇ mg/l	၀.၄၇ mg/l	၀.၃ mg/l
၆	Chloride	၄ mg/l	၃ mg/l	၂၅၀ mg/l
၇	Total Dissolved Solids	၁၄၄ mg/l	၁၄၈ mg/l	၁၀၀၀ mg/l
၈	Suspended Solids	၁၃ mg/l	၂၂ mg/l	-
၉	Manganese	Nil	Nil	၀.၀၅ mg/l
၁၀	Arsenic	Nil	Nil	၀.၀၁ mg/l
၁၁	Zinc	Nil	Nil	၃ mg/l
၁၂	Copper	Nil	Nil	၂ mg/l
၁၃	Phosphate	Nil	Nil	-
၁၄	Oil and grease	၈.၂၃ mg/l	၇.၃၄ mg/l	၁၀ mg/l
၁၅	COD	၃၂ mg/l	၃၂ mg/l	-
၁၆	BOD	၈ mg/l	၁၀ mg/l	-

စီးဆင်းရေ (တည်ဆောက်ရေးကာလအတွင်းတွင်)

တည်ဆောက်ရေးကာလအတွင်းတွင် တွေ့ရှိရသော စီးဆင်းရေကို ရန်ကုန်သို့ ပြန်လည်ပို့ဆောင်ပြီး ISO မာတ်ခွဲခန်း (အသိမှတ်ပြု မာတ်ခွဲခန်း) အင်းစိန်တွင် ရေအရည်အသွေးကို စစ်ဆေးခဲ့ပါသည် (နောက်ဆက်တွဲတွင် ကြည့်ရှုပါ)။ ရေနမူနာ ကောက်ယူသော ကိုဩဒိနိတ် တည်နေရာမှာ မြောက်လတ္တီတွဒ် ၂၂ ဒီဂရီ ၁၁ မိနစ် ၄.၅၀ စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၃ မိနစ် ၁၅.၁၆ စက္ကန့် ဖြစ်ပါသည်။

စဉ်	တိုင်းတာသည့် အချက်များ (parameter)	စက်ရုံရှိလက်ရှိတန်ဖိုးများ	ယူနစ်	NEQEG လမ်းညွှန်ချက် တန်ဖိုးများ
၁.	Biochemical Oxygen Demand	၃၄	mg/l	၃၀
၂.	Chemical Oxygen Demand	၉၆	mg/l	၁၂၅
၃.	Oil and grease	၅	mg/l	၁၀
၄.	pH	၇.၃	S.U	၆-၉
၅.	Total coliform bacteria	၁၈၀	mg/l	၄၀၀
၆.	Total nitrogen	<၅	mg/l	၁၀
၇.	Total phosphorus	၇	mg/l	၂
၈.	Total suspended solids	၆၀၅	mg/l	၅၀

စီမံကိန်းသည် လည်ပတ်ခြင်း အဆင့်တွင် မဟုတ်သည့်အတွက် အချက်များသည် အခြေပြုအချက်အလက်များသာ ဖြစ်ပြီး တစ်ခုလုံး၏ တန်ဖိုးသည် TTS မှလွဲ၍ လမ်းညွှန်ချက် တန်ဖိုးထက်များစွာ နိမ့်ပါသည်။

မြေအရည်အသွေး

စီမံကိန်း လုပ်ကွက်နှင့် အင်းဝိုင်းကျေးရွာ မှ မြေနမူနာကို ကောက်ယူပြီး ခွဲခြားစိတ်ဖြာရန်အတွက် ရန်ကုန်သို့ ပြန်လည်ပို့ဆောင်ပါသည်။ ကိုဩဒိနိတ် တည်နေရာ မှာ မြောက်လတ္တီတွဒ် ၂၂ ဒီဂရီ ၁၁ မိနစ် ၄.၅၈ စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၃ မိနစ် ၁၄.၇၈စက္ကန့် နှင့် မြောက်လတ္တီတွဒ် ၂၂ ဒီဂရီ ၁၀ မိနစ် ၅၃.၃၀ စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၃ မိနစ် ၅၀.၆၄ စက္ကန့် ဖြစ်ပါသည်။ ရလဒ်များမှာ အောက်ပါအတိုင်း ဖြစ်ပါသည်။

မြေအရည်အသွေးတိုင်းတာသည့် ရလဒ် (တင်ပြထားသော စီမံကိန်း လုပ်ကွက်)

Sr. No	Sample plot	pH Soil : Water ၁ : ၂.၅	Texture	Total N %	Available Nutrients
					P
၁	စီမံကိန်းတည်နေရာ	Slightly alkaline	Clay	Low	Low

မြေအရည်အသွေး ခွဲခြားစိတ်ဖြာခြင်း အချက်အလက် စာရွက် (တင်ပြထားသော စီမံကိန်း လုပ်ကွက်)

Sr. No	Sample plot	Moisture %	pH soil: Water ၁ : ၂.၅	Texture				Total N %	Available Nutrient
				Sand %	Silt %	Clay %	Total %		P ppm (Bray)
၁	စီမံကိန်း တည်နေရာ	၅.၆၃	၇.၁၀	၃၈.၇၆	၁၀.၆၄	၅၀.၆၀	၁၀၀	၀.၁၉	၀.၄၂

မြေအရည်အသွေးတိုင်းတာသည့် ရလဒ် (အင်းဝိုင်းကျေးရွာ)

Sr. No	Sample plot	pH Soil : Water ၁ : ၂.၅	Texture	Total N %	Available Nutrients
					P
၁	အင်းဝိုင်းကျေးရွာ	Moderately alkaline	Sand	Low	Medium

မြေအရည်အသွေး ခွဲခြားစိတ်ဖြာခြင်း အချက်အလက် စာရွက် (အင်းဝိုင်းကျေးရွာ)

Sr. No	Sample plot	Moisture %	pH soil: Water ၁ : ၂.၅	Texture				Total N %	Available Nutrient
				Sand %	Silt %	Clay %	Total %		P ppm (Bray)
၁	အင်းဝိုင်းကျေးရွာ	၆.၆၉	၇.၇၉	၈၆.၆၄	၉.၇၂	၃.၆၄	၁၀၀	၀.၁၉	၂၅.၂၉

အနှံ့

အနှံ့စနစ်အတွက် လမ်းညွှန်ချက် စံသတ်မှတ်ချက်မှာ ၅ နှင့် ၁၀ ကြား (၁၀ ထက် မပို၍) ဖြစ်ပါသည်။

တုန်ခါမှု

တုန်ခါမှုကို သကြားစက်ရုံ တည်ဆောက်သည့် နေရာ နှင့် အင်းဝိုင်းကျေးရွာတွင် တိုင်းတာခဲ့ပါသည်။

ကိုဩဒိနိတ် တည်နေရာ မှာ မြောက်လတ္တီကျူ ၂၂ ဒီဂရီ ၁၁ မိနစ် ၂.၂၅စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၃ မိနစ် ၁၅.၈၂ စက္ကန့် နှင့် မြောက်လတ္တီတွဒ် ၂၂ ဒီဂရီ ၁၀ မိနစ် ၅၃.၁၄ စက္ကန့်၊ အရှေ့လောင်ဂျီတွဒ် ၉၆ ဒီဂရီ ၄၂ မိနစ် ၅၁.၂၃ စက္ကန့် ဖြစ်ပါသည်။ အသုံးပြုသည့် ကိရိယာမှာ BEME-TECH Vibration Meter ဖြစ်ပါသည်။

ရလဒ်များမှာ ၀၄.၃ mm/s and ၀ mm/s ဖြစ်ပါသည်။

စီမံကိန်းသည် ယခုအချိန်ထိ မစတင်ရသေးသည့် အတွက် တုန်ခါမှု တန်ဖိုးသည် နိမ့်ခြင်း သို့မဟုတ် သုည နီးပါးအထိ ဖြစ်ပါသည်။

ဇီဝ အစိတ်အပိုင်းများအပေါ် လေ့လာခြင်း အနေဖြင့် -

- သဘာဝ အပင် မျိုးစိတ် ၃၂၁ မျိုး (သဘာဝအပင်များ)
- စိုက်ပျိုးထားသော အပင် မျိုးစိတ် ၇၁ မျိုး (စိုက်ပျိုးထားသော အပင်များ)
- ငှက်မျိုးစိတ် ၁၂၈ မျိုး (ငှက်များ)
- ကုန်းနေရေနေ သတ္တဝါ နှင့် တွားသွား သတ္တဝါ မျိုးစိတ် ၁၄ မျိုး (ကုန်းနေရေနေ သတ္တဝါ နှင့် တွားသွား သတ္တဝါ)
- ရေနေ သတ္တဝါ မျိုးစိတ် ၇ မျိုး (ငါးများ) ကို တွေ့ရှိပြီး ဖော်ထုတ်ခဲ့ပါသည်။ (အချို့သည် တစ်ဆင့်ခံ အချက်အလက်များမှ ဖြစ်ပါသည်။

ဇရိယာသည် စိုက်ပျိုးမြေဖြစ်သောကြောင့် သဘာဝဇီဝမျိုးစုံမျိုးကွဲသည် မရှိသလောက် နည်းပါသည်။ သေးငယ်သောသဘာဝအပင်များ (ဥပမာ - ချဉ်၊ ပင်ပျော့၊ မြက်အစရှိသော) နှင့် ငှက်များကို တွေ့ရမည်။

အင်းဝိုင်းကျေးရွာတစ်ရွာတည်းသာသက်ရောက်နိုင်သော်လည်း လူမှုစီးပွားရေးဆန်းသစ်ခြင်းကို အင်းဝိုင်း၊ တောင်ကျ၊ ထုံကုန်း၊ ပါဟဲ၊ ပလောင်ကုန်းနှင့် တဲတိုက်ကျေးရွာများကို ဆောင်ရွက်ခဲ့ပါသည်။ အင်းဝိုင်းသည် ကြီးမားသောကျေးရွာဖြစ်ပြီး ကျန်ကျေးရွာများမှာ သေးငယ်သည်။

ကျေးရွာ (၆)ရွာ၏ လူဦးရေစာရင်းမှာ-

အင်းဝိုင်း - ၁၀၈၈ ဦး

တောင်ကျ - ၁၄၀ ဦး

ထုံးကုန်း - ၁၆၀ ဦး

ပါဟဲ - ၆၇ ဦး

ပလောင်ကုန်း - ၇၀ ဦး

တဲတိုက် - ၃၃၅ ဦး ဖြစ်ကြသည်။

ဤဒေသတွင် (၅၅) ရာခိုင်နှုန်းသည် ဗမာ၊ (၂၅) ရာခိုင်နှုန်းသည် ရှမ်း၊ (၁၅) ရာခိုင်နှုန်းသည် ပလောင်နှင့် (၅) ရာခိုင်နှုန်းသည် ဓန ဖြစ်ပြီး (၁၀၀)ရာခိုင်နှုန်းမှာ ဗုဒ္ဓဘာသာများ ဖြစ်ကြသည်။

စာတတ်မြောက်နှုန်းမှာ (၇၇)ရာခိုင်နှုန်း ဖြစ်သည်။ (၅၇ ရာခိုင်နှုန်းမှာ အခြေခံပညာရေးနှင့် ၂၀ ရာခိုင်နှုန်းမှာ အလယ်တန်းပညာရေး)

(၈၀)ရာခိုင်နှုန်းမှာ လယ်သမားများဖြစ်ပြီး ကြံ၊ ပြောင်းဖူးနှင့်စပါး စိုက်ပျိုးကြသည်။ အိမ်ထောင်စု အများစုမှာ (၆၅ ရာခိုင်နှုန်း) နှစ်စဉ်ဝင်ငွေသည် ကျပ်သိန်း (၅၀) အောက်ဖြစ်သည်။ (၄၅) ရာခိုင်နှုန်းအိမ်များမှာ သစ်သားဖြင့်ပြုလုပ်ထားပြီး (၃)ရာခိုင်နှုန်းမှာ အုတ်ဖြင့်ဆောက်ထားသောအိမ်များ ဖြစ်သည်။

အင်းဝိုင်းကျေးရွာတွင် အလယ်တန်းကျောင်း(၁)ကျောင်း၊ တဲတိုက်၊ တောင်ကျနှင့်ပလောင်ကုန်း ကျေးရွာများတွင် မူလတန်းကျောင်း တစ်ကျောင်းစီနှင့် ထုံးကုန်းနှင့် ပါဟဲကျေးရွာကျေးရွာများတွင် မရှိပေ။ ကျေးရွာနှစ်ရွာ (အင်းဝိုင်းနှင့်တဲတိုက်) တွင် ဘုန်းကြီးကျောင်းတစ်ကျောင်းစီ ရှိသည်။ ကျေးရွာအားလုံးကို ကားဖြင့်သွားနိုင်သည်။

ကျေးရွာအားလုံးသည် မော်တော်ကားလမ်း ရှိပြီး ယခုအခါ ကျေးရွာငါးရွာမှာ ငွေရည်ပုလဲ သကြား စက်ရုံမှ လျှပ်စစ်မီးရရှိပါသည်။ ထုံးကုန်းကျေးရွာတွင် လျှပ်စစ်မီးသွယ်တန်းသည့် လုပ်ငန်းစဉ် ရောက်နေပါသည်။

လူမှုစီးပွားရေးအခန်းကဏ္ဍကို အခန်း(၅)တွင် အသေးစိတ်ဖော်ပြထားပါသည်။

မျက်စိပဒေသာဖြစ်သောရှုခင်းရှုကွက်အနေဖြင့် လှပသောမြေမျက်နှာသွင်ပြင်အနေအထားနှင့် ထင်ရှားသောအဆောက်အဦ မရှိပေ။ သမိုင်းဝင်၊ ယဉ်ကျေးမှုဆိုင်ရာနှင့် ဘာသာရေးဆိုင်ရာ အဆောက်အဦလည်းပဲ မရှိပေ။ ဇရိယာတစ်ခုလုံးတွင် လယ်ကွင်းများ၊ ယာများနှင့် လူနေဇရိယာ (ကျေးရွာများ) ဖြစ်သည်။

သက်ရောက်မှုများဆန်းစစ်ခြင်းနှင့် ဖြေလျှော့နိုင်မည့်နည်းလမ်းများ

ဤအကြောင်းအရာများကို အခန်း(၆)တွင် အသေးစိတ်ဖော်ပြထားပါသည်။ ဤအခန်းတွင် သက်ရောက်မှုဆန်းစစ်ခြင်းနှင့် ဖြေလျှော့နိုင်မည့်နည်းလမ်းများ၊ ဖြစ်နိုင်ခြေရှိသော ဘေးအန္တရာယ်များ၊ ဖြစ်နိုင်ခြေရှိသော ကြွင်းကျန်သက်ရောက်မှုများနှင့် စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်းပါဝင်သည်။

စီမံကိန်းကာလအခြေအနေ(၄)ခုလုံးအတွက် အမျိုးအစားခွဲ ဆန်းစစ်ထားသော ဖြစ်နိုင်ချေရှိသော သက်ရောက်မှုများနှင့် ဖြေလျော့နိုင်မည့် နည်းလမ်းများကို အနှစ်ချုပ်၍ အောက်တွင် ဇယားဖြင့် ဖော်ပြထားပါသည်။

တည်ဆောက်ခြင်း ကာလအတွင်း

စဉ်	သက်ရောက်မှု	လျော့ပါးစေရေးနည်းလမ်းများ
၁။	ပတ်ဝန်းကျင် လေထု အပေါ် သက်ရောက်မှု	- ဖုန်မှုန့်များနှင့် မီးခိုးများကို စီမံခန့်ခွဲခြင်း - အမှိုက်များကို ဟင်းလင်းပွင့် မီးပုံရှို့ခြင်းများကို ရှောင်ရှားခြင်း၊ - ဖုန်ထခြင်းအတွက်ရေဖြန်းခြင်း - ယာဉ်သွားလာမှုကို ကန့်သတ်ခြင်း၊ အရှိန်လျှော့ခြင်း - လေပြင်းများ တိုက်ခတ်နေသည့် အချိန်တွင် မြေလုပ်ငန်းများ သို့မဟုတ် မြေများ၊ သဲများ တင်ခြင်း၊ ချခြင်း ရပ်တန့်ထားခြင်း - မြေများ၊ သဲများ နှင့် ထုံးမှုန့်များကို ဟင်းလင်းပွင့် ပုံထားခြင်းကို ကန့်သတ်ခြင်း၊ - မြေများနှင့် အခြား အမှုန့် ပစ္စည်းများကို တင်ခြင်း၊ ချခြင်း ပြုလုပ်သည့် အမြင့်ကို လျော့ချခြင်း - ဖုန်မှုန့်များကို ထိန်းသိမ်းရန်အတွက် အကြီးမြန်သော အပင်များကို စိုက်ပျိုးခြင်း - သဘာဝ ပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေဖြစ်မည့် ယာဉ်များ စက်ပစ္စည်း ကိရိယာများ ကို ဝယ်ယူခြင်း ဥပမာ- မီးခိုးထုတ်လွှတ်မှု နည်းသော ပစ္စည်းများ - စက်ပစ္စည်းများကိုကောင်းစွာ လည်ပတ်စေရန်၊ ချောမွေ့စေရန် ယာဉ်များ စက်ပစ္စည်း ကိရိယာများ ကို ကောင်းစွာ ထိန်းသိမ်းခြင်း - Sulphur ပါဝင်မှု နည်းသော လောင်စာကို အသုံးပြုခြင်း - PPEs ထောက်ပံ့ပေးခြင်း - ဒေသခံလူထုသည် ဖုန်မှုန့်များနှင့် မီးခိုးများ နှင့် ပတ်သက်၍ တိုင်ကြားနိုင်ရန် ဆောင်ရွက်ခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း

၂။	ဆူညံသံ နှင့် တုန်ခါမှု	- ECD ၏ NEQEG လမ်းညွှန်ချက်များအတိုင်း လိုက်နာခြင်း၊ - ဆူညံသံ အဆင့် ထုတ်လွှတ်မှု နည်းသော ယာဉ်များ စက်ပစ္စည်း ကိရိယာများ ကို ဝယ်ယူခြင်း - ဆူညံသံ ကို အလုပ်ချိန်အတွင်းသာ ကန့်သတ်ခြင်း (ညအချိန်တွင် အလုပ်မလုပ်ခြင်း) - တိကျသော စက်ပစ္စည်း များတွင် silencers များ တပ်ဆင်ခြင်း - အလုပ်မလုပ်သော နာရီများအတွင်း ကိရိယာများ ကို ပိတ်ထားခြင်းနှင့် အရှိန်လျှော့ထားခြင်း - ယာဉ်သွားလာမှု အရှိန် သတ်မှတ်ခြင်း/ကန့်သတ်ခြင်း - စက်ပစ္စည်းများကိုကောင်းစွာ လည်ပတ်စေရန်၊ ချောမွေ့စေရန် ယာဉ်များ စက်ပစ္စည်း ကိရိယာများ ကို ကောင်းစွာ ထိန်းသိမ်းခြင်း - (ယာဉ်များ စက်ပစ္စည်း ကိရိယာများ၏) တုန်ခါမှုကို စီမံခန့်ခွဲခြင်း၊ သင့်တော်သော အောက်ခံ ကို ထောက်ပံ့ပေးခြင်း - ဆူညံသံကို ထိန်းသိမ်းရန်အတွက် အကြီးမြန်သော အပင်များကို စိုက်ပျိုးခြင်း - PPEs ထောက်ပံ့ပေးခြင်း - ဒေသခံလူထုသည် ဆူညံသံ နှင့် ပတ်သက်၍ တိုင်ကြားနိုင်ရန် ဆောင်ရွက်ခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၃။	ရေထု ပတ်ဝန်းကျင် အပေါ် သက်ရောက်မှု	- ဒိုးကုန်ချောင်း၏ ရေထုထဲသို့ မြေများ၊ သဲပုံများကို တိုက်စားခြင်း သို့မဟုတ် မတော်တဆ ပြိုကျခြင်းကို ရှောင်ရှားခြင်း - မြေများ နှင့် အသစ်ရောစပ်ထားသော ကွန်ကရစ်များ ရေထုထဲသို့ ဖိတ်စင်ခြင်း သို့မဟုတ် မတော်တဆ စွန့်ပစ်ခြင်းကို ရှောင်ရှားခြင်း - နှုန်းတင်ခြင်းနှင့် အနည်ကျခြင်းကို ရှောင်ရှားခြင်း သို့မဟုတ် လျော့ချခြင်း - ရေထုထဲသို့ ဆီနှင့် ဓာတုပစ္စည်းများ မတော်တဆ ဖိတ်စင်ခြင်း ရှောင်ရှားခြင်း

		- အိမ်တွင်း စွန့်ပစ်ပစ္စည်းများကို စီမံခန့်ခွဲခြင်း (အစိုင်အခဲ နှင့် အရည်) ရေထုထဲသို့ မစွန့်ပစ်ခြင်း - ရေအမြင့်၊ စီးဆင်းမှု နှင့် ထုထည်ကို တတ်နိုင်သမျှ စီမံခန့်ခွဲခြင်း၊ ဇလဗေဒ ဆိုင်ရာ ရာသီအလိုက် အပြောင်းအလဲ ကိုလည်း ထည့်သွင်းစဉ်းစားခြင်း - ဒေသခံလူထုသည် ရေထု၏ အရည်အသွေး နှင့် ပတ်သက်၍ ဖြစ်ပေါ်လျှင် တိုင်ကြားနိုင်ရန် ဆောင်ရွက်ခြင်း - ECD ၏ NEQEG လမ်းညွှန်ချက် တန်ဖိုးများနှင့် ကိုက်ညီရန် ကြိုးစားခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၄။	မြေထု အပေါ် သက်ရောက်မှု	- မလိုအပ်သော မြေလုပ်ငန်းများ၊ မြေရွှေ့ခြင်းနှင့် မြေသာ ဖြတ်တောက်ခြင်းများကို ရှောင်ရှားခြင်း - မြေဆီလွှာ နှင့် စွန့်ပစ်ပစ္စည်းများကို ခွဲခြားု၍ စွန့်ပစ်ခြင်း - မြေဆီလွှာ စီမံခန့်ခွဲခြင်း - မလိုအပ်ဘဲ မြေမျက်နှာသွင်ပြင် ပြောင်းလဲစေခြင်းကို ရှောင်ရှားခြင်း - မြေဆီလွှာများကို အခြားမြေသားများနှင့် သီးခြား ခွဲ၍ ပုံခြင်း (သို့လှောင်ပုံကို ခွဲခြားခြင်း)၊ အပေါ်ယံ မြေဆီလွှာကို အပင်များ ပြန်လည် စိုက်ပျိုးခြင်းအတွက်၊ အခြားမြေသားများကို တည်ဆောက်ခြင်းများ အတွက် - မြေဆီလွှာများ တိုက်စားခြင်း သို့မဟုတ် မတော်တဆ ပြိုကျခြင်းကို ကာကွယ်ခြင်း - မြေကြီးများ၊ ပစ္စည်းများကို ချောင်းအတွင်း ဆေးကြော ရေများနှင့် အတူ ဝင်ရောက်စေခြင်းကို ကာကွယ်ခြင်း - ဆောက်လုပ်ရေး လုပ်ငန်းများ ပြီးဆုံးသည့်အခါ မြေပြန်ညှိခြင်းနှင့် ထိတွေ့ထားသော မြေနေရာများကို တည်ငြိမ်အောင် လုပ်ဆောင်ခြင်း - စိုစွတ်သော ရာသီဥတုတွင် မြေကို ကြာရှည်စွာ ဖုံးအုပ်မထားခြင်း - စက်ပစ္စည်းများ သို့မဟုတ် ယာဉ်များကို အသုံးပြု၍ ကျစ်လစ်သော မြေသားကိုရရှိရန် ပြန်လည် လုပ်ဆောင်ခြင်း

		- မြေပေါ်တွင် လောင်စာဆီ ဖိတ်စင်ခြင်း ကို ရှောင်ရှားခြင်း၊ ဆီ ဖိတ်စင်ခြင်း ကို ချက်ချင်းရှင်းလင်းခြင်း၊ ရေဆေးခြင်း မပြုလုပ်ဘဲ စုပ်ယူနိုင်သည့် ပစ္စည်း အသုံးပြုခြင်း - လုပ်သားများကို လောင်စာဆီ ကိုင်တွယ်ခြင်းနှင့် ဖိတ်စင်ခြင်းကို ရှင်းလင်းခြင်းအတွက် သင်ကြားလေ့ကျင့်ပေးခြင်း၊ - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၅။	သက်ရောက်မှုများ- စွန့်ပစ်ပစ္စည်း	- အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲခြင်း - ဥပဒေများနှင့် စည်းမျဉ်းစည်းကမ်းများကို လိုက်နာခြင်း - အမှိုက်များကို ဟင်းလင်းပွင့် မီးပုံရှို့ခြင်းများကို ရှောင်ရှားခြင်း၊ - သတ်မှတ် အမှိုက်ပုံများတွင် အမှိုက်သေချာ စွန့်ပစ်ခြင်း - လုပ်သားများကို အိမ်တွင်း အလေ့အကျင့်ကောင်းများကို သင်ကြားလေ့ကျင့်ပေးခြင်း၊ - ဆောက်လုပ်ရေး ပစ္စည်းများကို ရောင်းချရန်အတွက် စုပုံထားခြင်း - ဆောက်လုပ်ရေး လုပ်ငန်းများ ပြီးဆုံးသည့်အခါ လုပ်ကွက်ကို ပြန်လည်ရှင်းလင်းရန်အတွက် ကန်ထရိုက်တာ ငှားရမ်းခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၆။	ဇီဝမျိုးစုံ မျိုးကွဲ များ အပေါ် ဖြစ်နိုင်ခြေ ရှိသော သက်ရောက်မှုများ	- သစ်ပင်ပန်းမန်များနှင့် တိရစ္ဆာန်များ ထိန်းသိမ်းခြင်း နှင့် စောင့်ရှောက်ခြင်း - ဇီဝမျိုးစုံ မျိုးကွဲ များ နှင့် နေထိုင်ရာများ အပေါ် အနည်းဆုံး နှောက်ယှက်မှု ဖြစ်စေရန် အကောင်အထည်ဖော်ခြင်း - ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဥပဒေ(၂၀၁၂)၊ နည်းဥပဒေ(၂၀၁၄)၊ ကို လိုက်နာခြင်း - အပင်များ ရှင်းလင်းခြင်းကို ကန့်သတ်ခြင်း - အပင်ကြီးများ တတ်နိုင်သလောက် ထိန်းသိမ်းခြင်း - အမှိုက်များကို ဟင်းလင်းပွင့် မီးရှို့ခြင်းကို ရှောင်ရှားခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း

၇။	လမ်းကြောင်း အပေါ် ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုများ	- လမ်းကြောင်း စီမံခန့်ခွဲခြင်း နှင့် အစီအစဉ် ရေးဆွဲခြင်း - ယာဉ်သွားလာမှု များ ကို အချိန်ဇယားရေးဆွဲခြင်း - အကာအကွယ် ကားမောင်းခြင်းအတွက် ယာဉ်မောင်းများကို အသိပညာပေးခြင်း - ယာဉ်မတော်တဆမှု လုံးဝ မဖြစ်စေရန် ထိန်းသိမ်းခြင်း - စက်ပစ္စည်းများကိုကောင်းစွာ လည်ပတ်စေရန်၊ ချောမွေ့စေရန် ယာဉ်များ စက်ပစ္စည်း ကိရိယာများ ကို ကောင်းစွာ ထိန်းသိမ်းခြင်း - အရှိန်လျှော့၍ မောင်းနှင်ခြင်း နှင့် ပတ်သက်၍ ကုန်ကားကြီးမောင်း ယာဉ်မောင်းများကို အသိပညာ ပေးခြင်း - ကုန်တင်ယာဉ်များ ဝန်ပို မသယ်ခြင်း။ စည်းမျဉ်း စည်းကမ်းများကို လိုက်နာခြင်း - သယ်ယူပို့ဆောင်နေစဉ် အတွင်းမြေများ သို့မဟုတ် အခြား သောပစ္စည်းများ ယာဉ်များမှ ဖိတ်စင်ခြင်းကို ရှောင်ရှားခြင်း - ကျေးရွာ အနီး သို့မဟုတ် ဖြတ်၍ မောင်းနှင်သည့်အချိန်တွင် အရှိန်လျှော့ချခြင်း - သွားလာရာ လမ်းတစ်လျှောက်တွင် သင့်တော်သည့် နေရာတွင် အရှိန်ကို ကန့်သတ် သတ်မှတ်ခြင်း - လျော့ပါးစေရေး ဆောင်ရွက်ချက်များကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၈။	လုပ်ငန်းခွင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး ဆိုင်ရာ ပြဿနာများ	- လုပ်သားများကို ကောင်းမွန်သော အလုပ်လုပ်ခြင်း အလေ့ကျင့်ကောင်းများ၊ လုံခြုံရေး အလေ့ကျင့်ကောင်း များ ကို လုပ်သားများအား ပညာပေးခြင်း လေ့ကျင့်ပေးခြင်း နှင့် ကြီးကြပ်ခြင်း - အရေးပေါ်အခြေအနေ လုပ်ထုံးလုပ်နည်းများအတွက် အစီစဉ် ရေးဆွဲခြင်း ရှေးဦးသူနာပြုပစ္စည်းများ၊ မီးသတ်ဆေးဘူး အစရှိသည်တို့ကို ထောက်ပံ့ပေးခြင်း၊ - မတော်တဆမှု လုံးဝ မဖြစ်စေရန် ထိန်းသိမ်းခြင်း - ကြက်ခြေနီ အသင်းများ၊ လူနာတင်ယာဉ်၊ နောင်ချူ ဆေးရုံ၊ မီးသတ်၊ အစရှိသည်တို့၏ ဖုန်းနံပါတ်များ နှင့် လိပ်စာများကို လူတိုင်းမြင်နိုင်စေရန် ကပ်ထားခြင်း

		- ရှေးဦးသူနာပြုသင်တန်းများ နှင့် မီးငြိမ်းသတ်ရေး လေ့ကျင့်မှုများ ကို လုပ်သားတစ်ချို့ကို လေ့ကျင့်သင်ကြားပေးခြင်း - ကုမ္ပဏီ အတွက်အာမခံ ထားရှိခြင်း နှင့် မီးအာမခံ လည်း ထားခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၉။	ဖြစ်နိုင်ခြေ ရှိသော လူမှုရေး ဆိုင်ရာ ပြဿနာများ	- ဒေသခံများ၏ လူမှု စီးပွား ဘဝအပေါ် ဖြစ်နိုင်ခြေ ရှိသော ဆိုးကျိုးသက်ရောက်မှုများကို ရှောင်ရှားခြင်း - လူထုနှင့် ကောင်းမွန်သော ဆက်ဆံရေးကို ထိန်းသိမ်းခြင်း - လူထုအမြင်ကို ဖော်ထုတ်နိုင်ရန် အတွက် လူထုတွေ့ဆုံဆွေးနွေးပွဲများကို အခါအားလျော်စွာ ကျင်းပပေးခြင်း - ဒေသခံများ နှင့် ဆက်ဆံသည့် အခါ သင့်လျော်သော အပြုအမူများကို သင်ကြားပေးခြင်း - လူမှုရေးအလေ့အကျင့်ဆိုးများ၊ ကိုယ်ကျင့်တရားဖောက်ပြန်ခြင်းများအတွက် စီမံခန့်ခွဲခြင်း - အမျိုးသား နှင့် အမျိုးသမီး လုပ်သားများကို နေရာ ခွဲခြားပေးထားခြင်း - ဆောက်လုပ်ရေး ကန်ထရိုက်များကိုလည်း ၎င်းတို့၏ လုပ်သားများ စည်းကမ်းလိုက်နာစေရန် တောင်းဆို ထားခြင်း - အပြစ်လုပ်သူများကို အပြစ်ပေးအရေးယူသည့် လုပ်ဆောင်မှုများ လုပ်ဆောင်ခြင်း - အလုပ်ချိန် အတွင်း အရက်သေစာများ သောက်သုံးခြင်းကို တားမြစ်ခြင်း၊ ဆေးအသုံးပြုခြင်းကို တားမြစ်ခြင်း၊ - အလုပ်သမားများကို အိမ်တွင်း အလေ့အကျင့် ကောင်းများ ကိုလေ့ကျင့်သင်ကြားပေးခြင်း - ဒေသခံများ၏ အသံကို ဂရုပြုခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၁၀။	ဖြစ်နိုင်ခြေ ရှိသော လုံခြုံရေး ဆိုင်ရာ ပြဿနာများ	- လုပ်ကွက်၏ လုံခြုံရေး စီမံခန့်ခွဲခြင်း - လုပ်ကွက်ကို ခြံခတ်ခြင်း သို့မဟုတ် နံရံကာခြင်း

		- အဝင်အထွက်များ အားလုံးကို ထိန်းချုပ်ထားခြင်း- ဂိတ်များ ထားခြင်းနှင့် လုံခြုံရေး ဝန်ထမ်းများ ထားခြင်း - လုပ်သားများကို အန္တရာယ်များအတွင်း သို့ ကြိုတင် ခွင့်ပြုမိန့် မရှိဘဲ မသွားလာစေခြင်း - ဒေသခံများနှင့် ရင်းနှီးဖော်ရွေစွာ ဆောနော်ခွင့် မပြုခြင်း (တည်ဆောက်ခြင်း ကာလအတွင်းသာ) - ပစ္စည်းများကို သော့ခတ်၍ သိမ်းဆည်းထားခြင်း - ဆောက်လုပ်ရေး ကန်ထရိုက်များကိုလည်း ၎င်းတို့၏ လုပ်သားများ စည်းကမ်းလိုက်နာစေရန် တောင်းဆို ထားခြင်း (တည်ဆောက်ခြင်း ကာလအတွင်းသာ) - အပြစ်လုပ်သူများကို အပြစ်ပေးအရေးယူသည့် လုပ်ဆောင်မှုများ လုပ်ဆောင်ခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း

စီမံကိန်းလည်ပတ်ခြင်း ကာလအတွင်း

စဉ်	သက်ရောက်မှု	လျော့ပါးစေရေးနည်းလမ်းများ
၁။	ပတ်ဝန်းကျင် လေထု အပေါ် သက်ရောက်မှု	- ECD မှ ချမှတ်ထားသော NEQEG ထုတ်လွှတ်မှု လမ်းညွှန်ချက်များအတိုင်း လိုက်နာခြင်း၊ - လေထု ထုတ်လွှတ်မှုများကို တတ်နိုင်သမျှ လျော့ချခြင်း နှင့် ထိန်းချုပ်ရန် ကြိုးပမ်းခြင်း - သဘာဝ ပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေဖြစ်မည့် မီးခိုးထုတ်လွှတ်မှု နည်းသော ကိရိယာများ/ စက်ပစ္စည်းများ/ယာဉ်များ ကို ဝယ်ယူခြင်း - အမှိုက်များ ပြည့်စုံစွာ လောင်ကျွမ်းစေခြင်း - ပြာ လျော့ချသည့် ကိရိယာများ ကို အသုံးပြုခြင်း ဥပမာ- အမှုန်ဖမ်းစက် နှင့် စစ်ထုတ်အိတ်များ - ပြာမှုန်များကို ရေးဖျန်း စနစ်တပ်ဆင် အသုံးပြုခြင်း (ဧရိုစံခြင်း) - စက်ပစ္စည်းများ ကိုင်တွယ်ခြင်း လည်ပတ်ခြင်း နှင့် ထိန်းသိမ်းခြင်း အတွက် သင့်တော်သော လေ့ကျင့်မှုများ ပေးခြင်း - အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းများကို ဟင်းလင်းပွင့် မီးပုံရှို့ခြင်းများကို ရှောင်ရှားခြင်း၊

		- ယာဉ်သွားလာမှုကို ကန့်သတ်ခြင်း၊ - ထုံမှုန့် ဖိတ်စင်ခြင်းကို ကာကွယ်ခြင်း - ဖုန်မှုန့်များနှင့် မီးခိုးများကို လျော့ချရန်အတွက် စက်ရုံ ဝန်းပတ်လည်တွင် အပင်များကို စိုက်ပျိုးခြင်း - ဖုန်ထခြင်းအတွက်ရေဖြန်းခြင်း - လုပ်သားများကို လုံလောက်သော PPEs ထောက်ပံ့ပေးခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၂။	ဆူညံသံ နှင့် တုန်ခါမှု	- ECD မှ ချမှတ်ထားသော NEQEG ထုတ်လွှတ်မှု လမ်းညွှန်ချက်များအတိုင်း လိုက်နာခြင်း၊ - ဆူညံသံနှင့် တုန်ခါမှုများကို တတ်နိုင်သမျှ လျော့ချခြင်း နှင့် ထိန်းချုပ်ရန် ကြိုးပမ်းခြင်း - သဘာဝ ပတ်ဝန်းကျင်နှင့် လိုက်လျောညီထွေဖြစ်မည့် ဆူညံသံအဆင့် ထုတ်လွှတ်မှု နည်းသော ကိရိယာများ/ စက်ပစ္စည်းများ/ယာဉ်များ ကို ဝယ်ယူခြင်း - စက်ပစ္စည်းများ/ယာဉ်များ ကို ကောင်းစွာ လည်ပတ် စေခြင်းနှင့် ထိန်းသိမ်းခြင်း - Silencer တပ်ဆင်ခြင်း - noise barrier/sound insulation များကို တပ်ဆင်ခြင်း - ယာဉ်သွားလာမှု အရှိန် ကန့်သတ်ခြင်း - တုန်ခါမှု ပြင်းသည့် စက်ပစ္စည်း များတွင် absorber များ တပ်ဆင်ခြင်း - တည်ငြိမ်သော အောက်ခံကို အသုံးပြုခြင်း - ဆူညံသံကို စုပ်ယူရန်အတွက် စိမ်းလန်းဇရိယာ ဖန်တီးထားခြင်း - PPEs ထောက်ပံ့ပေးခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၃။	အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း ၏ သက်ရောက်မှုများ	- စွန့်ပစ်ပစ္စည်း စီမံခန့်ခွဲခြင်း၊ စွန့်ပစ်ပစ္စည်း လျော့ချခြင်း၊ နှင့် အသုံးပြုခြင်း အတွက် အစီအစဉ်ရေးဆွဲခြင်းနှင့် လုပ်ဆောင်ခြင်း - လောင်စာအတွက် စွန့်ပစ်အမှိုက် ကို အသုံးပြုခြင်း - တင်လဲရည်ကို ပြန်လည်အသုံးပြုခြင်း၊ အီသနော ထုတ်လုပ်ခြင်း အတွက် လည်း ထည့်သွင်းစဉ်းစားခြင်း

		- "ရွံ့" (cachaza) ကို အရည်အသွေးမြင့် မြေဩဇာ အဖြစ် မြေဆွေးလုပ်ခြင်း - မြေဆီလွှာ အေးအောင် ပြုလုပ်ခြင်းအတွက် ခြောက်သွေ့သော အချိန်တွင် (ထုံး အခဲ) ကိုအသုံးပြုခြင်း - ပြာများကို စနစ်တကျ စုဆောင်းပြီး ပြာစုကန် အတွင်း တွင် သိုလှောင်ခြင်း၊ ပြာများကို ဆောက်လုပ်ရေး ပစ္စည်းများ အဖြစ် ပြုလုပ်ခြင်း - လုပ်သားများကို စွန့်ပစ်ပစ္စည်း များ ကို သင့်တော်သော ကိုင်တွယ်ခြင်း သင်ကြား လေ့ကျင့်ပေးခြင်း၊ - အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းများကို ဟင်းလင်းပွင့် မီးပုံရှို့ခြင်းများကို ရှောင်ရှားခြင်း၊ - 5 Rs နိယာမ အတိုင်းတတ်နိုင်သမျှ လိုက်နာခြင်း - သတ်မှတ် အမှိုက်ပုံတွင် သာလျှင် စွန့်ပစ်ပစ္စည်းများကို စွန့်ပစ်ခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၄။	အရည် စွန့်ပစ်ပစ္စည်း ၏ သက်ရောက်မှုများ	- ECD မှ ချမှတ်ထားသော NEQEG စွန့်ထုတ်မှု လမ်းညွှန်ချက်များအတိုင်း လိုက်နာခြင်း၊ - ရေဆိုး စီမံခန့်ခွဲခြင်း၊ နှင့် ရေဆိုး လျော့ချခြင်း၊ အတွက် အစီအစဉ်ရေးဆွဲခြင်းနှင့် လုပ်ဆောင်ခြင်း - ရေကို အကျိုးရှိရှိ အသုံးချခြင်းနှင့် ထိန်းသိမ်းခြင်းဆိုင်ရာ အသိပညာများကို မြှင့်တင်ခြင်း - ညစ်ညမ်းသော ရေစီးကြောင်းမှ ညစ်ညမ်းမှု မရှိသော ရေစီးကြောင်းကို ခွဲခြားထားခြင်း - ပြန်လည်အသုံးပြုခြင်း - အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းများ ရေဆိုးမြောင်းထဲသို့ ဝင်ရောက်ခြင်းကို ကာကွယ်ခြင်း ဖြင့် ဇီဝရေဆိုးများကို လျော့ချခြင်း - ရေစီးကြောင်းထဲသို့ တိုက်ရိုက်စီးဆင်းမှုကို ကာကွယ်ခြင်း - ရေကို ပြန်လည်ပြုပြုခြင်း နှင့် ပြန်လည်အသုံးပြုခြင်း - ရေဆိုး ကို သမာရိုးကျ နည်းလမ်းကို အသုံးပြု၍ ပြန်လည်သန့်စင်ခြင်း (ရုပ်ပိုင်းဆိုင်ရာ သန့်စင်ခြင်း) - လုပ်သားများကို အိမ်တွင်း အလေ့အကျင့်ကောင်း များနှင့် စွန့်ပစ်ပစ္စည်း များကို သင့်တော်သော ကိုင်တွယ်ခြင်းများကို သင်ကြားလေ့ကျင့်ပေးခြင်း၊

		- ရေနေ့စဉ် သုံးစွဲမှုကို စစ်ဆေးခြင်းနှင့် စောင့်ကြပ်ကြည့်ရှုခြင်း - ရေယိုဖိတ်မှုများအတွက် ကန်များ၊ ပိုက်များနှင့် ရေပိုက်ခေါင်းများကို ပုံမှန်စစ်ဆေးခြင်း နှင့် ၎င်းတို့ကို ချက်ချင်း ပြင်ဆင်ခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၅။	ရေထု ပတ်ဝန်းကျင် အပေါ် သက်ရောက်မှု	- ရေထု ပတ်ဝန်းကျင် ကာကွယ်ခြင်း နှင့် ထိန်းသိမ်းခြင်းအတွက် ညစ်ညမ်းခြင်းကို ထိန်းချုပ်ခြင်း နှင့် အစီအစဉ် ရေးဆွဲခြင်း - ဥပဒေနှင့် နည်းဥပဒေများကို လိုက်နာခြင်း (ရေအရင်းအမြစ်နှင့်မြစ်ချောင်းများ ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၆)) - ECD မှ ချမှတ်ထားသော NEQEG စွန့်ထုတ်မှု လမ်းညွှန်ချက်များအတိုင်း လိုက်နာခြင်း၊ - ဒိုးကုန်ရေကို ညစ်ညမ်းစေသော နည်းလမ်းအားလုံးကို ရှောင်ရှားခြင်း - ရေထု (ချောင်း) အတွင်းသို့ အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းများ၊ အရည် စွန့်ပစ်ပစ္စည်းများ စွန့်ပစ်ခြင်းကို ရှောင်ရှားခြင်း - ရေထု အတွင်းသို့ လောင်စာဆီများ ဖိတ်စင်ခြင်းကို ရှောင်ရှားခြင်း - ရေကို အကျိုးရှိရှိ အသုံးချခြင်းနှင့် ထိန်းသိမ်းခြင်းဆိုင်ရာ အသိပညာများကို မြှင့်တင်ခြင်း - ရေအသုံးပြုမှုသည် အစောပိုင်းတွင် ဖော်ပြထားသော လုပ်ငန်းဘောင်အတွင်း ရှိကြောင်း သေချာစေခြင်း (တစ်ရက်လျှင် ၃၀,၀၀၀ တန်) - အအေးခံသည့် စင်နှင့် အအေးခံသည့် ကန်များမှ ဖြတ်လာသော ရေများကို ပြန်လည် အသုံးပြုခြင်း - ရေယိုစိမ့်မှု မရှိကြောင်း သေချာစေရန် သင့်တော်သော ရေပိုက်ကို အသုံးပြုခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း

၆။	ယဉ်ကြေးပိတ်ဆို့မှုအပေါ် သက်ရောက်မှုများ	- မတော်တဆမှု လုံးဝ မရှိစေရန် ကြိုးစားခြင်း - အမြန်လမ်းမကြီး ဥပဒေ ၂၀၁၀ ကို လိုက်နာခြင်း - သင့်တော်သည့် နေရာတွင် အရှိန်ကို ကန့်သတ် ခြင်း သင်္ကေတ ကို ထားရှိခြင်း - အကာအကွယ် ကားမောင်းခြင်းအတွက် ယာဉ်မောင်းများကို လေ့ကျင့် သင်ကြားပေးခြင်း - ကုန်တင်ယာဉ်များ ဝန်ပိုတင်ခြင်းကို ရှောင်ရှားခြင်း - လမ်းအနှစ်ရာယ် ကင်းရှင်းရေး အတွက် လူထု အသိပညာပေး လှုပ်ရှားမှုများကို လုပ်ဆောင်ခြင်း - ယာဉ် တစ်စီးချင်းစီအတွက် မှတ်တမ်းစာအုပ် ထားရှိခြင်း - ယာဉ်သွားလာမှု များ ကို အချိန်ဇယားရေးဆွဲခြင်း - လျော့ပါးစေရေး လုပ်ဆောင်မှုများကို စောင့်ကြပ် ကြည့်ရှုခြင်း
၇။	လုပ်ငန်းခွင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး ဆိုင်ရာ ပြဿနာများ	- စက်ရုံအတွင်း ဘေးကင်းပြီး ကျန်းမာရေး အတွက် သင့်တော်သည့် လေထုအတွက် စီမံခန့်ခွဲခြင်း နှင့် အစီအစဉ် ရေးဆွဲခြင်း - မတော်တဆမှု လုံးဝ မဖြစ်စေရန် ထိန်းသိမ်းခြင်း - အလုပ်ရုံများအက် ဥပဒေ (၁၉၇၄)၊ ဘွိုင်လာ ဥပဒေ (၂၀၁၅)၊ အလုပ်သမား လျော်ကြေး အက်ဥပဒေ (၁၉၂၃) ကို လိုက်နာခြင်း - ECD မှ ချမှတ်ထားသော NEQEG ထုတ်လွှတ်မှု နှင့် ဆူညံသံ လမ်းညွှန်ချက်များအတိုင်း လိုက်နာခြင်း၊ - လုပ်သားများကို ကောင်းမွန်သော အလုပ်လုပ်ခြင်း အလေ့ကျင့်ကောင်းများ၊ လုံခြုံရေး အလေ့ကျင့်ကောင်းများ နှင့် ကျန်းမာရေး အသိပညာနှင့် တစ်ကိုယ်ရေ သန့်ရှင်းရေး အတွက် ပညာပေးခြင်း လေ့ကျင့်ပေးခြင်း နှင့် ကြီးကြပ်ခြင်း - ဓာတုပစ္စည်းများ ကိုင်တွယ်ခြင်းအတွက် ကိရိယာများ လည်ပတ်ခြင်း အတွက် ကျွမ်းကျင်မှုများ အတွက် ၎င်းတို့ကို ပညာပေးခြင်း လေ့ကျင့်ပေးခြင်း နှင့် ကြီးကြပ်ခြင်း (ဥပမာ- ထုံး၊ ဆာလဖာ) - စက်ပစ္စည်းများ/ကိရိယာများ ကို ကောင်းစွာ ထိန်းသိမ်းခြင်း နှင့် ကောင်းစွာ လည်ပတ်စေခြင်းကို ထိန်းသိမ်းခြင်း

		- PPEs ထောက်ပံ့ပေးခြင်း - အရေးပေါ် အစီအစဉ် အတွက် ဂရုတစိုက် အစီအစဉ် ဆွဲခြင်း - မီးငြိမ်းသတ်ခြင်းနှင့် ရှေးဦးသူနာပြုသင်တန်းများ ထောက်ပံ့ပေးခြင်း - ကြက်ခြေနီ အသင်းများ၊ လူနာတင်ယာဉ်၊ နှင့် မီးသတ်၊ အစရှိသည်တို့၏ ဖုန်းနံပါတ်များ နှင့် လိပ်စာများကို လူတိုင်းမြင်နိုင်စေရန် ကပ်ထားခြင်း - စက်ရုံအတွက်အာမခံ ထားရှိခြင်း နှင့် မီးအာမခံ လည်း ထားခြင်း - လျော့ပါးစေရေး လုပ်ဆောင်မှုများကို စောင့်ကြပ် ကြည့်ရှုခြင်း
၈။	ဖြစ်နိုင်ခြေ ရှိသော လူမှုရေး ဆိုင်ရာ ပြဿနာများ	- ဒေသခံများ၏ လူမှု စီးပွား ဘဝအပေါ် ဖြစ်နိုင်ခြေ ရှိသော ဆိုးကျိုးသက်ရောက်မှုများကို ကာကွယ်ခြင်း သို့မဟုတ် လျော့ချခြင်း - လူထုနှင့် ကောင်းမွန်သော ဆက်ဆံရေးကို တည်ဆောက်ခြင်း နှင့် ထိန်းသိမ်းခြင်း - လူထုတွေ့ဆုံဆွေးနွေးပွဲများကို အခါအားလျော်စွာ ကျင်းပပေးခြင်း - လုပ်သားများကို ကျင့်ဝတ် သိက္ခာရှိစေခြင်း နှင့် ဒေသခံများ၏ ဓလေ့ ထုံးတမ်း အစဉ်အလာများကို လေးစားလိုက်နာခြင်း အတွက် အသိပညာပေးခြင်း - လူမှုရေးအလေ့အကျင့်ဆိုးများ၊ ကိုယ်ကျင့်တရား ဖောက်ပြန်ခြင်းများ အတွက် စီမံခန့်ခွဲခြင်း - အမျိုးသား နှင့် အမျိုးသမီး လုပ်သားများကို နေရာ ခွဲခြားပေးထားခြင်း - အလုပ်ခွင် စည်းမျဉ်းစည်းကမ်းများနှင့် ကျင့်ဝတ် စည်းမျဉ်းစည်းကမ်းများကို မှန်ကန်စွာ လေ့ကျင့် သင်ကြားပေးခြင်းများကို ထောက်ပံ့ပေးခြင်း - သက်သာ ချောင်ချိရေး အစီအစဉ်ကို ထောက်ပံ့ပေးခြင်း - လုပ်သားများကို ပညာပေးခြင်း နှင့် စည်းကမ်းရှိစေခြင်း

		- လုပ်သားများကို တန်းတူညီမျှ ဆက်ဆံခြင်း - အပြစ်လုပ်သူများကို အပြစ်ပေးအရေးယူသည့် လုပ်ဆောင်မှုများ လုပ်ဆောင်ခြင်း - အလုပ်ချိန် အတွင်း အရက်သေစာများ သောက်သုံးခြင်းကို တားမြစ်ခြင်း၊ ဆေးအသုံးပြုခြင်းကို တားမြစ်ခြင်း၊ - လုံလောက်သော တစ်ကိုယ်ရေ သန့်စင်ရေး လိုအပ်ချက်များကို ထောက်ပံ့ပေးခြင်း ဥပမာ- အိမ်သာ ရေချိုးခန်း အစရှိသည်ဖြင့် - ဒေသခံများ၏ အသံကို နားစွင့်ခြင်း - CSR ကို တတ်နိုင်သမျှ လက်တွေ့ကျကျ စီစဉ်ခြင်း နှင့် လုပ်ဆောင်ခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၉။	ဖြစ်နိုင်ခြေ ရှိသော လုံခြုံရေး ဆိုင်ရာ ပြဿနာများ	- လုပ်ကွက်၏ လုံခြုံရေး စီမံခန့်ခွဲခြင်း - လုပ်ကွက်ကို အသုံးဝင်သော ခြံခတ်ခြင်း/နံရံကာခြင်း - အဝင်အထွက်များ အားလုံးကို ထိန်းချုပ်ထားခြင်း- လုံခြုံရေး ဂိတ်များ ထားခြင်းနှင့် လုံခြုံရေး ဝန်ထမ်းများ ထားခြင်း - ဒေသခံများနှင့် ရင်းနှီးဖော်ရွေစွာနေထိုင်ခွင့် မပြုခြင်း - လုပ်သားများကို အနီးရွာများအတွင်း သို့ ကြိုတင် ခွင့်ပြုမိန့် မရှိဘဲ မသွားလာစေခြင်း - ပစ္စည်းများကို သော့ခတ်၍ သိမ်းဆည်းထားခြင်း - အပြစ်လုပ်သူများကို အပြစ်ပေးအရေးယူသည့် လုပ်ဆောင်မှုများ လုပ်ဆောင်ခြင်း - လွယ်ကူစွာ ခွဲခြားနိုင်စေရန် လုပ်သားအားလုံးကို ID များ ထောက်ပံ့ပေးထားခြင်း - လုပ်သားအားလုံးကို တူညီသောဝတ်စုံ ထောက်ပံ့ပေးထားခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၁၀။	ဖြစ်နိုင်ခြေရှိသော မြင်ကွင်းဆိုင်ရာ သက်ရောက်မှုများ	- မြင်ကွင်းပဒေသများ အပေါ် အလေးထားသော သကြားစက်ရုံ စီမံကိန်း အစီအစဉ်ကို အကောင်အထည်ဖော်ခြင်း - စက်ရုံ၏ ဂုဏ်သရေ နှင့် လှပမှုကို မြှင့်တင်ခြင်း

		- သွားရာ လမ်းတစ်လျှောက်၏ ဘေးနှစ်ဘက်လုံးတွင် အရိပ်ရ အပင်များ စိုက်ပျိုးခြင်း၊ လုပ်ကွက်အတွင်း နှင့် ပတ်လည်တွင် အရိပ်ရ အပင်များ၊ အသီးပင်များ နှင့် အလှပင်များ စိုက်ပျိုးခြင်းဖြင့် အစိမ်းရောင်ဖုန် နှင့် ဇရိယာကို ဖန်တီးခြင်း - အနီးဝန်းကျင်ရှိ သဘာဝ အပင်များကို ထိန်းသိမ်းခြင်း - အဆောက်အအုံများ နှင့် ဖွဲ့စည်းပုံများအတွက် မျက်စိအေးစေသော အရောင်နှင့် ဆေးကို အသုံးပြုခြင်း - လုံခြုံရေး အကြောင်းအတွက် ညအချိန်တွင် အလင်းအသုံးပြုမှုကို သင့်တော်သော အလင်းရောင် ပေးခြင်း၊ အလင်းအလွန်အကျွံ အသုံးပြုမှုကို ရှောင်ရှားခြင်း - အင်းဆက်များ စုပုံခြင်းကို ရှောင်ကျဉ်ရန် အဝါရောင်မီးကို အဖြူရောင်မီးအစား အသုံးပြုခြင်း၊ အင်းဆက်များ စုပုံလာပါက မီးကို ခဏ ပိတ်ထားခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း

ဇယား-၂၆ စီမံကိန်းပိတ်သိမ်းခြင်း/ပြန်လည်ထူထောင်ခြင်း ကာလအတွင်း

စဉ်	သက်ရောက်မှု	လျော့ပါးစေရေးနည်းလမ်းများ
၁။	လုပ်ငန်းခွင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး ဆိုင်ရာ ပြဿနာများ	- ထိရောက်သော လုပ်ကွက် ပိတ်သိမ်းခြင်း အတွက် စီမံခန့်ခွဲခြင်း - ပိတ်သိမ်းခြင်းလုပ်ငန်းများ လုပ်ဆောင်ရန် ပိတ်သိမ်းခြင်း ကန်ထရိုက်တာများကို ငှားရမ်းခြင်း - ပြန်လည်အသုံးမပြုနိုင်သော ပစ္စည်းများကို စွန့်ပစ်ခြင်း၊ ပြန်လည် အသုံးပြုနိုင်သည်များကို ရောင်းရန်ထားခြင်း သို့မဟုတ် ပြန်လည် အသုံးချခြင်း - မြေပြင်နှင့် မြေဆီလွှာကို ပြန်လည် ထိန်းသိမ်းခြင်း - မြေပြင်ပေါ်တွင် အပင်များ ပြန်လည် စိုက်ပျိုးခြင်းနှင့် ပြန်လည်ထူထောင်ခြင်း- မတူညီသော အပင်မျိုးစိတ်များကို ရွေးချယ်ခြင်း

		- ပိတ်သိမ်းခြင်း လုပ်ငန်းများ လုပ်ဆောင်ပြီးနောက် အပေါက်များ၊တွင်းများ ချိုင့်များ ကျန်ရှိနေပါက အပင်များ ပြန်လည်စိုက်ပျိုးခြင်းကို လုပ်ဆောင်နိုင်ရန် အတွက် ၎င်းတို့ကို ပထမအနေဖြင့် မြေစာများ မြေပြန်လည် ဖြည့်ပြီးနောက် မြေဆီလွှာများဖြင့် ပြန်လည်ဖြည့်ခြင်း - လျော့ပါးစေရေး လုပ်ငန်းများကို စောင့်ကြပ်ကြည့်ရှုခြင်း
၂။	ဖြစ်နိုင်ခြေရှိသော ကြွင်းကျန် သက်ရောက်မှုများ	- ပိတ်သိမ်းခြင်းလုပ်ငန်းများ လုပ်ဆောင်ရန် ပိတ်သိမ်းခြင်း ကန်ထရိုက်တာများကို ငှားရမ်းခြင်း - လုပ်ကွက် ကို ရှင်းလင်းခြင်း နှင့် သန့်ရှင်းခြင်း - မြေများ ညစ်ညမ်းနေပါက ဖယ်ရှားခြင်း - နောက်ဆုံးအကြိမ် လေ၊ ရေနှင့် မြေ အရည်အသွေးကို လည်း စစ်ဆေးခြင်း - ပြန်လည်ထူထောင်ရေး လုပ်ငန်းများ (သစ်တောများ ပြန်လည်စိုက်ပျိုးခြင်း) ကို ဆက်လက် လုပ်ဆောင်ခြင်း - ထိရောက်သော သစ်တောများ ပြန်လည်စိုက်ပျိုးခြင်း အတွက် ပြန်လည်ထူထောင်ရေး ကန်ထရိုက်တာများကို ငှားရမ်းခြင်း

တင်ပြထားသောသက်ရောက်မှုတစ်ခုစီတိုင်းအတွက် ဖြေလျှော့နိုင်မည့်နည်းလမ်းများကို အခန်း(၆) တွင် အသေးစိတ်ဖော်ပြထားပါသည်။

ကောင်းကျိုးသက်ရောက်မှုအနေဖြင့် စီမံကိန်းကာလနှစ်ပေါင်း (၃၀)ကျော် အလုပ်သမား(၅၀၃)ဦး အလုပ်အကိုင်ရရှိမည်ဖြစ်ပြီး စီးပွားရေးပိုမိုကောင်းမွန်လာပါက အလုပ်အကိုင်အခွင့်အလမ်း ပိုမိုရရှိလာမည် ဖြစ်သည်။

နိုင်ငံတော်အနေဖြင့် စီမံကိန်းမှ ကျပ်သန်းပေါင်း ၁၆၃,၂၃၆.၃၉ တိုက်ရိုက်ရင်းနှီးမြှုပ်နှံမှုကြောင့် တိုင်းပြည်၏ GDP တိုးလာပါသည်။ စီမံကိန်းကြောင့် သကြားထုတ်လုပ်မှု ပိုမိုတိုးတက်လာပြီး ဒေသ၏အစားအသောက် ဆိုင်ရာကဏ္ဍဖွံ့ဖြိုးတိုးတက်လာမည်။

စီမံကိန်းပိတ်သိမ်းချိန်အတွင်း ဖြစ်နိုင်ခြေရှိသော သက်ရောက်မှုများသည် တည်ဆောက်ရေးကာလ အတွင်းတွင် ဖြစ်နိုင်ခြေရှိသောသက်ရောက်မှုများဖြင့် အနည်းနှင့်အများ ဆင်တူပါသည်။ အဆောက်အဦများကို ဖျက်သိမ်းခြင်းကြောင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး (မတော်တဆ) ဖြစ်နိုင်ပါသည်။

သက်ရောက်မှုအားလုံးအတွက် ဖြေလျှော့နိုင်မည့် နည်းလမ်းများ (ထင်ရှားသောနှင့်မထင်ရှားသော) ကို အသေးစိတ်ဖော်ပြထားပါသည်။

ဤအခန်း(၆)၏ ခေါင်းစဉ်ခွဲတစ်ခုသည် စီမံကိန်းနှင့်သက်ဆိုင်သော အမျိုးမျိုး သဘာဝနှင့် စက်မှုဆိုင်ရာ ဘေးအန္တရာယ်များကို အမျိုးအစားခွဲ ဆန်းစစ်တင်ပြခြင်းဖြစ်သည်။ ဆန်းစစ်တင်ပြခြင်းကို စီမံကိန်းလည်ပတ်စဉ်နှင့် နောက်ပိုင်းစီမံကိန်းပိတ်သိမ်းချိန်ဟူ၍ ခွဲခြားထားပါသည်။ စက်ရုံမှထွက်ရှိသော စက်မှုဆိုင်ရာစွန့်ပစ်ပစ္စည်းဖြစ်သော ဥပမာ- ကြံကြိတ်ဖက်၊ ပြာနှင့် ရွံ့ထွက်ရှိမည်ဖြစ်ပြီး ထိုအရာများမှာ ဘေးအန္တရာယ်မဟုတ်ပေ။ ဤစက်မှုဆိုင်ရာစွန့်ပစ်ပစ္စည်းများအတွက် ဖြေလျှော့နိုင်မည့် နည်းလမ်းများကို ဆွေးနွေးတင်ပြမည်။

အခန်း(၆)၏ အခြားခေါင်းစဉ်ခွဲသည် ကြွင်းကျန်သက်ရောက်မှုများနှင့်ဆုံးရှုံးမှုကို ဆန်းစစ်တင်ပြခြင်း ဖြစ်သည်။ ကြွင်းကျန်သက်ရောက်မှုနှင့် ဆုံးရှုံးမှုများကို သီအိုရီအရနှင့် လက်တွေ့ဆန်သော ချဉ်းကပ်နည်း များဖြင့် ပြုလုပ်ခဲ့ပါသည်။

လွှမ်းခြုံဆန်းစစ်တင်ပြခြင်းကို ပညာရှင်များမှ ခန့်မှန်းနည်းလမ်းနှင့် IFC ဇယား (ဖြစ်နိုင်ခြေ) အကျိုးဆက် တို့ကို အခြေခံ၍ ဇယားဖြင့် ဖော်ပြထားပါသည်။

နောက်ဆုံးခေါင်းစဉ်ခွဲသည် ပြည့်စုံသော စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်းဖြစ်ပြီး ဤအရာကို ဇယားဖြင့် ဖော်ပြထားပါသည်။

စောင့်ကြပ်ကြည့်ရှုလေ့လာရန် ပါရာမီတာများမှာ တည်ဆောက်ရေးကာလအတွင်းတွင် (၁၆)ချက်၊ စီမံကိန်းလည်ပတ်စဉ်ကာလတွင် (၃၂)ချက်နှင့် စီမံကိန်းပိတ်သိမ်းချိန်တွင် (၅)ချက်ဟူ၍ အသီးသီးဇယားဖြင့် ဖော်ပြထားပါသည်။ တိကျသော စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်ကို နောက်ပိုင်း အခန်း-၈ (EMP) တွင် ဖော်ပြထားပါသည်။

ဆက်စပ်သက်ရောက်မှုဆန်းစစ်ခြင်း

အခန်း(၇)သည် ဆက်စပ်သက်ရောက်မှုဆန်းစစ်ခြင်းအပိုင်းဖြစ်သည်။

ဤအခန်းတွင် နည်းပညာနှင့် ချဉ်းကပ်မှုနှင့် တစတစတိုးလာသောသက်ရောက်မှုဆန်းစစ်ခြင်း နှစ်ပိုင်းပါဝင်သည်။ အစပိုင်းတွင် တစတစတိုးလာသောသက်ရောက်မှုအကြောင်း အဓိပ္ပာယ်ဖွင့်ဆိုချက်ကို အကျဉ်ချုပ်ရှင်းပြထားပါသည်။

ကြီးမားသောစက်မှုဆိုင်ရာ စွန့်ပစ်ပစ္စည်းများမှာ ဥပမာ-စက်ရုံမှကြံကြိတ်ဖက်ထွက်မည်။ သို့ပေမယ့် ကြံကြိတ်ဖက်အားလုံးကို ဘွိုင်လာလောင်စာအဖြစ် ပြန်လည်အသုံးပြုမည်ဖြစ်သောကြောင့် တစတစတိုးလာ သောသက်ရောက်မှု မရှိပေ။ ပြာထွက်ရှိလိမ့်မည်။ သို့ပေမယ့် ပြာကန်များထဲတွင် စုဆောင်း အခြောက်ခံမည်။ နောက်ပိုင်းတွင် ပြာများကိုဆယ်ယူပြီး အပင်စိုက်ပျိုးခြင်းအတွက် မြေဩဇာအဖြစ်အသုံးပြုမည်။ ပြာကန် ၄ ကန်ဖြင့်သိုလှောင်ပြီး နောက်ဆုံးအရည်ကြည်ကို ပန့်များစုပ်တင်ပြီး အအေးခံခြင်းအတွက် ပြန်လည်အသုံးပြုပါမည်။

အနီးနားတွင်တည်ရှိပြီးသော ဆင်းရွှေလီသကြားစက်ရုံ(၂) ရှိသည်။ ထို့ကြောင့် အခြားအရင်းအမြစ်မှ ဆက်စပ်သက်ရောက်မှု ရှိမည်။

စက်ရုံသည် တစ်နေ့ကြံ ၁၂၀၀၀ တန်ကြိတ်မည်။ သက်ရှိသယံဇာတဖြစ်သော (ကြံ)အပေါ် တစတစတိုးလာသောသက်ရောက်မှုသည် မြင့်မားမည်။ သို့ပေမယ့် စက်ရုံသည် တစ်နှစ်ကိုရက်ပေါင်း (၁၅၀) သာလည်ပတ်ပါသည်။ ကျန်လများတွင် ကြံပင်များကို ကြံစိုက်တောင်သူများမှ ပြန်စိုက်နိုင်သည်။

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP)

ဤအခန်း(၈)သည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်(EMP)နှင့် စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်း အစီအစဉ် (MP) အကြောင်း ဖြစ်သည်။

ဤအခန်းတွင် အပိုင်း(၆)ပိုင်းပါဝင်ပြီး ၎င်းတို့မှာ အကျဉ်းချုပ်အစီရင်ခံစာ၊ စီမံကိန်းဆိုင်ရာ အသေးစိတ်အကြောင်းအရာ၊ ကျန်းမာရေးမူဝါဒ၊ ကတိကဝတ်၊ တရားရေးရာနှင့် ဖွဲ့စည်းပုံမူဘောင်၊ သက်ရောက်မှုများ အကျဉ်းချုပ်နှင့် ဖြေလျှော့နိုင်မည့်နည်းလမ်းများ၊ ဘက်ဂျက်၊ စီမံခန့်ခွဲမှုနှင့် စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်းအစီအစဉ်ခွဲနှင့် အစီအစဉ်ခွဲတစ်ခုစီတွင်ပါဝင်သည့် အကြောင်းအရာများ ဖြစ်ကြသည်။ ၎င်းသည် သီးသန့် EMP အစီရင်ခံစာ မဟုတ်သောကြောင့် အားလုံးကို အကျဉ်းချုပ်ဖော်ပြထားပြီး အချို့ကို တတ်နိုင်သလောက် ဇယားပုံစံဖြင့်ဖော်ပြထားပါသည်။ ကျန်းမာရေး လမ်းညွှန်ချက်များကို အကျဉ်းချုပ်ဖော်ပြထားပြီး သက်ရောက်မှုများ နှင့် လျှော့ပါးစေရေး နည်းလမ်းများကို ထပ်မံ၍ အကျဉ်းချုပ်၍ ဖော်ပြထားပါသည်။

EMP အကောင်အထည်ဖော် လုပ်ဆောင်ခြင်းများအတွက် စုစုပေါင်း ဘတ်ဂျက် နှင့် ပတ်သက်၍ အဓိက ဘတ်ဂျက်၏ ၁ ရာခိုင်နှုန်း (၁,၆၃၂,၃၆၃,၉၀၀ ကျပ်) ကို EMP ရန်ပုံငွေ အဖြစ် သတ်မှတ်ထားပါသည်။

EMP ရန်ပုံငွေ ကို EMP အဖွဲ့ ဖွဲ့စည်းခြင်းအတွက် ကုန်ကျစရိတ်၊ စွမ်းဆောင်ရည်မြှင့်တင်ခြင်း၊ သင်တန်းပေးခြင်း အတွက် ကုန်ကျစရိတ်၊ ကိရိယာ အသေးများ နှင့် စက်ပစ္စည်း အသေးများ တစ်စိတ်တစ်ပိုင်း ဝယ်ယူခြင်း အတွက် ကုန်ကျစရိတ်၊(လျှော့ပါးသက်သာစေရန် လျှော့ပါသက်သာစေရေး အတွက် ကုန်ကျစရိတ်၊ စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်း အတွက် ကုန်ကျစရိတ်၊ အရေးပေါ်အစီအစဉ် တုန့်ပြန်မှုအတွက် နှင့် အထွေထွေကုန်ကျစရိတ်အတွက် ကုန်ကျစရိတ်) စသည်ဖြင့် အစီအစဉ် တစ်ခုချင်းစီအတွက် ခွဲဝေသုံးစွဲပါသည်။ အသေးစိတ် ကုန်ကျစရိတ်မှာ အောက်ပါအတိုင်းဖြစ်ပါသည်-

- EMP အဖွဲ့ ဖွဲ့စည်းရန်အတွက် ကုန်ကျစရိတ် ၂ ရာခိုင်နှုန်း (ကျပ် ၃၂,၆၄၇,၂၇၈)
- EMP အတွက် အမှန်တကယ် ကုန်ကျမည့် ကုန်ကျစရိတ်
  - (က) ဖြေလျော့နိုင်မည့် နည်းလမ်းများအတွက် ၂၅ ရာခိုင်နှုန်း (ကျပ် ၄၀၈,၀၉၀,၉၇၅)
  - (ခ) စောင့်ကြပ်ကြည့်ရှု လေ့လာခြင်းအတွက် ၂၅ ရာခိုင်နှုန်း (ကျပ် ၄၀၈,၀၉၀,၉၇၅)
- ပစ္စည်းကိရိယာ၀ယ်ယူမှုအတွက် ကုန်ကျစရိတ် ၂၀ ရာခိုင်နှုန်း (ကျပ် ၃၂၆,၄၇၂,၇၈၀)
- စွမ်းဆောင်ရည်မြှင့် သင်တန်းများအတွက် ကုန်ကျစရိတ် ၇ ရာခိုင်နှုန်း (ကျပ် ၁၁၄,၂၆၅,၄၇၃)
- အရေးပေါ် အစီအစဉ်အတွက် ကုန်ကျစရိတ် ၁၀ ရာခိုင်နှုန်း (ကျပ် ၁၆၃,၂၃၆,၃၉၀)
- အစီရင်ခံတင်ပြခြင်း လုပ်ငန်းအတွက် ကုန်ကျစရိတ် ၈ ရာခိုင်နှုန်း (ကျပ် ၁၃၀,၅၈၉,၁၁၂)
- အထွေထွေ ကုန်ကျစရိတ် ၃ ရာခိုင်နှုန်း (ကျပ် ၄၈,၉၇၀,၉၁၇)

  (EMPအဖွဲ့၀င်ဖြစ်သော ရွာသားနှစ်ယောက်အတွက် အပါအ၀င်)

စီမံကိန်း အဆင့်အလိုက် စီမံခန့်ခွဲခြင်း နှင့် စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်း အစီအစဉ်ခွဲများ-ဆူညံသံ၊ တုန်ခါမှု၊ စွန့်ပစ်ပစ္စည်း၊ ဘေးအန္တရာယ် ဖြစ်စေသော စွန့်ပစ်ပစ္စည်း၊ စွန့်ပစ်ရေနှင့် မိုးရေ၊ လေအရည်အသွေး၊ အနံ့၊ ဓာတုပစ္စည်းများ၊ ရေအရည်အသွေး၊ တိုက်စားခံရခြင်း နှင့် အနည်ကျခြင်း၊ ဇီ၀မျိုးစုံမျိုးကွဲများ၊ လုပ်ငန်းခွင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး OHS၊ လူထု ကျန်းမာရေး နှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး CHS၊ ယဉ်ကျေးမှု အမွေအနှစ်၊ အလုပ်အကိုင် နှင့် သင်တန်းပေးခြင်း နှင့် အရေးပေါ်တုန့်ပြန်မှု (ECD မှ ၂၀၁၅ EIA လုပ်ထုံးလုပ်နည်းတွင် ဖော်ပြထားသည့်အတိုင်း) များကို အကျဉ်းချုပ်၍ ဇယား ပုံစံဖြင့် ဖော်ပြထားပါသည်။

အခန်း-၈ ၏ နောက်ဆုံးအပိုင်းသည် အစီအစဉ်ခွဲ တစ်ခုချင်းစီအတွက် အကြောင်းအရာများ ဖြစ်ပြီး ၂၀၁၅ EIA လုပ်ထုံးလုပ်နည်း ပုံစံဖြင့် ဖော်ပြထားပြီး ECD သို့ တစ်နှစ် နှစ်ကြိမ် တင်ပြရသည့် တိကျသော စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်း အစီအစဉ်များကို ဖော်ပြထားပါသည်။

ဤအခန်းသည် စီမံကိန်းဘတ်ဂျက် (စောင့်ကြပ်ကြည့်ရှုလေ့လာခြင်း အတွက်) နှင့် တာဝန်များနှင့် အဆုံးသတ်ထားပါသည်။ ၎င်းတို့ကို ဇယား ပုံစံဖြင့် ဖော်ပြထားပါသည်။

လူထုတွေ့ဆုံဆွေးနွေးပွဲ

အခန်း(၉)သည် လူထုတွေ့ဆုံဆွေးနွေးပွဲအကြောင်းနှင့် သတင်းအချက်အလက် ထုတ်ဖော်ခြင်း ဖြစ်သည်။ ဤအခန်းတွင် အပိုင်း(၅)ပိုင်း ပါဝင်ပြီး ထိုအရာများမှာ နည်းစနစ်နှင့်ကျဉ်းကပ်မှု၊ လူထုတွေ့ဆုံပွဲရလဒ်၏အနှစ်ချုပ်၊ လူထုတွေ့ဆုံပွဲရလဒ်၊ အနာဂတ်တွင်လုပ်ဆောင်မည့် လူထုတွေ့ဆုံဆွေးနွေးခြင်းနှင့် နောက်ဆုံးတွင် သတင်းအချက်အလက်ထုတ်ဖော်ခြင်း ဖြစ်သည်။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) လေ့လာမှုအတွင်းတွင် လုပ်ဆောင်သောလူထုတွေ့ဆုံဆွေးနွေးပွဲကို အတော်အသင့် အသေးစိတ်ဖော်ပြထားပါသည်။ စီမံကိန်းအဆိုပြုတင်ပြသူနှင့် ဒေသခံများအကြားတွင် ကောင်းမွန်သော ဆက်ဆံရေးရှိပြီး ဒေသခံများက စီမံကိန်းကိုလက်ခံနိုင်မှု မြင့်မားသည်ဟု လူထုတွေ့ဆွေးနွေးပွဲရလဒ်မှ ခန့်မှန်းတွက်ချက်နိုင်ပါသည်။

ငွေရည်ပုလဲသကြားကုမ္ပဏီလီမိတက်သည် ဒေသခံများနှင့်အတူ အချိန်နှင့်အမျှ တွေ့ဆုံဆွေးနွေးပွဲများ ကျင်းပပြီးဖြစ်ပါသည်။ ဤဇရိယာတွင် ကုမ္ပဏီသည် နှစ်ပေါင်းများစွာကတည်းက စီးပွားရေးလုပ်ငန်း လုပ်ဆောင်နေသောကြောင့် ဒေသခံများအကြား ကောင်းမွန်သောဆက်ဆံရေးရှိပါသည်။ ယခင်ရှင်းပြသကဲ့သို့ ကုမ္ပဏီသည် ဤဇရိယာတစ်ခုလုံးတွင် CSR လုပ်ငန်းများကို ကျပ် ၁,၀၆၅,၄၆၆,၉၀၀ ထိသုံးစွဲခဲ့ပြီးဖြစ်ပါသည်။

မူလလူထုတွေ့ဆုံပွဲတစ်ခုကို နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းလေ့လာချိန်တွင် ၂၇-၅-၂၀၁၈ ရက်နေ့တွင် ကျင်းပခဲ့ပါသည်။ ကျေးရွာ (၆)ရွာမှ ဒေသခံများနှင့်အတူ နောက်ထပ်လူထုတွေ့ဆုံပွဲကို ၅-၁၂-၂၀၁၈ ရက်နေ့တွင် ဆောင်ရွက်ခဲ့ပါသည်။ အစည်းအဝေးမှတ်တမ်းအားလုံးကို ဤပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာတွင် ထည့်သွင်းဖော်ပြထားပါသည်။

အနာဂတ်အတွက်လူထုတွေ့ဆုံပွဲအတွက်နှင့် မကျေနပ်ချက်နှင့် တိုင်ကြားချက်များအတွက် ပြုလုပ်ရန် အကြံပေးမှုများကိုလည်း ဖော်ပြထားပါသည်။

ခြံငုံချက်အနေဖြင့် လူထုသည် စီမံကိန်း လုပ်ဆောင်ခြင်းအပေါ် ကောင်းမွန်သော အမြင်များ ရှိကြပြီး စီမံကိန်းကို လက်ခံသည့် ရာခိုင်နှုန်းမှာ မြင့်ပါသည်။ ၎င်းမှာ စီမံကိန်းသည် ၎င်း ဒေသ၏ ဒေသတွင်း စီးပွားရေးကို အမှန်တကယ် ကောင်းမွန်စေသောကြောင့် ဖြစ်ပြီး ကြံစိုက်ပျိုးသူများ အနေဖြင့် ၎င်းတို့၏ ထွက်ကုန်များကို စက်ရုံသို့ ရောင်းချနိုင်သောကြောင့် ဖြစ်ပါသည်။ ဒေသခံအများစုသည်လည်း အနီးရှိ စက်ရုံ အမှတ် -၂ တွင်လည်း အလုပ်လုပ်ကိုင်နေကြပြီး အများစုမှာလည်း စီမံကိန်း တည်ဆောက်ခြင်း ကာလတွင်လည်း အလုပ်ရရှိပါသည်။ လာမည့် စီမံကိန်းလည်ပတ်ခြင်း ကာလအတွင်းတွင်လည်း ရေရှည် အလုပ်အကိုင် ပိုမို ရရှိနိုင်ပါသည်။

ကုမ္ပဏီသည် လမ်းများ ဆောက်လုပ်ခြင်းဖြင့် ဒေသ၏ အခြေခံ လိုအပ်ချက်များကို တိုးတက်စေပြီး ကျေးရွာ ၅ ရွာကို လျှပ်စစ်မီးပေးပါသည်။

ကုမ္ပဏီသည် အဓိကအနေဖြင့် လူထုထောက်ပံ့မှု နှင့် လူထု ဖွံ့ဖြိုးမှုများအတွက် CSR အစီအစဉ် အကောင်အထည်ဖော်ခြင်းအတွက် ကျပ် ၇,၁၀၅,၅၇၁,၈၂၅ ကျပ်ကိုလည်း သုံးစွဲခဲ့ပါသည်။

ဒေသခံအများစုသည် ကုမ္ပဏီကို ၎င်းတို့၏ ကျေးဇူးရှင် နှင့် ကယ်တင်ရှင် အဖြစ် ရှုမြင်ကြပါသည်။

နောင်တွင် လူထုတွေ့ဆုံပွဲအတွက် အမြင်သဘောသထားများနှင့် ပြဿနာနှင့် မကျေနပ်ချက်များတိုင်ကြားရန် ယန္တရား (CGM) သို့မဟုတ် မကျေနပ်ချက်များကို ပြန်လည်ပြင်ဆင်ခြင်း ယန္တရား (GRM) အစီအစဉ်များကိုလည်း ဖော်ပြထားပါသည်။

လူထုတွေ့ဆုံဆွေးနွေးပွဲနှင့်ပက်သက်သော သတင်းအချက်အလက်ကို The Voice Daily သတင်းစာတွင် ၂၄-၁၂-၂၀၁၈ နေ့၌ ထည့်သွင်းဖော်ပြထားပါသည်။ အဆိုပါသတင်းကိုလည်း မြန်မာ့ပတ်ဝန်းကျင်ရေရှည်တည်တံ့ရန်ထိန်းသိမ်းရေး၏ လူမှုကွန်ရက်စာမျက်နှာဖြစ်သော www.Myanmar Environment Sustianable Conservation. တွင်လည်း ဖော်ပြခဲ့ပါသည်။ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာ အတည်ပြုပြီးသောအခါတွင် အစီရင်ခံစာ၏အစိတ်အပိုင်းကို ကုမ္ပဏီ၏ဝဘ်ဆိုဒ် www.ngweyipale.com တွင် တင်ပြသွားမည်ဖြစ်ပါသည်။

1. EXECUTIVE SUMMARY

This is the Environmental Impact Assessment (EIA) report for the construction and operation of Sinn Shwe Li Sugar Factory (3) by Ngwe Yi Pale' Sugar Co., Ltd.

The company has already obtained the permit from the Myanmar Investment Commission (MIC), permit no.126/2018, dated 19-11-2018.

This EIA report is prepared and submitted after a forerunner scoping report was approved by the authority. Document (Thittaw) 3 (2)/16(D) (1803/2021), dated 2021-7-2. (ANNEX)

The project proponent

Ngwe Yi Pale' Sugar Co., Ltd was registered as a limited company on 3-3-2014. (Document: Certificate of Incorporation No. 5665/2013-2014; Directorate of Investment and Company Administration, Ministry of Planning and Economic Development). The new registration number is 155769114.

Name of project proponent	: Ngwe Yi Pale' Sugar Co., Ltd.
Head office (Mandalay)	: No. 414/1, Corner 35th x 36th Street, Mandalay City.
Telephone	: 02-31941, 02-34015
Fax	: 02-4071424
E mail	: info@ngweyipale.com
Website	: www.ngweyipale.com
Contact person	: U Lin Thein Aung (Admin Manager)
Phone	: 09 977150336, 09 444002600
E.mail	: lintheinaung777@gmail.com
Location of project site	: Holding No.121-123, 129, 160-163, Plot No.2, Inn Wine village Area, Kone Gyi village Tract, Naunghkio Township Shan State.

The company has 11 executive and administration members. U Thein Myint @ U Chaung Pin is the managing direct while 10 directors are: U Maung Shwe, U Tun Win, U Kyaw Shein, U Myo Myint Aung, U Tin Maung Oo, U Shin Si, U Shi Pyin Yinn, U Zaw Khaing Myint, U Ai Maung and U Sein Myo Aung.

About the consultant firm

The consultant firm, Myanmar Environment Sustainable Conservation Co., Ltd was officially registered in 2014 as a consultant service company at the Ministry of National Planning and Economic Development. Document: Yaka-8(Ga) 001/2014(004720); date: 6-6-2014. Registration No.830/2014-2015 (20-5-2014). The Transitional Registration/License number of MESC is No. 0003, ECD, dated 1-7-2017.

Contact address	:	Room No. (B.5), Building No. 67/69, Parami Road, Ward No.16, Hlaing Township, Yangon.
Contact person	:	Myint Kyaw Thura
Phone	:	959 420105071
	:	959 73044903
E mail	:	myanmar.esc@gmail.com

Members of MESC consultant firm who are IEE/EIA appraiser and/or practitioners or who are involved in this EIA report are:

U Myint Kyaw Thura, MD, U Saw Han Shein, Dr. Thiri Dawe Aung, U Tin Tun Aung, Daw Khin Nwe Naing, U Than Soe Oo, U Okka Kyaw Thu and Daw Thin Thin Yee.

MESC has also part time members working as free lances. More about the project proponent and the consultant firm is described in the Introduction.

Policy, legal and administrative frame work

The environment policy of the government is to protect and conserve the environment while striving for national development; and to aim for sustainable development.

In this **Chapter-3**, first of all corporate Environmental and social policies of the project proponent is mentioned. The first and foremost policy is to company with laws, rules and regulation relating to the physical and social environment. The company will implement the project which will be environmentally sound, socially sustainable and economically viable.

Fourty six applicable law, rules and regulations are listed and relevant articles are excerpted. International conventions and agreements are also listed.

Laws, rules and regulation of great relevant are:

- Environmental Conservation Law, 2012; Environmental Conservation Rules, 2014; Environmental Impact Assessment Procedure, 2015; National Environmental Quality (Emission) Guideline, 2015, the Factory Act, 1995; Boiler Law, 2015; the conservation of Water Resource and Rivers Law, 2006; the Public Health Law, 1972 and Occupational Health and Safety Law (2019), among others.

National Environmental Quality Guidelines (air emission, effluent, noise level, odor) prescribed by ECD are reproduced.

(a) Air emission

Ngwe Yi Pale' Sugar Co., Ltd will follow the general National Environmental Quality guideline values for air emission as prescribed by the Environmental Conservation Department (from Notification No.615/2015, December 2015, by ECD, then under the Ministry of Environmental Conservation and Forestry (MOECAF), now MONREC, Code No. 1.1.

Parameter	Averaging Period	Guideline Value μg/m^3
Nitrogen dioxide	1-year 1-hour	40 200
Ozone	8-hour daily maximum	100
Particulate matter PM_{10}[a]	1-year 24-hour	20 50
Particulate matter $PM_{2.5}$[b]	1-year 24-hour	10 25
Sulfur dioxide	24-hour 10-minute	20 500

[a] Particulate matter 10 micrometers or less in diameter

[b] Particulate matter 2.5 micrometers or less in diameter

(b) Effluent

Ngwe Yi Pale' Sugar Co., Ltd will follow the National Environmental Quality sugar manufacturing guideline values for effluent levels (Notification No.615/2015, December 2015, by ECD, MOECAF), Code No. 2.3.1.7

Effluent levels

Parameter	Unit	Guideline value
5 day biochemical oxygen demand	mg/l	50
Active ingredients/Antibiotics	To be determined on a case specific basis	
Biocides	mg/l	0.05
Chemical oxygen demand	mg/l	250
Oil and grease	mg/l	10
pH	S.U.[a]	6-9
Temperature increase	^oC	<3[b]
Total coliform bacteria	100 ml	400
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50

[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.

WHO drinking water standards

Parameter	Unit	Guideline Value
pH	S.U	6.5-8.5
Chloride	mg/l	250
Total Hardness as $CaCO_3$	mg/l	500
Total Iron	mg/l	0.3
Sulphate	mg/l	250
Temperature increase	^oC	<3
Turbidity	NTU	5
Manganese	mg/l	0.4
Total dissolved solids	mg/l	600
Copper	mg/l	2
Arsenic	mg/l	0.01
Cyanide	mg/l	0.07
Zinc	mg/l	3

(c) Noise level

The National Environmental Quality general guideline for noise (from Notification No.615/2015, December 2015, by MOECAF), code No.1.3.

Receptor	One Hour LAeq (dBA)[a]	
	Daytime 07:00 - 22:00 (10:00 - 22:00 for public holidays)	**Nighttime 22:00 - 07:00 (22:00 - 10:00 for public holidays)**
Residential, institutional, educational	55	45
Industrial, commercial	70	70

[a] Equivalent continuous sound level in decibels

International standard and guideline for operation of sugar factories are downloaded from the internet and reproduced.

The commitments made by the project proponent as well as by the consultant firm are mentioned. The Company commits 2% it net profits for the implementation of CSR programme. The company has already involved in community assistance and community development even before any profit is realized yet. Ngwe Yi Pale' Group of companies has already spent Ks 7,105,570,825 in various aspects of CSR. Ngwe Yi Pale' Sugar Co., Ltd in particular has already spent Ks 2,837,210,400 for CSR programme in the area.

The institutional frame work of National Environmental Conservation and Climate Change Central Committee (NECCCCC) and the focal agency responsible for all the environmental affairs of the country, the Environmental Conservation Department of MONREC are depicted in charts.

The environmental and social performance standard by the International Finance Corporation (IFC) is briefly described.

Finally Environmental Health and Safety (EHS), Occupational Health and Safety (OHS) and Community Health and Safety (CHS) to be followed are briefly mentioned.

Policy, legal and institutional frame works are described in detail in Chapter-3.

Project description and alternative selection

The proposed project is for the construction and operation of a sugar factory at Holding No.121-123, 129, 160-163, Plot No.2 of Inn Wine Village Area, Naunghkio Township, Shan State. Coordinates: N. Lat. 22˚ 11' 00.22"; E. Long. 96˚ 43' 50.56" and the elevation is 1872 feet asl.

The project factory site has an area of 49.75 acres. The proposed sugar factory (No.3) will have a capacity of milling 12,000 tons of sugar cane per day and producing 1,200 tons of sugar per day.

The estimated budget is Ks 163,236.39 million. The Construction Phase and Operation Phase are estimated at 3 years and 30 plus years respectively.

The main components include: the cane yard, the main mill plant, boiler house, ash pool, pan boiling and centrifugal section, process plant clarify and filtration section, process plant sugar drying and packing section and other facilities among others.

Water will be sourced from Doe Gon stream.

Electricity will be sourced from National Gridline electricity and also from own generators (as back up) and also from boiler.

The annual raw material (sugar cane) requirement is estimated at 18,000,000 tons. The annual operational days are 150 days. The chemicals to be used are sulphur, lime powder, phosphoric acids, kurifloc, washing soda, sodium chloride etc.

350 and 503 employees will be deployed during the Construction and Operation Phases respectively. 35 foreigner technicians will be employed during the Operation Phase on the temporary basis.

The project site has a total are of 70.91 acres: 49.75 acres as factory premise, 13.67 acres for office and administrative facility, and 7.49 acres as residential area, (the residential area is inside the factory No.2 area).

Working hours is 8 hrs/day; 48 hrs/week.

The technology used will be "press" or "squeeze" technology where sugar cane is pressed by roller mills and pressing out the juice. Sugar manufacturing process is described in technical detail in **Chapter-4** together with flow chart diagram.

The wastes to be generated are: bagasse (pulp or fibre), "mud" (chchaza), molasse, ash, waste water, emission of air (dust, smoke, PM etc). Huge quantity of bagasse is generated at a sugar mill. But all the bagasse will be reused as fuel for boiler thereby tackling the solid waste issue. A cachaza, molasse can be reused in other ways. These are described in technical detail in Chapter-4.

The project alternatives

From environmental safe guard view point alternative analysis is conducted. The options are: site location alternative, relocation alternative, reorientation alternative, materials alternative, energy alternative, technology/methodology alternative, demand alternative, activities alternative and "no go alternative"/"no project alternative".

Better alternative for site cannot be seen; there are various sugar cane field in the near and far vicinity where raw materials are readily available. Raw sugar cane can be also procured from many other cane fields in the Naunghkio Township area. As regarded technology, the "press" or "squeeze" technology is the best technology appropriate for the production of sugar, so far. As regards other alternatives these are briefly described in Chapter-4.

The surrounding environment

Chapter-5 is on the surrounding environment. The surrounding area consists of mainly cultivated lands, fields or farm and residential areas, 6 villages in the vicinity. The terrain on the whole is undulating one.

The six villages in the near and far vicinity are, namely Inn Wine, Taung Kya, Htone Kon, Te Taik, Palaung Kone and Par He are incorporated into EIA study area. Sinn Shwe Li Sugar Factory (No.2) is also in the vicinity.

The studies on the physical, biological, socio-economics, cultural and visual components of the surrounding environment are conducted and baseline data collected.

Meteorological data are collected from Meteorological Department, Naunghkio Town. The monthly highest temperature (33.8°C) was recorded in April, 2010 while the lowest (6.8°C) was recorded in January, 2019. The year 2010 has the highest rainfall (59.2 inch) while the year 2019 has the lowest (0.1 inch).

Other physical characteristics eg- topography, geology, ambient air, noise, water etc are also studied and recorded. Geological data are secondary data obtained from company geologists. The project site area is underlain by limestone of Permian to Triassic Periods; predominantly limestone of Permian. As regards hydrology there is a small stream, the Doe Gon Chaung nearby, flowing from north to south.

Baseline data on ambient air, noise level and water quality are studied and recorded. The values recorded area compared with the NEQ guideline values prescribed by ECD.

Ambient air quality

Air qualities at proposed project site and Inn Wine village were conducted during the survey. The coordinates are N. Lat. 22˚ 11' 6.76."; E. Long. 96˚ 43' 17.87"; and N. Lat. 22˚ 10' 53.47"; E. Long. 96˚ 42' 51.71". The results are shown in the following table.

Parameter	**Existing values at site (μg/m^3)**	**At Inn Wine village (μg/m^3)**	**Averaging Period**	**NEQEG Guideline Value (μg/m^3)**
Nitrogen dioxide	53 (1 hr)	22 (1 hr)	1-hour	200
Ozone	71 (8 hrs)	20 (8 hrs)	8-hour daily maximum	100
Particulate matter PM_{10}[a]	39 (24 hrs)	38 (24 hrs)	24-hour	50
Particulate matter $PM_{2.5}$[b]	34 (24 hrs)	31 (24 hrs)	24-hour	25
Sulfur dioxide	34.2 (24 hrs)	30 (24 hrs)	24-hour	20

[a] Particulate matter 10 micrometers or less in diameter

[b] Particulate matter 2.5 micrometers or less in diameter

Two of the values are lower than the guideline values but PM_{10}, $PM_{2.5}$ and SO_2 are higher than the guideline values. And this may be due to activities from nearby existing sugar factory no.2 and also due to activies of construction work including vehicular activies.

Noise level

Noise level was measured by a portable noise detector, EXTECH. The coordinates are N. Lat. 22˚ 11' 6.76."; E. Long. 96˚ 43' 17.87"; and N. Lat. 22˚ 10' 53.47"; E. Long. 96˚ 42' 51.71".

Site Name /Time and Date to start	L_{eq} in dBA			L_{max} in dBA			NEQE guideline	
	Day	Night	Total	Day	Night	Total	Day	Night
Project site (3.12.2018) 10:18 Hrs to (4.12.2018) 10:18 Hrs	41	38	40	29	29	29	70	70
Values inside Inn Wine village (4.12.2018) 12:20 Hrs to (5.12.2018) 12:20 Hrs	55	30	53	27	20	25	55	45

As the project has not started yet the noise levels are lower than the guideline values.

Water quality

The water qualities from Doe Gon stream and Inn Wine waterfall were brought back to Yangon and analysis of water was conducted at ISO Laboratory (a certified laboratory) in Insein (See **ANNEX).** The coordinates where water sample was taken N. Lat. 22˚ 11' 7.69."; E. Long. 96˚ 43' 28.81" and N. Lat. 22˚ 10' 41.52"; E. Long. 96˚ 43' 22.80".

Sr.	Parameters	Existing values at Doe Gon stream	Existing values at Waterfall	WHO guideline values
1	pH	7.6	8.0	6.5 – 8.5
2	Temperature	25.0 ^{o}C	25.0 ^{o}C	<3
3	Turbidity	10 NTU	18 NTU	5 NTU
4	Total Hardness	150 mg/l	160 mg/l	500 mg/l
5	Iron	0.37 mg/l	0.47 mg/l	0.3 mg/l
6	Chloride	4 mg/l	3 mg/l	250 mg/l
7	Total Dissolved Solids	144 mg/l	148 mg/l	1000 mg/l
8	Suspended Solids	13 mg/l	22 mg/l	-
9	Manganese	Nil	Nil	0.05 mg/l
10	Arsenic	Nil	Nil	0.01 mg/l
11	Zinc	Nil	Nil	3 mg/l
12	Copper	Nil	Nil	2 mg/l
13	Phosphate	Nil	Nil	-
14	Oil and grease	8.23 mg/l	7.34 mg/l	10 mg/l
15	COD	32 mg/l	32 mg/l	-
16	BOD	8 mg/l	10 mg/l	-

Site runoff water (During construction phase)

The runoff water during the construction phase was brought back to Yangon and analysis of water was conducted at ISO Laboratory (a certified laboratory) in Insein (See **ANNEX)**. The coordinates where water sample was taken: N. Lat. 22˚ 11' 4.50"; E. Long. 96˚ 43' 15.16".

Sr. No	Parameters	At the site	Unit	NEQEG guideline values
1.	Biochemical Oxygen Demand	34	mg/l	30
2.	Chemical Oxygen Demand	96	mg/l	125
3.	Oil and grease	5	mg/l	10
4.	P^H	7.3	S.U	6-9
5.	Total coliform bacteria	180	mg/l	400
6.	Total nitrogen	<5	mg/l	10
7.	Total phosphorus	7	mg/l	2
8.	Total suspended solids	605	mg/l	50

As the project is not in operation yet the data are merely baseline data and the values on the whole except TSS are lower/much lower than the guideline values.

Soil quality

The soil samples from the proposed project site and Inn Wine village were collected and taken back to Yangon for analysis. The coordinates: N.Lat. 22˚ 11' 4.58."; E. Long. 96˚ 43' 14.78" and N.Lat. 22˚ 10' 53.30."; E. Long. 96˚ 43' 50.64". The results are as follows:

Soil test results (Proposed project site)

Sr. No	Sample plot	pH Soil : Water 1 : 2.5	Texture	Total N %	Available Nutrients
					P
1.	Project site	Slightly alkaline	Clay	Low	Low

Soil analytical data sheet (Proposed project site)

Sr. No	Sample plot	Moisture %	pH soil: Water 1: 2.5	Texture				Total N %	Available Nutrient
				Sand %	Silt %	Clay %	Total %		P ppm (Bray)
1.	Project site	5.63	7.10	38.76	10.64	50.60	100	0.19	0.42

Soil test results (Inn Wine village)

Sr. No	Sample plot	pH Soil : Water 1 : 2.5	Texture	Total N %	Available Nutrients
					P
1.	Inn Wine village	Moderately alkaline	Sand	Low	Medium

Soil analytical data sheet (Inn Wine village)

Sr. No	Sample plot	Moisture %	pH soil: Water 1: 2.5	Texture				Total N %	Available Nutrient
				Sand %	Silt %	Clay %	Total %		P ppm (o)
1.	Inn Wine village	6.69	7.79	86.64	9.72	3.64	100	0.19	25.29

Odour

Guideline standard for odorant unit is between 5 and 10 (not exceed 10).

Vibration

The vibrations were measured at the place of construction of sugar mill and Inn Wine village.

The coordinates are N. Lat. 22˚ 11' 2.25."; E. Long. 96˚ 43' 15.82" and N. Lat. 22˚ 10' 53.14"; E. Long. 96˚ 42' 51.23". The equipment used is BEME-TECH Vibration Meter.

The results are 04.3 mm/s and 0 mm/s.

As the project has not yet commenced vibration value is very low or almost zero.

As regards study on biological component;

- 321 species of natural flora (natural vegetation)
- 71 species of artificial flora (cultivated plants)
- 128 species of avian fauna (birds)
- 14 species of herpetfauna (amphibians and reptiles)
- 7 species of aquatic fauna (fish) are found and identified (some are from secondary information).

The area being cultivated land of fields and farms the large natural biodiversity (forest) is almost non-existent. Only small natural vegetation (e.g. shrub, herb, grass etc.) and birds are normally found.

Socio-economic assessment on 6 villages, namely, Inn Wine, Taung Kya, Htone Kone, Par He, Palaung Kone and Te Taik, was conducted, even though the only village to be effected, if any, can be Inn Wine. Inn Wine is the only large village while the other is small villages or hamlets.

The population of the six villages/hamlets are:

Inn Wine	-	1088
Taung Kya	-	140
Htone Kone	-	160
Par He	-	67
Palaung Kone	-	70
Te Taik	-	335

55% of the people of this area are Bamar, while Shan, Palaung and Danu constitute 25%, 15% and 5%, respectively 100% are Buddhists.

The literacy rate is 77% (57% primary education and 20% secondary education).

80% are farmers growing sugar cane, maize and rice. The majority of household (65%) have annual income less than Kyats 50 Lakhs. 45% of the houses are made of wood and only 3% are brick house.

Inn Wine village has one affiliated middle school while Te Taik, Taung Kya and Palaung Kone have on primary school each. Htone Kone and Par He have none. Only two villages (Inn Wine and Te Taik) have a Buddhist monastery each. All villages are accessible by car.

All villages are accessible by motor roads; five villages are now electrified by Ngwe Yi Pale' Sugar Co., Ltd. Electrification for Htone Kone village by the company is in the process.

The socio-economic aspects are described in relative details in Chapter-5.

As regards visual components there are no scenic spot, beautiful landscape and outstanding land mark. There are also no historical, cultural, religious monuments of any magnitude. The whole landscape is that of fields and farms, and residential areas (villages).

Risks and impact assessment and mitigation measures

These are described in technical details in **Chapter-6**. This chapter covers methodology; impacts and risks assessment and mitigation measures; likelihood of disasters; potential residual impacts and monitoring.

The potential impacts identified and assessed during the four phases of the project life and mitigation measures to be taken are summarized in tabulated form as below:

During the Construction Phase

Sr. No.	Impact	Mitigation
1.	Impact on air environment	- Manage dust and smoke - Avoid open burning of debris - Suppress dust with water spray - Restrict vehicular movements, reduce the speed - Stop earth work or loading and unloading of earth, sand when strong wind is blowing - Limit open stockpiles of earth, sand, lime powder - Minimize drop height when loading and unloading earth and other loose materials - Plant fast growing trees to trap dust - Procure equipment and vehicles that are eco-friendly eg. those that emit less smoke - Keep equipment and vehicle well-maintained and well-operated - Use fuel with low sulphur content - Provide adequate PPEs - Heed to complaint of the local concerning dust and smoke - Monitor the mitigation works

2.	Noise and vibration	- Comply with NEQ guideline of ECD - Procure eco-friendly equipment and vehicles that generate low noise level - Restrict noise to working hours only (no work at night) - Install silencers on certain machinery - Switch off or throttle down equipment during idle hours - Limit/restrict the movement and speed of vehicles - Keep equipment and vehicles well maintained and well-operated - Manage vibration (of machinery, vehicles); provide suitable foundation - Plant fast growing trees to absorb noise - Provide PPEs - Heed to the complaint of the local regarding noise - Monitor the mitigation effort
3.	Impact on water environment	- Avoid accidental sliding or erosion of stockpile of earth or sand into the water of Doe Gon rivulet - Avoid accidental dumping or spill of earth and newly mixed concrete into water - Avoid or minimize siltation and sedimentation - Avoid accidental spillage of oil and chemical into water - Manage domestic waste (solid and liquid); no disposal into rivulet - Manage the water level, flow and volume as practical as possible; also consider for seasonal change in hydrology - Heed to the complaint of locals regarding the quality of rivulet water, if any - Try to meet NEQEG values by ECD - Monitor the mitigation works
4.	Impact on soil	- Avoid unnecessarly earth work, earth moving, earth cuts - Avoid discriminate dumping of soil and wastes - Manage the soil - Avoid unnecessary destruction of soil profile - Separate top soil from sub-soil (separate stockpiles); top soil for revegetation; sub-soil for construction - Prevent soil erosion and siltation - Prevent wash water from carrying earth and materials into the stream - After construction work resurface and stabilize exposed ground

		- Do not keep the ground bare for long period during wet season - Rake and restore soil compacted by vehicles or machinery - Avoid fuel oil spill on soil; remove the spill immediately; do not wash down with water but use absorbent - Train workers for handling of fuel and cleanup of spills - Monitor the mitigation activities.
5.	Impact: waste	- Manage solid waste - Comply with rules and regulations - Avoid open burning of debris - Dump waste at approved landfills - Educate and train workers for goodhouse-keeping - Put up left over construction materials for sale - Hire a contractor for tidying up the site after completion of construction work - Monitor the mitigation works
6.	Potential impact on biodiversity	- Protect and conserve flora and fauna - Execute minimum disturbance on the biodiversity and habitat - Comply with Environmental Conservation Law, 2012 and Rules, 2014 - Restrict the clearing of vegetation - Keep big trees as contact as far as possible - Avoid open burning of debris - Monitor the mitigation works
7.	Potential impact on traffic	- Plan and manage traffic - Schedule the timing for vehicular movement, - Educate the drivers for defensive driving - Try to maintain zero road accident - Keep vehicle well-operated and well-maintained - Educate heavy truck driver for driving with reduced speed - Do not overload the truck; comply with regulation - Avoid spilling of earth or other materials from truck during transportation - Reduce the speed when driving near or through a village - Set up speed limit at appropriate spot along access road - Monitor the mitigation effort

8.	Occupational health and safety issue	- Educate, train and supervise workers for good working practice and good safety practice - Plan for emergency procedure; provide First Aid Kids, fire extinguisher etc. - Try to achieve zero accident - Display phone number and address of Red Cross Society, Ambulance Service, Nanghkio Hosiptal, Fire Brigade etc so that everyone can see - Train some staff for First Aid and Firefighting Trainings - Take out insurance for the company and Insurance for Fire - Monitor the mitigation works
9.	Potential social issue	- Avoid the potential negative impacts on the socio-economic life of the locals - Maintain good relation with the locals - Conduct public consultations from time to time; heed to their opinions - Educate workers for appropriate behaviours when dealing with locals - Manage misbehaviour and social illness of workers - Keep separate dormitories for male and female workers - Ask the construction contractor to discipline his workers - Apply punitive actions for wrong doer - Prohibit the drinking of alcohol during working hours; ban the use of narcotics - Train workers for good housekeeping - Heed to the voice of the locals - Monitor the mitigation works
10.	Potential security issue	- Manage for the security of site - Wall or fence the site - Control all accesses; set up gates and deploy security guards - Do not let workers enter the neighbouring village without pre-authorization; - Do not let them mingle freely with locals (Construction Phase only) - Keep certain materials under lock and key - Ask the building contractor to discipline his workers (construction phase only) - Take punitive actions for wrong doer - Monitor the mitigation works

During the Operation Phase

Sr. No.	Impact	Mitigations
1.	Impact on air environment	- Comply with NEQ emission guideline by ECD - Try to control and mitigate air emission as practical as possible - Procure eco-friendly equipment/machinery/vehicles that generate less smoke - Ensure for complete combustion of bagasse waste - Apply ash reduction equipment, eg. dust collector, filter bag - Apply wet scrubber system (water dozing) - Proper training, operation and maintenance of machinery/equipment - Avoid open burning of solid waste - Restrict vehicular movements - Prevent spillage of lime powder, - Plant trees around the compound to mitigate dust and smoke - Spray water for dust suppression. - Provide adequate PPEs to workers - Monitor the mitigation works
2.	Noise and vibration	- Comply with NEQEG guideline by ECD - Try to manage and mitigate noise and vibration - Procure machinery/equipment/vehicle that are eco-friendly; emitting lower noise level - Maintain and operate machinery/vehicle well - Install silencer - Install noise barrier/sound insulation - Limit the speed of truck - Install absorber on machine that vibrate violently - Implement stable foundation - Create green belt to absorb noise - Provide PPEs - Monitor the mitigation actions
3.	Impact of solid waste	- Plan and execute waste management, waste minimization and utilization - Use bagasse waste for fuel - Recycle molasse; also consider for production of ethanol - Compost "mud" (cachaza) into high quality organic fertilizar

		- Use dry time (solid lime) for soil conditioning - Systematically collect ash and store in ash pools; process ash into construction material - Educate workers for proper handling of waste - Avoid open burning of solid waste - Follow the 5Rs principles for waste, if the is possible - dispose waste only at approved landfill or dumping site - Monitor the mitigation work
4.	Impact of liquid waste	- Comply with NEQ effluent guideline by ECD - Plan and execute the management of waste water and reduction of waste water - Promote awareness on the efficient use of water and conservation of water - Seggregate non-contaminated waste water stream from contaminated stream; reuse - Reduce the organic load of waste water by preventing the entry of solid waste into the waste water stream - Prevent direct run off to water course - Recycle process water and reuse - Duly treat waste water applying conventional method (physical treatment) - Educate and train workers for good housekeeping practice and proper handling of waste water - Check and monitor daily use of water - Regularly check the tanks, pipes, taps for water leakage and fix them immediately - Monitor the mitigation works
5.	Impact on water environment	- Plan and manage for water environment protection and water conservation - Follow rules and regulation (Conservation of Water Resources and River Law, 2006) - Comply with NEQ effluent guideline by ECD - Avoid by all means the pollution of Doe Gon rivulet - Avoid dispossing of solid and liquid waste into the rivulet (stream) - Avoid spillage of fuel oil into the rivulet - Promote awareness of efficient use of water and water conservation - Ensure that the consumption of water is in the workframe stated earlier (30,000 tons/day) - Recycle water, through cooling tower and series of cooling tanks

		- Apply appropriate plumbing and ensure that there is no leakage of water - Monitor the mitigation works
6.	Impact on traffic	- Try to achieve zero road accident - Comply with Highway Law, 2000 - Set up signage for speed limit at appropriate places - Educate and train the drivers for defensive driving - Avoid over loading of truck - Conduct public education campaign for road safety - Keep a log book for each vehicle - Schedule vehicular movements - Monitor the mitigation actions
7.	Occupational health and safety issue	- Plan and manage for a safe and healthy atmosphere inside the factory - Try to achieve zero accidents - Comply with Factory Acts, 1974; Boiler Law, 2015; Workmen Compensation Act, 1923 - Also comply with NEQ guideline for emission and noise by ECD - Educate, train and supervise workers for good working practice, good safety practice and good health and hygiene practice - Educate, train and supervise them for skill, for operation of equipment, for handling for chemicals (eg. lime, sulphur) - Keep all machinery/equipment well-maintained and well-operated - Provide adequate PPEs - Carefully plan for emergency procedure - Provide First Aid and Firefighting training - Display addresses and phone numbers of Red Cross Society, Ambulance Service, Fire brigade etc. so that every one can easily see - take out insurance for the factory, also take out fire insurance - Monitor the mitigation actions
8.	Potential social issue	- Prevent or minimize negative impact on socio-economic life of the local - Build and maintain good relation with locals - Hold public consultation from time to time - Educate the workers for etiquette, and respect the custom and tradition of the locals - Manage misbehaviours and social illness of workers

		- Keep separate housing for male and female workers - Provide proper training on work place regulation and code of conducts - Provide welfare programme - Educate and discipline workers - Deal with workers on a fair and square basis - Take punitive action to wrong doer - Prohibit the drinking of alcohol during working hours; ban the use of narcotics - Provide adequate sanitation eg-toilet, baths etc. - Heed to the voice of the locals - Plan and implement CSR as practical as possible - Monitor the mitigation actions
9.	Potential security issue	- Manage security of the site - undertake effective fencing/walling of the site - Control all accesses; set up security gates; deploys guards - Do not let workers mingle freely with locals - Do not let the workers enter the neighbouring village without pre-authorization; - Put certain materials under lock and key - Apply punitive measures to wrong doer - Provide ID cards for all for easy idenfication - Provide uniform for all - Monitor the mitigation works
10.	Potential visual impact	- Plan and excute for a sugar factory project which is focused on visual appeal - Enhance the splendor and beauty of the factory - Plant shade trees along both sides of access road; plant shade trees, fruit trees and ornamental trees in and around the site; create green zones and belts - Conserve natural vegetation in the vicinity - Use eyes pleasing paints and colours for buildings and structure - Provide appropriate lighting at night only for security reason; avoid the use of excessive light - Use yellow light instead of white light to mitigate insect aggregation; if insect aggregrate turn off the light for a while - Monitor the mitigation works

During the Decommissioning/Rehabilitation Phase

Sr. No.	Impact	Mitigation
1.	Occupational health and safety issue	- Manage for effective decommissioning of site. - Hire decommissioning contractor to do the work. - Dispose materials that are no longer useable; redeploy or put up for sale those that are useable - Restore the ground and soil profile. - Revegetate and rehabilitate the ground, select a variety of plant species. - Backfill pits, dents and depressions, if any remain after decommissioning; backfill first with overburden and then put top soil on top to facilitate revegetation. - Monitor the mitigation works
2.	Potential residual impacts	- Hired a decommissioning contractor to do the work - Clean and tidy up the site - Remove contaminated soil, if any - Test the quality of air, water and soil for the last time - Continue rehabitation (reforestation) work - Hired a rehabilitation contractor and party for effective reforestation

All the said impacts and mitigation measures to be put in place for each and every impact are described in technical detail in the Chapter-6.

The positive (beneficial) impacts during the long Operation Phase of 30 plus years will be many. The positive impacts are in the form of provision of permanent jobs for 503 employees and the chance of more employment opportunities as the business progress.

At national level the benefit from the project will accrue to the nation in the form of direct investment of Ks 163,236.39 million, increasing the GDP of the country. The project will play an active role in the increased production of sugar and to the development of food industrial sector of the region.

A subsection of this Chapter-6 is on the identification and assessment of the likelihood and severity of natural and industrial hazards relevant to the project. The assessment is divided into the present Operation and the later Decommissioning Phase. Large quantity of industrial waste e.g. bagasse, ash and "mud" are generated from the factory, but none of them are hazardous. Mitigation/mediation measures for these industrial wastes are discussed.

Another subsection of Chapter-6 is on characterization and assessment of any residual impacts and risks. Both residual and risk assessment are made, including both theoretical and pragmatic approach.

The overall risk assessment (impact assessment) based from Expert consensus method and IFC table (likelihood x consequence) in tabulated forms.

The last subsection deals with comprehensive monitoring to be conducted and this is shown in tabulated form.

16, 32 and 5 components/parameters to be monitored (overall, generalized monitoring) during the Construction, Operation and Decommissioning Phases, respectively, are shown in tabulated forms. Specific monitoring plan is shown later in Chapter 8, (EMP).

Cumulative impact assessment

Chapter-7 deals with the cumulative impact assessment.

This chapter includes two sections, namely, methodology and approach and Cumulative Impact Assessment (CIA); and 2 sub-sections. First of all the definition of cumulative impact is very briefly mentioned.

Large quantity of industrial waste e.g. bagasse will be generated from the factory. But as all bagasse waste will be totally reused as fuel for boiler there can be no cumulative impact. Large quantity of ash will be generated but will be regularly collected and dried and store in ash pools. Later the ash will be removed and most will be used as soil conditioner/fertilizer for plant. The ash water will be stored steps by steps in 4 ash pools and finally only the supernatant layer will be recirculated with the aid of pumps for cooling.

The existing Sugar Factory (No.2) is in the vicinity. Therefore there will be a simultaneous cumulative impact from other source that is this No.2 factory.

The factory can consume 12,000 tons of sugar cane per day. The cumulative successive impact on the living resource (sugar cane) can be very high in the duration of one year. But the factory is operational for only about 150 days per year. Sugar cane plants can be replenished (regrown) effectively by sugar cane farmers during the remaining months.

Environmental management plan (EMP)

This **Chapter-8** is all about Environmental Management Plan (EMP) and Monitoring Plan (MP).

This chapter includes 6 sections, namely, executive summary, project description, health policy, commitment, legal requirement and institutional arrangement, summary of impacts and mitigation measures, overall budget, management and monitoring sub-plan and contents each sub-plan. As this is not a standalone EMP report, all are summarized as far as possible, some are shown in tabulated forms. Health policy is briefly mentioned, impact and mitigation measures are briefly summarized again.

As regards overall budget for implementation of EMP 1% of the main budget (which is equivalent to Ks 1,632,363,900) is set aside for EMP fund.

The EMP fund is then allotted for each programme, namely, cost of organizing EMP, cost for capacity building and training, cost for partial procurement of small equipment and device, cost for execution of mitigation, cost for monitoring, for emergency and miscellaneous. The detailed costs are as follows:

- Cost of organizing EMP — 2% of EMP fund (Ks 32,647,278)
- Cost for actual execution and dissemination of EMP in the forms of:
  - (a) Taking mitigation measure — 25% of EMP fund(Ks 1,224,250,000)
  - (b) Monitoring actions — 25% of EMP fund (Ks 1,224,250,000)
- Cost for partial procurement of equipment and materials — 20% of EMP fund (Ks 326,472,780)
- Cost for capacity building and training — 7% of EMP fund (Ks 114,265,473)
- Cost for emergency/contingency (for probable emergency cases) — 10% of EMP fund (Ks 163,236,390)
- Cost for reporting, documentation work — 8% of EMP fund (Ks 130,589,112)
- Miscellaneous (including casual fees for two villagers, who are EMP cell members) — 3% of EMP fund (Ks 48,970,917)

Management and monitoring sub-plan by project phase: on noise, vibration, waste, hazardous waste, waste water and storm water, air quality, odour, chemicals, water quality, erosion and sedimentation, biodiversity, OHS, CHS, cultural heritage, employment and training and emergency response (as prescribed by ECD in EIA procedure, 2015) are summarized in tabulated form.

The last section of Chapter 8 is content for each sub-plan and this is described according to EIA procedure format, 2015, specific monitoring plan to be submitted semiannually to ECD is shown.

The Chapter ends with projected budget (for monitoring) and responsibilities. These are shown in tabulated form.

Public consultation

Chapter-9 is all about public consultation meeting and information disclosure. The chapter encompasses five sections, namely, methodology and approach; summary of consultation and activities taken; result of consultation, further ongoing consultations and finally information disclosure. The public consultation meeting conducted during the EIA study is described in relative detail.

Ngwe Yi Pale' Sugar Co., Ltd has held many meetings with the public from time to time. As the company is doing business in this area for many years it has on the whole good relation with the locals.

A primary consultation meeting was held on 27-5-2018 during the scoping study. The next public consultation meeting with locals from six villages/hamlets was conducted on 5-12-2018. All the minutes of meeting are documented in details and incorporated into this EIA report.

On the whole the local communities have a positive view on the project and the rate of acceptance of the project is high. This is due to the fact that the project will really boost the local economy of the area, particularly the local sugar cane growers who can sell all their produces to the factory. Many locals are also employed in the nearby Factory No.2 and many are employed during the Construction Phase of this project. Many more will be employed for long term during the coming Operation Phase.

The company has improved the infrastructure of the area by building roads and electrified the 5 villages.

The company has, so far, spent Ks 2,837,210,400 for execution of CSR programmes mainly for community assistance and community development.

Many locals view the company has their benefactor and redeemer.

Recommendation for future consultation and setting up of Complaint and Grievance Mechanism (CGM) or Grievance Redress Mechanism (GRM) programme are also mentioned.

The information concerning the public meeting was disclosed and appeared in the newspaper, The 7 Day Daily, on 24-12-2018. The information was also launched at facebook website, www.Myanmar Environment Sustianable Conservation. When the EIA report is approved part of the report will be launched at the website of the company, www.ngweyipale.com.

2. INTRODUCTION

Sugar is an essential food commodity for mankind. Temperate consumption of sugar provides energy and is good for the well-being of human body. Although eating too much sugar can contribute to obesity, diabetes and heart disease the food industry cannot go on without sugar.

In addition to providing sweet taste and flavour sugar performs a variety of function in food technology and products. Sugar is used as a preservative for inhibiting the growth of micro-organisms eg. in jam and jelly and sugar is used in a variety of food eg. confectionary, cakes, snacks, etc and drinks.

Sugar is an important source of energy both for cellular functions and for the body.

During the past few years and at the present the sugar market in Myanmar is unstable. The export of sugar to China normally fluctuates. When there is great demand in China the export will increase resulting in more sugar cane acreage but when the demand is low there will be less sugar cane plantation. Many merchants used to import sugar from Thailand and re-export it to China.

Ngwe Yi Pale' Sugar Co., Ltd can contribute to the stability of sugar market in Myanmar in many ways. 60% of its sugar will be for export while 40% will be for local market. This project will surely enhance commercial sugar production in Myanmar. At the local and district level this project boost the local economy by ensuring the long term income security of the sugar cane farmers of the region. Farmers can sell all their produces to the company. Many locals will be employed for long term at the factory.

2.1 Presentation of the project proponent

Ngwe Yi Pale' Sugar Co., Ltd is a subsidiary of Ngwe Yi Pale' Group of Companies, a conglomerate involves in a variety of big business.

content person

As mentioned earlier the company was registered in 2014.

Name of the project proponent	:	Ngwe Yi Pale' Sugar Co., Ltd
Address (Head office) Mandalay	:	No. 414/1, Corner of 35th x 65th Street, Mandalay City, Myanmar
Telephone	:	02 31941, 02 34015
Fax	:	02 4071424
E-mail	:	info@ngweyipale.com
Website	:	www.ngweyipale.com
Contact person	:	U Lin Thein Aung (Admin Manager)
Phone	:	09 977150336, 09 444002600
E-mail	:	lintheinaung777@gmail.com

Location of project site : Plot No. 2, Inn Wine Village Area, Kone Gyi Village Tract, Naunghkio Township, Shan State

Particulars of executive and administrative body

Name	Nationality & National Registration Card No.	Address of resident	Designation
U Thein Myint @ Chaung Hpin	Myanmar 13/Na Kha Na (Ei)000017	No.(415), S2, Pyay Gyi Yan Lon Quarter, Aung Myay Thar Zan Township, Mandalay	Managing Director
U Maung Shwe @ Khin Maung Shwe	Myanmar 9/Ma Kha Na (N)047737	No.101/2, Bu Kone Village, Patheingyi Township, Mandalay	Director
U Tun Win	Myanmar 9/Ma Ya Ma (N)053811	No.76, Pyay Gyi Yan Lon Quarter, Aung Myay Tharzan Township, Mandalay	Director
U Kyaw Shein	Myanmar 9/Ma Na Ma (Ei)000048	No.1/7, Theik Pan Street, Mahar Myaing (1)Quarter, Mahar Aung Myay Township, Mandalay	Director
U Myo Myint Aung	Myanmar 13/La Ya Na (Ei)000608	Building (A), Room (G-3), Shwe Gone Thu Housing, Pan Hlaing Quarter, Kyimyindaing Township, Yangon	Director
U Tin Maung Oo	Myanmar 9/Ma Ya Na (N)025195	No.807, 63th Road, Between 29 th x 30 th Street, Pyay Gyi Myat Mun Qtr., Chan Aye Tharzan Township, Mandalay	Director
U Shin Si @ U Hla Win	Myanmar 9/Ma Na Ma (N)122804	No.54, 78th Street, Between 29th x 30th Street, Hay Mar Zala Ward, Chan Aye Tharzan Township, Mandalay	Director
U Shi Pyin Yinn	Myanmar 13/Ka Na Ma (N)012586	No.568, 32th Street, Between 81th x 82th Street, Aung Nan East Qtr., Chan Aye Tharzan Township, Mandalay	Director
U Zaw Khaing Myint @ Kyauk Kyar Chan	Myanmar 13/Ka Ma Na (N)037294	No.73, 33th Street, Between 71 x 72 Street, Yan Myo Lon Quarter, Chan Aye Tharzan Township, Mandalay	Director
U Ai Maung @ Lee Syun Sho	Myanmar 9/Ma Ya Ma (N)080982	No.561, Bet: (33th x 34th) Street, Aung Nan Yeikthar (West) Qtr, Chan Aye Thar Zan Township, Mandalay	Director
U Sein Myo Aung	Myanmar 9/Ma Na Ma (N)098578	No.561, Bet: (33th x 34th) Street, Pyay Gyi Yan Lon Quarter, Aung Myay Thar Zan Township, Mandalay	Appointed As Director (w.e.f 26-2-2016)

The managing director is, U Thein Myint @ Chaung Hpin.

There are 10 directors in the board of directors.

The company is 100% owned by nationals.

Number of the shares so allotted payable in cashs	-	500	Shares
Nominal amount of the shares so allotted	-	50,000,000	Kyats
Amount paid or due and payable on cash such share	-	100,000	Kyats

Eight executive (allottees) members have taken the number of shares as follow:-

U Thein Myint @ Chaung Hpin has taken	-	50	number of shares
U Maung Shwe @ Khin Maung Shwe has taken	-	50	number of shares
U Tun Win has taken	-	50	number of shares
U Kyaw Shein has taken	-	50	number of shares
U Myo Myint Aung has taken	-	50	number of shares
U Tin Maung Oo has taken	-	50	number of shares
U Shin Si @ U Hla Win has taken	-	50	number of shares
U Shi Pyin Yinn has taken	-	50	number of shares
U Zaw Khaing Myint @ Kyauk Kyar Chan has taken	-	50	number of shares
U Ai Maung @ Lee Syun Sho has taken	-	50	number of shares


ကုမ္ပဏီမှတ်ပုံတင်လက်မှတ်

Certificate of Incorporation

ငွေရည်ပုလဲ သကြား ကုမ္ပဏီ လီမိတက်

NGWE YI PALE SUGAR COMPANY LIMITED

Company Registration No. 155769114

မြန်မာနိုင်ငံကုမ္ပဏီများအက်ဥပဒေ ၁၉၁၄ ခုနှစ် အရ

ငွေရည်ပုလဲ သကြား ကုမ္ပဏီ လီမိတက်

အား ၂၀၁၄ ခုနှစ် မတ်လ ၃ ရက်နေ့တွင်

အစုရှယ်ယာအားဖြင့် တာဝန်ကန့်သတ်ထား သည့် အများနှင့်မသက်ဆိုင်သောကုမ္ပဏီ

အဖြစ် ဖွဲ့စည်းမှတ်ပုံတင်ခွင့် ပြုလိုက်သည်။

This is to certify that

NGWE YI PALE SUGAR COMPANY LIMITED

was incorporated under the Myanmar Companies Act 1914 on 3 March 2014 as a Private Company Limited by Shares.

ကုမ္ပဏီမှတ်ပုံတင်အရာရှိ

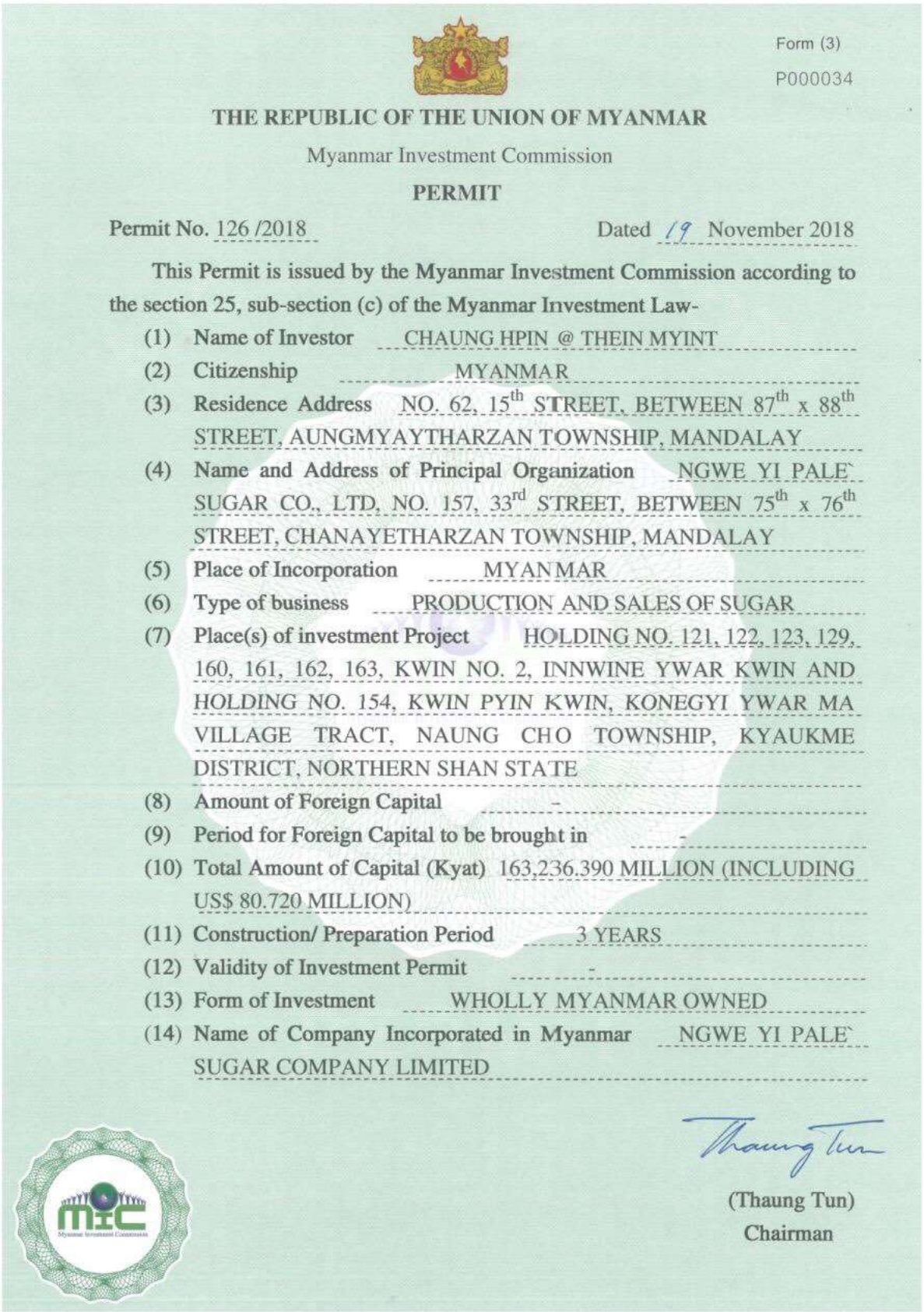
Registrar of Companies

ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန

Directorate of Investment and Company Administration

Former Registration No. 5665/2013-2014

Figure-1: Certificate of Incorporation



Form (3)
P000034

THE REPUBLIC OF THE UNION OF MYANMAR

Myanmar Investment Commission

PERMIT

Permit No. 126 /2018 Dated 19 November 2018

This Permit is issued by the Myanmar Investment Commission according to the section 25, sub-section (c) of the Myanmar Investment Law-

(1) Name of Investor CHAUNG HPIN @ THEIN MYINT
(2) Citizenship MYANMAR
(3) Residence Address NO. 62, 15th STREET, BETWEEN 87th x 88th STREET, AUNGMYAYTHARZAN TOWNSHIP, MANDALAY
(4) Name and Address of Principal Organization NGWE YI PALE` SUGAR CO., LTD, NO. 157, 33rd STREET, BETWEEN 75th x 76th STREET, CHANAYETHARZAN TOWNSHIP, MANDALAY
(5) Place of Incorporation MYANMAR
(6) Type of business PRODUCTION AND SALES OF SUGAR
(7) Place(s) of investment Project HOLDING NO. 121, 122, 123, 129, 160, 161, 162, 163, KWIN NO. 2, INNWINE YWAR KWIN AND HOLDING NO. 154, KWIN PYIN KWIN, KONEGYI YWAR MA VILLAGE TRACT, NAUNG CHO TOWNSHIP, KYAUKME DISTRICT, NORTHERN SHAN STATE
(8) Amount of Foreign Capital -
(9) Period for Foreign Capital to be brought in -
(10) Total Amount of Capital (Kyat) 163,236.390 MILLION (INCLUDING US$ 80.720 MILLION)
(11) Construction/ Preparation Period 3 YEARS
(12) Validity of Investment Permit -
(13) Form of Investment WHOLLY MYANMAR OWNED
(14) Name of Company Incorporated in Myanmar NGWE YI PALE` SUGAR COMPANY LIMITED

(Thaung Tun)
Chairman

Figure – 2: MIC permit

2.2 Presentation of Environmental and Social experts

Another section of Chapter-1 is about the presentation of environmental and social experts.

Myanmar Environment Sustainable Conservation Co., Ltd (MESC) is a consultant firm.

About the consultant firm, Myanmar Environment Sustainable Conservation Co., Ltd (MESC)

MESC is a consultant firm officially registered in 2014 as a limited company (a consultant/service company) at the Ministry of National Planning and Economic Development. Document: YaKa-8(Ga) 001/2014(004720), dated: 6th June, 2014. Registration No. 830/2014-2015, (20-5-2014).

The Transitional Registration/License No. of the consultant firm, MESC is No. 0003, ECD, Dated 1st July 2017.

Contact Address : Room no. (B -5), Building no.67/69, Parami Road, 16 Ward, Hlaing Township, Yangon

Contact person : Myint Kyaw Thura

95 9 420105071

Contact number : 95 9 73044903

E-mail : myanmar.esc@gmail.com

Members of MESC who are IEE/EIA appraisers, or IEE/EIA practitioners or who are involved in this IEE/EIA project are as follows: -

Name	Nationality & National Registration Card No.	Registration/ license No. by ECD	Designation
U Myint Kyaw Thura	Myanmar 12/Da Ga Ta (N)028349	0006	Managing Director, Biodiversity Specialist (Fauna), EIA practitioner and EIA Appraiser
U Saw Han Shein	Myanmar 10/Ma La Ma(N)008173	0007	Retired Professor, EIA Practitioner and Appraiser
Dr. Thiri Dawe Aung	Myanmar 12/Da La Na (N) 029433	0008	Biodiversity Specialist (Ornithologist)
U Tin Tun Aung	Myanmar 12/U Ka Ma (N)172111	0009	Engineer and EIA practitioner
Daw Khin Nhwe Naing	Myanmar 9/Pa Kha Ka (N)001252	00010	Biodiversity Specialist (Flora), Environment Researcher
U Than Soe Oo	Myanmar 9/Ma Na Ma (N) 050808	00011	EIA practitioner
U Oakka Kyaw Thu	Myanmar 7/Ya Ta Ya (N) 090371	00012	Geologist
Daw Thin Thin Yee	Myanmar 12/Tha Ga Ka (N)039292	00013	Chemical Environment Researcher, Computer Programmer

MESC has also part time members working as free lances.

The firm is not in a position to employ all its part time members on a permanent basis.

These are botanists, zoologists, ornithologists, ecologists, aquatic ecologists, social scientists, engineers and geologists working with this firm.

For the physical and chemical environmental studies MESC has to hire experts, say for example, from the Health Department and from registered laboratory in Yangon. Since portable test kits are sometime not reliable, experts from the Health Department have to be hired for the analysis of air quality. Experts from a registered laboratory were hired for the analysis of water (or samples have to be sent to the laboratory).

2.3 Presentation of Health Experts for the project with Health Impact

As regards health expert the Consultant Firm (MESC) is not in a position yet, to employ health experts for EIA.

However, the consultant firm (MESC) has one part time medical officer (MBBS), who cannot be called an HIA expert yet.

One of the senior members, U Myint Kyaw Thura is the General Security of Myanmar Environmental Assessment Association (MEAA) and holds an HIA certificate. (Online training on HIA cosponsored by IFC, Australia Aid and MEAA, Oct 2010. One junior member has attended special lecture classes provided by HIA experts from MEAA.

In undertaking EIA works MESC has always asked for the help of technicians from the Occupational Environmental Health Division (OEHD) of the Department of Public Health.

Ambient air/emission and water quality/effluent, noise and vibration are measured and analysed by experienced technicians from Occupational and Environmental Health Division (OEHD), Ministry of Health and Sports.

One day when Health Impact Assessment (HIA) becomes mandatory the company and consultant firm will hire health experts, for this matter.

REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. ၁၀၀3 Date 01 JUL 2017

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၊ ၅၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို အဖွဲ့အစည်းအား ထုတ်ပေးလိုက်သည်။)

(a)	Name of Organization (အဖွဲ့အစည်းအမည်)	Myanmar Environment Sustainable Conservation-MESC
(b)	Name of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ အမည်)	U Myint Kyaw Thura
(c)	Citizenship of the representative in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ နိုင်ငံသား)	Myanmar
(d)	Identity Card /Passport Numberof the representative person in the organization (အဖွဲ့အစည်းကိုယ်စားလှယ်၏ မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)	12/ Da Ga Ta (N) 028349
(e)	Address of organization (ဆက်သွယ်ရန်လိပ်စာ)	Room No. B-5, Building No.72, Marlar Myaing 6th street, 16 Ward, Hlaing Township, Yangon. myanmar.esc@gmail.com , 09 73044903
(f)	Type of Consultancy (အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)	Organization
(g)	Duration of validity (သက်တမ်းကုန်ဆုံးရက်)	31 March 2018

EXTENSION
သက်တမ်းတိုးမြှင့်ခြင်း
The VALIDITY of this certificate is extended for one year from (1.4.2018) to (31.3.2019)
ဤလက်မှတ်အား (၀၁-၀၄-၂၀၁၈) ရက်နေ့မှ (၃၁-၀၃-၂၀၁၉) ရက်နေ့အထိ တစ်နှစ်သက်တမ်း တိုးမြှင့်ပေးသည်။
12-9-2018
For Director General
(Soe Naing, Director)
Environmental Conservation Department

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

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Air Pollution Control

2. Ecology and Biodiversity

3. Facilitation of Meeting

4. Geology and Soil

5. Land use

6. Modeling for Water Quality

7. Socio-Economy

8. Water Pollution Control

EXTENSION
သက်တမ်းတိုးခြင်းခြင်း
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 ကုမ္ပဏီလက်တမ်းတိုးခြင်းသည်။
5.1.2020
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးခြင်းခြင်း
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 (ကိုးလ)သက်တမ်းတိုးခြင်းသည်။
7.6.19
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
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 သက်တမ်းတိုးခြင်းသည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

EXTENSION
သက်တမ်းတိုးခြင်းခြင်း
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 သက်တမ်းတိုးခြင်းသည်။
Soe Naing
For Director General
(Soe Naing, Director)
Environmental Conservation Department

Figure – 3: Certificate of consultant firm

3. ENVIRONMENTAL POLICY, LEGAL AND INSTITUTIONAL FRAME WORK

Environmental policy of Myanmar

The environmental policy is to protect and conserve the environment while striving for national development. In other word to aim for sustainable development.

The National Environmental Policy (1994) is:

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

In short, the policy covers three strategic areas:

(a) Clean environment and health, functioning ecosystem

(b) Sustainable development, and

(c) Mainstreaming environmental protection and management.

Myanmar is cooperating with the international community to draft a national environment policy and adopt its main tasks in order to contribute to sustainable development, policies, strategies and work programmes relating to climate change, a framework for a green economy and strategies and work programmes for waste management.

The nation is in the process of formulating a new and comprehensive national environmental policy. Since 2015 United Nations Development Programme (UNDP) has been supporting the government to formulate a new national environmental policy that places environmental consideration at the centre of efforts to promote economic and social development, reduce poverty and mitigate and adapt to climate change and natural disasters.

This national environmental policy will ensure environmental protection and sustainable development across the country.

The pragmatic aim is to integrate environmental governance into the national economic development programme. This is indeed a new multifaceted national environmental policy and strategic frame work that address new challenges.

3.1 Corporate Environmental and Social policies of Ngwe Yi Pale' Sugar Co., Ltd

(**Reproduced from:** International Finance Corporation (IFC), Policy on Environmental and Social Sustainability, 2012)

There are eight performance standards for a big company to do business in a new area. The project proponent will follow these standards as practical as possible. At the moment the company has not yet any written policy or written statement on environment.

I) Assessment and Management of Environmental and Social Risks and Impacts

- identify and evaluate environmental and social risks and impacts of the project
- adopt mitigation measures to avoid, or if avoidance is not possible, minimize or mitigate the impact; compensate for the impacts on people and on the environment
- promote improved environmental and social performance through the effective use of management system
- ensure that grievances from the effected people are responded and managed appropriately
- promote and provide means for adequate engagement with the community throughout the project period

II) Labour and Working Conditions

- promote the fair treatment, non-discrimination and equal opportunity of workers
- establish, maintain and improve the worker-management relationship
- promote compliance with national employment and labour laws
- promote safe and healthy working conditions and the health of workers
- avoid the use of forced labour and child labour

III) Resource Efficiency and Pollution Prevention

- avoid or minimize adverse impacts or human health and the environment by avoiding or minimizing pollution from project activities
- promote more sustainable use of resources, including energy and water
- reduce project-related GHG emissions

IV) Community Health, Safety and Security

- avoid adverse impact on the health and safety of the community during the project life
- ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the community

V) Land Acquisition and Involuntary Resettlement

- avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs
- avoid forced eviction

- avoid, or where avoidance is not possible, minimize social and economic impacts from land acquisition or restriction on land use by

  (i) providing compensation for loss of assets at replacement cost (value of asset plus transaction costs), and

  (ii) ensure that resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those effected

- improve or restore, the livelihoods and standards of living of displaced persons

VI) Biodiversity Conservation and Sustainable Management of living Natural Resources

- protect and conserve biodiversity
- maintain the benefits from ecosystem services
- promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities

VII) Indigenous Peoples

- ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of indigenous peoples
- avoid adverse impacts of project on indigenous people, or when avoidance is not possible, minimize and/or compensate for such impacts
- promote sustainable development benefits and opportunities for indigenous people in a culturally appropriate manner
- establish and maintain an ongoing relationship with these people throughout the project period
- respect and preserve the culture, knowledge and practices of indigenous peoples

VIII) Cultural Heritage

- protect cultural heritage from the adverse impacts of project activities and support its preservation
- promote the equitable sharing of benefits from the use of cultural heritage

Principle for Environmental and Social Sustainability

The ethic code for 21th century big business is not to make profit at the expense of the environment and the local community.

The big company should not focus only on economically viable venture but also on functionally sound and ecologically viable as well as socially sustainable venture.

Environmental and social policy of Ngwe Yi Pale' Sugar Co., Ltd

The company pledges to comply with all the environmental Laws, Rules and Regulation concerning the manufacturing and marketing of sugar. The company also pledges to do the business that will be environmentally sound as far as possible.

The company will endeavour to:

- Operate the factory with an environmentally and socially responsible manner and to comply with laws and regulation
- Prevent pollution of surrounding area; monitoring and adopting suitable measures for environment protection
- Implement EMP effectively to mitigate pollution of water, land, air, noise and dust and proper disposal of waste
- Develop green belt in available space
- Conservation of natural resources water and energy as far as possible
- Create environmental awareness among employees and local community through education and training
- Duly compensate for any loss or damage of local people properties
- Duly implement meaningful CSR programme (2% of the net profit will be set aside for execution of CSR programme).

Corporate Social Responsibility (CSR)

CSR has become mandatory in most developed countries. It has also become mandatory for big companies doing business in developing countries. In fact it has become an official policy of many big companies worldwide.

A big company that is doing business in an area must commit itself to environmental and social sustainability. The motto is "**do not harm the environment and the people**".

The company must take the responsibility for community development as far as possible. A certain amount of budget or 2 percent of the net profit has to be allocated for CSR activities, it is learnt.

Many view CSR as a form of compensation for the environmental and socio-economic components impacted. The main objective of CSR is more than mitigation and compensation; but also for the economic and social development of the community impacted by the project. The compensation for land or property lost or damaged due to project, the construction of school, and clinic, the improvement for infrastructure and the provision of alternative livelihoods, donations, charities etc. are parts of CSR activities. The CSR activities must be meaningful and effective, not a mere formality.

The main essence of CSR is taking the responsibility for the community development. And the main principles of CSR are:

- not to destroy the environment
- not to infringe on human rights
- not to get involve in child labour or forced labour, and
- not to get involve in bribery and corruption in league with corrupt officials or authorities when doing business.

CSR programme implemented

Ngwe Yi Pale' Group of companies has already spent Ks 7,105,570,825 in various aspects of CSR. Ngwe Yi Pale' Sugar Co., Ltd in particular has already spent Ks 2,837,210,400 for CSR programme in the area. (See ANNEX).

Commitment

The project proponent is commitment itself to the continuation of its CSR programme. 2% of the net profit will be allotted for execution of CSR programme.

U Sein Myo Aung
Executive Director
Ngwe Yi Pale' Sugar Co., Ltd

3.2 Policy and legal frame work

Article 42 of Myanmar Constitution (2008) clearly states that "The Union shall protect and conserve natural environment".

Environmental conservation is an obligation of every citizen of Myanmar as per the Myanmar Constitution (2008), Section 8, Article 390 of the Constitution states that: "Every citizen has the duty to assist the Union in carrying out the following matter:

(b) Environmental conservation

The National Environmental Policy (1994) is:

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

There were/are several laws or Acts since the colonial days which were/are in one way or another pertaining to the environmental and social elements of the country.

The conservation of the environment was/is one of the priorities of successive governments.

3.2.1 Applicable laws and rules

Ngwe Yi Pale' Sugar Co., Ltd will comply with the following laws.

1. Environmental Conservation Law, 2012
2. Environmental Conservation Rule, 2014
3. Environmental Impact Assessment Procedure, 2015
4. National Environmental Quality (Emission) Guideline, 2015
5. The Conservation of Water Resources and River Law, 2006
6. The Forest Law, 2018
7. The Protection of Wildlife and Protected Area Law, 1994
8. Protection and Preservation of Antique Objects Law, 2015
9. The Protection and Preservation of Cultural Heritage Regions Law, 2019
10. The Protection and Preservation of Ancient Monument Law, 2015
11. Myanmar Investment Law, 2016
12. Myanmar Investment Rules, 2017
13. Land Acquisition, Resettlement and Rehabilitation Law, 2019
14. Farmland Law, 2012

15. The Factories Act, 1951
16. Prevention of Hazards from Chemical Substances Law, 2013
17. Boiler Law, 2015
18. Fire Brigade Law, 2015
19. Electricity Law, 2014
20. Myanmar Engineering Council Law, 2013
21. Myanmar Private Industry Enterprise Law, 1990
22. Employment and Skill Development Law, 2013
23. The Ethnic Rights Protection Law, 2015
24. Myanmar Insurance Law, 1993
25. The Social Security Law, 2012
26. Labour Organization Law, 2013
27. Workmen Compensation Act, 1951
28. The Leave and Holiday Act, 1951
29. Settlement of Labour Disputes Law, 2012
30. Consumer Protection Law, 2019
31. Payment and Wages Law, 2016
32. Minimum Wages Law, 2013
33. The Control of Smoking and Consumption of Tobacco Product Law, 2016
34. The Public Health Law, 1972
35. Occupational Health and Safety Law, 2019
36. Prevention and Control of Communicable Diseases Law, 1995
37. Myanmar Export Import Law, 2012
38. Myanmar Highway Law, 2000
39. Trademark Law, 2019
40. Industrial Design Rights Law, 2019
41. Patent Law, 2019
42. Law on Standardization, 2014
43. Tax Management Law, 2019

44. Union Tax Law, 2019
45. Registration of Deeds Law, 2018
46. The Petroleum and Petroleum Products Law, 2017
47. The Sugar Act or Sugar Law is still in the draft status at the Pyi Thu Hlutaw, it is learnt

The above-mentioned 46 laws, rules and guidelines are directly or indirectly related to sugar business. The company shall comply with all these laws. Since these laws cover a very wide spectrum and various aspects, the company is not in a position to read and study all these laws. The company, therefore, has hired a legal expert to deal with the details of these laws.

When implementing the project and doing the sugar business the company authority will apply the common sense and simple logics not to pollute the air, water, land and the community. When it comes to details the legal expert hired by the company will assist the company to comply with these laws, accordingly.

Staffs shall be educated and trained for environmental awareness and for maintenance of environmental performance during the entire life of the project.

However, certain points or Articles of the law which are of great environmental relevant to sugar business are excerpted and reproduced as follows:

1. The Environmental Conservation Law, 2012

Section-7 (d): The ministry prescribes environmental quality standards including standards on emission, effluents, solid wastes, production procedures, processes and products for conservation and enhancement of environmental quality;

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-24: The Ministry may, in issuing the prior permission, stipulate terms and conditions relating to environmental conservation. It may conduct inspection whether or not it is performed in conformity with such terms and conditions or inform the relevant Government departments, Government organization to carry out inspections.

Section-29: No one shall violate any prohibition contained in the rules, notification, orders, directives and procedures issued under this Law.

Section-32: Whoever violates any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law shall, on conviction, be punished with imprisonment for a term not exceeding one year, or with fine, or with both.

2. The Environmental Conservation Rules, 2014

Rule-69 (a): Any person shall not emit, cause to emit, dispose, cause to dispose, pile and cause to pile, by any means, the pollutants to environment and hazardous waste or hazardous material stipulated by notification under the Law and any these rules at any place which may affect the public directly or indirectly.

Rule-69 (b): Any person shall not carry out the action which can be damaged to natural environment which is changing due to ecosystem and such system, except the permission of the relevant Ministry in order to the interest of the public.

3. Environmental Impact Assessment Procedure, 2015

Section -102: The project Proponent shall bear full legal and financial responsibility for:

(a) All of the Project Proponent's actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the Project acting

(b) PAPs until they have achieved socio-economic stability at a level not lower than that in effect prior to the commencement of the Project, and shall support programs for livelihood restoration and resettlement in consultation with the PAPs, related government agencies, and organizations and other concerned persons for all Adverse Impacts.

Section-103: The project proponent shall fully implement the EMP, all project commitments, and conditions and is liable to ensure that all contractors and subcontractors of the project comply fully with all applicable laws, the rules, this procedure, the EMP, project commitments and condition when providing services to the project.

Section-104: The project proponent shall be responsible for and shall fully and effectively implement, all requirements set forth in ECC, applicable laws, the rules, this procedure and standards.

Section-105: The project proponent shall timely notify and identify in writing to the ministry, providing detailed information as the proposed project's potential adverse impacts.

Section-106: The project proponent shall, during all phase of the project (Preconstruction, Construction, Operation, Decommissioning, Closure and Post-closure) engage in continuous, proactive and comprehensive self-monitoring of the project and activities related thereto, all adverse impacts, and compliance with applicable laws, the rules, this procedure, standards, the ECC and the EMP.

Section-107: The project proponent shall notify and identify in writing to the ministry any breaches of its obligations or other performance failures or violations of the ECC and the EMP as soon as reasonably possible and in any event, in respect of any breach which would have a serious impact or where the urgent attention or the ministry is or may be required, within not later than twenty-four (24) hours, and in all cases within seven (7) days the project proponent becoming aware of such accidents.

Section-108: The project proponent shall submit monitoring reports to the ministry not less frequently than every six (6) months, as provided in a schedule in the EMP, or periodically as prescribed by the ministry.

Section-109: The monitoring reports shall include:

a) Documentation of compliance with all conditions

b) Progress made to date on implementation of the EMP against the submitted implementation schedule

c) Difficulties encountered in implementing EMP and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar future difficulties

d) Number and type of non-compliance with the EMP and proposed remedial measures and timelines for completion of remediation

e) Accidents or incidents relating to the occupational and community health and safety, and the environment, and

f) Monitoring data of environmental parameters and conditions as committed in the EMP or otherwise required.

Section-110: Within ten(10) days of completing a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, the Project Proponent shall make such report (except as relate to National Security concerns) publicly available on the Project's website, at public meeting places (e.g libraries, community halls) and at the Project offices. Any organization or person may request a digital copy of a monitoring report and the Project shall, with ten (10) days of receiving such request, submit a digital copy via email or as may otherwise be agreed upon with the requestor.

Section-113: For purpose of monitoring and inspection, the Project Proponent:

(a) Shall grant to the Ministry and/or its representatives, at any time during normal working hours, access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed; and

(b) From time to time as and when the Ministry may reasonably require, shall grant the Ministry access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed.

Section-115: In the event of an emergency, or where, in the opinion of the Ministry, there is or may exist a violation or risk of violation of the compliance by the Project with all applicable environmental and social requirements, the Project shall grant full and immediate access to the Ministry at any time as may be required by the Ministry.

Section-117: The Project Proponent shall further ensure that the Ministry's rights of access hereunder shall extend to access by the Ministry to the Project's contractors and information storage, and persons.

4. National Environmental Quality (Emission) Guideline, 2015

All the guidelines that are of relevance for this project are shown under a separate section of this report.

5. The Conservation of Water Resources and Rivers Law, 2006

Section-8: No person shall:

(a) Carry out any act or channel shifting with the aim to ruin the water resources and river and creeks.

(b) Cause the wastage of water resources willfully.

Section-11: No person shall:

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

Section-19: No one shall dispose of any substance into the river, creek that may cause damage to water way or change of water course from the bank or vessel which is plying, vessel which has berthed, anchored, stranded or sunk.

Section-21: No one shall:

(a) build lavatories unsuitable to the urban and rural community lifestyle in the bank area and watercourse area.

(b) drill well or pond or dig earth without the permission of the Directorate.

Section-22: No one shall, without the permission of the Directorate, pile sand, shingle and other heavy materials for business purpose on the bank area and water front area.

Section-24: No one shall:

(a) violate the conditions relating to navigation of vessels in rivers and creeks prescribed by the Directorate for conservation of water resources, rivers and creeks.

(b) violate the conditions prescribed by the Directorate so as not to cause water pollution and change of watercourse in rivers and creeks.

Section-29: Whoever attempts or conspires or abets in the commission of an offence under this law shall be punished with the punishment provided for such offence in this law.

Section-30: Any government department and organization or any person desirous of constructing drainage, utilizing river water intake, constructing bridged spanning rivers, connecting underground pipe, connecting underground electric cables, connecting underground telecom cable or digging in river or creeks, bank boundary and water front boundary, under the requirement of work, shall in order not to adversely affect the water resources and river and creeks, carry out only after obtaining the approval of the Ministry of Transport.

6. The Forest Law, 2018

Section-40: Whoever commits any of the following acts shall, on conviction, be punished with fine which may not exceed kyats 300,000 or with imprisonment for a term which may not exceed 1 year or with both:

(a) trespassing and encroaching in a reserved forest;

(c) breaking up any land, clearing, digging or causing damage to the rriginal condition of the land without a permit in a reserved forest;

Section-41: Whoever commits any of the following acts shall, on conviction, be punished with fine ranging from kyats 300,000 to 500,000 or which may not exceed 2 years or with both:

(a) extracting, moving, keeping in possession unlawfully any forest produce, with the exception of timber from teak and reserved tree, without a permit;

(b) selling or utilizing in other works, forest produce extracted under section 18 subsection (d), without the prior permission of the person authorized to grant permission for extraction.

Section-42: Whoever commits any of the following acts shall, on conviction, be punished with fine ranging from kyats 500,000 to 1,000,000 or with imprisonment for a term which may not exceed to 7 years or with both:

(a) felling, cutting, girdling, marking, lopping, tapping or injuring by fire or otherwise any tree in a reserved forest;

(b) extracting, moving, keeping in possession unlawfully timber from reserved tree other than teak without a permit;

7. The Protection of Wildlife and Protected Area Law, 1994

Objectives:

(a) to implement the government policy for wildlife protection

(b) to implement the policy for natural areas conservation

(c) to carry out in accordance with the International Conservations acceded by the State in aspects of the protection and conservation of wildlife, ecosystems and migratory birds to protect endangered species of wildlife and their natural habitats

8. Protection and Preservation of Antique Objects Law, 2015

Section-12: A person who finds any object which has no owner or custodian shall promptly inform the relevant Ward or Village-Tract Administration if he known or it seems reasonable to assume that the said object is an antique object.

9. Protection and Preservation of Cultural Heritage Regions Law, 2019

Section-13: A person desirous of carrying out one of the following shall abide by the provisions of other existing laws and also apply to the Department in accordance with stipulation to obtain prior permission under this law:-

(a) Within the ancient monumental zone or the ancient site zone

(1) Construction or extending a building

(2) Renovating the ancient monument or extending the boundary of its enclosure;

(b) Within the preserved or protected zone, constructing extending, renovating a hotel, motel, guest house, lodging house or industrial building or extending the boundary of its enclosure

(c) Within the culture heritage region:

(1) Carrying out the renovation and maintenance work of the ancient monument without altering the original ancient form and structure or original workmanship;

(2) Carrying out archeological excavations;

(3) Building road, constructing bridge, irrigation canal and embankment or extending the same

Section-22: No person shall construct a building which is not in conformity with the conditions prescribed region wise by The Ministry of Culture in the cultural heritage region.

10. Protection and Preservation of Ancient Monuments Law, 2015

Section-12: Anyone who has found an ancient building of 100 years or more of age without owner on the ground, underground above the water or under the water has to inform, if the building is recognized as or believed to be an ancient monument , the nearest village or township administration department.

Section-15: Every person desirous to engage in the following within the area of certain ancient monuments has to apply for the permission of the administration department:

(b) Constructing industrial building

(e) Digging a well, pond

(h) Constructing buildings near an ancient monument if this violets the structural rules approved by the ministry.

The administration development can approve or reject an application submitted under section 14 or 15 after having analyzed it.

Section-20: No one is allowed to do any of the following acts likely to cause damage to an ancient monument within the boundary without prior written permission of the administration department

(b) Using and driving heavy machines and vehicles which may cause vibration within the area of an ancient monument

(f) Releasing of chemical waste which can cause pollution of ancient monument and the natural environment

11. Myanmar Investment Law, 2016

Section-50: (e) The Government may grant more favorable terms and conditions for the lease of land and the use of land by Myanmar citizen investors.

Section-51: The investor:

(a) May appoint any citizen who is a qualified person as senior manager, technical and operational expert, and advisor in his investment within the union in accordance with the law.

Section-65: The investor:

(f) Shall not make any significant alternation of topography or elevation of the land on which he is entitled to lease or to use, without the approval of the commission.

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

(i) Shall close and discontinue the investment only after payment of compensation to employees in accordance with applicable laws for any breach of employment contracts, closure of investment, sale and transfer of investment, discontinuation of investment, or reduction of workforce;

(j) Shall pay wages and salaries to employees in accordance with applicable laws, rules, procedures, directives and so forth during the period of suspension of investment for a credible reason;

(k) Shall pay compensation and indemnification in accordance with applicable laws to the relevant employee or his successor for injury, disability, disease and death due to the work;

(l) Shall supervise foreign experts, supervisors and their families, who employ in their investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar;

(m) Shall respect and comply with the labor laws;

(o) Shall pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a permit or an endorsement.

(p) Shall allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment;

(q) Shall take in advance permit or endorsement of the Commission for the investments which need to obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of activities of the investments which obtained permit or endorsement of the Commission.

Section-73: The investor shall insure the types of insurance stipulated in the provision of the rules at any insurance enterprise which is entitled to carry out insurance businesses within the Union.

12. Myanmar Investment Rules, 2017

Rules-202: The Investor must comply with the conditions of the Permit and other applicable laws when making an Investment.

Rules-206: It the Investor is desirous to appoint a foreigner as senior management, technician expert or consultant according to section 51(a) of the law, it shall submit such foreigner's passport, expertise evidence or degree and profile to the Commission Office for approval.

Rules-212: Every Investor that holds the Permit or Tax Incentives must have taken out the relevant insurance out of the following types of insurance at any insurance business that holds the license in the Union based on the nature of the business:

(a) Property and Business Interruption Insurance;

(b) Engineering Insurance;

(c) Professional Liability Insurance;

(d) Professional Accident Insurance;

(e) Marine Insurance; and

(f) Workmen Compensation Insurance.

13. Land Acquisition, Resettlement and Rehabilitation Law, 2019

Section-37: The land owner

(a) has the right to claim for the expense of resettlement and rehabilitation as stipulated by law, due to the acquisition of his land and property.

(b) In addition to the night mentioned in the subsection (a) he has also the right to claim for the price of land and property not more tham current price after agreement with the department or organization that proposed for aquisition.

Section-38: The land acquisition committee, instead of giving compensation, can give a land to the owner as an exchange for the land acqusitioned, with the approval of the Union Government.

14. Farmland Law, 2012

Chapter III

Section-9: The person who has the right to use the farmland shall have the following rights:

(a) right to have the farmland in possession, right to use the farmland, right to enjoy the benefit arises from this right;

(b) right to sell, mortgage, lease, exchange and gift on the whole or part of the right to use the farmland in accord with the stipulated terms and conditions;

Chapter IV

Section-12: The person who has the right to use the farmland:

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

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

Chapter X

Section-30: In respect of the application to utilize farmland for other purposes in the interest of the public:

(b) The respective Region or state Government shall give permission to utilize the farmland for other purposes except paddy land, with the recommendation of the Region or State Farmland Management Body.

Section-30: (b) The relevant Region or State Government Organization may permit to use the farm land by other means except low land (paddy land) with the recommendation of the Region or State Administrative Body of the farmland.

Chapter XII

Section-35: Any person who has the right to use the farmland fails to comply with the order passed under Section 19 or the order or decision passed in the dispute of the right to use the farmland under this Law shall, on conviction, be punished with imprisonment for a minimum of six months to a maximum of two years and shall also be liable to fine for a minimum of three hundred thousand kyats to a maximum of five hundred thousand kyats.

15. The Factories Act, 1951

The law contains 10 Chapters and 109 articles.

Purpose: to ensure the health, safety, welfare, fair working time the clean environment for the employees working inside a factory. This law focuses on all stipulation for the employer (project owner).

The project owner should abide by nearly all sections in this Act. The project owner has to abide by all provisions for healthy, safety, welfare, (Chapter 3, 4, 5 respectively) working-hours and other needs. The project owner shall ask its legal expert to study this Act in details for his advice.

This Act also contains the provision for chemicals management and storage. The chemicals use in the manufacturing of motorcycle, paints, thinners, varnishes etc, may not require permits. Since iron smelting will not be involved permit for "hot work" may not be also necessary.

Chapter-8 is on the employment of young person.

Chapter-9 deals with punishment and procedure for employer who violates this law.

This factories Acts requires all factories to have proper pollution control measures such as air pollution, sewage and waste water treatment system and solid waste management system.

16. Prevention of Hazard from Chemical Substances Law, 2013

Section-14: The Central Supervisory Board:-

(a) shall grant the licence with regulations, if permit to grant the licence, after being paid the licence fees.

Section-15: A person who has obtained a licence, before starting the respective chemical and related substances business:-

(a) Shall be inspected for the safety and the power of resistance of the machinery and equipments by the respective Supervisory Board and Board of Inspection;

(b) Shall be attended the person who serve in the work to the respective foreign trainings or the training and the expert trainings on prevention of hazard from the chemical and related substances opened by the government department and the government organizations.

Section-16: A person who has obtained a license:-

(a) Shall abide by the license regulation;

(b) Shall perform to abide strictly the instructions for being safety in using the chemical and related substances by himself and also the persons who serve the work;

(c) Shall keep the required safety equipment enough in the chemical and related substances businesses, furthermore shall grant the personal protection equipment and dresses free of charge to the working persons;

(d) Shall make the course of training and study and instruction if necessary to the working persons for using the occupational safety equipment, the personal protection equipment and the dresses systematically in the chemical and related substances business;

(e) Shall be inspected by the respective Supervisory Board and Board of Inspection in respect of whether or not the hazard may impact on the Human Being and Animals' health and the environment;

(f) Shall make medical checkup the working persons who will work in the chemical and related substances business and shall permit to serve in that work after obtaining the

recommendation that his health is suitable for that work. This medical checkup records shall be kept systematically;

(g) Shall send the copy of informative letter of the permission to the respective Department of Township Administration, if the hazardous chemical or related substances are permitted to store;

(h) Shall acquire in advance the guidance and agreement of the respective Department of Fire Brigade, if the business that is worried to fire hazard is operated by using the fire hazard substances or the explosive substances;

(i) Shall transport only the permitted amount of the chemical and related substances in accordance with the prescriptive stipulations, if they are transported in local;

(j) Shall take the permission from the Central Supervisory Board if the chemical and related substance is altered and transferred from one place to any other place which contained in the license;

Section-17: A person who has obtained a license, shall put the insurance in accordance with prescriptive stipulations to be able to pay the compensation, if the impact and damage is occurred on the Human Being and Animals or the environment in respect of the chemical and related substances businesses.

Section-20: A person who has obtained a licence shall apply the related chemical and related substances that will be used in his chemical and related substances business in accordance with the stipulations to the Central Supervisory Board.

Section-21: The Central Supervisory Board scrutinizes the application according to section 20 and if it is in accord with the stipulations, shall issue the registration certificate with regulations after being paid the registration fees for the respective chemical and related substances.

Section-22: A person who has obtained the registration certificated shall abide the regulations consisted in the registration certificate furthermore shall also abide the order and instructions issued occasionally by the Central Supervisory Board.

Section-23: A person who has obtained the registration certificate:-

(a) shall apply to register again, to the Central Supervisory Board if the chemical and related substances, which are not contained in the registered list, are used;

(b) shall inform and submit the unused chemical and related substances list to the Central Supervisory Board, although which are contained in the registered list.

Section-27: A person who has obtained the license to be complied the following matters to control and decrease the hazard of the chemical and related substances:-

(a) Classifying the hazard level to protect in advance the hazard according to the properties of the chemical and related

substances;

(b) Expressing the Material Safety Data Sheet and Pictogram;

(c) Providing the safety equipment, the personal protection equipment to protect and decrease the accident and attending to the training to be used systematically;

(c) Performing in accordance with the stipulations in respect of transporting, possessing, storing, using, discharging the chemical and related substances;

(d) Not being imported or exported the chemical and related substances banned by the Central Supervisory Board and the machinery and equipment which are used them.

17. Boiler Law, 2015

Section-5: Any person desirous to use a boiler for any enterprise shall register under this law.

Section-6: A boiler shall be manufactured in accord with Myanmar standards and international standards.

Section-7: The documents and certificates relating to the boiler shall be attached to the application and submitted to the inspector when applying for the registration of the boiler under section-5.

Section-12: The owner shall:

(a) Apply to the respective inspector to obtain certificates in accord with the prescribed manner.

(b) Apply to register only for the boiler constructed in accord with Myanmar standards or international standards.

Section-14: The owner shall apply to the respective inspector in advance in order to obtain permission though he or she has obtained the certificate or the provisional order if desirous to carry out any of the following matters:

(a) Using the boiler at more than allowable pressure

(b) Repairing, altering adding or renewing any steam-pipe, pipe or any mounting or other fitting attached such steam pipe, feed-pipe or mounting or other fitting attached to the boiler.

Section-15: The owner shall submit the certificate or provisional order when so requested by the respective government department and organization as may be necessary.

Section-18: The owner shall inform immediately to the inspector if any accident occurs.

Section-19: The owner shall not:

(a) use a boiler at a pressure higher than allowable pressure;

(b) repair and alter or force to repair and alter the safety valve to exceed allowable pressure;

(c) do any act contained in sub-section (b) of section 14 without permission.

Section-20: The owner shall not use the following boiler:

(a) Boiler without certificate or provisional order

(b) Boiler of which certificate or provisional order is void

(c) Boiler of which certificate or provisional order is revoked.

Section-21: The owner shall engrave the register number specified by the chief inspector in accord with the prescribed manner.

Section-22: The owner:

(a) has the right to use a boiler in accord with the prescribed manner if he or she obtains certificate or provisional order;

(b) may, if desirous to alter the term of the certificate or provisional order, apply in advance for inspection before the expiry of the term of such certificate or provisional order.

Section-24: The owner shall not:

(a) Carry out with the person who has not boiler repairer certificate on the receipt of notice to repair, alter, add or renew any boiler, steam pipe, feed pipe or any mounting or other fitting attached to such boiler, steam-pipe and feed pipe.

(b) Assign any person to charge the boiler used in the work except the person who operates and maintains the boiler

Section-29: (a) Any person desirous to obtain a boiler attendant certificate may apply to the respective inspector in accord with the stipulations;

Section-30: The boiler attendant shall:

(a) have the right to operate the boiler which is issued certificate or provisional order with the approval of the owner;

Section-31: The boiler attendant shall not use the boiler at more than allowable pressure.

Section-38: The inspector, in accord with the prescribed manners, shall:

(a) Inspect the boiler existing within the area where he is responsible,

(b) Inspect any boiler existing anywhere according to the assignment of the Chief Inspector.

Section-40: During performing under section 38, an inspector may enter and inspect any place or building in which he has reason to believe that a boiler is in use.

Section-59: No one shall amend, alter, deface, destroy the form and make invisible the register number engraved under section 21.

Section-62: No one shall adjust and alter the safety valve in order to exceed the allowable pressure on his volition or under the instruction of the owner.

18. Fire Brigade Law, 2015

Section-24: No person shall fail to abide by the directives in respect of fire precaution and prevention issued under section -16 by the Township Fire Service Department.

Section-25: The owner or manager of the factory, workshop, work site or business exposed to fire hazard shall:

(a) Not fail to form the reserve fire bridge

(b) Not fail to provide materials and apparatus for fire precaution and prevention, in conformity with the directive of the Fire Service Department

19. Electricity Law, 2014

Section-10: When engaging in electricity activities, the ministry, the relevant region or state government and the head ("oozi") of the relevant self-administered division or self-administered zone –

(b) shall carry out an environmental impact assessment (EIA) in order to minimize the impact on the environment in accordance with the provisions stipulated in the Environmental Conservation Law. They shall pay compensation for the impact and contribute to the environmental conservation fund. Private entrepreneurs holding a license must also comply with these points

Section-18: The license holder has the right to engage in electric power generation and distribution only after having received the electrical hazards safety certificate from the chief inspector.

Section-21: (a) The license holder shall, if he fails to comply with the law, rules, regulations, procedures, orders and directions or the specified quality, standards and norms, be responsible in accordance with the law if any person or organization is affected or suffers a loss as a result.

Section-22: (a) The license holder shall be responsible in accordance with the law if any person or organization is affected or suffers a loss due to his negligence in performance;

Section-26: The license holder must comply with the following-

(a) Electricity exploration must be done in accordance with the law;

(b) In electric power generation, transmission and distribution-

(1) Electrical power must be generated as specified in the license;

(2) Instruments for measuring electric power and protective equipment must be systematically used and maintained in accordance with the stipulations.

Section-27: The license holder and the authorized person must inform the chief inspector and the relevant department in charge immediately if an electrical hazard has accidentally occurred when generating, transmitting, distributing or consuming electric power.

Section-40: The license holders comply with the rules, norms and procedures issued by the ministry and must accept necessary inspections by the relevant government departments and organizations.

Section-68: If the negligence or irresponsibility of the license holder or of persons assigned by him has caused injury, disability or death by electrocution or fire, the aggrieved person has the right to request compensation from the license holder as follows-

(a) If the aggrieved person is entitled to compensation according to the existing labour compensation law, the compensation specified in this law;

(b) If the aggrieved person is not entitled to compensation according to the existing labour compensation law, the compensation specified in the rules, issued under this law

20. Myanmar Engineering Council Law, 2013

Section-34: If, whoever has received a registration certificate, is found to have breached any rules contained in the registration certificate or violated any prohibition contained in a rule, order or directive enacted under this law or in any stipulation of the law, the executive committee may take the following administrative actions:

(a) Giving a warning;

(b) Assessing a suitable fine;

(c) Suspending the registration certificate,

(d) Cancelling the registration certificate.

Section-37: No one shall perform any engineering work and technological work which are specified as being dangerous to the public by a rule enacted under this law without having received a registration certificate issued by the Council, except engineers appointed in a government department or an organization in the performance of their duties.

21. Myanmar Private Industrial Enterprise Law, 1990

Section-4: (a) Any person desirous of conducting any private industrial enterprise;

(b) Any person conducting any private industrial enterprise on the day this Law is enacted; by using any type of power which is three horsepower and above or manpower of ten wage-earning workers and above shall register under this Law.

Section-13: The duties of the entrepreneur are as follows:-

(a) Shall pay the registration fees, fees for the renewal of registration and other payable duties and taxes prescribed by the Directorate;

(b) Shall abide by the terms and conditions of the registration certificate;

(c) Shall conduct the enterprise by opening an account with the relevant bank in the name of its registered enterprise;

(f) Shall shift the place of enterprise, change the nature of enterprise, amalgamate enterprises and split up enterprises only with the approval of the Directorate;

(g) Shall abide by the orders and directives issued from time to time by the Ministry and the Directorate;

(h) Shall also abide by the existing laws.

Section-15: The entrepreneur has the right to carry out the followings:-

(a) appointing foreign experts and technicians with the approval of the Ministry;

(b) carrying out change of the name of enterprise, transfer of ownership, temporary suspension or permanent closing down of the enterprise in the manner prescribed and with the approval of the Directorate.

Section-16: The Director General shall, in order that entrepreneurs may, have the right to enjoy, submit to the Private Industrial Enterprise Co-ordination Body and carry out in respect of the following matters:-

(a) land, water, power, communication and transport et cetera required for use in his enterprise;

(b) exemptions and reliefs from taxes;

(c) loans for fixed capital and working capital;

(d) raw materials, machinery and spare parts required locally and from abroad for his enterprise;

(e) local and foreign technical know-how for enhanced production of goods and for improvement in the quality of finished goods;

(f) to acquire local and foreign markets;

(g) to acquire industrial areas and leased land for industrial enterprises.

Section-26: No one shall conduct a private industrial enterprise contained in section ~ without obtaining registration under this Law.

Section-27: An entrepreneur:

(a) In distributing and selling the goods he has produced shall not sell without a trade mark;

(b) Shall not violate any provision of section 13;

(c) Shall not fail to comply with any order or decision passed by the Minister and the Director General.

Section-28: Whoever violates the provision of section 26 shall, on conviction:-

(a) in the case of conducting a small scale private industrial enterprise, he punished with fine which may extend from a minimum of kyats 5,000 to a maximum of kyats 10,000;

(h) in the case of conducting a medium scale private industrial enterprise, he punished with fine which may extend from a minimum of kyats 10,000 to a maximum of kyats 20,000:

(c) in the case of conducting a large scale private industrial enterprise be punished with fine which may extend from a minimum of kyats 20,00() to a maximum of kyats 50,000.

Section-29: If a person who is convicted of an offence under Section 28 continues in the commission of such offence, he shall be punished with fine at the following rate for each day of the extent of the period of continuance thereof: -

(a) in the case of a small scale private industrial enterprise, at the rate of kyats 100:

(h) in the case of a medium scale private industrial enterprise, at the rate of kyats 150:

(c) in the case of a large scale private industrial enterprise, at the rate -. of kyats 200.

22. Employment and Skill Development Law, 2013

Section-5: (a) (1) If the employer has appointed the employee to work for an employment, the employment agreement shall be made within 30 days. But it shall not be related with government department and organization for a permanent employment.

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

(b) The following particulars shall be included in the employment agreement:

(1) The type of employment;

(2) The probation period;

(3) Wage, salary;

(4) Location of the employment;

(5) The term of the agreement;

(6) Working hour;

(7) Day off, holiday and leave;

(8) Overtime;

(9) Meal arrangement during the work hour;

(10) Accommodation;

(11) Medical treatment;

(12) Ferry arrangement to worksite and travelling;

(13) Regulations to be followed by the employees;

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

(15) Resigning and termination of service;

(16) Termination of agreement;

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

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

(19) Other matters;

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

(21) Miscellaneous.

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

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

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

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

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

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

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

Section-20: The duties of the Registered Training Centre are as follows:-

(a) Documenting the training program matters described below and submitting the same to the Skills Development Agency for approval:-

(1) Occupational Competency Standards

(2) Curriculum

(3) Location of the Training Centre, buildings and facilities.

(4) Names of the Instructors and their qualifications

(5) Duration of the training course

(6) Training Methodology and Training Aids

(7) Certificates to be awarded

(8) Training Fee

(9) Other matters prescribed by the Occupational Competency Standards and Training Committee

(b) Making Training Contract with the trainee

(c) Maintaining the personal data of the trainees

(d) Within 15 days of completion of the training program, submitting a report of the training program to the Skills Development Agency.

(e) If the Training Centre is to be handed over to another person who wants toestablish a training centre, to inform the Skills Development Agency at least 30 days in advance prior to such transfer.

(f) If it is desirous to terminate the training centre, to transfer the trainees together with the remaining training costs to another centre offering the same training course.

Section-30: (a) The employers of Industrial and Service Enterprises shall pay contribution to the fund every month without fail amounting to not less than below 0.5% of the payroll of his workers up to the level of supervisors of the workers.

Section-30: (b) The employer shall not deduct the contribution paid under sub- section (a) to the fund from the wages of the workers.

23. The Ethnic Rights Protection Law, 2015

Section-5: Indigenous people (ta-ne tain-yin-tha) should receive complete and precise information about extractive industry project and other business a activities in their area before project implementation so that negotiation between groups and the Government/companies can take place.

Section-5: The matters of the project shall completely be informed, coordinated and performed with the relevant local ethnic groups in the case of development works, major projects, business and extraction of natural resources will be implemented within the area of ethnic groups.

24. Myanmar Insurance Law, 1993

Section-15: Owner of motor vehicles shall effect life insurance for a minor

Section-16: An entrepreneur or organization operating an enterprise which may cause loss to state-owned property or which may cause damage to the life and property of the public or which may cause pollution to the environment shall effect compulsory General Liability Insurance with the Myanmar Insurance.

25. Social Security Law, 2012

Section-11:(a) The following establishments shall be applied with the provisions for compulsory registration for social security system and benefits contained in this Law if they employ minimum number of workers and above determined by the Ministry of Labour in co-ordination with the Social Security Board:

(i) industries which carry out business whether or not they utilize mechanical power or a certain kind of power, businesses of manufacturing, repairing and servicing, or engineering businesses, factories, warehouse- es and establishments;

(ii) Government departments, Government organizations and regional administrative organizations which carry out business;

(iii) development organizations;

(iv) financial organizations;

(v) companies, associations, organizations, and their subordinate departments and branch carry out business;

(vi) shops, commercial establishments, public entertaining establishments;

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

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

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

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

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

(xii) ports and out-ports contained in any existing law;

(xiii) businesses and organizations carried out with freight handling workers;

(xiv) Ministry of Labour and its subordinate departments and organizations;

(xv) establishments determined by the Ministry of Labour, from time to time, that they shall be applied with the provisions of compulsory registration for Social Security System and benefits contained in this Law in coordination with the Social Security Board and with the approval of the Union Government.

Section-11: (b) The project owner will register to the respective social security office.

Section-15: (a) The project owner will pay the social security fund for four types of social security

Section-18: (b) The project owner will pay the fund which has to be paid by him together with the funds which have to be paid from the salaries of the employees.

Section-48: (b) The employers may affect insurance by registering voluntarily for the workers who are not applied to provisions of compulsory registration for employment injury benefit insurance system and by paying stipulated contribution to employment injury benefit insurance fund.

Section-49:

(a) The employers and insured of establishments where the employer had registered compulsorily under sub-section (a) of section 48 or where the employer had registered voluntarily under sub-section (b) of section 48 who have paid contribution to employm- ent injury benefit fund shall not apply to the provisions contained in the Workmen's Compensa- tion Act in respect of the employment injury benefit.

(b) The insured that has affected insurance for employment injury benefit under sub-sections (a) and (b) of section 48 shall only be entitled to employment injury benefits contained in this Law.

Section-75: The project owner will submit the lists and records, provided in article 75, to related social security office.

26. Labour Organization Law, 2011

Section-17: The labour organization 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 organization has the right to negotiate and settle with the employer if the workers are unable to obtain and enjoy the right of the workers contained in the labour laws and to submit demands to the employer claim in accord with the relevant law if the agreement cannot be reached.

Section-18: The labour organizations have the right to demand the relevant employer to re-appoint a worker if such worker is dismissed by the employer and if there is cause to believe that the reason of such dismissal were based on labour organization membership or activities, or were not in conformity with the labour law.

Section-19: The labour organizations have the right to send representation to the Conciliation Body in settling the dispute between the employer and the worker. Similarly, they have the right send representatives to the Conciliation Tribunal formed with the representatives from the various levels of labour organization.

Section-20: In discussing with the Government the employer and the complaining workers in respect of workers' right or interests contained in the labour laws, the representative 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 meetings, going on strike and carrying out other collective activities in accord with the procedure, regulations, by-law and any directives prescribed by the relevant labour Federation ship.

27. Workmen's Compensation Act, 1923

It was/is an Act to provide for the payment by certain classes of employers to their workmen of compensation for injury by accidents.

This law was amended in 2005 by chairman of the State Peace and Development Council. Since the rate in kyats for compensation during the 1920s are no longer applicable (workable) the rate for compensation are increased. The rate shall be according to the Notification by the existing Ministry of Labour. E.g. fine which may extend to "Ks 100" is substituted by "Ks 10,000".

Section-13: Compensation shall be paid in line with the provision of the said law.

28. Leaves and Holiday Act, 1951

The law contains 18 sections and the purpose is for regulating the taking of leaves and holidays, covering the hours of work, weekly rest and paid leave. Three types of leaves, namely Earned leave, casual leave and leave on Medical Certificate are stipulated. The holidays during that period (the 19505) include: Independence Day, Fullmoon of Tabaung, Thingyan, Burmese New Year, May Day, Full Moon of Kason, Resistance Day, beginning of Buddhist Lent, Martyrs' Day, End of Buddhist Lent, Full Moon of Tansaungmone, and National Day. One Islam Holiday and Hindu Holiday are official but are not written in the Act, but are notified in short advance.

29. The Settlement of Labour Dispute Law, 2012

Section-38: No employer shall fail to negotiate and coordinate in respect of the complaint with the prescribed period without sufficient cause

Section-39: No employer shall alter the condition of service relating to workers concerned in such dispute at the consecutive period before commencing the dispute within the period under the investigation of the dispute before the Arbitration Body or Tribunal, to affect the interest of such workers immediately.

Section-40: No party shall proceed to lock-out or strike without accepting negotiation, conciliation and arbitration by Arbitration Body in accord with this law in respect of a dispute.

Section-51: It an employer in the course of settlement of dispute commits any action omission without sufficient case, which by causing reduction in production resulting so as to

reduce the workers' benefits shall be liable to pay full compensation in the amount determined by the Arbitration Body or Tribunal. Such money shall be recovered as the arrear of land revenue.

30. Consumer Protection Law, 2019

Objectives:

Section-3 (a): To fully protect the rights of consumers

Section-3 (b): To conduct comprehensive education campaign regarding consumer protection

Section-3 (c): To provide true information regarding consumer protection

Section-3 (d): To guarantee for safety, health and satisfaction for consumers and to provide quality products and services for consumers

Section-3 (e): To ensure that goods producers and services providers comply with the law

Section 69-73: anyone who is non-compliance with the prohibitions stipulated in Sections 62, 63, 64, 65, 66, 67, 68 shall be punished, on conviction, with imprisonment for terms (ranging from not exceeding 6 months to not exceeding 2 Years) or with fines (ranging from not exceeding Ks. 20 lakhs to fines not exceeding Ks. 200 lakhs) or with both.

31. Payment and Wages Law, 2016

Section-3: The employer:

(a) shall pay wages to the workers employing in his business in local currency or foreign currencies stipulated by the Central Bank of Myanmar. Such payment may be paid in cash or cheque or deposit into the bank account of the worker with the agreement between the employer and the worker.

(b) In paying such wages:

(i) if it is necessary to pay particular benefit, profits and opportunities for workers working in commerce, production and service businesses, it may be paid in cash or some in cash and some in things set up by local price on own volition of workers in accordance with the stipulations.

(ii) For workers employing in agriculture and livestock breeding business, it rnay be paid some wage in cash and something set up by local price according to custom, or on the volition of majority of worker or by collective agreement. In paying so, it shall be for personal use and the interest of his family, and shall be appropriate and equitable.

(c) If any worker is conscripted under the Public Military Service Law, the (60) days of wages shall be paid as a special right.

Section-4: The employer:

(a) shall pay wages at the end of the work or at the time agreed to pay to the worker for hourly, daily, weekly or other part time work, or temporary or piece work;

(b) shall not exceed one month than the period agreed with the worker under sub-section (a) to pay wages;

(c) shall pay the wages for the permanent work monthly. In making such payment:

(i) if workers are not more than 100, wages shall be paid at the end of the period for payment of wage;

(ii) If workers are more than 100, it shall be paid no later than five days after the end of the period for payment of wage;

(d) shall pay the due wages within two working days from the date of termination, if a worker is terminated;

(e) shall pay the wages at the end of the period for payment of wages, if a worker resigns on his own volition by sending prior written notice of resignation;

(f) shall pay the due wages to a legal heir within two working days after the decease, if a worker is deceased;

(g) shall pay all wages on a working day.

Section-5: employer encounters difficulties to make payment under sub-section (c) of the Section 4 due to any unexpected condition, including natural disaster; the employer shall submit that which date has been altered for the payment of wages with the consent of the workers to the Department on reasonable ground.

Section-6: The Department may, with the approval of the Ministry, allow the employers to postpone payment within the appropriate time under stipulated conditions, if it is scrutinized that the submission under Section5should be allowed.

Section-7: The employer:

(a) may deduct from wages, except leaves which are entitled wages under the relevant law and public holidays, for the absent period from work;

(b) may deduct expenses which are allowance for accommodation and ferry service arranged by the employer, meal allowance, electricity charges, water service charges and income taxes liable to paid by workers and cash paid in excess under a mistake, which are not included in the expression of wages under this Law;

(c) may deduct advance payment or reimburse or saving for the worker or any contribution under any law demanded by a worker from wages.

(d) may deduct from the wages of the worker under a decision of a Court or Arbitration Council or Arbitration Body.

Section-8: The employer shall not deduct from the wages of the worker except deduction from wages in accordance with provisions of Section 7 and Section 11.

Section-9: In deducting from wages under Section 7, all deductions made by the employer shall not exceed 50 percent of the wages of a worker except deduction from wages for the failure of a worker to perform his duty.

Section-10: The employer:

(a) shall obtain prior approval of the Department for what deduction can be made from wage and how much can be deducted before deducting anything stipulated as a fine under section 11.

(b) shall post the approval contained in sub-section (a) in conspicuous places at relevant factory and work;

(c) shall not exceed fine deducted for compensation than the value of damage or loss by action or omission of a worker;

(d) in deducting from wages under Section 11:

(i) shall not deduct from wages without giving right to defence of the worker;

(ii) shal1 not deduct more than 5 percent of the monthly wages of the worker.

(e) shall not absolutely deduct as the fine from a worker under 16 years of age;

(f) may caffy out the date of payment of passing fine in accordance with the agreement between the employer and the worker;

(g) shall deduct from wages for compensation due to loss of property within a limited period by an agreement of the relevant Township Conciliation Body;

(h) shall enter the deducting cash from wages into the register and systematically maintain it;

(i) shall submit a report of the deduction from wages to the Department;

(j) sha1l use fines of deduction from wages under sub-section (b) of Section 11 for the worker benefit in coordination with legally registered Labour aryanization in the factory.

Section-11: The employer may designate as fine to compensate for the following acts and omissions of a worker and deduct from his wages:

(a) any loss of property and cash expressly entrusted to the worker by the employer due to intentional negligence and carelessness or dishonest acts or omissions of the worker, which is caused directly by the carelessness and mistake of such worker;

(b) violation of any terms or conditions stipulated as fines in the employment agreement.

Section-12: The worker:

(a) may request to the employer to be settled by himself or legally registered labour organization or the Workplace Coordination Committee in the factory if the following conditions occur;

(i) deduction from wages obtainable without credible reason;

(ii) failure to pay overdue payment of wages.

(b) may submit to the inspector to solve the problem, if the employer fails to solve the problem asked under sub-section (a), within six months from the date of deduction or failure to pay.

Section-13: (a)The inspector rnay scrutinize such submission under sub-section (b) of the Section 12 and, if necessary, interrogate the relevant persons and make an appropriate order.

Section-13: (b) The worker or employer may file an appeal to the chief inspector, if he does not satisfy the order made under sub-Section (a), within 30 days from the date of such order.

Section-13: (c) The chief inspector may make an appropriate order after scrutinizing the appeal under sub-section (b) and hearing the employer and the worker.

Section-13: (d) The order of the Chief Inspector is final.

Section-14: If a worker has worked overtime he has the right to be paid according to the rate of payment designated.

Section-22: No employer shall not violate sections 4, 5, 8, 9 and 11 regarding payment and term and rate of payment.

Section-23: No employer shall violate the rules, decrees and prohibition regarding payment to its employees.

Chapter-8 deals with penalties for violation of the law. The penalties range from:

- Imprisonment of no more than 3 months and fine not more than Ks 500,000.
- Imprisonment of no more than 3 months and fine at least Ks 2,000,000.
- Imprisonment of up to 6 months and fine at least Ks 5,000,000.

32. Minimum Wages Law, 2013

Section-12: The employer:

(a) Shall not pay wage to the worker less than the minimum wage stipulated under this Law;

(b) May pay more than the minimum wage stipulated under this Law;

(c) Shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law;

(d) Shall pay the minimum wage to the workers working in the commercial, production and service business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker;

(e) In paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. Such payment shall be for any personal use and benefit of the worker and his family and the value shall also be considerable and fair.

Section-13: The employer:

(a) Shall inform the workers the rates of minimum wage relating to the business among the rates of minimum wage stipulated under this Law and advertise it at the workplace to enable to be seen by the relevant workers;

(b) Shall prepare and maintain the lists, schedules, documents and wages of the workers correctly;

(c) Shall report the lists, schedules and documents prepared and maintained under sub-Section (b) to the relevant department in accord with the stipulations;

(d) Shall accept the inspection when summoned by the inspection officer. Moreover, he shall produce the said lists and documents upon asking to submit;

(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;

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

(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.

Section-18: The inspection officer:

(a) Has the right to enter and inspect the relevant commercial, production and service workplaces, 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;

(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.

(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;

(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 card issued by the relevant department;

(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.

33. The Control of Smoking and Consumption of Tobacco Product Law, 2016

Section-9: The person in charge at the factory shall:-

(a) Keep the caption and mark referring that it is a non-smoking area the place mentioned.

Section-6: In accordance with stipulation.

(b) Arrange the specific place where smoking is allowed as mentioned in section-7 and keep the caption and mark also referring that it is a specific place where smoking is allowed, in accordance with the stipulation

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

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

34. Public Health Law, 1972

Section-3: The company shall cooperate with the authorized person or organization in line with the law and shall abide by any instruction or stipulation for public health.

Section-5: The company shall accept any inspection anytime and anywhere if it is needed.

35. Occupational Health and Safety Law, 2018

Section-12: The Employer shall, in accordance with the stipulations of the Ministry:

(a) appoint the Person In-charge for Occupational Safety and Health to closely supervise safety and health of Workers in line with the type of Industry/Business; and

(b) form the respective Occupational Safety and Health Committee in line with the type of Industry/Business comprising equal number of Employer and Worker representatives to become safe and healthy Workplace on condition that the number of Workers in his/her Industry/Business exceeds the number determined by the Ministry for that purpose. The Occupational Safety and Health of female Workers shall be considered according to the nature of Industry/Business whten forming such Occupational Safety and Health Committee.

Section-14: Persons In-charge for Occupational Safety and Health shall comply with this Law and rules, orders, directives and procedures made under this Law to make the Workplace to be a safe Workplace that is good for health.

Section-16: Inspection Officers shall enter the Workplaces to which this Law applies and inspect Occupational Safety and Health conditions and direct Employers for their compliance and report the findings to the Chief Inspection Officer.

Section-17: Inspection Officers have the powers to perform the following for Occupational Safety and Health in accordance with their codes of conduct:-

(a) the power to enter, inspect and inquire at any Workplaces related to this Law at any time by showing the Inspection Officer's identity without warrant;

(b) the power to look at, make copies of and seize as evidence as required documents and records in connection with Workplaces and Processes;

(c) the power to take photos and record videos in connection with Workplaces and Processes that may be harmful to Occupational Safety and Health;

(d) the power to assess and measure and take records of the extent of impairment and duration caused to the environment of the Workplace due to loudness, light, heat, coldness, particles, gas and Hazardous Materials, and obtain the assistance of the expert in the relevant field of study if required;

(e) the power to inquire of any person in the Workplace during working hours with the assistance of the Recognised Doctor to check any conditions that put or are likely to put Workers in contact with Occupational Disease; and

(f) the power to require responsible persons at clinics or hospitals to deliver, with the
stipulated security grade, medical treatment records of the Worker who is under treatment or information relating to death due to Occupational Accident or Occupational Disease, or autopsy results asked by the Department in the stipulated form.

Section-18: Inspection Officers shall, with the approval of the Chief Inspection Officer, order the Employer to temporarily close a whole or part of the Workplace, and notify the relevant Departments if required, if they believe that an Occupational Accident, Occupational Disease, Hazardous Eventor Major and Serious Occupational Accident occurs or is likely to occur because:

(a) it is not appropriate to continue doing the Industry/Business due to dangerous Workplace condition, or unsafe operation carried by Workers, or existence of Hazardous Materials and Hazardous Machines, or layout and function of Workplace, part of the machine or equipment;

(b) it is not appropriate to continue doing the Industry/Business due to breach or incompliance with any of the provisions of this Law;

(c) it deems that Workers in the Workplace are in danger due to acts, omissions, negligence or carelessness; or

(d) it needs to evacuate Workers from hazards because an Occupational Accident or accident is about to occur.

Section-26: The Employer shall be responsible to: -

(a) arrange as required to assess the risks of Workplace, Process and machines and materials used thereat;

(b) arrange as required to assess the likelihood of occurrence of hazards at the Workplace and to the environment;

(c) arrange to have Workers medical checked-up by the Recognized Doctor in accordance with stipulations whether they suffer from any Occupational Disease;

(d) arrange to improve the Workplace until it is safe and good for health based on the findings as per sub-sections (a), (b) and (c)

(e) provide Workers with sufficient number of personal protective clothing, materials and facilities prescribed and approved by the Department on free of charge basis and cause Workers to wear them while working;

(f) prescribe precautionary plans and plans for emergency;

(g) provide a clinic, appoint the Registered Doctors and nurses and provide medicines and supporting equipment for any Industry/Business where the number of Workers is not less than the number determined by the Ministry;

(h) make necessary arrangements for managers, Workers and members of the Occupational Safety and Health Committee including (Employer) himself/herself to attend Occupational Safety and Health training courses stipulated by the Ministry in accordance with their departments or types of work;

(i) make necessary arrangements to enable immediate reporting to the Person In-charge for Occupational Safety and Health or manager in case where a Worker suffers an Occupational Accident or his/her life or health is likely to be in danger;

(j) arrange to prevent any persons in the Workplace from Occupational Safety and Health risks occurred due to materials, machines or wastes used in the Workplace or Process;

(k) immediately stop the Process, evacuate Workers and conduct necessary rescue plans if any Occupational Accident is about to occur. If possible, Workers will be relocated to another appropriate safe Workplaces;

(l) display Occupational Safety and Health instructions, danger signs, notices, posters and signage for directions in accordance with stipulations;

(m) arrange to be complied with precautions when entering restricted hazardous Workplaces;

(n) arrange to disseminate Occupational Safety and Health manuals and guidelines issued by the relevant Ministries for knowledge, technology, information and skills not only to Workers but also to related persons or raise their awareness or knowledge thereof;

(o) lay down the fire safety plan, perform fire drilling and train Workers to use fire extinguishers systematically;

(p) allow the Chief Inspection Officer and Inspection Officers to enter Workplaces, inquire, request documents and information or seize exhibits;

(q) cause Workers to work only for the specified working hours if they have to work in Hazardous Industry/Business and Workplace; and

(r) Incur the expenses for Occupational Safety and Health matters.

Section-27: No Employer shall dismiss or demote a Worker: -

(a) during any period before a medical certificate is issued by the Registered Doctor for occupational injury or by the Recognized Doctor for contact with Occupational Disease;

(b) because the said Worker has addressed a complaint for hazardous or health detrimental condition;

(c) because the said Worker has conducted the responsibilities of Occupational Safety and Health Committee; or

(d) because the said Worker has refused to work in any condition where an Occupational Accident or Occupational Disease is about to occur.

Section-34: The Employer is responsible to undertake the following in accordance with the stipulations: -

(a) informing the Department in case of an Occupational Accident, Hazardous Event or Major and Serious Occupational Accident;

(b) if a Worker is in contact with a stipulated Occupational Disease or contaminated or likely to be contaminated due to materials or Process used, sending a report to the Department together with a medical report prepared by the Recognized Doctor.

Section-36:

(a) Inspection Officers must perform inspection as required if any Occupational Accident, Hazardous Event, Occupational Disease or Occupational Contamination breaks out.

(b) No one shall, without consent of the Chief Inspection Officer, remove, conceal, add or change a whole or part of the materials, machines, equipment, layout, documents or signs relating to the occurrence of an Occupational Accident, Hazardous Event,Occupational Disease or Occupational Contamination.

36. Prevention and Control of Communicable Diseases Law, 1995

Section-3: In order to prevent the outbreak of Communicable Diseases the Department of Health shall implement the following project activities.

(a) Immunization of children by injection or orally.

(b) immunization of those who have attained majority, by injection or orally, when necessary;

(c) carrying out health educative activities relating to Communicable Disease.

Section-4: When a principal epidemic disease of a notificable disease occurs:-

(a) Immunization and other necessary measures shall be undertaken by the Department of Health, in order to control the spread thereof

(b) The public shall abide by the measures undertaken by the Department of Health under sub-section (a)

Section-9: The head of the household or any member of the household shall report immediately to the nearest health department or hospital when any of the following events occur:-

(a) Rat fall

(b) Outbreak of a principal epidemic disease

(c) Outbreak of a noticeable disease

Section-11: In order to prevent and control the spread of a principal disease the health officer may undertake the following measures:-

(a) Investigation of a patient or any other person required

(b) Medical examination

(c) Causing laboratory examination of stool, urine, sputum and blood sample to be carried out

(d) Causing investigation by injection to be carried out

(e) Carrying out any other investigation.

37. Myanmar Export Import Law, 2012

Section-6: Without obtaining license, no person shall export or import the specific goods which is to obtain permission

Section-7: A person who obtain any license shall not violet the conditions contained in the license.

38. The Highway Law, 2000

Section-7: Whoever without the permission of the Public Works commits any of the following acts shall, on conviction, be punished with imprisonment for a term which may extend to 3 years or with fine or with both:-

(b) constructing the building within the boundary of the highway

Section-8: Whoever commits any of the following acts shall, on conviction, be punished with imprisonment for a term which may extend to months or with fine or with both:-

(c) planting, cutting or destroying tree or crops within the boundary of the highway without permission of Public Works

Section-9: Whoever commits any of the following acts shall, on conviction, be punished with imprisonment for a term which may extend to 3 months or with fine or with both:-

(d) setting up the signboard of advertisement within the boundary of high ways without permission of Public Works

39. Trademark Law, 2019

Chapter (XII):

Section-37: If the owner of a mark complies with the provisions in Chapter XI, he shall enjoy the registered mark-related rights stipulated in this chapter for the term of the registration.

Section-38: The right holder shall, without prejudice to the provisions in sections 39 and 40,:

(a) Enjoy the following as an exclusive right:

(1) a right to prevent, in accordance with this law, the use by any other person, without his consent in the course of trade, of an identical or similar mark for identical or similar goods or services if such use misleads the public.

(2) the right to pursue criminal action, civil action or both against those who infringe on the rights relating to a registered mark.

(3) under the following conditions, a right to prevent the use of a mark identical or similar to a registered, well-known mark for different goods or services, without the consent of owner of the mark, in the course of trade:

(aa) if it indicates that there is a connection with the owner of a registered well-known mark and the goods or services for which said mark is used;

(bb) if it is harmful to the interests of such registered mark owner.

(b) The rights of a registered mark may be transferred or licensed, in accordance with the provisions in chapters XIII and XIV, to any other person.

Chapter (XXIII):

Section-87: (a) Whoever is found guilty of any of the following offences for commercial purposes without the consent of the right holder shall be punished with a prison sentence of no more than three years, a fine not exceeding five million (5,000,000) kyats, or both:

(1) counterfeiting a mark;

(2) using a counterfeit mark for goods or in relation with services;

(3) keeping any object or equipment mainly used to make a counterfeit mark or mainly used to use a counterfeit mark in goods.

Section-87: (b) Whoever is found guilty of any of the following offences shall be punished with a prison sentence of no more than two years, a fine not exceeding five million (5,000,000) kyats, or both:

(1) trading in and distributing goods using counterfeit marks or keeping such goods in possession for the purpose of trading and distribution;

(2) importing goods using counterfeit marks into Myanmar or exporting such goods from Myanmar.

40. Industrial Design Rights Law, 2019

Chapter (IV):

Section-17: An inventor of the industrial design, his legal heir, or his legal transferee may apply for the registration of said industrial design.

Section-18: If an industrial design is created by more than one person, said persons have the right to jointly apply for the registration of such industrial design.

Chapter (X):

Section-20: Any person, who is eligible, under this Law, to apply for the registration of an industrial design, shall apply for registration of said industrial design to the Registrar, in accordance with the stipulations, if he wishes to receive industrial design rights.

Chapter (XIV):

Section-42: The term of registration for a registered industrial design is five years from the date of submission of the application. The term of registration may be renewed for up to two times in increments of five years.

Chapter (XV):

Section-45: If the owner of the industrial design complies with the provisions in Chapter XIV, he may enjoy the registered industrial design rights under this chapter during the term of registration.

Section-46: Without prejudice to the provisions of sections 49 and 50, the owner of the industrial design:

(a) As an exclusive right:

(1) to prevent another person from producing, selling or importing products, for commercial purposes without his consent, which are made from or include reproductions of an industrial design that has been registered according to this

Law or an industrial design which reproduces the main parts of a registered industrial design under this Law;

(2) the right to pursue civil action against those who infringe upon the rights of registered industrial designs.

(b) may transfer or grant license of the rights of the registered industrial design to any other person in accordance with the provisions of chapters 16 and 17.

Chapter (XXIII):

Section-75: Whoever commits any of the following acts shall be punished with an imprisonment term of not more than one year, a fine not exceeding 2,000,000 kyats, or both, upon conviction:

(a) issuing a false industrial design registration certificate or ordering a false industrial design registration certificate to be issued;

(b) making a false entry without good faith or ordering a false entry to be made in the registration records;

(c) disclosing the industrial design, which should be kept confidential during a certain period of time when said design must be kept confidential, to an unrelated party;

(d) providing the documents related to the application for the registration of an industrial design to an unrelated Party, disclosing to the public, or allowing the use of such documents, during the stipulated period before the announcement.

41. Patent Law, 2019

Chapter (14):

Section-51: A patentee, who complies with the provisions contained in chapter 13, is entitled to the patent rights contained in this chapter during the term of the patent.

Section-52: Without prejudice to the provisions contained in section 54, the patentee:

(a) as an exclusive right:

(1) Shall be entitled to prevent or prohibit, in accordance with this Law, another person from manufacturing, using, offering for sale, selling or importing his patented product without his approval.

(2) Shall be entitled to prevent or prohibit, in accordance with this Law, another person from using his patented production process or carrying out the acts contained in item (1) of subsection (a) for a product which is manufactured using said production process without his approval.

(b) Shall be entitled to pursue civil action against those who infringe upon patent rights.

(c) May transfer his patent rights or grant licenses to any other person, in accordance with the provisions contained in Chapters 15 and 16.

Chapter (24):

Section-105: Any person convicted of any of the following activities shall be penalized with imprisonment of no more than one year, a fine of not more than two million kyats, or both:

(a) Issuing or causing to issue a false patent certificate or a minor invention patent certificate;

(b) Making or causing to make a false entry in the registration records without good faith.

42. Law on Standardization, 2014

Chapter (VI):

Section-17: A person desirous of obtaining certificate of certification shall apply to the department and organization which has obtained the accreditation.

Chapter (VII):

Taking Action by Committee

Section-19: 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 orders:

(a) warning;

(b) suspending the certificate of certification for limited period;

(c) cancelling the certificate of certification

Section-26: If any person who obtained certificate of certification uses standardization mark on the product which is not in conformity with the relevant standard or relating to service shall be punished with imprisonment for a term not exceeding one year or with fine not more than one million Kyats or with both.

43. Tax Management Law, 2019

Section-40:

(a) Everybody who has the duty to pay tax must pay the tax within the period as stipulated by tax law.

(b) Must pay the tax in accordance with the place and method as designated by the Director General.

Section65: Anybody who violates the followings will be fined at a rate of 10% of the tax to be paid.

(a) fail to register in accordance with the tax law

(b) fail to report to the Director General regarding the changes in inforemation and data on tax payment as stipulated in Section-9, Sub-section (f) and (g).

Section-77: Anybody who evade tax in any manner, if convicted will be punished with imprisonment of not more than 7 years or fined with Ks 25,000 or cash equivalent to 100% of tax evasion period, whichever is more, or both.

44. Union Tax Law, 2019

Section-19: (d) Enterprises, companies, and Cooperatives that are operating according to approval by Natural Economic Organization and Myanmar Investment Commission, have to pay the taxes in accordance with the type and rate as stipulated in the law.

45. Registration of Deeds Law, 2018

Section-20: The following persons may register the deeds at the Registration of Deeds office established according to Section-10 or Section-11.

(a) Persons having made the deed person having an interest in the decree or order issued by a court.

(b) The person according to Section-3 (h).

(c) The persons who have obtained the following powers of attorney given by a person according to Sub-section (a).

Section-71: Any person may look at, and obtain a copy of, the deeds and maps prescribed in Section-70 by paying the specified fees.

46. The Petroleum and Petroleum Products Law, 2017

Article -9: The Ministry of Transport and communications shall carry out the following functions relating to any petroleum and petroleum products.

(a) Issuing license to vehicles, vessels and barges that carry any petroleum and petroleum product.

(c) Determine and supervision on ports for vessels and barges that carry out import, export and transport by water in accordance with procedures

Article -10: The ministry shall:

(a) Issue licence for the right to store for the storage tanks and warehouses

(b) Issue transport permit for the vehicles, vessels and barges that shall carry any petroleum and petroleum product

(d) If it occurs environmental impact, in carrying out petroleum and petroleum product business activities, taking action, as necessary in accordance with the existing laws of on-site inspection.

(e) Determine in coordination with ministries concerned, procedures and conditions relating to standard and quality of storage tanks and warehouse and tanks of vehicles, vessels and barges that carry any petroleum and petroleum product.

Article -11: On all receptacles containing any dangerous petroleum and petroleum product the warning sign of danger by stamping, embossing, painting, printing or any other means shall be expressed. If it is impossible to express as such, similar warning signs of the nature of danger of gasoline, spirit or petroleum shall be expressed in writing at the ostensible place in salient words or signs near the receptacle.

Article -31: Any license:

(a) Shall not violet any prohibition contained in the rules, regulations, bye-laws, notifications, orders, directives, procedure and conditions or fail the duty to implement

(c) Shall not import, transport, store, sell and distribute the dangerous petroleum and petroleum products or non-dangerous petroleum and petroleum product except by the means stipulated in the law

(d) Shall not have the right to carry out without under taking the environmental impacts, in operating petroleum and petroleum product business activities.

Ngwe Yi Pale' Sugar Co., Ltd will comply with the above- mentioned laws, rules, regulation, particulary, the relevant section/subsection excerpted and reproduced above.

U Sein Myo Aung

Executive Director

Ngwe Yi Pale' Sugar Co., Ltd

3.2.2 International conventions treaties and agreement (concerning environmental affairs)

Myanmar has either signed or ratified no less than thirty treaties, conventions and protocols concerning environment, it is learnt.

Some of the regional conventions or protocols signed or ratified by Myanmar are:

(i) ASEAN Agreement on Conservation of Nature and Natural Resources. Kuala Lumpur, 1985

(ii) Agreement on Aquatic Centre in Asia and Pacific Bangkok, 1988

(iii) ASEAN Agreement on Tran-boundary Haze Pollution, 2002

(iv) Establishment of ASEAN Regional Centre for Biodiversity, 2005

Some of the international conventions and protocol which are of importance are:

(i) Convention on Wetlands of internationally importance, RAMSAR 1971 and amended, 1987

(ii) Convention for the protection of World Culture and National Heritages. Paris, 1972.

(iii) Convention on International trade in Endangered Species of wild Fauna and Flora. Washington, 1973, and amended, Bonn, 1979.

(iv) Convention on conservation of migratory species of wild animals. Bern, 1983.

(v) Vienna convention for the protection of Ozone Layer. Vienna, 1985.

(vi) Convention on Biological Diversity. Rio-de-Janero, 1992

(vii) U N Frame work Convention on Climate Change, 1992.

(viii) Kyoto Protocol on the frame work convention on climate change. Kyoto, 1998

(ix) Protocol on Bio safety. Cartagena, 2000

(x) Convention on Persistent Organic Pollution (POP). Stockholm, 2004

Recently the country has participated in:

(xi) UN Climate Change Conference, COP (conference of the parties) 21, Paris, 2015

(xii) UN Climate change conference, COP 22, Marrakesh, 2016

The country will also participate in:

(xiii) International conference on climate change, 2017

(xiv) Second international conference on climate change, Colombo, 2018 and all UN Climate change yearly conference hold in the frame work of UN Framework Convention on Climate Change (UNFCCC).

3.2.3 National and international standards and guideline

I. National Environmental Quality Guideline by Environmental Conservation Department (ECD)

(a) Air emission

Ngwe Yi Pale' Sugar Co., Ltd will follow the general National Environmental Quality guideline values for air emission as prescribed by the Environmental Conservation Department (from Notification No.615/2015, December 2015, by ECD, then under the Ministry of Environmental Conservation and Forestry (MOECAF), now MONREC, Code No. 1.1.

Parameter	Averaging Period	Guideline Value μg/m^3
Nitrogen dioxide	1-year 1-hour	40 200
Ozone	8-hour daily maximum	100
Particulate matter PM_{10}[a]	1-year 24-hour	20 50
Particulate matter $PM_{2.5}$[b]	1-year 24-hour	10 25
Sulfur dioxide	24-hour 10-minute	20 500

[a] Particulate matter 10 micrometers or less in diameter

[b] Particulate matter 2.5 micrometers or less in diameter

(b) Effluent

Ngwe Yi Pale' Sugar Co., Ltd will follow the National Environmental Quality sugar manufacturing guideline values for effluent levels (Notification No.615/2015, December 2015, by ECD, MOECAF), Code No. 2.3.1.7

Effluent levels

Parameter	Unit	Guideline value
5 day biochemical oxygen demand	mg/l	50
Active ingredients/Antibiotics	To be determined on a case specific basis	
Biocides	mg/l	0.05
Chemical oxygen demand	mg/l	250
Oil and grease	mg/l	10
pH	S.U.[a]	6-9
Temperature increase	^oC	<3[b]
Total coliform bacteria	100 ml	400
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50

[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.

WHO drinking water standards

Parameter	Unit	Guideline Value
pH	S.U	6.5-8.5
Chloride	mg/l	250
Total Hardness as $CaCO_3$	mg/l	500
Total Iron	mg/l	0.3
Sulphate	mg/l	250
Temperature increase	^oC	<3
Turbidity	NTU	5
Manganese	mg/l	0.4
Total dissolved solids	mg/l	600
Copper	mg/l	2
Arsenic	mg/l	0.01
Cyanide	mg/l	0.07
Zinc	mg/l	3

(c) Noise level

The National Environmental Quality general guideline for noise (from Notification No.615/2015, December 2015, by MOECAF), code No.1.3.

Receptor	One Hour LAeq (dBA)[a]	
	Daytime 07:00 - 22:00 (10:00 - 22:00 for public holidays)	**Nighttime 22:00 - 07:00 (22:00 - 10:00 for public holidays)**
Residential, institutional, educational	55	45
Industrial, commercial	70	70

[a] Equivalent continuous sound level in decibels

(d) Odour

Guideline standard for odorant unit is between 5 and 10.

II. International standards and guideline

(a) For sugar manufacturing

1) Aspects of Occupational Health in the sugar cane industry. https://www.ncbi-nim-nih.gov>

2) CEFS (European committee for sugar manufactures). 2001. Guide to establishing BAT in sugar industry.

3) Hazards of sugar factory. https://rishumancon.com>tag>hazards

4) IFC. EHS guidelines for sugar manufacturing, April, 2007.

5) ILO Standard on occupational safety and health (OSH). ilo.org.global>standards

6) N.S.W. Sugar milling, waste minimization and energy efficiency. http://www.deh.gov.au/settlement/industry/nswsugar.htmi

7) Phosphoric Acid (H_3PO_4) dosing in sugar industry. www.sugarprocesstech.com>phosphoric

8) Production of milk of lime for sugar cane industry. https://www.researchgate.net>publication

9) Queen land Government. HS code for sugar industry. http://www.dir.gov.au/workplace/law/code/sugar

10) Sugar mill safety. http://www.worksafe.qd.gov.an>

11) Sugar production. www.carmeuse.agriculture.com>sugar

12) Sugar cane process waste. http://www.jstor.org>stable

13) Sulphitation in white sugar manufacture. https://archive.org>stream

14) To ward sustainable decommissioning. sitercourse.worldbante.org>resources

15) Decommissioning process guide. http://its.edu>--->archive

16) Decommissioning Phase procedure HUD. http://www.hud.gov

(b) For sugar factory structural integrity

1) Building and Engineering work. www.iso.org>iso>catalogue

2) ISO.91. Construction materials and building. https://www.iso.org>ics

3) Guidelines for structural engineering. https://www.bca.gov.sg>other>psi

4) IBC. International building code.

5) IFC Construction and infrastructure guideline. www.ifc.org>wps>wcm>connect

The above-mentioned standards and guidelines are intended for both developed and developing countries. Ngwe Yi Pale' Sugar Co., Ltd will do its best to follow these guidelines and standards as practical as possible.

3.3 Contractual and other commitments

Ngwe Yi Pale' Sugar Co., Ltd has contracted two construction companies, namely, Soe Tint Aung Industry (STI) company and Lin Zaw Aung company, for the construction of the propsed sugar factory.

Contracted agreement were signed between these two construction companies and Ngwe Yi Pale' company.

According to the agreement the construction will be completed within two years (at the end of 2020). But due to the unexpected situation (the outbreak of COVID 19 pandemic) it is expected that construction will be complete a little later than Dec, 2021.

Commitment made by the project proponent

(a) First of all the project proponent declares that the information in the report is, to the best of its knowledge, true, accurate and complete.

(b) The EIA report has been prepared in strict compliance with applicable laws, rules, regulations, guidelines and procedures.

(c) The project proponent will at all times comply fully with the commitments, mitigation measures, and plans in the EIA Report. (Re: EIA Procedure; Notification No.616/2015; Section 62, a-c)

Ngwe Yi Pale' Sugar Co., Ltd commits to create a healthy and safe working place and working condition. First priority will be given to the Occupational Health and Safety of the workers and the Environmental, Health and Safety of all workers and the community. Global Paper Holding Co., Ltd will strictly follow the National Environmental Quality (air emission and effluent) Guidelines prescribed by ECD.

The company pledges not to pollute the air, water and land environment as practical as possible throughout the entire life of the project from the Construction Phase through the Operation Phase to the Decommissioning and Rehabilitation Phase. The Company will monitor and adopt suitable measures for environmental protection. And the company will follow all at the mitigation measures to be taken and the EMP implemented as prescribed in this EIA report.

The company pledges to spend 2% of its net profit for the implementation of CSR. The company has already spent about Kyats 2,837,210,400 for CSR programme (**See ANNEX**). The company will continue to implement the CSR programme and also continue its donation and charity works for development.

The company commits 2% of it's not profit for the implementation of CSR programme. The Ngwe Yi Pale' Group of companies has already spent Ks 7,105,570,825 for CSR programme (even any profit is realized yet.) The company will continue to implement the CSR programme and also will continued its donations and charity works.

U Sein Myo Aung

Executive Director

Ngwe Yi Pale' Sugar Co., Ltd

Commitment made by the consultant firm, MESC

The consultant firm, Myanmar Environment Sustainable Conservation (MESC) declares that the information submitted in this EIA report is, to the best of its knowledge, true and accurate up to the date of submitting of this report.

The report has been prescribed by MESC with utmost effort with all reasonable skills, care and deligence within the term of contract with the client (Ngwe Yi Pale' Sugar Co., Ltd). Recommendations are based on the experiences of its members applying internationally accepted practices, using professional judgement and based on the available information.

Above all, the preparation of this report strictly followed the environmental regulation and guidelines set up, and particularly the format for EMP laid down, by the Environmental Conservation Department (ECD) of the Ministry of Natural Resources and Environmental Conservation (MONREC). (Environmental Impact Assessment Procedure. Notification Number.616/2015, 29-12-2015)

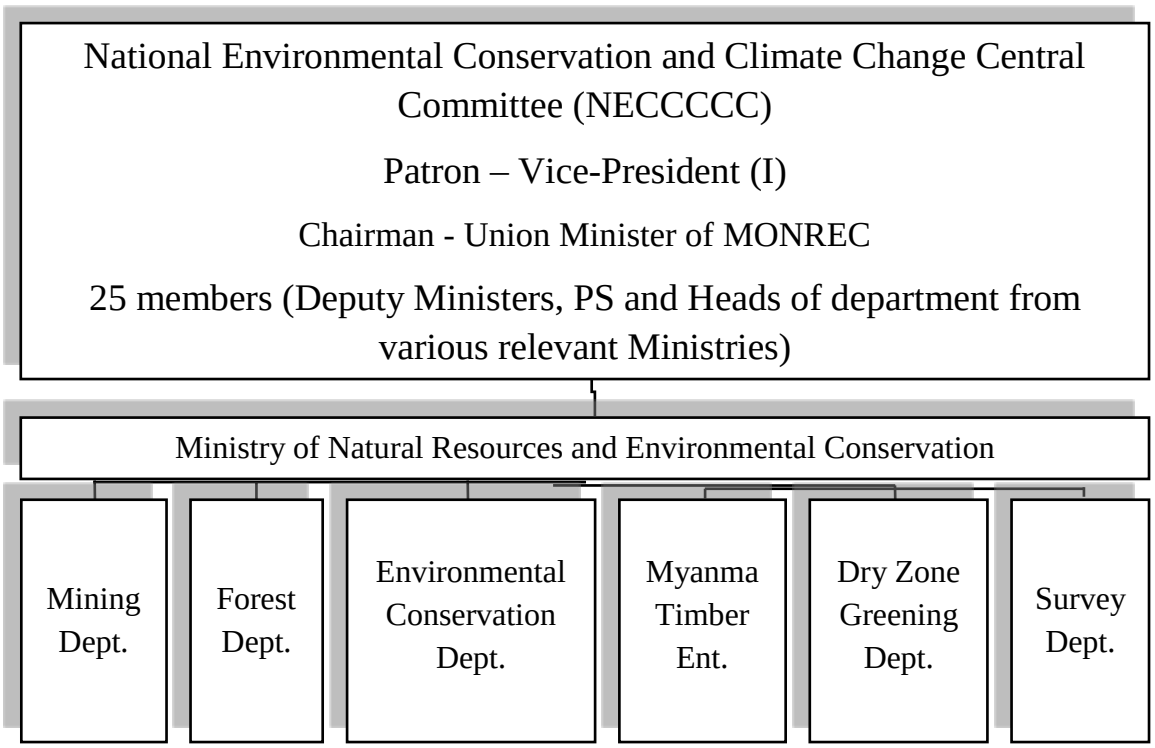
The report is strictly confidential between Ngwe Yi Pale' ' Company and the consultant firm, MESC, until it is submitted to the authorities concerned.

U Myint Kyaw Thura,
Managing Director
Myanmar Environment Sustainable Conservation
(MESC)

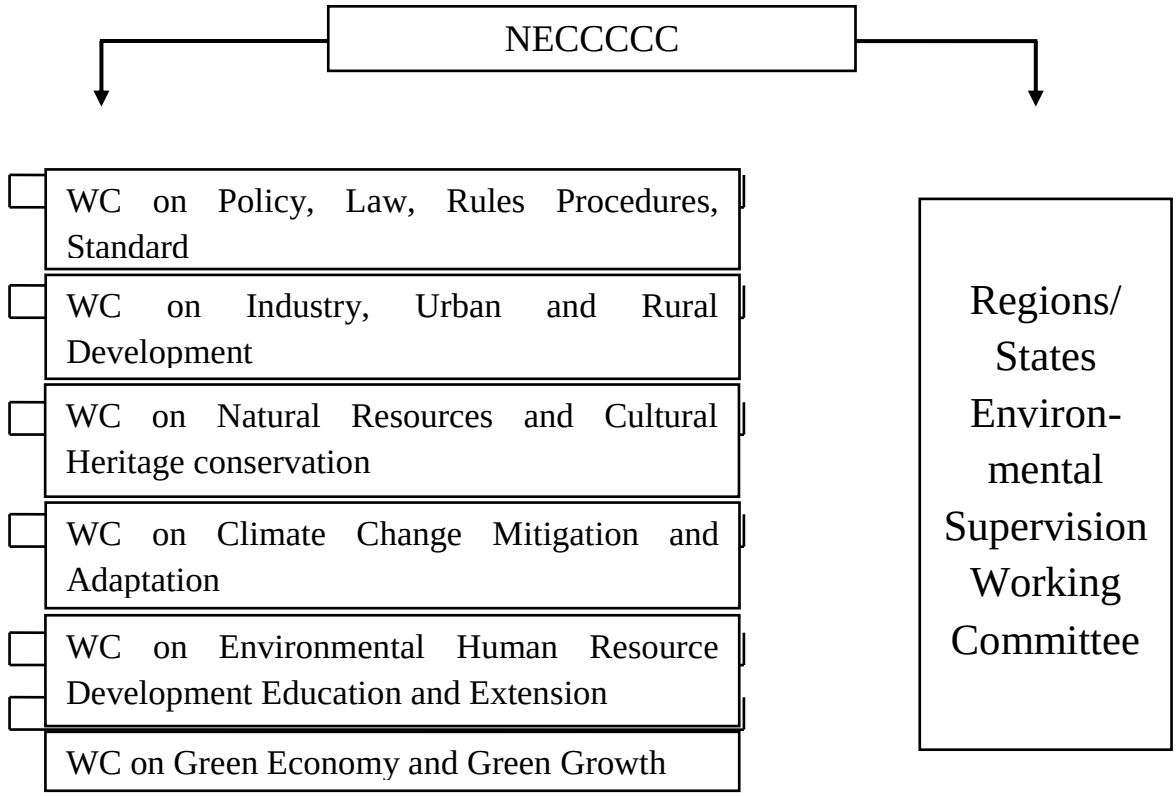
3.4 Institutional frame work

The National Environmental Conservation Committee (NECC) was formed in 2011 with the aim to achieve sound environmental management in the country. It is enlarged and reorganized as National Environmental Conservation and Climate Change Central Committee (NECCCCC).

The institutional organization of NECCCCC is as follow:

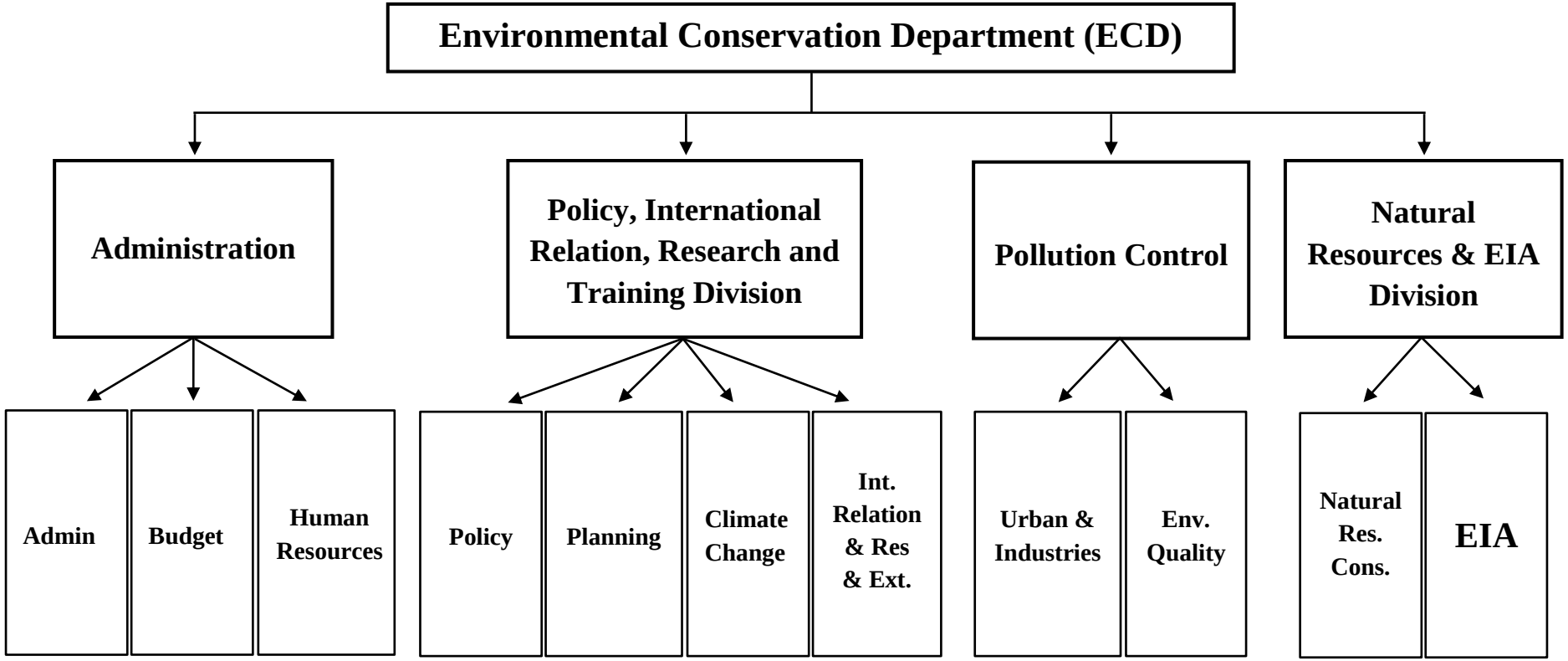


There are six Working committees under NECCCCC and supervision WC at 14 states and Regions.



Institutional organization of ECD

ECD is a major department under MONREC and is headed by a director general. Under the Director General are one Deputy Director General and 4 Directors at the directorate. ECD is the focal and coordinating agency for the overall environmental management of the country. It is also directly responsible for all the management of IEE, EIA, EMP etc. activities taking places all over the country.



These four departments are each headed by a director.

The main tasks of ECD include:

- implementing environmental conservation policy
- designing and implementing monitoring programmes
- prescribing environmental quality standards and,
- conducting activities relating to waste management and conducting environmental impacts assessments

Recently various Environmental Conservation Departments at States and Regional levels under the Directorate were established in all the 14 States and Regions of the nation. This will surely greatly enhance the conservation of the environment and especially the management of the environment of the country.

Institutional Arrangement (staff organization) of the company is depicted.

Sr. No	Designation	Number of employeed	Monthly salaries (Ks)	Annual salaries (in million ks)
	(Nationals)			
1	Factory Manager	1	650,000	7.80
2	Deputy Manager	1	550,000	6.60
3	Assist Manager	3	450,000	16.20
4	Work Division head	13	400,000	62.40
5	Sub-division head	23	350,000	96.60
6	Section head	42	300,000	151.20
7	Sub-section head	68	250,000	204.00
8	Grade (3) workers	87	200,000	208.80
9	Grade (4) workers	106	180,000	228.96
10	Grade (5) workers	159	150,000	286.20
11	Daily wages (1 month before sugar season, 3 months during sugar season, 1 month after sugar season)	301	145,205	262.24
	Total	804		1531.00
	(Foreigners)			
1	Experts/technicians	35		0.00
	Total	35		0.00
	Grand Total	839		1531.00

Note – 35 foreign experts/technicians are temporary staffs who are involved in procurement of machinery/equipment, installation of machinery/equipment, providing training and maintenance works.

3.5 Project environmental and social standards

The International Finance Corporation (IFC) has developed a policy on Environmental and Social Sustainability (2012). That includes eight Environmental and Social Performance standards for a big company to do business in a new area. There are:

IX) Assessment and Management of Environmental and Social Risks and Impacts

- identify and evaluate environmental and social risks and impacts of the project
- adopt mitigation measures to avoid, or if avoidance is not possible, minimize or mitigate the impact; compensate for the impacts on people and on the environment
- promote improved environmental and social performance through the effective use of management system
- ensure that grievances from the effected people are responded and managed appropriately
- promote and provide means for adequate engagement with the community throughout the project period

X) Labour and Working Conditions

- promote the fair treatment, non-discrimination and equal opportunity of workers
- establish, maintain and improve the worker-management relationship
- promote compliance with national employment and labour laws
- promote safe and healthy working conditions and the health of workers
- avoid the use of forced labour and child labour

XI) Resource Efficiency and Pollution Prevention

- avoid or minimize adverse impacts or human health and the environment by avoiding or minimizing pollution from project activities
- promote more sustainable use of resources, including energy and water
- reduce project-related GHG emissions

XII) Community Health, Safety and Security

- avoid adverse impact on the health and safety of the community during the project life
- ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the community

XIII) Land Acquisition and Involuntary Resettlement

- avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs
- avoid forced eviction
- avoid, or where avoidance is not possible, minimize social and economic impacts from land acquisition or restriction on land use by
  - (iii) providing compensation for loss of assets at replacement cost (value of asset plus transaction costs), and
  - (iv) ensure that resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those effected
- improve or restore, the livelihoods and standards of living of displaced persons

XIV) Biodiversity Conservation and Sustainable Management of living Natural Resources

- protect and conserve biodiversity
- maintain the benefits from ecosystem services
- promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities

XV) Indigenous Peoples

- ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of indigenous peoples
- avoid adverse impacts of project on indigenous people, or when avoidance is not possible, minimize and/or compensate for such impacts
- promote sustainable development benefits and opportunities for indigenous people in a culturally appropriate manner
- establish and maintain an ongoing relationship with these people throughout the project period
- respect and preserve the culture, knowledge and practices of indigenous peoples

XVI) Cultural Heritage

- protect cultural heritage from the adverse impacts of project activities and support its preservation
- promote the equitable sharing of benefits from the use of cultural heritage

3.6 Health standards for projects with health impacts

In implementation of sugar factory project there can be impacts such as the issues of accidents and injuries at the factory. IFC has set up Environmental Health and Safety (EHS) guidelines for the operation of sugar factories and most of all these guidelines are reproduced in this report. IFC has also set up EHS general guidelines that encompass Environmental Health and Safety (EHS) as well as Occupational Health and Safety (OHS) and Community Health and Safety (CHS).

Environmental Health and Safety (EHS) aspects

This main section includes:

a) air emission and ambient air quality

b) energy conservation

c) waste water and ambient water quality

d) water conservation

e) hazardous materials management

f) waste management

g) noise management and

h) contaminated land management

Occupation Health and Safety (OHS) aspects

The Occupation Health and Safety guideline by IFC encompasses:

- general facility design and operation
- physical hazards
- chemical hazards
- biological hazards
- radiological hazards
- Personal Protective Equipment (PPE)
- special hazard environments
- communication, training and monitoring

Community Health and Safety (CHS) aspects

The Community Health and Safety guideline by IFC encompasses:

- water quality and availability
- structural safety of project infrastructure
- life and fire safety L&FS
- traffic safety
- transport of hazardous materials and disease prevention
- emergency preparedness and response

3.6.1 Occupational Health and Safety (OHS) by ILO

OHS is defined by International Labour Organization (ILO) as:

- The science of the anticipation, recognition, evaluation and control of hazards arising in or from the work place that could impair the health and well-being of workers taking into account the possible impact on the surrounding communities and the general environment.

Some core principles of OHS

- All workers have rights and employers must ensure that:
  - work should take place is a safe and health working environment;
  - condition of work should be consistent with worker's well-being and human dignity;
- Occupational safety and health policy must be established
- Social partners (employers and employees) and other stakeholders must be consulted
- OHS programmes and policies must aim at both prevention and protection
- Continuous improvement of OHS must be promoted
- Health promotion is a central element of OHS practices
- Compensation, rehabilitation and curative services must be made available to workers who suffer occupational injuries, accidents and work related diseases
- Education and training are vital components of safe, healthy working environment
- OHS policy must be enforced

4. PROJECT DESCRIPTION AND ALTERNATIVE SELECTION

4.1 Background

Ngwe Yi Pale' Sugar Co., Ltd was registered as a limited company in 2014. (Document: Ministry of National Planning and Economic Development, Directorate of Investment and Company Administration; Certificate of Incorporation No. 5665/2013-2014; Dated: 3 March 2014). Ngwe Yi Pale' Sugar Co., Ltd is a subsidiary of Ngwe Yi Pale' Group of Companies which is involved in a variety of big business eg. Cement production, Sugar Production, mining etc.

The company has contracted the consultant firm, MESC for conducting EIA study and preparation of the EIA report.

Sugar is manufactured by pressing the juice of sugar cane with roller mills and the clarification, evaporation and crystalizing of juice to sugar.

4.2 Project location, overview map and layout maps

The proposed Sinn Shwe Li Sugar Factory (3) is situated at Plot No.2, Inn Wine Ywar Kwin, Kwin Pyin Kwin, Kon Gyi village tract. (Plot No.2 comprises: Holding No. 121,122,123,129,154,160, 161, 162 and 163) The villages are in Naunghkio Township, Shan State. It is 1 mile northeast of Inn Wine village less than 1 mile in the east is Sinn Shwe Li Sugar Factory (2). About 1 mile and 1.2 miles in the southeast is Palaung Kone village and Par He villages, respectively. 1.5 miles in the northeast is Te Taik village, 1.5 miles in west is Htone Kone village, and 1.76 miles in the northwest is Taung Kya village. Inn Wine is a large village while the others are hamlets.

The proposed site is 12 miles southwest of Naunghkio Town and is on the eastern side of Mandalay-Lashio High Way. It is about 40 miles northeast of Mandalay City.

Project Acre

The project site has a total are of 70.91 acres: 49.75 acres as factory premise, 13.67 acres for office and administrative facility, and 7.49 acres as residential area, (the residential area is inside the factory No.2 area).

Production Rate

The proposed sugar factory (No.3) will have a capacity of milling 12,000 tons of sugar cane per day and producing 1,200 tons of sugar per day.

The GPS coordinates are: N. Lat. 22˚ 11' 00.22"; E. Long. 96˚ 43' 50.56" and the elevation is 1872 feet asl.

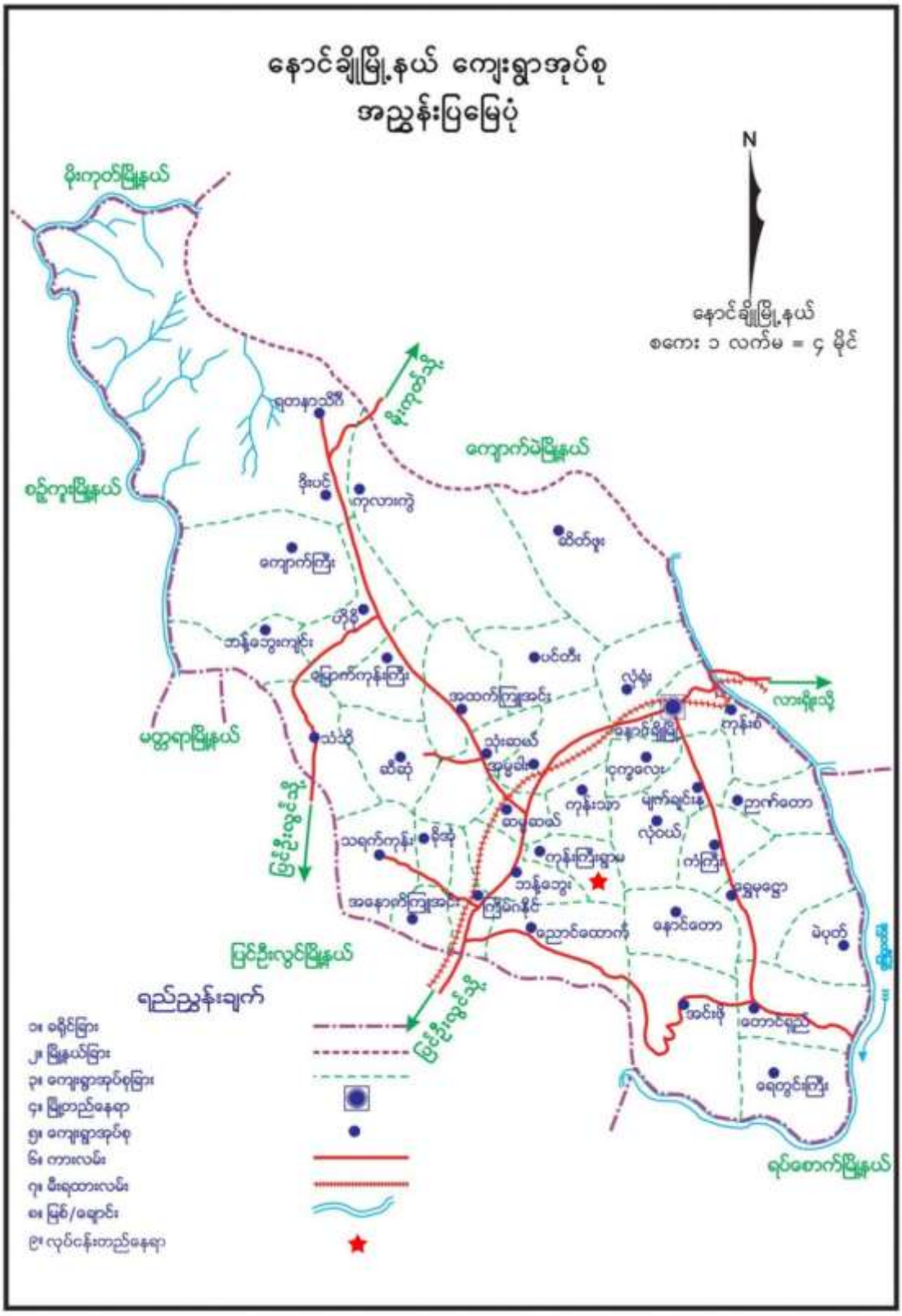


Figure – 4: Map of Naunghkio Township

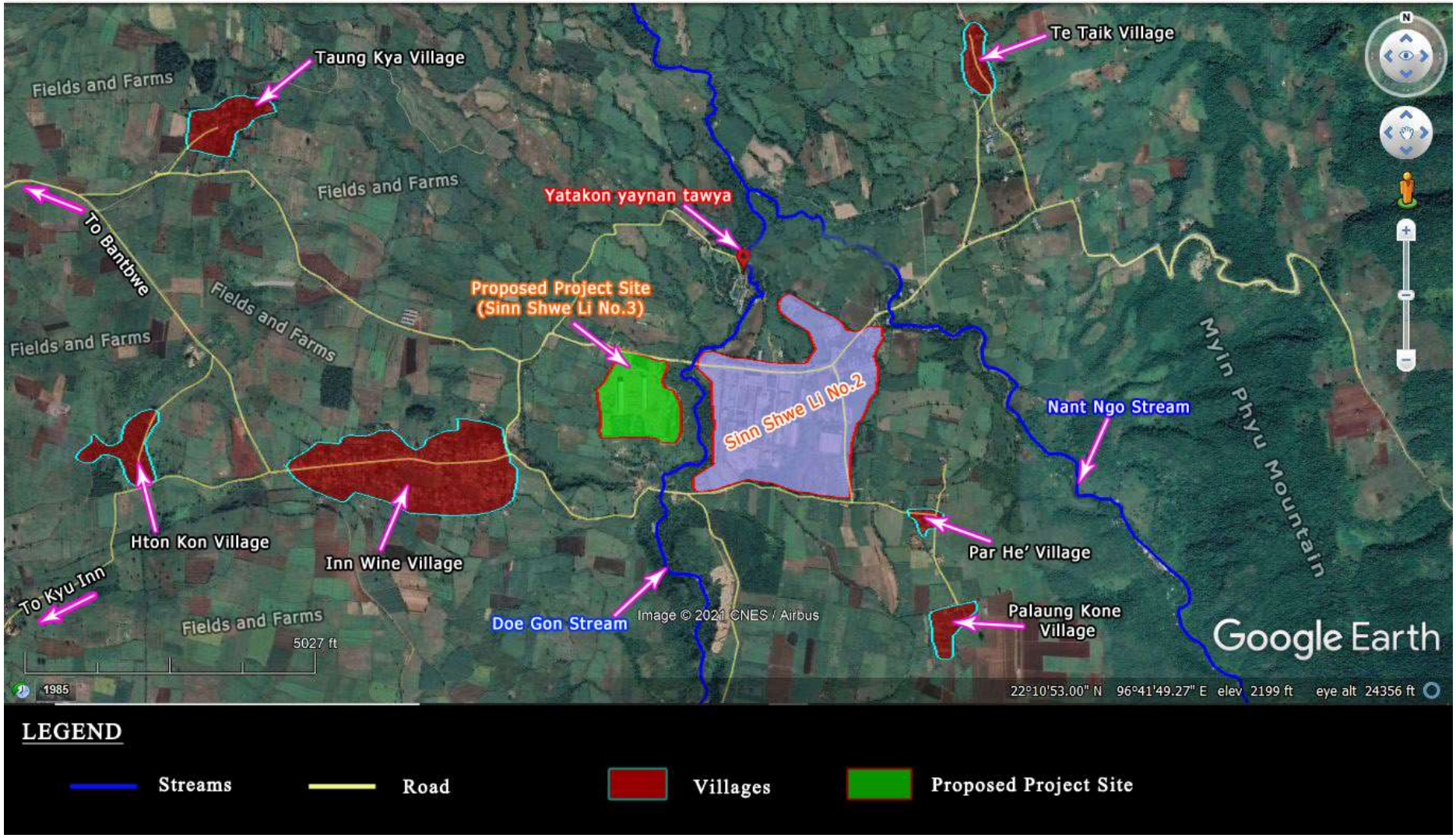


Figure – 5: Satellite image showing the proposed project site and its environs

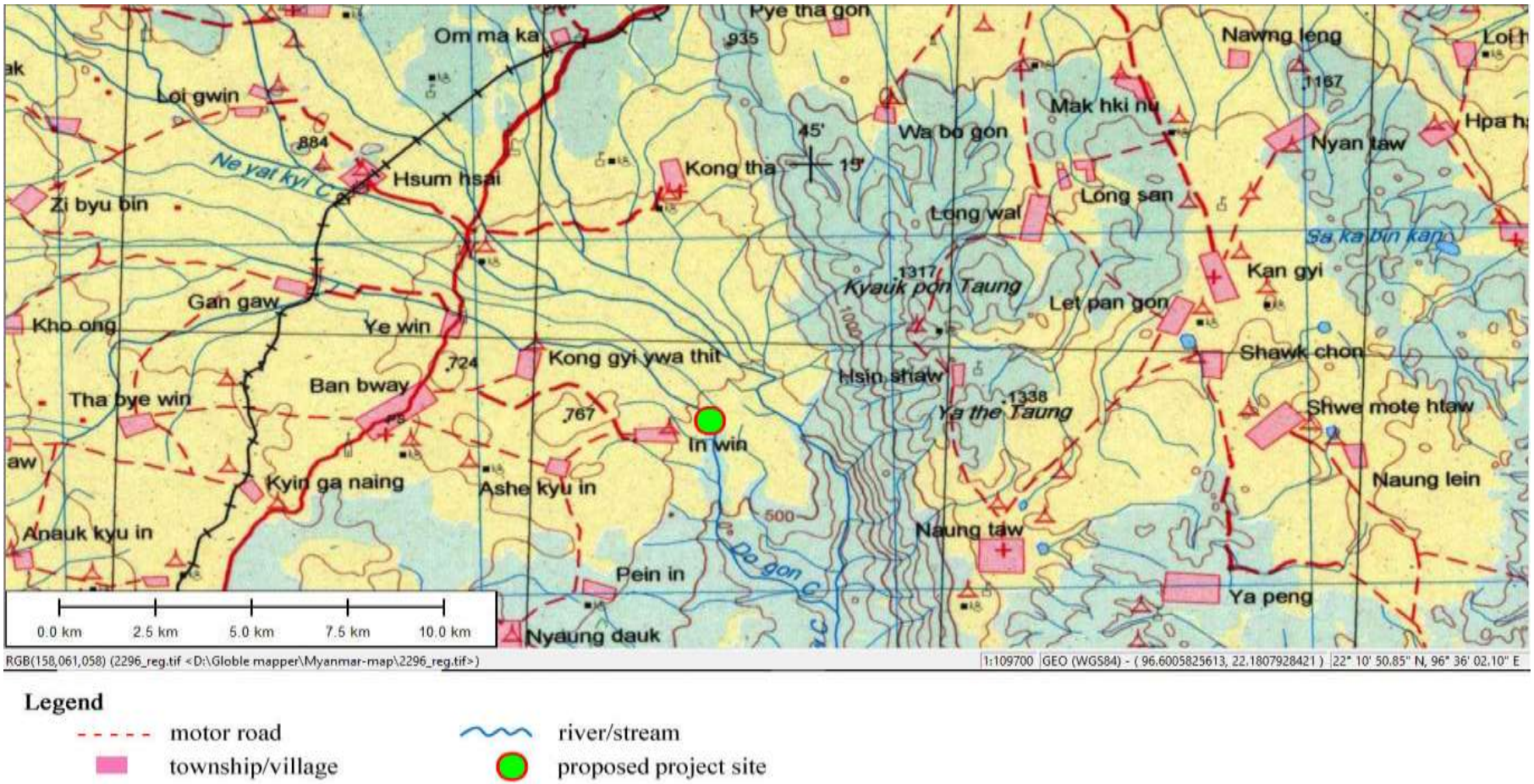


Figure – 6: Map of part of Naunghkio Township showing proposed project site

Figure – 7: The proposed project site

Figure – 8: Model of sugar mill

4.3 Project development and implementation time schedules

Pre-construction Phase	Construction Phase	Operation Phase	Decommissioning Phase
← 1 year →	← 3 years →	← 30 plus years →	← 2 years →

During Preconstruction Phase : 1 year (Planning and paper works)

During Construction Phase : 3 years (Procurement, construction and installation)

During Operation Phase : 30 plus years (Long term Operation and maintenance)

During Decommissioning/Rehabilitation Phase : 2 years (Decommissioning/Rehabilitation to original ecology as far as possible)

The four phases can be very briefly summarized as follows:

(1) Preconstruction Phase

At the moment the project is still in the Preconstruction Phase. The works involve planning, drawing and a variety of paper works and also bureaucratic procedures. It is difficult to estimate the time for Preconstruction Phase.

(2) Construction Phase

When the permit is granted Construction Phase will commence; procurement of building materials, machinery and equipment etc will be immediately carried out. Preparation and mobilization work will be started; then actual construction of buildings and structures will be commenced. A building contractor will be hired later installation, fabrication and finishing works will be followed. The Construction Phase is estimated to be 3 years.

(3) Operation Phase

After test running and preparation work actual operation will commence. During this long Operation Phase the daily and routine manufacturing and production of quality sugar will be undertaken. The work during this long phase also involves the regular procurement of raw material (Sugar Cane) and other materials and chemicals. The regular maintenance works and the implementation of Environmental Management Plan as well as mitigation measures will be also undertaken. Depending on the supply condition of sugar cane the operating days for one year are estimated as 150 working days.

This long Operation Phase will last for at least 30 years and is renewable and so may be up to 50 years.

(4) Decommissioning/Rehabilitation Phase

The Decommissioning and Rehabilitation Phase is estimated to be at most 2 years.

The decommissioning works eg. isolation and shut down of the factory, demolition, dismantling and removal works and final tidy up works can take only a few weeks. A decommissioning contractor will be hired to do the works.

The rehabilitation in the form of replanting trees will take several months, probably up to 2 years.

4.4 Description of the project

Size : The total area is 70.91 acres: factory premise 49.75 acres: office and administrative facilities 13.67 acres and residential are 7.49 acres. The residential area is inside the No.2 Factory's premise.

Infrastructure and installation

The 5 miles access road to Mandalay-Lashio High Way built by Sinn Shwe Li Sugar Factory (2) will be also the access road for Factory (3). It was built in both directions in such a way that the high way can be reached at the northwest at one point and northeast at another point.

The main components of the proposed sugar factory include:

- Office
- Automatic unloading system
- Mill plant building
- Cane juice boiling unit
- Cane juice distilling unit
- Packing house
- Sugar warehouse
- Loading area
- Pumps house
- Water pond (concrete)
- Molasses tanks
- Firefighting unit
- Cooling tower
- Waste treatment plant
- Turbine house
- Boiler house
- Stacks and dust collector unit
- Bagasse store house
- Bagasse dumping yard
- Control room
- Ash pools
- Weighting scale

See also **ANNEX** for list of machinery and equipment in detail.

LEGEND

A. 22°11'13.18"N, 96°43'13.44"E
B. 22°11'5.43"N, 96°43'10.81"E
C. 22°10'59.27"N, 96°43'12.14"E
D. 22°10'53.50"N, 96°43'14.49"E
E. 22°10'56.33"N, 96°43'19.49"E
F. 22°10'51.25"N, 96°43'23.99"E
G. 22°10'53.37"N, 96°43'31.22"E
H. 22°11'10.44"N, 96°43'28.01"E

Figure – 9: Satellite image showing project site and its corners

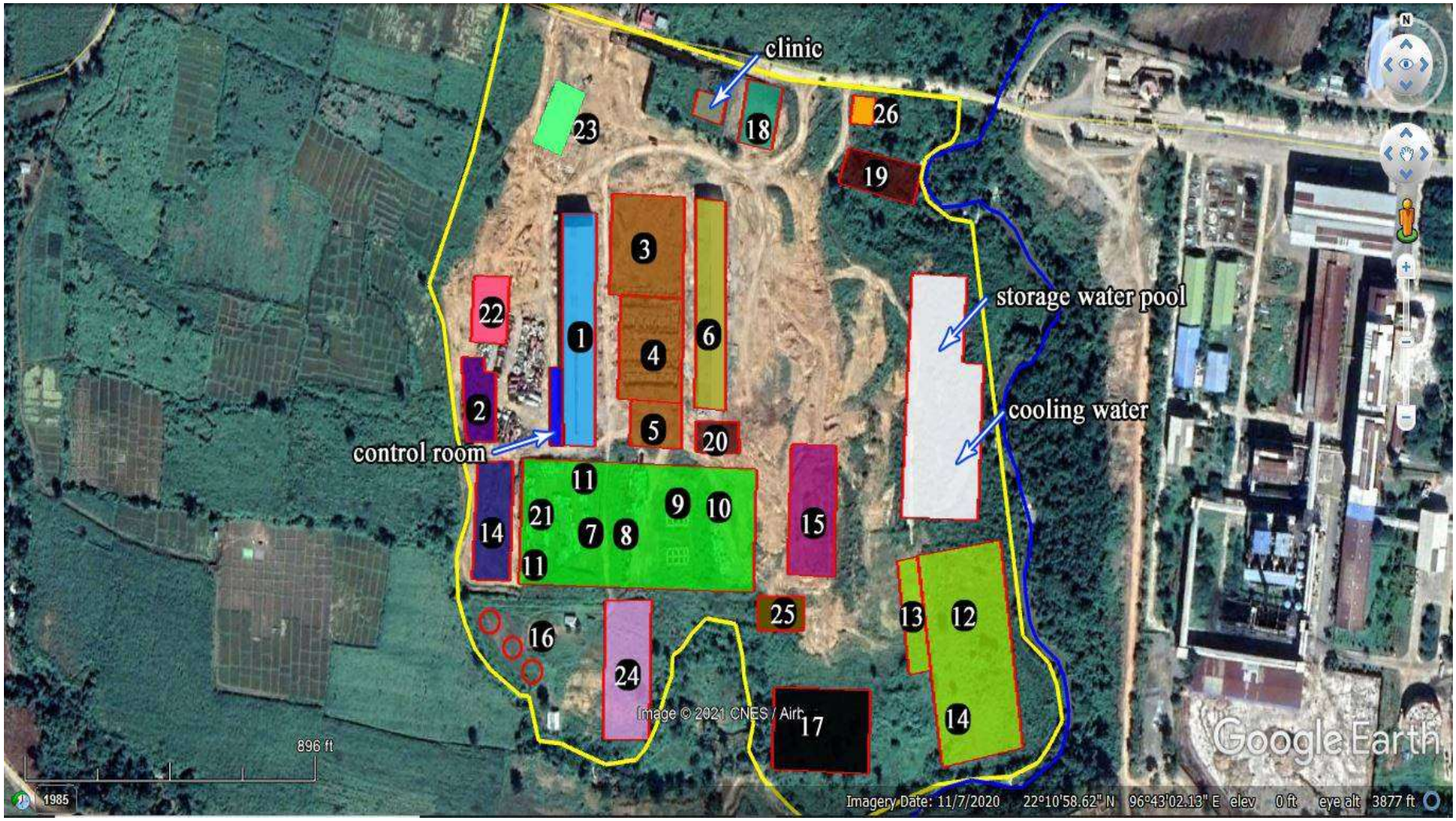


Figure – 10: Layout plan of the proposed project site

Sr. No	Name of buildings	Floor	Measurement
1	Mill Plant	1 F	171m x 27m x 19.1 m
2	Row Sugar Milk of Lime Preparation Section	1 F	42m x 15m x 8 m
3	Process Plant Clarification. Heating and Evaporation Section	3 F	27m x 29m x 33.6m 42m x 24m x 27.2m
4	Process Plant Boiling Section	5 F	70m x 47m x 34m
5	Process Plan Drying, Screening and Packing Section	3 F	50m x 40m x 8m
6	Sugar Storehouse	1 F	162m x 24m x 7m
7	The Turbine Workshop	2 F	83m x 28m x 15m
8	Boiler House	2 F	83m x 44.8m x 24.9m
9	Induced Draft Fan House	1 F	73m x 50m
10	Chimney	1 F	Ø9.6 m
11	Bagasse corridor	1 F	135m x 4m x 10m
12	Cold Water Pool	1 F	270m x 70m x 5.5m
13	Water Pump Station	1 F	56m x 9m x 12m
14	Cooling Tower	3 F	78.2m x 19.4m x 14.9m
15	Ash Pool	1 F	84m x 23m x 5.5m
16	Molasses storage tank	1 F	Ø36 m
17	Waste Water Pool	1 F	105m x 75m x 5.5m
18	Administration Office	1 F	20m x 14m x 4.5m
19	Sugar Belt Conveyor Car Packing	2 F	60m x 30m x 12m
20	Central control room	2 F	42m x 24m x 12m
21	Water softening room	1 F	20m x 24m x 5.5m
22	Main Store	1 F	30m x 24m x 6m
23	Weighting Scale	1 F	20m x 30m
24	Bagasse Storehouse	1 F	132m x 48m x 8m
25	Bagasse Yard		150m x 50m
26	Main Gate	1 F	6m x 6m x 3.5m

Figure – 11: Proposed staff housing area inside factory 2. premise

Figure – 12: Mill house

Figure – 13: Process house in the process of construction

Figure – 14: Control room in the process of construction

Figure – 15: Evaporation section in the process of construction

Figure – 16: Clarifier in the process of construction

Figure – 17: Packing area designated

Figure – 18: Vertical crystallizer in the process of construction

Figure – 19: Molassess tank area in the process of construction

Figure – 20: Turbine house area in the process of construction

Figure – 21: Boilers in the process of construction

Figure – 22: Storage area for final product

Figure – 23: Water tank (area designated for water tanks)

Figure – 24: Cooling tower area in the process of construction

Figure – 25: Designated final discharge area

Figure – 26: Spray water for suppression of dust

Figure – 27: Sample of the end product (sugar)

Other aspects of the project (Uses of materials and resources)

The budget is Ks 163,236.39 million.

Duration of project life

Preconstruction Phase : 1 year

Construction Phase : 3 years (2019-2021)

Operation Phase : 30 plus years (2022-2052)

Decommissioning/Rehabilitation Phase : 2 years

Factory capacity

Can mill (consume) 12,000 tons of sugar cane per day

There are numerous sugar cane fields in the vicinity; will also source from other sugar cane fields in Naunghkio Township. Sugar cane will be delivered to the factory by sugar cane merchants.

Can produce 1000 tons quality sugar per day

60% will be for export while 40% for local market.

Operational days : 150 days/year

Staff strength

Construction Phase : 350 workers (nationals) and 70 foreigners (engineers and technicians). No need for housing; all are camped inside the nearby Factory No.2 compound.

Operation Phase : 503 staffs (nationals) and 35 foreigners (engineers and technicians). Foreigners are on temporary employment basis; installation works, giving training and maintenance works.

Salaries : range from Ks 180,000 to Ks 1,800,000

Working hours : 8 hrs/day; 48 hrs/week

Source of water : from Doe Gon chaung nearby

Source of electricity : from National Gird Line and also from own generators (as a backup system); and also from boiler

Annual water requirement : 4,500,000 tons/year (150 working days) (daily – 30,000 tons/days)

Annual fuel requirement : Diesel 2,300,000 Litres

: Petroleum 13000 Litres

: Grease 100 drums

: Gear oil 120 drums

: Hydraulic oil 15 drums

: Turbo oil 30 drums – etc

: Bagasse will be used as burner

Fuels will be shared with the main fuel depot inside Factory 2 premise.

Figure – 28: Oil depot inside factory 2 premise

Figure – 29: Lubricants store inside factory 2 premise

Annual electricity requirement : 9,000 kW (150 working days)

Annual (150 working days) raw materials requirement : 18,000,000 tons sugar cane

Annual (150 working days) chemicals requirement : Sulphur 528 tons

: Lime powder 1,440 tons

: Phosphoric acids 144 tons

: Kurifloc 1,920 kg

: Washing Soda 6,240 kg

: Tri-sodium Phosphate 3,600 kg

: Sodium Chloride 13,824 kg

Chemicals will be procured from Mandalay City.

Chemicals will be stored in Factory 2 premise and will be shared.

Figure – 30: Chemical store inside factory 2 premise

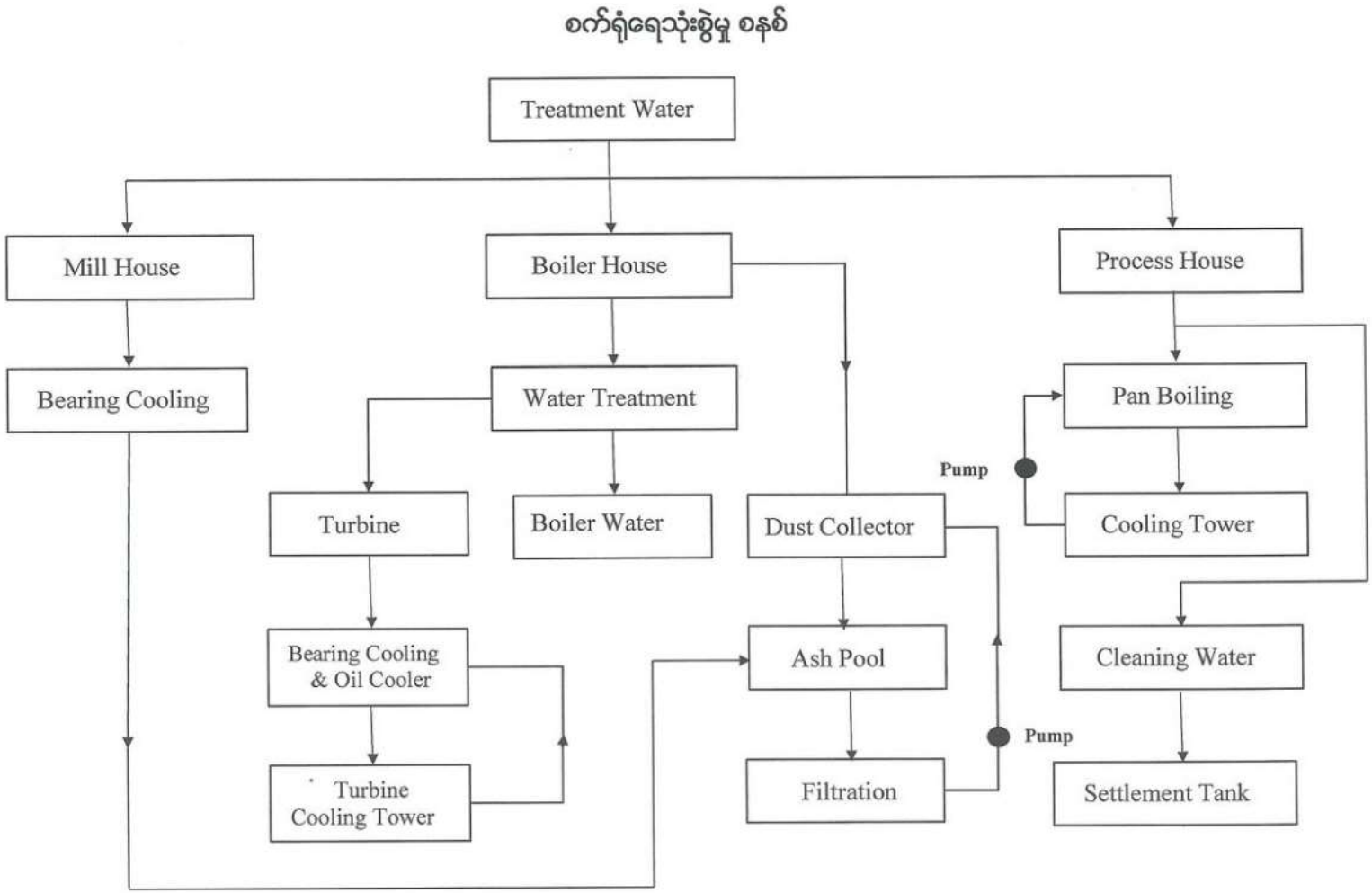


Figure – 31: Water usage system of the factory

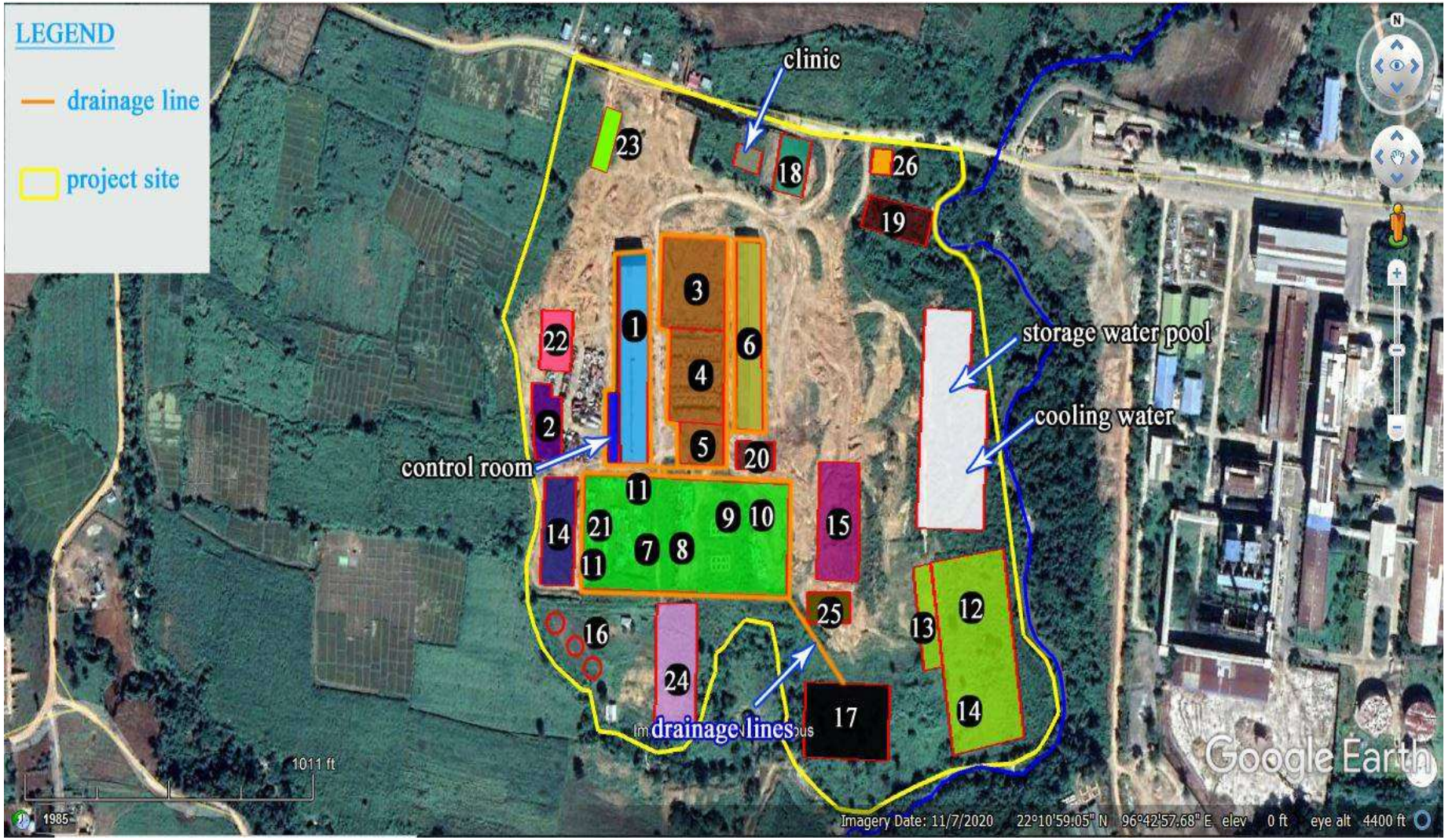


Figure – 32: Drainage system (orange colour line) of the factory

Technology

Technology and Production Process: Sugar cane is the raw material for the manufacturing and production of sugar. The cane comes from Naunghkio and Yartsauk Townships.

The technology is the "press" or "squeeze" technology or mechanical technology where sugar cane is pressed by roller mills and pressing out the juice.

(Diffusion leaching process technology is not applied here) After the juice is extracted the main processes, namely, clarification, evaporation and crystallization follow. The product is refined and the final product is white quality sugar.

Sugar manufacturing processes involve:

1) Cane preparation (leaves removal, washing)
2) Milling and extraction
3) Juice clarification
4) Juice boiling and evaporation
5) Pan boiling and crystallization
6) Massecuite cooling, separation of sugar from molasses and drying of sugar (centrifuging and bagging)

1) Cane preparation (leaves removal, washing)

   The main objective is the cutting of sugar cane stems into smallest pieces for crushing and milling. These pieces of cane have to undergo six steps of milling for the optimal extraction of juice.

   Raw material sugar canes transported by trucks and arrived at the centre are weighed with a computerized weighing machine. After that the raw material is sent to feeder bay (hopper) with the aid of 4 cranes. From then the raw materials get into the two conveying machines, belt conveyors. One of the conveying machines is installed with a cane leveller to regulate the flow of raw materials (cane).

   The raw material (cane) is then cut with two cane cutters; after several steps of cuttings and shredding the stems of canes are transformed into smallest pieces. This is done in order to achieve the Preparation Index of at least 85% and also achieve the Mill Extraction rate of 96%.

2) Milling and extraction

   In order to maintain the constant per hour milling rate pieces of shredded cane are passed through a Neuclear Weight scale. A magnetic device is used to attract and remove iron particles, if any, among the crush cane materials. This is done so as to prevent the iron particles from damaging the mill rollers. The crushed cane materials devoid of iron

particles are then milled/crushed at 5 milling/crushing machines. The cane juice produced is mixed with line water and phosphoric acid and then conveyed to cane juice purification unit.

The bagasse produced from the milling and extraction activities is sent to the boiler unit for use as burner.

3) Juice clarification

The aim of clarification is for the removal of non-sugary substances and for the prevention of losses as far as possible in doing so. Another aim is to acquire pure and bright juice.

At the juice clarification unit the juice is heated with two Juice Heaters to a temperature of 60-65°C. In order to maintain pH of 6.9-7.1 the juice is mixed with milk lime and treated with sulphur gas (known as sulphitation). The juice is then heated with another two Juice Heaters to a temperature of 98-102°C. It is then conveyed to the clarifier. In order to enhance sedimentation a flocculation-sedimentation a catylst solution (kurifloc) is added into the clarifier. The suspended and turbid cane juice is filtered by Rotary Vacuum Filter. The filtered or clarified juice is heated at the third Juice Heater up to a temperature of 110-125°C. The filtrate, known as mud or cachaza, is used as organic fertilizer in agriculture.

4) Juice evaporation

Juice evaporation unit is responsible for the evaporation of clarified juice and the subsequent crystallization of sugar.

The clarified juice (110-125°C) coming from the clarification unit is conveyed to five evaporators. After undergoing evaporation process the juice is transformed into a syrup with the Brix of 55°-65° (viscoscity). The second sulphitation (treatment with sulphur gas) is undertaken and the syrup is conveyed to the crystallization unit.

5) Pan boiling for crystallization

Crystallization is a main important step in the manufacturing of sugar. The aim is to produce sugar crystals from the syrup, and:

a) To optimize the production of sugar crystals

b) To produce sugar crystals of appropriate size

c) To produce white sugar

d) To optimize the recovery of crystals from syrup and

e) To reduce the purity of the final molasses.

At the crystallization unit the syrup is panned in "C" Vacuum Pan and "C" massecuite is produced. After undergoing continuous centrifugation "C" sugar and final molasses are produced.

"C" sugar is dissolved and then panned in "B" Vacuum Pan and "B" Massecuite is produced. The "B" class Massecuite undergo continuous centrifugation and "B" class sugar and "B" class molasses are produced. The "B" class sugar is dissolved and panned in "A" class Vacuum Pan and "A" class Massecuite is produced. The "A" massecuite is then passed through batch centrifuges and "A" class sugar and "A" class molasses are finally separated and produced.

The "A" class molasses is reused for the production of "B" class massecuite and the "B" class molasses is reused for the production of "C" class massecuite.

6) Massecuite cooling, separation of sugar from molasses and drying of sugar (centrifuging and bagging)

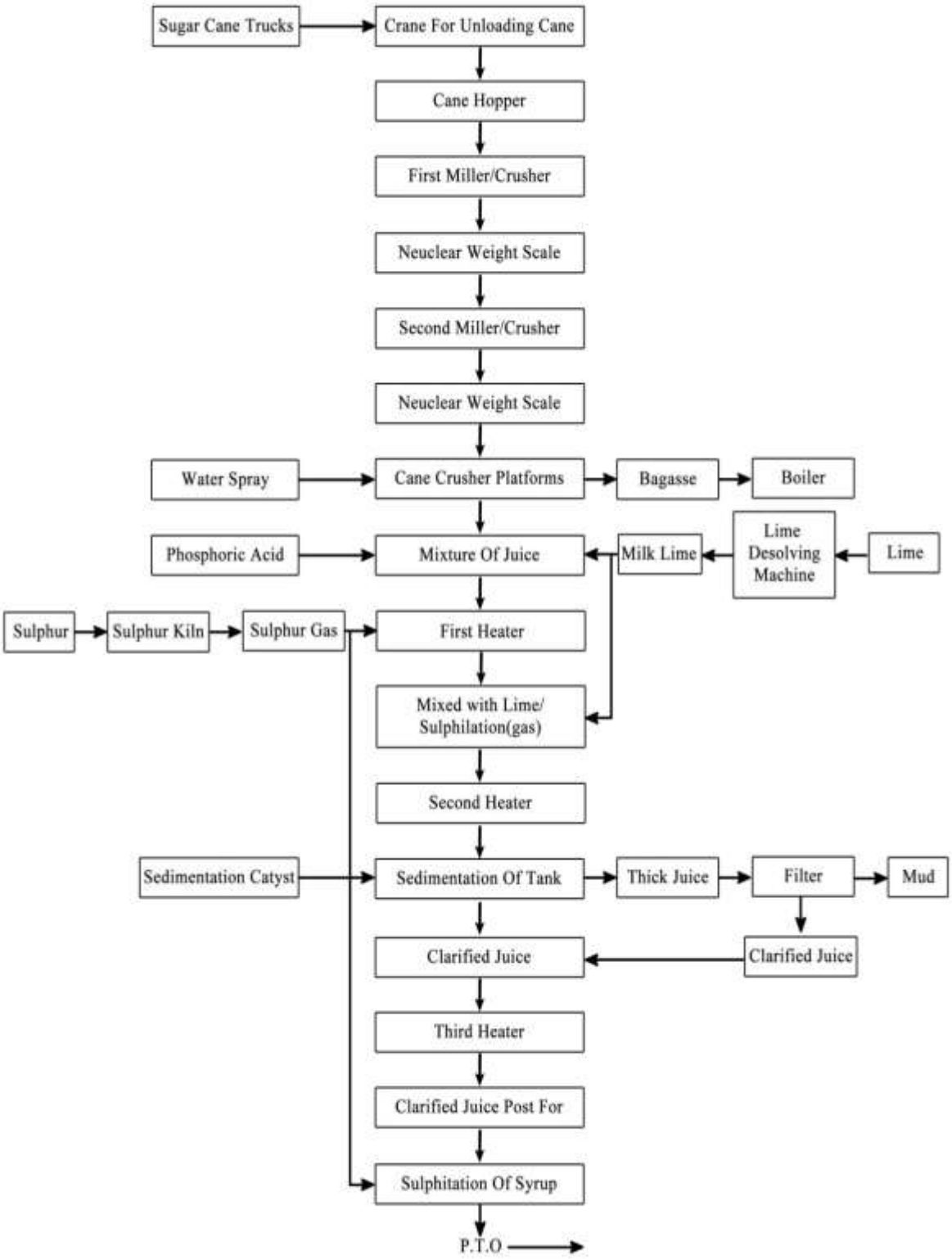
A, B and C massecuites have to be cooled before undergoing centrifugation. Especially this has to be undertaken for C massecuite. The massecuite panned from the boiling pan has a temperature of 65-70°C and sugar is dissolved in the massecuite-molasses mixture. The cooling process result in the crystallization of sugar thus preventing the loss of sugar and at the same time reducing the quantity of molasses.

Sugar produced from "A" centrifuge has relatively high content of moisture. For the long term storage and prevention of hygroscopic condition the wet "A" sugar is dried on a Hopper and Dryer machine. The sugar coming out of Hopper and Dryer must have a moisture content of less than 0.1%.

Before packing or bagging the dried sugar coming out of the Hopper and Dryer a magnetic separator device is used to remove iron particles, if any, from the sugar substance. A Grader is also used for grading the size of sugar crystals in order to get sugar crystal of appropriate size. Crystals with size larger than required size are dissolved and reused for manufacturing of sugar.

The dried and graded sugar is then temporarily stored in Sugar Bin and then packed in bags of 50 kilograms or 30 visses by means of automatic packing machine.

Steps In Sugar Manufacturing Process



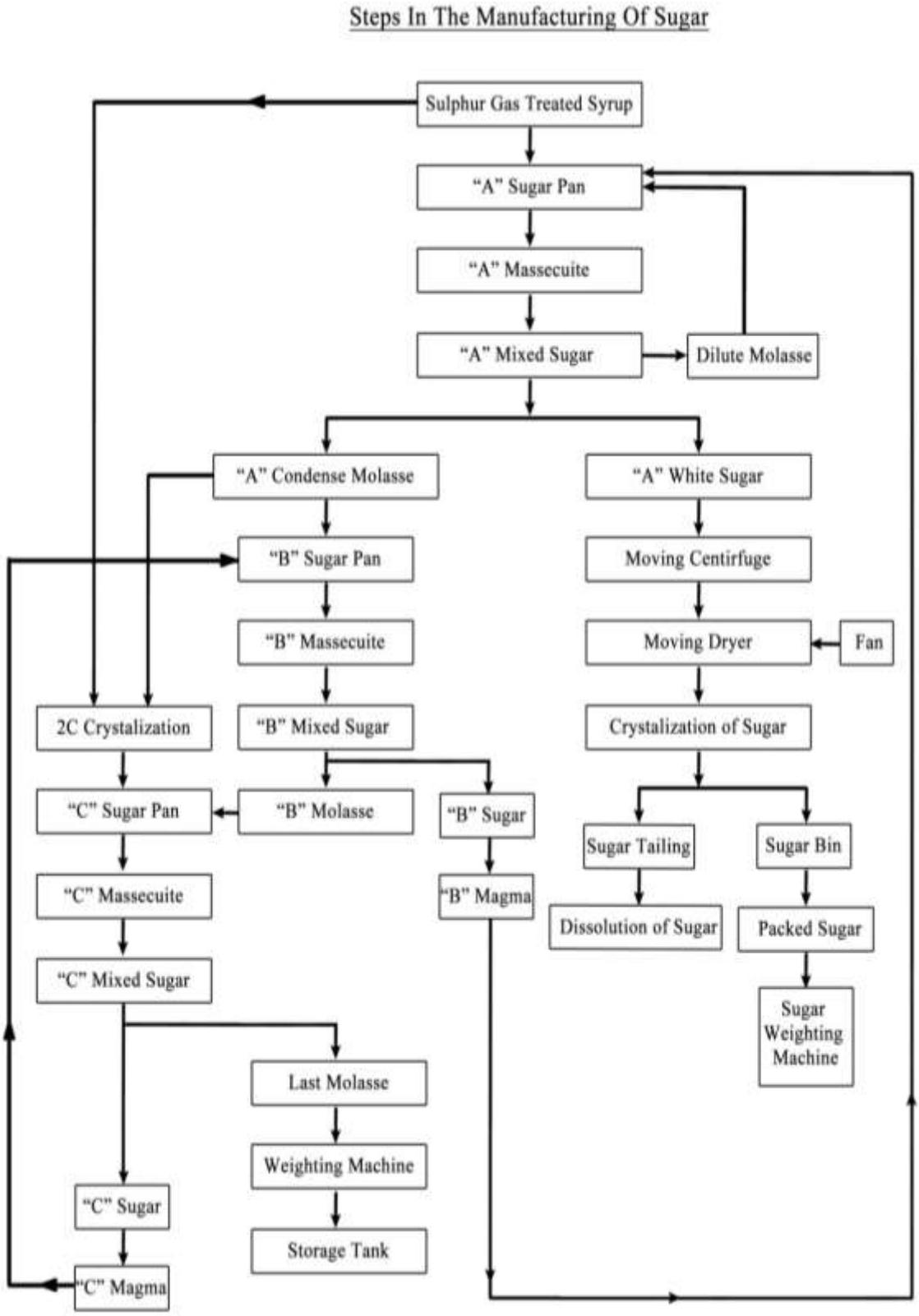


Figure – 33: Simplified flow chart diagram for manufacturing of sugar

Waste generation, emission and disturbances

Industrial solid waste

- Bagasse (pulp or fiber) is generated in huge quantity after milling and extraction of juice from the cane stem. (It is estimated that 3360 tons of bagasse is generated per day; one ton of cane produces 280 kg of bagasse).
- Sugar press mud (cachaza) is generated as filtrate from clarification of juice after filtration. (It is estimated that 34 tons is produced per day)
- Molasses is produced from final crystallization of sugar. (It is estimated that 450 tons of molasses is produced per day).
- Solid lime (dry lime) is generated in small quantity. (Less than 10 tons of lime powder is to be used per day and the waste at most 6 tons).
- Ash (bagasse ash) is generated from the burning of bagasse (use as burner fuel). (It is estimated that 336 tons of bagasse ash is generated per day from the burning of 3360 tons bagasse per day).

Other industrial solid wastes generated in small quantity are:

- package materials, spent filter materials, active carbon, resin from ion exchange process, acid from chemical clearing of equipment etc.

Domestic solid waste

Office waste, kitchen waste (food waste), waste from workers housing, trash, debris are generated in relatively small quantity.

Based from the general solid waste generation formula, 0.3 kg/capacity/day, the generation of domestic solid per day for 503 employees will be 150 kg/day.

Emission

The main air emission is from the factory's stack, (known as point source (stationary emission).

Air pollutants mainly include PM, (PM_{25}, PM_{10}, $PM_{2.5}$, PM_{1}), SO_2, NOx, CO_2, CO, CH_4, VOC and hydrocarbon etc. Based from emission factor concerning the production of sugar, where bagasse is burnt, the quantity of emission will be:

- 116 tons of fly ash and 29 tons of bottom ash (PM) per day
- 150 kg of NOx per day
- 47 kg of SO_2 per day and
- 241 tons of CO_2 will be generated per day.

Effluent

Hugh quantity of water is required for a sugar mill. To make sugar from one ton of cane 2 tons of water has to be used of which 0.4 tons will end up as effluent. In this proposed factory context of 24,000 tons, 30,000 tons of water will be consumed per day; 4800 tons will be become waste water, but most will be recirculated and reused through cooling tower and cooling ponds. However, up to 1,000 tons of water can end up as waste water and will be discharged into final waste water pond with a dimension of 105 x 75 x 5.5 m. The waste water from a sugar factory has high BOD, COD and total dissolved solids. Waste water contain high organic matters (especially), nutrient, oil and grease, chloride, sulphide and sometimes, heavy metal. The waste water with high organic contents will produce bad odour and will be highly polluted. Treatment is imperative, therefore lime powder will be applied and the remaining small quantity of waste water will dry up in the final waste water pond.

Disturbance

On the whole noise level in a sugar factory is high, coming from a variety of sources; rotating machinery, cane milling, lime milling, ventilators, turbines, compressor, generators etc.

Heavy machinery and vehicular movements also emit high noise level.

Management of wastes, effluent, emission

These are described later in Chapter 6, 6.2.1.3, mitigation measures to be taken in detail. In fact all solid waste can be reused:

- bagasse will be reused as fuel burner instead of coal; surplus bagasse can be sued as pulp for manufacturing pulp for making paper and paper board (actually all are used up as burner).

- molasses actually cannot be termed as waste; it can be used for making alcohol (rum) and ethanol, as sweetener and flavor in candy; it can be used in the production of vinegar, citric acid, etc.; blackstrap molasses is good as medicine (good as brain booster, for curing fatigue, anxiety, stress, prevent anemia, lower blood sugar); low grade molasses are used as mixed animal feeds (actually all molasses are sold).

- sugar press mud (cachaza) can be composted into high quality organic fertilizer; it can be made into EM in Bokashi organic fertilizer, press mud based gypsum fertilizer, press mud based dolomite fertilizer; also for the production of Triple sugar phosphate fertilizer, Potash (potassium chloride) fertilizer and ash etc. (actually all are used up as fertilizer and sold to cane farmers)

- dry lime (solid lime) can be made into soil conditioning products for agriculture.

- ash (bagasse ash) when mixed with cement can be used as construction material; it is rich in potassium and can be partially used as fertilizer in small quantity. (actually all are used up as mixture of fertilizer)

Domestic waste

These will be regularly collected in separate garbage bins, recyclable and non-recyclable, and disposed at the landfill.

Emission

The company will apply wet scrubber method to reduced/mitigate emission. Regular water dozing and occasional chemical water dozing (spraying lime water) will be conducted. The height of the stack is 50m. Wearing of mask, face and nose covers is mandatory for workers exposed to long hour of smoke.

Effluent

Hugh quantity of water has to be used daily but most are recirculate through cooling tower and cooling ponds and sprinkles. Therefore, when compared with the water used the quantity of waste water is much smaller. Physical treatment – e.g. screening and sedimentation and removal of sediment (sludge) with over head crane will be applied. No special treatment considered yet.

Disturbances

A sugar factory is a noisy factory. Options of mitigation measures for noise are described later in Chapter 6, 6.2.1.3.

One plausible method is wearing of PPE, ear plugs, ear muffs, ear protectors.

The waste water if not well-managed can emit bad odour, it is not wise to mitigate bad odour but to prevent it in the first place. Ensure that physical treatment of waste water is quite efficient; check level of BOD, COD and organic waste control them to prevent odour.

These are described in details in Chapter 6, 6.2.1.3.

4.5 Description of selected alternative

From environmental safeguard view point alternative analysis is an important tool for the best selection of the project site, technology to be followed and operational mechanism in term of environmental acceptability of the chosen method. Alternative analysis provides information about the advantages and disadvantages; quantifies the environmental impact to the extent possible and attaches economic values where feasible for each alternative considered.

For successful implementation of a project a number of alternative have to be considered and the better or best alternative have to be selected and implemented.

All alternatives should be taken into consideration during the start of the Preconstruction (Planning) Phase of the project. Alternatives to be considered can be categorized into, site location alternative, relocation alternative, orientation alternative, material alternative, energy alternative, technology (methodology) alternative, demand alternative, supply alternative, activities alternative, and "no go" alternative (no project alternative).

As project operation goes on, mitigation alternative and alternative for better EMP can be also considered.

Two main examples are:

(a) Site location alternative

In this era of environmental awareness the site with the following attributes/characteristics shall not be selected:

- It is inside a protected area or wildlife sanctuary or bird sanctuary or ecologically fragile jungle, wetland etc.
- It is too close to a big lake or reservoir that serves as drinking water source for a city or big community.
- It is inside or too close to historical, cultural religious monuments and archeological sites.
- It is inside agricultural lands or animal farm.
- It is prome to natural disasters eg. earthquakes floods violent storms, land slides etc.
- It has issues of land disputes or land grabbing etc.

Other Alternatives to be considered for site selection include:

- Availability of land
- Accessibility and logistics
- Availability of water and/or natural resources or materials eg. for construction work.
- The price of land
- Locals perception.

(b) The "no go alternative" or "no project alternative"

When the "negative aspects" outweigh "the positive ones" and/or when the disadvantages outweigh the "advantages" then the final decision will be the "no project alternative". Or when it becomes clear that the project is economically, socially and environmentally not feasible the "no project alternative" has to be chosen.

4.6 Comparison and selection of the preferred alternatives

a) Site location alternative

Ngwe Yi Pale' Sugar Co., Ltd has selected the site because it is devoid of all the six undesirable attributes/characteristics mentioned above (4.5, a).

The land is available at a reasonable price; the locals are quite willing to lease (sell) their land. Accessibility is perfect --- the proposed sugar factory will share the 5 miles access already constructed by Sugar Factory No.2.

b) Relocation alternative

Relocation alternative to a different site is an alternative available for the project implementation. However there is no reason for relocation. The company has already selected this site and has invested a large sum of money for this.

The company has good relation with the locals who are expecting to grow more sugar cane and boost their economy when the proposed sugar factory is in operation. Many are also expecting for employment opportunities at the proposed sugar factory.

c) Orientation alternative

The proposed factory is a large factory with a capacity of milling 12,000 tons of sugar cane a day. The design engineers and architects of the company have already carried out meticulous details study for the lay out design. The available land is exactly sufficient for the construction of the sugar factory complex. All available spaces have been allotted for the construction of buildings and structures of the factory complex. No better alternative can be considered in term of orientation as there are no more available space left.

d) Material alternative

Materials in the form of building materials and machinery have been already selected during the Preconstruction Phase. When the construction permit is obtained the construction works will commence.

As regards building materials the company had selected locally sourced sand, gravel, cement metal bars, timber etc of quality or accepted material (eg. sand from fresh water revers/streams is preferred to sand from marine origin).

As regards machinery and equipment the company had selected modern and internationally accepted ones particularly machinery and equipment that are eco-friendly. Ecofriendly machinery are preferred to conventional ones.

e) Energy alternative

Although the site has access to national gridline electricity, Ngwe Ye Pale' Sugar Co., Ltd however has its own generator for generation of electricity in case of power failure. Moreover electricity is also produced from boiler. As regards fuel for burner the readily available bagasse waste is preferred to fuel wood. This is an environmentally friendly practice and at the same time it solves the generated waste, bagasse issue. Small quatity of coal has to be used for kindling fire.

Coal is preferred to fire wood as it generates less smoke and no tree has to be cut.

Regarding fuel oil the company has no chance to select sulphur free fuel oil, but to procure fuel oil that is available in the country.

f) Technology/methodology alternative

There are two main technologies for extraction of sugar juice from sugar cane. The so called "pressing or squeezing process" and the "diffusion leaching process". The company prefers "the pressing/squeezing process" to the "diffusion leaching process".

The first one involves roller mills which press out the juice. It is used widely; and the technology is quite a simple mechanical process but the technology is sound. The second technology, diffusion leaching process involves a complex chemical processes which is not suitable in the region for the time being.

On the whole the company has applied the modern technology rather than the old or conventional technology.

g) Demand alternatives

In the future the company shall consider for the application of solar panels (solar energy) for lighting at night and for domestic used inside the factory compound rather than totally relying on gridline electricity all the time. This can reduce the burden on gridline quite considerably.

h) Supply alternative

For the consumption of water, fuel and energy the company shall adhere to the principle of conservation rather than using them extravagantly; conservation is preffered to extravagance. Rather than totally relying solely on ground water. The company will consider for the harvest of rain. Rain water can be used for watering plants, washing machinery and vehicles, suppressing dust etc.

i) Activities alternatives

The company will educate, train and supervise its staff for good working practice, good safety practice and good environmental practice rather than follow the traditional/conventional way in performing their jobs.

The company will educate and train them to "work smarter" rather than "work harder". "Work smarter" is preferred to "work harder" because it can bring better result.

Will educate them to walk or ride bicycle rather than riding car when commuting to and from workplace to conserve fuel and to contribute to emission reduction. Non-carbon emission commuting is preferred to carbon emission commuting.

j) The "no go alternative" or "no project alternative"

This proposed sugar factory (No.3) will no doubt contribute to the development of the industrial sector in the form of emergence of a new sugar mill. It will also contribute to the industrial development of food sector in the form of more sugar for local consumption and for export. It will contribute to the stabilization of the sugar market.

Since the advantages outweigh the disadvantages in many aspects the "no project alternative" is out of the question. The project will proceed and progress smoothly. The "no go" or "no project alternative" will only mean that the local area will remain in its previously back ward and undeveloped condition.

This last option (alternative) will simply mean no development in the economy of the region and country; no improvement in the sugar cane agricultural sector and the sugar industry. Without this sugar factory the existing land use is not profitable to the optimum; the existing agricultural practices are not as profitable as compared to sugar cane cultivation; and there will be no or little employment opportunities without the sugar factory. None of the benefits realized from this sugar factory will be realized by the country which remains lagging behind in development when compares with its neighbours.

As time goes on during the Operation Phase there can arise "mitigation" alternative and/or "EMP alternative". As new technologies are emerging quite rapidly nowadays the company will be ready to adopt any state-of-the-art technology, or in other words, better alternatives.

When the Operation Phase has ended the company will consider for implementation of decommissioning process and the follow-up rehabilitation process. Instead of following the old conventional approach in undertaking decommissioning task the company will adopt to better decommissioning alternative method which can emerge in the near future.

5. DESCRIPTION OF THE SURROUNDING ENVIRONMENT

5.1 Setting the study limits

The designated EIA study area is the Sinn Shwe Li Sugar Factory (3) premise and the neighbourhood within a 2 miles radius. The surrounding area consists of undulating terrains with cultivated land, rice fields, maize farms and sugar cane fields. Inn Wine and five other small villages or hamlets, namely, Taung Kya, Htone Kone, Te Taik, Palaung Kone and Par He are also incorporated into the study area. With the exception of a line of small green trees and bushes along the stream, which flows generally in a north to south direction between the proposed site and the existing sugar factory (2), the whole area is predominantly cultivated land.

There are no natural forests or Reserved Forest nearby. The impact on the biological component, if any, is negligible. There can be impact on the physical component to a certain extent by the proposed project but generally most can be insignificant. There is a monastery and a pagoda in the process of construction between the proposed site and Inn Wine village. The monastery and the pagoda is about half mile west of the proposed site. As there is no forest or buffer zone between there can be certain impact on the cultural/religion component. The pragmatic mitigation measures are addressed in the later **Chapter-6**.

As a part of socio-economic impacts assessment the six villages mentioned above are incorporated into the EIA study area.

The coordinates of the six villages are:

Inn Wine : N. Lat. 22˚ 10' 48.50"; E. Long. 96˚ 42' 35.77"; elevation 2052 feet asl

Taung Kya : N. Lat. 22˚ 11' 53.59"; E. Long. 96˚ 42' 01.99"; elevation 2214 feet asl

Htone Kone : N. Lat. 22˚ 11' 01.66"; E. Long. 96˚ 41' 42.88"; elevation 2298 feet asl

Te Taik : N. Lat. 22˚ 11' 59.20"; E. Long. 96˚ 44' 26.47"; elevation 2044 feet asl

Palaung Kone : N. Lat. 22˚ 10' 26.58"; E. Long. 96˚ 44' 18.85"; elevation 1817 feet asl

Par He : N. Lat. 22˚ 10' 44.72"; E. Long. 96˚ 44' 14.26"; elevation 1838 feet asl

The EIA study area covers an area of 16 sq. miles which is occupied mostly by fields and farms and residential areas, that is the villages area.

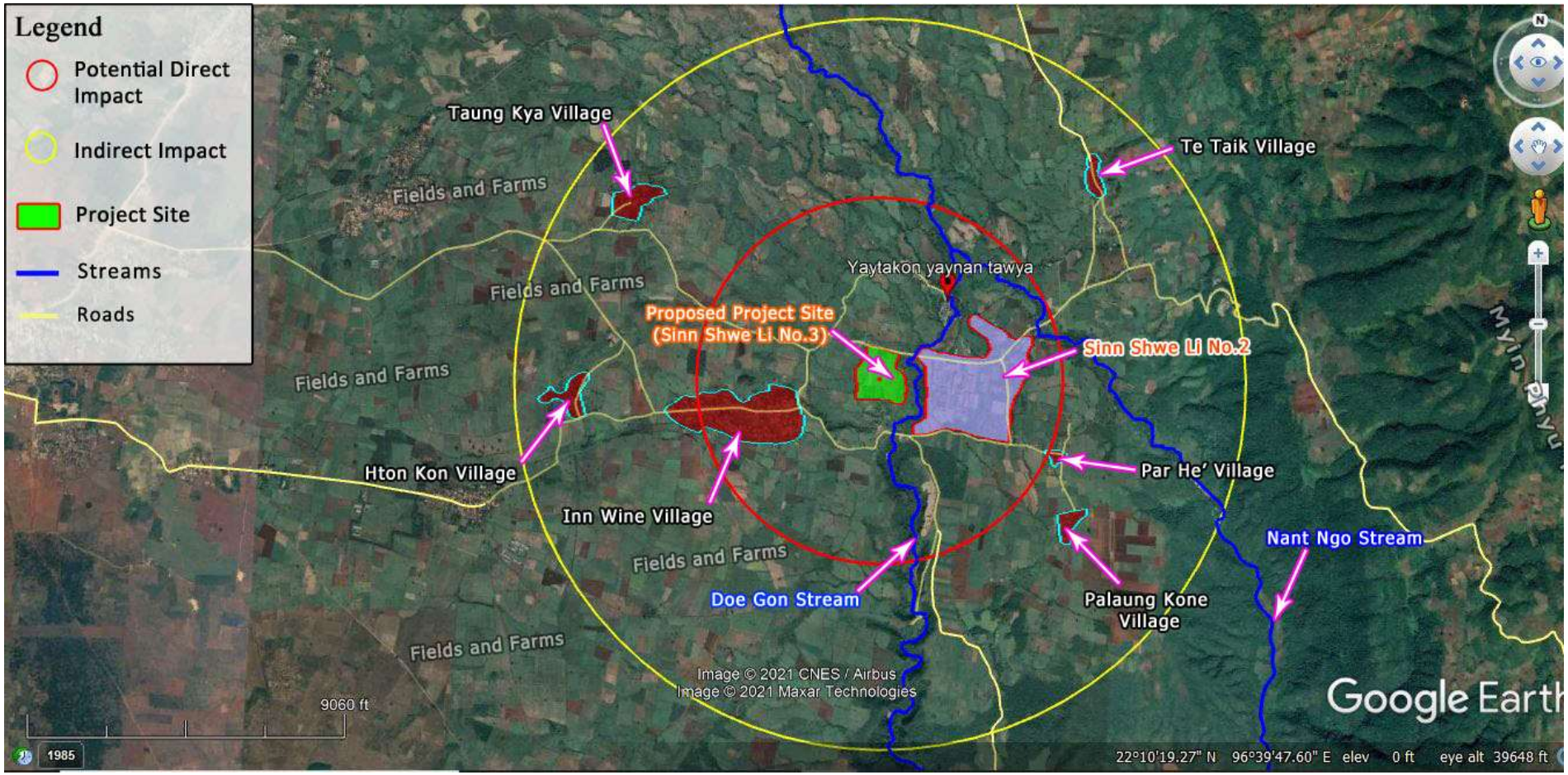


Figure – 34: Satellite image of project site and environs (the study area is within the yellow circle; about 16 sq miles)

5.2 Methodology and objectives

EIA work involved the visual inspection of the area, the surveying work and collection of baseline environmental and social data.

The methodology comprises desktop survey, field study, consultation meeting and the gathering of information and data and report writing.

Desktop survey covers the reviewing of all available report and literature.

(a) Physical parameters

The physical data such as air quality, particulate matter (PM), SO_2, NO_2 and noise were all primary data, collected through field survey. The data for water analysis were also primary data. Basic geological data is secondary data from a previous geological data.

All geological data are secondary information from the findings of geologists in previous study. The methodology involved Satellite image analysis, geological outcrop mapping, lithogeo-chemical survey, gravity investigation and mechanical drilling for extraction of samples at various depths, it was learnt. Analysis work was conducted in Yangon.

All meteorological data, monthly rainfall, monthly maximum and minimum temperature, humidity, wind speed etc. were secondary data. They were obtained from Naunghkio Township Meteorology Office.

(b) Biological parameters

The data on the biological components particularly flora were all primary data. All data on flora, birds, reptiles, amphibian as well as the large majority of aquatic organisms, if present, were collected through this field surveys.

As wildlife are non-existence in this cultivated area the flora remain the main biological component for study. The flora study involved the overall view of the forest and classification of forest type; distribution pattern, if possible, transect walk through the forest and on the spot identification of species. However in this study there was no forest in the vicinity to study.

(c) Socio-economic parameters

As regards socio-economic data most were secondary data. These were gathered by means of conducting Key Informant Interview (KII) and also from certain Secondary Source (SS). Certain primary data were acquired by means of visual observation, inspection, transect walks and focal group discussion (FGD).

Desktop survey is also sometimes applied if there are previous data and information regarding the socio-economic aspects of the area.

(d) Cultural/religion parameter

As for cultural components there were no important cultural, religious, historical and archeological monuments or sites in the area. The exceptional case: a small Buddhist monastery, and a pagoda still in process of construction and there is certain likelihood to be impact by the activities of the project.

(e) Visual component parameter

In the case of visual component there is no visual component to be impacted by the project.

There are no outstanding landmark and site of aesthetic beauty and scenic spots to be impacted. The only prominent visual component is the existing sugar factory No.2 in the vicinity.

Tools, instruments, data and information

As for pragmatic approach the testing and measurement of air quality, ambient air, PM, SO_2 and NO_2 involved the use of relatively sophisticated and bulky equipment and so technicians (on leave) from the Health Department have to be contracted. The portable air test kits has the advantage of measuring the in situ (on the spot) condition but not so reliable.

Advanced tools such as EPAS air sampler and EPAS Haz scanner with auto sensors are used. The EXTECH Sound Level Meter is used for measuring sound level. The BEME-TECH Vibration Meter is used for measuring vibration.

Portable water test kits are not so reliable and water samples have to be brought back to Yangon for analysis at a registered private laboratory. The technicians at this laboratory carried out the analysis work.

All geological data are secondary information from the findings of geologists in previous study.

All meteorological data, monthly rainfall, monthly maximum and minimum temperature, humidity, wind speed etc. were secondary data. They were obtained from Naunghkio Township Meteorology Office.

The essential tool for EIA biological survey work include computer, GPS, camera, telescopes (especially for birds) binoculars, hand lens, compass, herbarium press, measuring tapes, ropes, pruners and cutter, tool for catching and trapping wild life (snare, trap, scoop, nets stakes etc), lamp and torch for night survey for nocturnal animals. Chemical preservatives (alcohol, formalin) together with plastic containers of various sizes for the preservation of specimens (especially those that could not be identified during the survey trip but to be identified later) were also necessary.

Google earth satellite imagery was also applied for the overview of forest structure, if any, generalized distribution pattern, forest gradients, opened forest, canopied forest and for the possible detection of peculiar micro-ecological niches (for both plants and animals).

Objective

The main objective is the collection, recording and documentation of all baseline data on the physical, biological, socio-economic, cultural and visual components of the area for the preparation of EIA report.

Another objective is the gathering of all available secondary information and practical as possible.

5.3 Public administration and planning

Inn Wine village and other 3 smaller villages, namely, Taung Kya, Yay Win and Pin Sone, are under the jurisdiction of Kon Gyi village Tract, Naunghkio Toungship, Kyaukme District, Shan State.

At the moment there is no known industrial development plan for the area from the Union level, State level and Township level. There is also no known rural development, urban development and agricultural development plan for the area at the Union level, State level and Township level.

So far, there is no known plan for socio-economic development for Kon Gyi Village Tract. There is yet, no such plan for future agricultural development or industrial development for this area. There is yet, no such plan at the Union Government level, Shan State level and at Naunghkio Township level.

There may be certain rural development plan, (general socio-economic aspects) implemented by NGO or INGO in the area but the EIA team does not have yet any information about this.

Except the existing Sinn Shwe Li Sugar Factory (2) there are no other existing sugar factories owned by other companies and also no other factories or plants or industrial establishments in the area.

5.4 Legally protected area

Formerly the project site is farmland. One plot of land, Plot No. 2 Inn Wine Village Area owned by a local was bought at a reasonable price by Ngwe Yi Pale' Sugar Co., Ltd.

There is no Reserved Forest or legally protected areas in this area. The whole area outside the factory compound comprises farmland, gently undulating terrain and residential areas, that is, the six villages areas.

There are no clearly demarcated public forests, in near and far vicinity. There are also no parks, wildlife sanctuaries, scientific reserves, nature reserves, geophysically significant reserves, nature reserves nominated by MONREC, protected archeological area or area of historical significance.

There are no known protected cultural heritage spots in the form of a big sacred tree or sacred rock.

In the east about 4 miles away is a low mountain range, that runs generally from north to south direction, with degraded forest.

5.5 Physical components of the surrounding environment

5.5.1 Topography

The area on the whole is midly undulating or flat terrains with a low mountain about 4 miles in the east running generally in a north-south direction. Sugar cane fields, rice fields and maize farms dominate the area with 6 residential areas (village areas) around. There are no forests in the near and far vicinity. The only water course is the small stream Doe Gon Chaung, flowing generally from north to south between the proposed sugar factory site and the existing Sugar Factory No.2.

The elevation at the proposed site is 1872 feet asl.

Figure – 35: Physical feature of the surrounding area

5.5.2 Water sources

The above-mentioned small stream Doe Gon Chaung is the water source of the area. However the villagers of Inn Wine source their water from the ground water at a depth of 210 feet. Most household have their own tube well or shallow wells.

The villagers of the other six villages source their water from either shallow wells or tube wells for drinking and domestic uses.

Figure – 36: Doe Gon Chaung

5.5.3 Geology, soil and hydrology/hydro geology

The data on geology etc are the secondary data obtained from the geologists of the company.

The region is within the Eastern Highland Belt, Geo-tectonic zone of Myanmar. This belt is characterized by major geologic components such as highly folded rocks of Paleozoic Era, partly metamorphosed. There are limestone layers in two horizons; one in Silurian to Devonian Periods, another in carboniferous to Permian Periods.

The project site is underlain and dominated by limestone of Permian to Triassic Periods.

The limestone is massive and its bedding, which is stiff and jointed at an interval of 50cm to 3m is scarcely seen at the site.

Geological components distributed at the project site generally from top to bottom are: to top soil, debris deposit and calcite deposit, siltstone and limestone. According to geologists the bed rock at the site can be categorized into 4 classes in term of strength. They are:

- Class D - Very soft; completely weathered siltstone.
- Class CL - Soft; highly to moderately weathered siltstone; highly weathered limestone.
- Class CM - Moderate hard; slightly weathered siltstone; moderately weathered limestone.
- Class CH - Hard; fresh siltstone; slightly weathered limestone.

The top soil includes organic debris (humus) sand, sandy clay and certain gravel. The soil type on the whole is highly leached, iron-rick and reddish brown soil. The soil type, according to FAO classification, is Acrisol.

As mentioned earlier there is the small stream Doe Gon Chaung between the existing Sugar Factory No. 2 and the proposed factory, flowing generally from north to south. It is a relatively fast flowing stream with clear water.

The depth of the water of the stream near the proposed site is relatively deep.

Doe Gon Chaung is about 100 feet from the site, in the east.

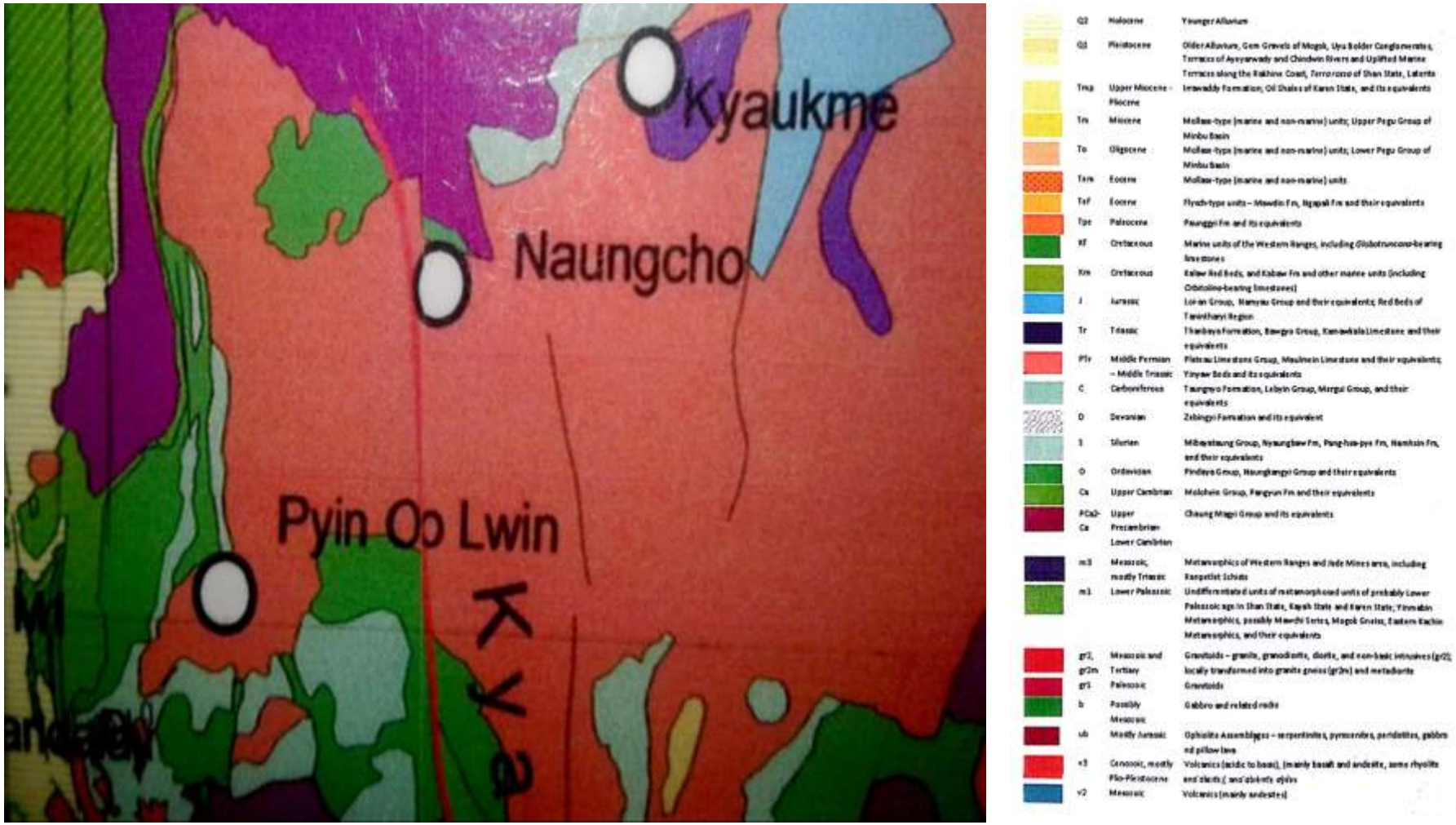


Figure – 37: General geology of the region

Soil samples (surface soil)

Soil samples were collected from Factory site, Naunghkio Township.

The soil samples from the proposed project site and Inn Wine village were brought back to Yangon and analysed at Ministry of Agriculture and Irrigation (Department of Landuse) laboratory. The coordinates: N.Lat. 22˚ 11' 4.58."; E. Long. 96˚ 43' 14.78" and N.Lat. 22˚ 10' 53.30."; E. Long. 96˚ 42' 50.64".

Soil test results (proposed project site)

Sr. No	Sample plot	pH	Texture	Total N	Available Nutrient
					P
1.	At the factory	Slightly alkaline	Clay	Low	Low

Soil analytical data sheet (proposed project site)

Sr. No	Sample plot	Moisture %	pH soil: Water 1: 2.5	Texture				Total N %	Available Nutrient
				Sand %	Silt %	Clay %	Total %		P ppm (Olsen)
1.	At the factory	5.63	7.10	38.76	10.64	50.60	100.00	0.19	0.42

Soil test results (Inn Wine village)

Sr. No	Sample plot	pH Soil : Water 1 : 2.5	Texture	Total N %	Available Nutrients
					P
1.	Inn Wine village	Moderately alkaline	Sand	Low	Medium

Soil analytical data sheet (Inn Wine village)

Sr. No	Sample plot	Moisture %	pH soil: Water 1: 2.5	Texture				Total N %	Available Nutrient
				Sand %	Silt %	Clay %	Total %		P ppm (o)
1.	Inn Wine village	6.69	7.79	86.64	9.72	3.64	100	0.19	25.29

Note: Soil samples are free of contamination by hydrocarbon, SO_2 and toxic substances.

Contaminants: The top soils are not contaminated by fuel oil or SO_2 or any other compounds.

Figure – 38: Taking soil sample from the project site

Figure – 39: Taking soil sample from the Inn Wine village

5.5.4 Environmental quality

(a) Water quality

Water samples were collected from the Doe Gon Chaung stream (coordinate: N. Lat. 22˚ 11' 7.69."; E. Long. 96˚ 43' 28.81") and from the Inn Wine waterfall near the site (coordinates: N. Lat. 22˚ 10' 41.52"; E. Long. 96˚ 43' 22.80"). Another one was collected from the drain of the factory (runoff water durng construction phase), (coordinates: N. Lat. 22˚ 11' 4.50"; E. Long. 96˚ 43' 15.16"). Water samples are analyzed at ISO TECH Laboratory, Insein, Yangon **(Also see ANNEX)**.

Figure – 40: Water sample taken from Doe Gon stream

Figure – 41: Water sample taken from waterfall

Figure – 42: Runoff water taken from the site

Table-1: Surface water quality

Sr.	Parameters	Existing values at Doe Gon stream	Existing values at Waterfall	WHO guideline values
1	pH	7.6	8.0	6.5 – 8.5
2	Temperature	25.0 ^{o}C	25.0 ^{o}C	< 3
3	Turbidity	10 NTU	18 NTU	5 NTU
4	Total Hardness	150 mg/l	160 mg/l	500 mg/l
5	Iron	0.37 mg/l	0.47 mg/l	0.3 mg/l
6	Chloride	4 mg/l	3 mg/l	250 mg/l
7	Total Dissolved Solids	144 mg/l	148 mg/l	1000 mg/l
8	Suspended Solids	13 mg/l	22 mg/l	-
9	Manganese	Nil	Nil	0.05 mg/l
10	Arsenic	Nil	Nil	0.01 mg/l
11	Zinc	Nil	Nil	3 mg/l
12	Copper	Nil	Nil	2 mg/l
13	Phosphate	Nil	Nil	-
14	Oil and grease	8.23 mg/l	7.34 mg/l	10 mg/l
15	COD	32 mg/l	32 mg/l	-
16	BOD	8 mg/l	10 mg/l	-

Table – 2: Site runoff water

Sr.	Parameters	Unit	At the site	NEQEG guideline values
1	Biochemical Oxygen Demand	mg/l	34	30
2	Chemical Oxygen Demand	mg/l	96	125
3	Oil and grease	mg/l	5	10
4	P^{H}	S.U	7.3	6-9
5	Total coliform bacteria	mg/l	180	400
6	Total nitrogen	mg/l	<5	10
7	Total phosphorus	mg/l	7	2
8	Total suspended solids	mg/l	605	50

With the exception of TSS and BOD the values are generally lower than the National Environmental Quality (NEQE) guideline values prescribed by ECD.

(b) Ambient air quality

The ambient air qualities at two spots, the proposed site and another inside Inn Wine village, were measured by technicians from the Health Department. The coordinates of the spot (at proposed site) are: N. Lat. 22˚ 11' 6.76."; E. Long. 96˚ 43' 17.87"; and inside the Inn Wine village are: N. Lat. 22˚ 10' 53.47"; E. Long. 96˚ 42' 51.71".

Figure – 43: Measuring air quality at proposed site

Figure – 44: Measuring air quality at Innwine village

Table – 3: Ambient air at the site

Sr. No	Parameters	At the proposed site	At Inn Wine Village	NEQE guideline values
1	PM_{10}	39 µg/m^3	38 µg/m^3	50 µg/m^3(24 hrs)
2	$PM_{2.5}$	34 µg/m^3	31 µg/m^3	25 µg/m^3(24 hrs)
3	NO_2	53 µg/m^3	22 µg/m^3	200 µg/m^3(1 hr)
4	SO_2	34.2 µg/m^3	30 µg/m^3	20 µg/m^3(24 hrs)
5	Ozone (O_3)	71 µg/m^3	20 µg/m^3	100 µg/m^3(8 hrs)

Except SO_2 and $PM_{2.5}$ on the whole the values are lower than the guideline values as the project is not in operation yet (The values are actually baseline values).

There can be certain impacts on the physical components but all impacts can be either controlled or mitigated.

(c) Sound Level Parameters

The sound levels (noise levels) are measured at two sites, at the same spots where ambient air is measured;

The coordinates of the spot (at proposed site) are: N. Lat. 22˚ 11' 6.76."; E. Long. 96˚ 43' 17.87"; and inside the Inn Wine village are: N. Lat. 22˚ 10' 53.47"; E. Long. 96˚ 42' 51.71".

The equipment used is EXTECH Sound Level Meter.

Table – 4: Quality of Ambient noise at sample site

Site Name /Time and Date to start	L_{eq} in dBA			L_{max} in dBA			NEQE guideline	
	Day	Night	Total	Day	Night	Total	Day	Night
Project site (3.12.2018) 10:18 Hrs to (4.12.2018) 10:18 Hrs	41	38	40	29	29	29	70	70
Values inside Inn Wine village (4.12.2018) 12:20 Hrs to (5.12.2018) 12:20 Hrs	55	30	53	27	20	25	55	45

On the whole the sound/noise level values are lower than the NEQ guideline values as the project is not in operation yet (These are actually baseline values).

(d) Vibration

Vibration were also measured at two spots, one was inside the partially completed sugar mill and Inn Wine village.

The coordinates are N. Lat. 22˚ 11' 2.25."; E. Long. 96˚ 43' 15.82" and N. Lat. 22˚ 10' 53.14"; E. Long. 96˚ 42' 51.23". The equipment used is BEME-TECH Vibration Meter.

Figure – 45: Measuring vibration at sugar mill

Figure – 46: Measuring vibration at Inn Wine village

Table – 5: Vibration

Units of measurement/value	Values at proposed site	Values inside Inn Wine village
mm/sec (peak particles velocity-PPV)	04.3 mm/s	0 mm/s

Although the guideline values are not available yet the vibration level is very low (actually no vibration) on the project is not operational yet.

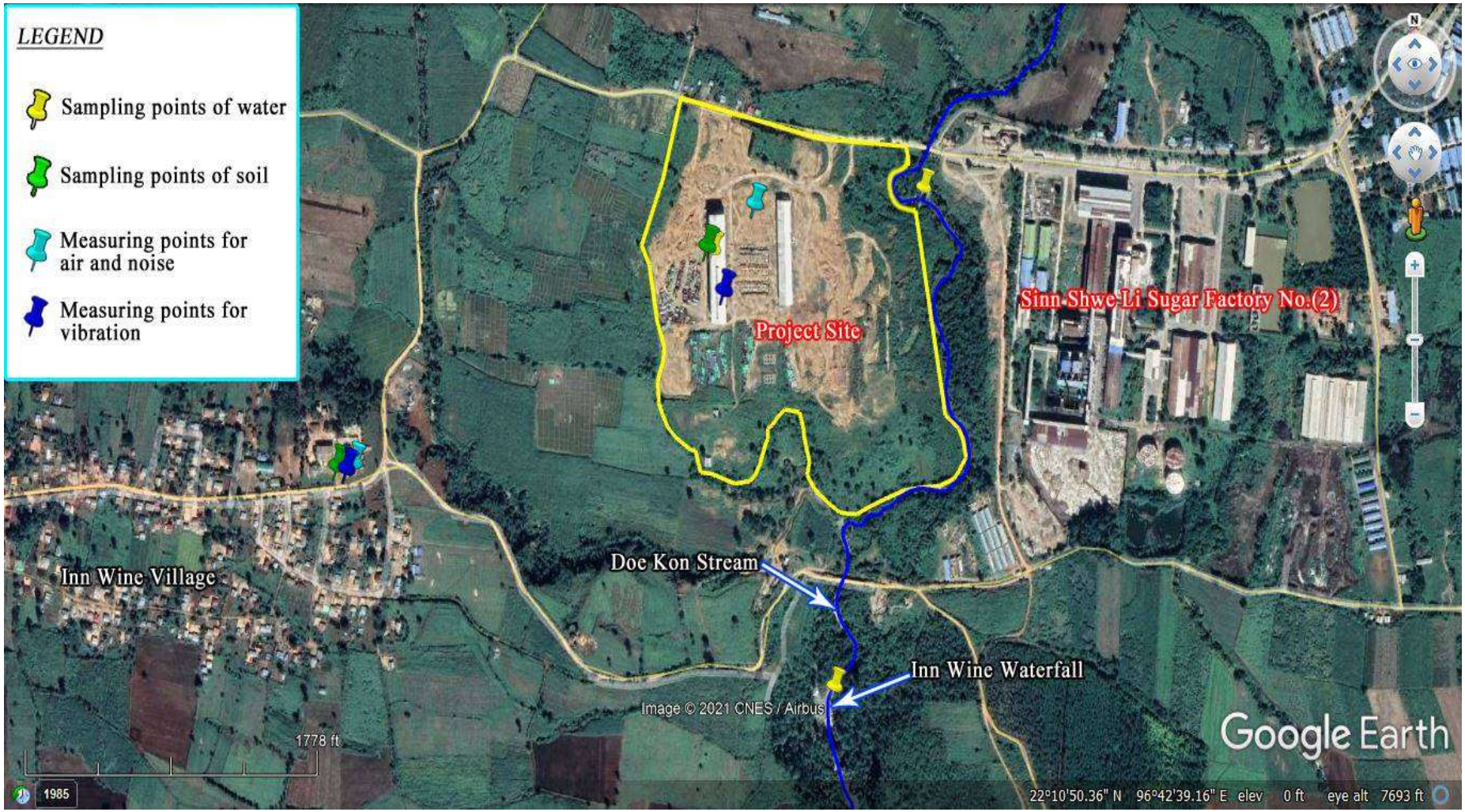


Figure – 47: Satellite image showing points where air, noise and vibration were measured and water and soil samples were taken

5.5.5 Climate

The climate is the hot wet tropical monsoon climate with relatively high temperature the whole year through. But as the elevation is relatively high it is cool to relatively cold in the cool season. There is a dry season (March – June) a wet season (June to September) and a cool season (November – end of February). This is just the generalized pattern.

Table – (6), (7), (8) and (9) show the monthly maximum, minimum mean temperature, rainfall humidity and wind speed during (2013-2021). The data were secondary ones acquired from the Naunghkio Township Meterology and Hydrology Department.

Table – 6: Monthly minimum and maximum temperature (ºC) of Naunghkio Township during 2015-2021 November

Month	Monthly temperature																	
	Maximum									Minimum								
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013	2014	2015	2016	2017	2018	2019	2020	2021
January	24.7	24.7	24.5	23.4	25.7	24.2	24.4	24.4	26.2	9.1	8.5	9.1	6.8	7.4	8.2	6.8	9.5	10.3
February	29.0	26.3	27.1	27.2	28.6	27.8	27.9	27.6	27.9	12.5	10.4	8.3	9.7	10.8	9.1	8.2	9.7	9.9
March	30.4	30.3	31.2	31.4	30.0	30.5	29.2	31.2	32.2	19.6	14.5	13.4	13.1	12.9	11.8	12.9	13.1	12.5
April	33.0	31.7	30.7	34.3	30.7	31.0	33.2	31.8	31.1	18.8	19.1	16.7	17.1	17.2	15.6	18.1	16.5	16.8
May	28.8	30.3	31.1	30.9	30.8	29.4	33.1	31.8	30.5	20.6	21.3	19.5	17.4	19.5	17.5	19.3	19.3	19.7
June	29.2	28.8	30.4	29.4	39.0	28.0	30.1	30.2	29.5	22.2	22.7	20.9	18.5	20.9	19.1	18.6	21.3	21.0
July	27.5	28.7	28.2	28.7	28.6	28.5	28.4	29.6	29.4	22.2	22.1	20.6	18.3	20.9	19.3	18.2	21.6	20.9
August	27.0	28.7	28.4	29.2	28.7	28.1	29.1	28.5	28.5	21.6	21.4	20.1	18.0	20.7	18.8	17.8	21.6	20.8
September	28.3	29.2	30.1	29.8	29.5	29.1	29.6	30.1	29.4	21.6	20.2	20.4	17.7	20.0	18.0	17.5	21.2	20.0
October	26.9	28.2	28.5	28.8	29.0	26.5	29.0	29.1	29.6	18.9	16.9	16.4	16.3	18.3	15.5	18.2	19.8	19.3
November	26.4	27.6	26.5	26.3	27.8	27.0	27.9	27.8		14.9	14.0	12.7	11.6	14.6	10.5	14.9	14.5	
December	22.8	25.6	24.2	25.8	24.5	23.8	24.8	26.2		9.4	9.2	8.9	8.2	10.1	9.4	9.3	10.5	

During the last eight years, the month June, 2017, had recorded the highest temperature (39.0ºC) while January 2019 had the lowest temperature record (6.8 ºC).

Table – 7: Shows the monthly rainfall and total rainfall of Naunghkio Township during the last eight years (2013-2021)

Month	Total rainfall per month (inch)							
	2014	2015	2016	2017	2018	2019	2020	2021
January	-	0.79	-	0.16	2.12	4.1	1.5	0.1
February	0.98	-	-	-	-	0.1	-	0.6
March	-	1.06	-	0.55	-	0.4	-	-
April	3.71	3.39	1.70	3.66	4.02	0.4	0.9	2.2
May	5.86	10.59	7.79	8.31	8.23	4.1	5.1	11.7
June	10.36	3.26	10.98	7.83	8.07	8.6	5.4	39.3
July	9.64	14.45	3.78	5.24	6.22	2.5	10.0	9.7
August	8.03	9.33	10.47	5.51	8.23	10.3	5.0	13.8
September	8.55	3.90	2.41	11.06	7.40	1.7	4.3	9.5
October	3.89	6.58	9.29	4.45	11.46	3.1	8.4	2.2
November	1.46	2.75	2.79	2.32	0.16	1.5	1.5	-
December	-	0.20	0.08	0.52	-	-	-	-
Total rainfall	**52.48**	**56.3**	**49.29**	**49.61**	**55.91**	**36.8**	**42.1**	**89.1**

A comparison of rainfall patterns during the last 8 years (2013-2021) revealed that the year 2021 had the maximum annual total rainfall–89.1 inches while the year 2019 had the minimum – 36.8.

Table – 8: Monthly humidity (%) of Naunghkio Township during (2013-2018)

Month	Humidity (%)								
	2010	2011	2012	2013	2014	2015	2016	2017	2018
January	99	84	83	79	83	79	82	83	78
February	62	69	64	64	71	67	78	76	77
March	55	60	58	53	53	59	59	64	66
April	47	69	61	48	60	63	56	70	66
May	64	82	72	76	77	74	77	80	77
June	79	85	81	77	81	79	87	83	85
July	85	83	84	87	86	86	86	85	82
August	87	88	85	86	81	87	84	87	87
September	86	86	82	83	86	81	87	86	87
October	80	89	82	84	81	86	89	86	87
November	79	81	87	88	88	88	92	84	89
December	87	94	87	81	-	-	89	85	-

A comparison of the values of mean monthly humidity (%) for the last eight years showed that the highest value, 99 occurred in January, 2010 while the lowest, 47, occurred in April, 2010.

Table – 9: Monthly wind speed (mph) of Naunghkio Township during (2013-2021)

Month	Wind speed (mph)								
	2013	2014	2015	2016	2017	2018	2019	2020	2021
January	2.1	1.6	3.5	2.3	1.3	1.6	8.0	10.0	8.5
February	2.3	2.8	4.9	4.4	1.6	2.1	7.8	11.0	8.0
March	3.5	3.2	5.0	5.7	6.2	2.5	11.0	10.5	15.0
April	4.2	3.0	5.0	6.2	5.8	2.5	10.5	11.0	10.0
May	2.2	2.4	3.6	4.8	2.2	2.0	10.0	9.0	9.5
June	1.7	3.0	3.2	3.1	1.7	1.5	6.0	9.0	10.0
July	1.4	2.5	2.7	3.1	1.6	1.5	7.0	8.0	11.0
August	1.9	2.9	2.6	3.8	1.5	1.7	6.5	8.0	7.5
September	1.8	3.1	2.7	4.1	1.8	1.4	6.8	9.0	9.5
October	1.5	3.5	2.7	2.1	1.5	1.3	8.0	8.3	9.0
November	1.7	2.6	1.7	2.1	1.1	1.2	7.0	5.5	-
December	1.1	2.3	2.9	3.0	1.3	1.4	9.5	6.0	-

The highest wind speed (15.0 mph) was recorded in March, 2021 while the lowest (1.1 mph) was recorded in December and November, 2013 and 2017, respectively. The direction of prevailing winds were generally from South West to North East during the rainy season while during the cool season the general direction were from North East to South West. But during the hot dry season the winds were irregular and there were no perceptible prevailing wind with regular direction.

5.5.6 Vegetation cover

As already mentioned earlier there are only field and farms and residential areas with literally no forest or shrub land. The area is dominated by only cultivated plants and wild herbs. There is only a green line of small trees and bush along the small stream Doe Gon Chaung.

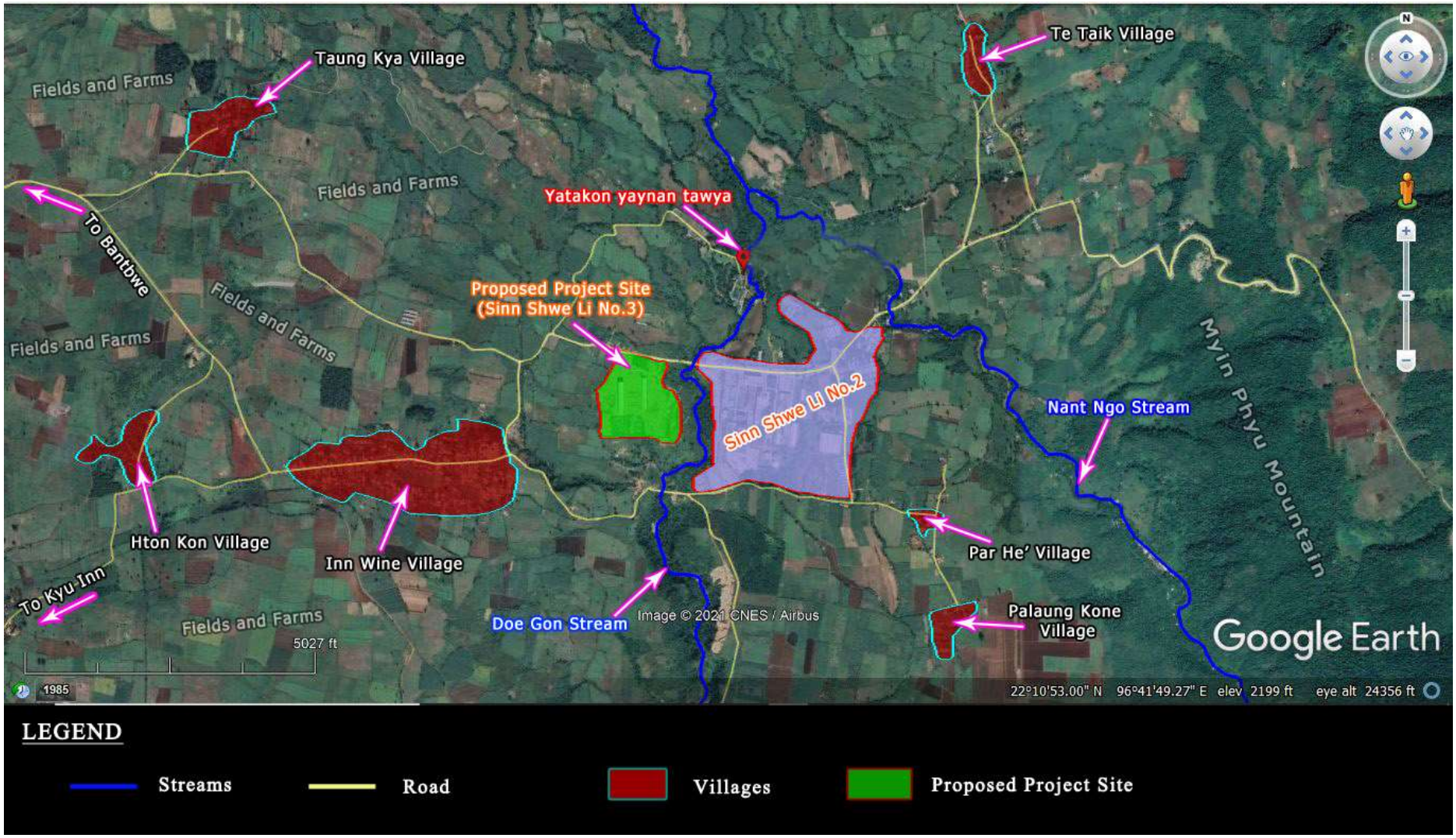


Figure – 48: Satellite image of the area showing general vegetation cover

5.5.7 Natural hazards

There were no precedents of natural hazards such as earth quakes, extreme weather events, floodings, droughts and major wild fires etc within memories of 5 decades, it is learnt.

When the unprecedented major floods that wreaked harvoc on 11 of the 14 States and Regions of the country occured in 2016 this area was luckily spared (only small floods in July, it is learnt).

The very recent major floods that wreak havoc in Bago and Taninthayi Regions, Mon and Kayin state here little or no effect on this area.

A glimpse at the meteorological data during the last seven years did not reveal any extreme events regarding monthly rainfalls and monthly temperature. The data did not also reveal any evidence to speculate for global warming or climate change. (No sign of gradual increases in temperature over the last 7 years or the gradual decrease in rainfall over that period.)

The area is within the Kyauk Kyan fault line zone which runs from north to south. Further in the west is Shan Scrap Fault Zone which runs from north to south.

5.6 Biological components of the surrounding environment

5.6.1 Flora species

The vegetation within the two miles radius of the site are studied in detail outside the area of study limit.

Only cultivated plants dominate the whole area. As mentioned above there is a green line of natural vegetation (small trees and bush) along the small stream. There are also fruit trees and shade trees inside and around the villages. The proposed site is devoid of natural trees only small shrub, herb and grass.

Diversity

A total of 321 species of plants (Angiospernes and Pteridophyte) and 71 cultivated species are recorded. Although the forest is no longer a primary one the biodiversity is still relatively high.

The inventory of plant species recorded for the whole area is shown in **Table-10**.

Table – 10: List of plant species (natural vegetation) found and recorded

No.	Botanical Name	Vanicular Name	Family	Habit	IUCN
1	*Abelmoschus manihot* (L.) Medik.	Kon-kado	Malvaceae	S	
2	*Acacia pennata* (L.) Willd.	Su-bok-gyi	Mimosaceae	C/C	
3	*Achyranthes aspera* L.	Kyet-mauk-pyan	Amaranthaceae	S	
4	*Acmella paniculata*	Unknown	Asteraceae	H	LC
5	*Adhatoda vasica* Nees.	Mu-ya-gyi	Acanthaceae	S	
6	*Adiantum capillus-veneris*	Maidenhair Fern	Adiantaceae	F	LC
7	*Aegle marmelos* (L.) Correa	Ohm-shit	Rutaceae	T	
8	*Ageratum conyzoides*L.	Khway-thay-pan	Asteraceae	H	
9	*Albizia lucidior* (Steud.) Nielsen	Than-that	Mimosaceae	T	
10	*Albizia odoratissima* (L.F.) Benth.	Taung-ma-gyi	Mimosaceae	T	
11	*Albizia procera* (Roxb.)Benth.	Sit	Mimosaceae	T	
12	*Aloe vera* L.	Sha-zaung- lat-pat	Liliaceae	H	
13	*Alpinia zerumbet* B.L Rurtt.	Padegaw	Zingiberaceae	S	
14	*Alstonia scholaris* (L.) R.Br.	Taung-ma-yo	Apocynaceae	T	LC
15	*Alternanthera sessilis* L.	Pazonsar-yaing	Amaranthaceae	H	LC
16	*Alysicarpus vaginalis* (L.) DC.	Than-ma-naing-kyauk-ma-naing	Fabaceae	S	
17	*Amaranthus spinosus* L.	Hin-nu-nwe-suyit	Amaranthaceae	H	
18	*Amaranthus viridis* L.	Hin-nu-nwe	Amaranthaceae	H	
19	*Amorphophallus paeoniifolius* (Dennst.)	Wa-u	Araceae	H	LC
20	*Andrographis paniculata* (Burm.f.) Wall.ex.Nees	Say-khar-gyi	Acanthaceae	S	
21	*Andropogon contortus* L.	Myet-lan	Poaceae	G	
22	*Anogeissus acuminata* Wall.	Yone-pin	Combretaceae	T	
23	*Anthocephalus cadamba* Miq.	Mau-bin	Rubiaceae	T	
24	*Antidesma bunius* (L.) Spreng.	kin-pa-lin	Euphorbiaceae	ST	
25	*Antidesma velutinum* Tul.	Kin-palin-gyi	Euphorbiaceae	ST	
26	*Antigonon leptopus* Hook.f. & Arn.	Taik-pan	Polygonaceae	C/C	
27	*Aphelandra acanthus* Nees.	Unknown	Acanthaceae	S	
28	*Apluda mutica* L.	Myat-wa	Poaceae	G	
29	*Archidendron jiringa* (Jack)	Danyin	Mimosaceae	T	

	I.C.Nielsan				
30	*Artemisia vulgaris* L.	Me-di-dok	Asteraceae	S	
31	*Artocarpus lakoocha* Roxb.	Myauk-lote	Moraceae	T	
32	*Arundo donax* L.	Alokyu	Poaceae	G	LC
33	*Asclepias curassavica* L.	Shwe-ta-gone	Asclepiadaceae	S	
34	*Asparagus racemosus* Wald.	Shint matet	Liliaceae	C	
35	*Axonopus compressus* (Sw.) P.Beavu	Be-sa-myat	Poaceae	G	
36	*Baliospermum axillare* Blume	Hnat-cho	Euphorbiaceae	S	
37	*Bambusa tulda* Roxb.	Thaik-wa	Poaceae	B	
38	*Barleria cristata* L.	Laik-su-apyar	Acanthaceae	S	
39	*Bauhinia acuminata* L.	Swe-daw	Caesalpiniaceae	ST	LC
40	*Bauhinia anguina* Roxb.	Myauk-lega	Caesalpiniaceae	C	LC
41	*Bauhinia glauca* (Wall.ex.Benth) Benth.	Nwe-palan	Caesalpiniaceae	C	LC
42	*Bauhinia malabarica* Roxb.	Chin-pyit	Caesalpiniaceae	T	LC
43	*Bauhinia ornata* Kz.	Swe-daw-nwe	Caesalpiniaceae	C	
44	*Bauhinia purpurea* L.	Swedaw-ni	Caesalpiniaceae	T	
45	*Bauhinia racemosa* Lam.	Phalan-pin	Caesalpiniaceae	T	
46	*Bauhinia sulphurea* Fischer.	Swedaw	Caesalpiniaceae	T	
47	*Bidens pilosa* L.	Spanish needle	Asteraceae	S	
48	*Bischofia javanica* Blume	Yepadone	Euphorbiaceae	T	
49	*Blumea balsamifera* L.	Phone-ma-thein	Asteraceae	S	
50	*Boehmeria nivea* (L.) Gaud.	Kya-sha	Urticaceae	S	
51	*Bombax ceiba* L.	Let-pan	Bombacaceae	T	
52	*Bombax insigne* Wall.	Dee-dote	Bombacaceae	T	CR
53	*Borreria capita* (Ruiz & Pav.)	Unknown	Rubiaceae	H	
54	*Borreria hispida* (L.) K. Schum.	Gant-galar	Rubiaceae	H	
55	*Bothriochloa pertusa* (L.) A.Camus.	Pan-daw-phyu	Poaceae	G	
56	*Breynia rhamnoides* Muell.	Gon-chin-ya	Euphorbiaceae	S	
57	*Broussonetia papyrifera* (L.) Vent.	Thar-lae	Moraceae	T	
58	*Buddleia asiatica* Lour.	Kyaung-mi-ku	Buddleieaceae	S	
59	*Butea frondosa* Aroxb.	Pauk-pin	Fabaceae	T	
60	*Callicarpa longifolia*	Kyun-na-lein	Verbenaceae	ST	
61	*Callicarpa macrophylla* Vahl.	Pe-bok-pin	Verbenaceae	T	

62	*Calotropis procera* (Ait.) R.Br.	Ma-yo	Asclepiadaceae	S	
63	*Canavalia virosa* Wight. & Arn	Pe-ta-let-yaing	Fabaceae	C/C	
64	*Capsicum minimum* Roxb.	Nga-yoke	Solanaceae	S	
65	*Cardiospermum halicacabum* L.	Kalar-myet-si	Sapindaceae	C/C	
66	*Careya arborea* Roxb.	Bant-bway	Lecythidaceae	T	
67	*Carica papara* L.	Thinbaw	Caricaceae	ST	
68	*Caryota urens* L.	Min-paw	Arecaceae	T	LC
69	*Cassia fistula* L.	Ngu	Fabaceae	T	LC
70	*Cassia tora* L.	Dant-gywe	Caesalpinaceae	S	
71	*Castanopsis indica* A.DC	Thit-e-gyin	Fagaceae	T	
72	*Cayratia japonica* (Thunb.) Gagnep.	Langpum	Vitaceae	C/C	
73	*Cayratia trifolia* (L.) Domin	Man-thone-kwa	Vitaceae	C/C	
74	*Celastrus paniculatus* Willd.	Nwe-ni	Celastraceae	C/C	
75	*Celosia argentea* L.	Kyet-mauk	Amaranthaceae	H	
76	*Cenchrus echinatus*	Unknown	Poaceae	G	
77	*Centella asiatica* (L.)	Myin-kwar	Apiaceae	H	LC
78	*Centrosema virginanum*	Unknown	Fabaceae	C	
79	*Cephalostachyum pergracile* Munro.	Tin-wa	Poaceae	B	
80	*Chloris inflata* Link	Laykhwa-myat	Poaceae	G	
81	*Chrysopogon aciculatus* (Retz.) Trin.	Nauk-poe-myat	Poaceae	G	
82	*Chukrasia tabularis* A.Juss	Yin-mar	Meliaceae	T	LC
83	*Cinnamomum obtusifolium* (Roxb.) Nees.	Nalein-kyaw	Lauraceae	T	
84	*Cissampelos hexandra* Roxb.	Taung-kyar-u	Menispermaceae	C/C	
85	*Cissus javana* DC.	Nga-yaung-kin-che	Vitaceae	C/C	
86	*Citrus* Sp.	Taw-shauk	Rutaceae	ST	
87	*Clematis apiifolia* DC.	Unknown	Ranunculaceae	C	
88	*Clerodendrum bungei*	Unknown	Verbenaceae	S	
89	*Clerodendrum indicum* L.	Nga-yant-padu	Verbenaceae	S	
90	*Clerodendrum japonicum* Sweet.	Unknown	Verbenaceae	S	
91	*Clerodendrum petasites* (Lour.)s. Moore.	Phet-khar	Verbenaceae	S	

92	*Clerodendrum serratum* Spreng.	Yin-bya-net	Verbenaceae	S	
93	*Cocos nucifera* L	Ohm-pin	Arecaceae	T	
94	*Colebrookea oppositifolia* Sm.	Chying-htawng-la	Lamiaceae	S	
95	*Colocasia affinis* Schott.	Pein	Araceae	H	
96	*Colocasia esculenta* (Linn.) Schott.	Mahura-pein	Araceae	H	LC
97	*Combretum ocuminatum* Roxb.	Nabu-nwe	Combretaceae	C/C	
98	*Corchorus aestuans* L.	Pilaw	Tiliaceae	S	
99	*Corchorus olitorius* L.	Pilaw-yaing	Tiliaceae	S	
100	*Cordia dichotoma* Forst.	Thanet-phet-pin	Boraginaceae	T	
101	*Cordia myxa* L.	Taung-thanut	Boraginaceae	T	
102	*Costus speciosus* Sm.	Phalaung-taung-mway	Costaceae	H	
103	*Crassocephalum crepidioides* (Benth.)	Pan-zauk-htoe	Asteraceae	H	
104	*Crassocephalum rubens*	Unknown	Asteraceae	H	
105	*Crateva hygrophila* Kurz.	Kadat	Capparaceae	T	
106	*Cratoxylum pruniflorum* Kurz.	Sa-tha-ngal-ohm-nauk	Hypericaceae	T	
107	*Crinum asiaticum* L.	Koyan-gyi	Amaryllidaceae	H	
108	*Crotalaria juncea* L.	Unknown	Fabaceae	S	
109	*Croton oblongifolius* Roxb.	Thet-yin-gyi	Euphorbiaceae	ST	LC
110	*Curculigo orchioides* Gaertn.	Ka-nyut-net	Hypoxidaceae	S	
111	*Cynodon dactylon* (L.) Pers.	Myay-sa-myat	Poaceae	G	
112	*Cyperus compressus* L.	Wet-lar	Cyperaceae	G	LC
113	*Cyperus diffusus* Vahl.	Wet-kyan	Cyperaceae	G	LC
114	*Dactyloctenium aegyotium* (L.) Willd.	Myat-lay-Kwa	Poaceae	G	
115	*Dalbergia cultrata* Grah	Yin-daik	Fabaceae	T	NT
116	*Dalbergia foliacea* Wall.	Dauk-ta-laung	Fabaceae	C/C	LC
117	*Dalbergia hupeana*	Unknown	Fabaceae	T	NT
118	*Dalbergia oliveri* Gamble	Tamalan	Fabaceae	T	EN
119	*Dalbergia paniculata* Roxb.	Thit-pagan	Fabaceae	T	
120	*Dalbergia stipulacea* Roxb.	Tamalan-nwe	Fabaceae	C/C	
121	*Dendrocalamus brandisii* Kz	Wa-bo	Poaceae	B	
122	*Derris elliptica* (Roxb.) Benth	Hone-pin	Fabaceae	S	
123	*Desmodium cephalotes* Wall.	Lauk-min	Fabaceae	S	
124	*Desmodium pulchellum* Benth.	Taung-tamin	Fabaceae	S	LC

125	*Desmodium triquetrum* (L.) DC	Lauk-thay	Fabaceae	S	
126	*Dicliptera chinensis*	Unknown	Acanthaceae	S	
127	*Digitaria sanguinalis*	Unknown	Poaceae	G	
128	*Dillenia parviflora* Martelli	Zinbyun	Dilleniaceae	T	
129	*Dioscorea glabra* Roxb.	Tayo-nwe	Dioscoreaceae	C/C	
130	*Dioscorea japonica* Thunb.	Muyauk-u	Dioscoreaceae	C	
131	*Diospyros*sp.	Te	Ebenaceae	T	
132	*Diplocyclos palmatus* (L.) C. Jeffrey	Tha-khwar-byauk-thi	Cucurbitaceae	C	
133	*Dryopteris* arguta (Kaulfuss) Watt	Not-known	Dryopteridaceae	F	
134	*Duabanga grandiflora* (Roxb.ex DC) Walp.	Lin-zin	Lythraceae	T	
135	*Echinochloa crusgalli* (L.) P. Beauv.	Myat-thi	Poaceae	G	LC
136	*Eclipta alba* Hassk.	Kyeik-hman	Asteraceae	H	
137	*Elaeocarpus decipiens*	Unknown	Elaeocarpaceae	T	
138	*Elaeocarpus floribundus* Blume.	Pan-mauk-kone	Elaeocarpaceae	T	
139	*Elephantopus scaber* L.	Sin-che	Asteraceae	H	
140	*Emblica officinalis* Gaertn.	Zi-phyu	Euphorbiaceae	T	
141	*Equisetum ramosissimim*	Unknown	Equisetaceae	H	
142	*Eragrostis nigra* Nees ex Steud.	Myat-thin-don	Poaceae	G	
143	*Eranthemum splendens* Siebert & Voss.	Sok-sa-li	Acanthaceae	S	
144	*Eranthemum tetragonum* Nees.	Pan-zet	Acanthaceae	S	
145	*Erythrina indica* Lam.	In-kathit	Fabaceae	T	LC
146	*Erythrina stricta* Roxb.	Taung -kathit	Fabaceae	T	
147	*Erythrina suberosa* Roxb.	Kathit	Fabaceae	T	
148	*Eucalyptus globulus* Labill	Eu-ka-lit	Myrtaceae	T	
149	*Eugenia fruticosa* Roxb.	Thabye-ni	Myrtaceae	T	
150	*Eugenia kurzii* Duthic.	Thabye-nyo	Myrtaceae	T	
151	*Eupatorium odoratum* L.	Bizet	Asteraceae	S	
152	*Euphorbia heterophylla* L.	Kywe-kyaung-min-say	Euphorbiaceae	S	
153	*Euphorbia hirta* L.	Not-known	Euphorbiaceae	H	
154	*Euphorbia neriifolia* L.	Sha-zaung- myin-na	Euphorbiaceae	ST	

155	*Ficus glomerata* Roxb.	Ye-tha-phan	Moraceae	T	
156	*Ficus hispida*L.	Kha-aung	Moraceae	T	
157	*Ficus infectoria* Roxb.	Nyaung-chin	Moraceae	T	
158	*Ficus lyrata*	Thaphan	Moraceae	S	
159	*Ficus nervosa* Heyne ex Roth.	Nyaung-peinne	Moraceae	T	
160	*Ficus obitusifolia* Roxb.	Nyaung-gyet	Moraceae	T	
161	*Ficus palmata* Forssk.	Thaphan-kalar	Moraceae	T	
162	*Ficus racemosa* L.	Yay-tha-phan	Moraceae	T	
163	*Ficus religiosa* L.	Baw-di-nyaung	Moraceae	T	
164	*Ficus roxburghii* Wall.	Sin-thaphan	Moraceae	T	
165	*Ficus semicordata* Ham	Ka-dwut	Moraceae	T	
166	*Flemingia congesta* Roxb.	Kyay-myi-ni	Fabaceae	S	
167	*Flemingia strobilifera* R.Br.	Say-leik-pya	Fabaceae	S	
168	*Flueggea leucopyrus* Willd.	Kone-chin-ya	Euphorbiaceae	S	
169	*Fraxinus griffithii* C.B.Clarke.	Say-khar- gyi	Oleaceae	T	LC
170	*Galinsoga parviflora* Cav.	Bizet-wa	Asteraceae	H	
171	*Garuga pinnata* Roxb.	Chinyoke	Burseraceae	T	
172	*Girardinia heterophylla* Decne.	Sin-phet-ya	Urticaceae	S	
173	*Glochidion* sp.	Htama-soke	Euphorbiaceae	ST	
174	*Gluta tavoyana* Wall.	Thayet-thitsay	Anacardiaceae	T	
175	*Gmelina arborea*Roxb.	Ye-ma nay	Verbenaceae	T	
176	*Grewia hirsuta* Vahl.	Kyet-tayaw	Tiliaceae	ST	
177	*Grewia retusifolia* Kurz.	Tayaw	Tiliaceae	ST	
178	*Grewia scabrophylla* Roxb.	Phet-shat	Tiliaceae	ST	
179	*Grewia tiliaefolia* Roxb.	Tayaw	Tiliaceae	T	
180	*Haplophragma adenophyllum* (Wall.) Dop.	Phet-than	Bignoniaceae	T	
181	*Harrisonia perforata* Merr.	Tabu	Simaroubaceae	ST	
182	*Hibiscus ficulneus* L.	Taw-yonbade	Malvaceae	S	
183	*Holarrhena pubescens* Wall.ex.G. Don	Lat-htoke-kyi	Apocynaceae	T	LC
184	*Holmskioldia sanguinea* Retz.	Hti-pan	Verbenaceae	S	
185	*Hoya carnosa* R.Br.	Wax plant	Asclepiadaceae	C/C	
186	*Hydrocotyle javanica* Thumb.	Myin-kwar	Apiaceae	H	LC
187	*Hydrocotyle vulgaris*	Unknown	Apiaceae	H	LC
188	*Hygrophila ringens*	Unknown	Acanthaceae	S	

189	*Hymenodictyon excelsum (Roxb.) Wall.*	Khu-than	Rubiaceae	T	
190	*Hymenopyramis brachiata Wall.*	Chitelet-nwe	Verbenaceae	C/C	
191	*Imperata cylindrical* (L.) P.Beauv.	Thekke	Poaceae	G	
192	*Ipomoea purpurea* (L.) Roth.	Pan-kazon-nwe	Convolvulaceae	C/C	
193	*Ipomoea quamoclit* L.	Myat-lay-pan	Convolvulaceae	C/C	
194	*Ipomoea sepiaria* koen.ex.Roxb.	Taw-kanzon	Convolvulaceae	C/C	
195	*Ipomoea triloba* L.	Unknown	Convolvulaceae	C/C	
196	*Ipomoea violacea* L.	Taung-kazon	Convolvulaceae	C/C	
197	*Jatropha curcas* (L.)	Siyo-kyetsu	Euphorbiaceae	S	
198	*Justica diffusa* Willd.	Bahone-phyu	Acanthaceae	S	
199	*Justicia adhatoda* L.	Mu-yar-gyi	Acanthaceae	S	
200	*Justicia betonica*	Not-known	Acanthaceae	S	
201	*Justicia procumbens* L.	Phet-yar	Acanthaceae	S	
202	*Justicia* Sp.	Unknown	Acanthaceae	H	
203	*Kydia calycina* Roxb.	Tabo	Malvaceae	T	
204	*Lagerstroemia parviflora* Roxb.	Zaung-pale	Lythraceae	T	
205	*Lagerstroemia tomentosa* Presl.	Leza	Lythraceae	T	
206	*Lannea coromandelica* Merr.	Na-be	Anacardiaceae	T	
207	*Lantana camara* L.	Sein-na-pan	Verbenaceae	S	
208	*Lasia spinosa* (L.)Thwaites.	Zayit	Araceae	H	LC
209	*Leea sambucina* Willd.	Taung-baung	Leeaceae	S	
210	*Leucaena leucocephala* (Lam.) De wit	Baw-sa-gaing	Mimosaceae	ST	
211	*Leucas aspera*L.	Taw-pin-sein	Lamiaceae	S	
212	*Leucas cephalotes* Spreng.	Pin-ku-hteik-pate	Lamiaceae	S	
213	*Ligustrum lucidum*	Unknown	Oleaceae	T	
214	*Lindenbergia indica* (L.) Kuntze.	Not-known	Scrophulariaceae	H	LC
215	*Lithocarpus collettii* (King) Merr	Sagat	Fagaceae	T	
216	*Lithocarpus dealbatus* (Hook. f. & Thoms) Rehd.	Kywet-sa-ni	Fagaceae	T	
217	*Lithocarpus lindleyannus* (Wall.ex A.DC)	Phet-Kyan	Fagaceae	T	

218	*Lithocarpus* Sp.	Phet-kasar	Fagaceae	T	
219	*Litsea* Sp.	Ondon	Lauraceae	T	
220	*Ludwigia octovalvis* (Jacq).) Raven	Lay-nyin-gyi	Onagraceae	H	LC
221	*Luffa acutangula* (L.) Roxb.	Thabut-khar-nwe	Cucurbitaceae	C/C	
222	*Luffa aegyptiaca* Mill	Thabut-cho	Cucurbitaceae	C	
223	*Macaranga gigantea*	Taw-kyun	Euphorbiaceae	T	
224	*Malvastrum coromandelianum* (L.) Garcke	Taw-pilaw	Malvaceae	S	
225	*Mangifera indica* L.	Tha-yet	Anacardaiceae	T	
226	*Melilotus alba* Lam.	Pae-yaing	Fabaceae	C/C	
227	*Merremia vitifolia* (Burm.f) Hallier.f.	Kyet-hingale-nwe	Convolvulaceae	C/C	
228	*Michelia champaca* L.	Saga-wa	Magnoliaceae	T	LC
229	*Mikania micrantha* H.B.K.	Bizet-nwe	Asteraceae	C/C	
230	*Millenttia auriculata* Baker.	Won-u	Fabaceae	C/C	
231	*Millettia ovalifolia* Kurz.	Thin-win	Fabaceae	T	
232	*Mimosa pudica* L.	Hti-Ka-yone	Mimosaceae	S	LC
233	*Mimosa rubicaulis* Lam.	Japan-htika-yone	Mimosaceae	S	
234	Mitracarpus villosus (Sw.) DC	Unknown	Rubiaceae	H	
235	*Mitragyna rotundifolia* (Roxb.) O.Kuntze.	Binga	Rubiaceae	T	LC
236	*Moringa oleifera* Lamk.	Dant-tha-lon	Moringaceae	ST	
237	*Mucuna pruriens* (L.) DC	Khway-laya	Fabaceae	C/C	
238	*Musa ornata* Roxb.	Taw-nget-pyaw	Musaceae	H	
239	*Musa sapientum*	Ya-khine-nga-pyaw	Musaceae	H	
240	*Musa x paradisiaca* L.	Phee-gyam	Musaceae	H	
241	*Operculina turpethum* L.ex.Manso.	Kya-hin-pin	Convolvulaceae	C/C	
242	*Oroxylum indicum* Vent.	Kyaung-sha	Bignoniaceae	ST	
243	*Ottochloa nodosa* (Kunth) Dandy.	Wa-yone -myat	Poaceae	G	
244	*Pandanus furcatus* Roxb.	Kazut	Pendanaceae	ST	
245	*Pavonia odorata* Willd.	Barlar-pin	Malvaceae	S	
246	*Pennisetum alopecuroides* Etouffee	Pandaw-ni	Poaceae	G	
247	*Pentaceae burmanica* Kurz.	Kathi ka	Tiliaceae	T	
248	*Persicaria glabra* (Willd.)	Bote-htaung	Polygonaceae	H	

249	*Petraea volubilis* L.	Thamaga-pan	Verbenaceae	C/C	
250	*Phaseolus calcaratus* Roxb.	Pe-yin	Fabaceae	C/C	
251	*Phragmites karka* (Retz.) Trin.ex. Steud.	Kyu	Poaceae	G	LC
252	*Phyllanthus niruri* L.	Kyet-tha-hin	Euphorbiaceae	S	
253	*Phyllanthus reticulates* Poir.	Ye-chin-ya	Euphorbiaceae	S	
254	*Phyllanthus urinaria* L.	Mye-zi-phyu	Euphorbiaceae	H	
255	*Physalis minima* L.	Bauk-pin	Solanaceae	H	
256	*Picrorhiza kuroa* Royle.	Saung-may-khar	Scrophulariaceae	S	
257	*Piper nigrum* L.	Nga-yoke-kaung	Piperaceae	C	
258	*Platycerium superbum*	Zaw-gi-u-htoke	Polypodiacceae	F	
259	*Polygonum barbatum* L.	Su-zet-pan	Polygonaceae	S	
260	*Polygonum tomentosum* Willd.	Ma-har-kar-kyan-sit	Polygonaceae	S	LC
261	*Protium serratum* Engl.	Thadi	Burseraceae	T	
262	*Pterocarpus indicus* Willd	Padauk	Fabaceae	T	EN
263	*Pueraria montana* Var.	Unknown	Fabaceae	C	
264	*Quercus helferiana* A.DC	Yin-gu-akyi	Fagaceae	T	
265	*Randia dumetorum* (Retz.) Poir.	Thamin-sa	Rubiaceae	S	
266	*Ricinus communis* L.	Kyet-su	Euphorbiaceae	S	
267	*Saccharum spontaneum* L.	Kaing	Poaceae	G	LC
268	*Salix matsudana*	Thit-ta-phwe	Salicaceae	T	
269	*Sapindus rarak* DC.	Ngwa-padi	Sapindaceae	T	
270	*Schleichera trijuga* Willd.	Gyoe-pin	Sepindaceae	T	
271	*Senna occidentalis*	Dant-kywe	Fabaceae	S	
272	*Senna siamea* (Lam.) irwin & Barneby	Mezali	Caesalpiniaceae	T	LC
273	*Shorea obtusa* Wall	Thit-ya	Dipterocarpaceae	T	NT
274	*Sida acuta* Burm.	Tabyatsi-ywet-chon	Malvaceae	S	
275	*Sida cordifolia* L.	Tabyatsi-ywet-wine	Malvaceae	S	
276	*Smilax glabra* Roxb.	Sein-na-baw	Smilaceae	C	
277	*Smilax macrophylla* Roem.	Sein-na-baw-gyi	Smilaceae	C	
278	*Solanum erianthum* D.Don	Daung-satpya	Solanaceae	S	
279	*Solanum indicum* L.	Kazaw-kha	Solanaceae	S	
280	*Solanum nigrum* L.	Baung-laung-nyo	Solanaceae	S	
281	*Solanum torvum* L.	Khayan-kazaw	Solanaceae	S	

282	*Sonchus asper*	Unknown	Asteraceae	H	
283	*Sonchus wightianus*	Unknown	Asteraceae	H	
284	*Sphaeranthus indicus* L.	Kadu	Asteraceae	H	LC
285	*Spondias mangifera* Willd.	Gway-thi	Anacardiaceae	T	
286	*Spondias pinnata* (L.) Kurz.	Taw-gway	Anacardiaceae	T	
287	*Stachytarpheta indica* (L.) Vahl.	Aseik-taya	Verbenaceae	S	
288	*Stephania venosa* (Blume) Spreng	Sin-tone-ma-nwe	Menispermaceae	C	
289	*Sterculia versicolor* Wall.	Shaw-phyu	Sterculiaceae	T	
290	*Stereospermum personatum* (Hassk.)	Than-tay	Bignoniaceae	T	
291	*Stereospermum suaveolens* DC.	Kywe-ma-gyo-lein	Bignoniaceae	T	
292	*Strobilanthes cusia* (Nees) Kuntze.	Unknown	Acanthaceae	S	
293	*Stychnos nux-vomica* L.	Kha-paung	Loganiaceae	T	
294	*Swintonia floribunda Griff.*	Taung-tha-yet	Anacardiaceae	T	
295	*Synedrella nodiflora* (L.) Gaertn.	Bizat-hpo	Asteraceae	H	
296	*Tamarindus indica* L.	Magyi	Caesalpinaceae	T	LC
297	*Tanacetum vulgare*	Unknown	Asteraceae	H	
298	*Tectona grandis* L.f	Kyun	Verbenaceae	T	
299	*Terminalia arjuna* Wight &Arn.	Htauk-kyant	Combretaceae	T	
300	*Terminalia bellerica* Roxb.	Thit-seint	Combretaceae	T	
301	*Terminalia chebula* Retz.	Phan-khar	Combretaceae	ST	
302	*Themeda triandra* forssk.	Myauk-mi	Poaceae	G	
303	*Thunbergia grandiflora* Roxb.	Pan-ye-sut-nwe	Acanthaceae	C/C	
304	*Thyrsostachys oliveri* Gamble.	Thana-wa	Poaceae	B	
305	*Tithonia diversifolia* A.Gray	Nay-kyar	Asteraceae	S	
306	*Toona ciliata* m.Roem	Taung-tama	Meliaceae	T	LC
307	*Trachycarpus fortunei* (Hook) H. Wendl.	Chinese windmill palm	Arecaceae	T	
308	*Trema orientalis* (L.)	Kywe-sa	Ulmaceae	ST	LC
309	*Trevesia palmata* (Roxb.ex Lindl.) Vis	Hpaw-bu-pin	Araliaceae	ST	
310	*Trichosanthes cordata* Roxb.	kyi-ar-gyi	Cucurbitaceae	C/C	
311	*Triumfetta canna*	Katsine	Tiliaceae	S	

312	*Triumfetta rhomboidea* Jacq.	Katsine-galay	Tiliaceae	S	
313	*Urena lobata* L.	Ket-si-nae	Malvaceae	S	
314	*Vernonia cinerea* (L.) Less.	Kadu-pyan	Asteraceae	H	
315	*Vitex limonifolia* Wall.	Kyun-gaung-nwe	Verbenaceae	T	
316	*Waltheria indica* L.	Bauk-phyu	Sterculiacae	S	
317	*Wattakaka volubilis* (L.f) Stapf	Gwe-dauk-nwe	Asclepiadaceae	C	
318	*Youngia japonica* (L.) DC.	Sin-chae	Asteraceae	H	
319	*Zehneria umbellata*	Tha-kwar-byauk-thi	Cucurbitaceae	C/C	
320	*Ziziphus aenoplia* (L.) Mill.	Zi-pin	Rhamnaceae	T	
321	*Ziziphus mauritiana* Lam.	Zi-chin	Rhamnaceae	T	

Table – 11: List of plant species (artificial vegetation) found and recorded

No.	Botanical Name	Vanicular Name	Family	Habit
1	*Allium cepa* L.	Kyet-thon-ni	Liliaceae	H
2	*Albiza lebbek* (L.) Benth.	Kokko	Mimosaceae	T
3	*Alternanthera brasiliana* L.	Palae-thwe	Amaranthaceae	S
4	*Ananas comosus* (L.) Merr.	Nar-net	Bromeliaceae	S
5	*Annona squamosa* L.	Awza	Annonaceae	T
6	*Araucaria cunninghamii Sw.*	Hoop-pine	Araucariaceae	T
7	*Artocarpus heterophyllus* Lam.	Pein-ne	Moraceae	T
8	*Azadirachta indica* A.Juss	Tama	Meliaceae	T
9	*Benincasa hispida* (Thunb.) Cogn.	Kyauk-pha-yone	Cucurbitaceae	C/C
10	*Bougainvillea glabra* Choisy.	Sekku-pan	Nyctaginaceae	C/C
11	*Callistermon lanceolatus* DC.	Payoke-swe-le	Myrtaceae	ST
12	*Capsicum minimum* Roxb.	Nga-yoke	Solanaceae	S
13	*Carica papara* L.	Thinbaw	Caricaceae	ST
14	*Catharanthus roseus* (L.) G.Don.	Thinbaw-manyo	Apocynaceae	S
15	*Cicer arietinum* L.	Kalar-pe	Fabaceae	C
16	*Citrullus vulgaris Schoraol.*	Pha-ye-thi pin	Cucurbitaceae	C/C
17	*Clausena excavate* Burm.f	Pyin-daw-thein	Rutaceae	S
18	*Codiaeum variegatum* (L.) Blume.	Ywet-hla	Euphorbiaceae	S
19	*Coriandrum sativum* L.	Nan-nan-pin	Apiaceae	H
20	*Cuphea hookeriana* Walp.	Star-war	Lythraceae	H
21	*Cymbopogon citratus* Stapf.	Sapalin	Poaceae	G
22	*Delonix regia* (Bojer ex Hook.Rof)	Sein-pan-gyi	Caesalpinaceae	T
23	*Diospyros embryopteris* Pers.	Kalar-te	Ebennaceae	T
24	*Duranta repens* L.	Bo-ka-daw-myet-kone	Verbenaceae	S

25	*Ervatamia coronaria* (Willd.) Stap.	Zalat-sat-kya	Apocynaceae	S
26	*Eucalyptus globulus* Labill	Eu-ka-lit	Myrtaceae	T
27	*Eugenia kurzii* Duthic.	Thabye-nyo	Myrtaceae	T
28	*Euphorbia milii* Moutins.	Kiss-me-quick	Euphorbiaceae	S
29	*Gardenia jasminoides* Ellis.	Zi-za-wa	Rubiaceae	S
30	*Grevillea robusta* A.Cunn.ex R.Br	Khar-taw-mi	Proteaceae	ST
31	*Guizotia obyssinica* (L.f) Cass	Pan-Hnun	Asteraceae	S
32	*Hibiscus esculantus* L.	Yone-padi	Malvaceae	S
33	*Hibiscus sabdariffa* L.	Chin-baung-ni	Malvaceae	S
34	*Impatiens balsamina* L.	Dan-ta-let-pin	Balsaminaceae	H
35	*Ipomoea batatas*	Kazon-u	Convolvulaceae	C
36	*Ixora coccinea* L.	Ponna-yeik	Rubiaceae	S
37	*Jasminum abyssinicum* H.ex. DC.	Sapal	Oleaceae	S
38	*Juniperus chinensis*	Christmas	Cupressaceae	S
39	*Laqenaria vulgaris* Ser.	Bu-thi	Cucurbitaceae	C
40	*Lycopersicun esculentum* Mill.	Khayan-chin	Solanaceae	S
41	*Manihot esculenta* Crantz	Pilaw-pinum	Euphorbiaceae	T
42	*Mesua ferrea* L.	Gant-gaw	Guttiferae	T
43	*Mimusops elengi* L.	Khayay	Sapotaceae	T
44	*Moringa oleifera* Lam.	Dant-tha-lon	Moringaceae	T
45	*Murraya paniculata* (L.) Jack.	Yuzana	Rutaceae	ST
46	*Musa sapientum*	Ya-khine-nga-pyaw	Musaceae	H
47	*Musa x paradisiaca* L.	Phee-gyam	Musaceae	H
48	*Nerium oleander* L.	Nwe-thar-ge	Apocynaceae	C/C
49	*Ocimum sanctum* L.	Pin-sein	Lamiaceae	H
50	*Oryza sativa* L.	Saba	Poaceae	G
51	*Phlox drummondii* Hook.	Thayet-htal-pan	Polemoniaceae	H
52	*Pinus amerkusii* Jungh	Htinn-yu	Pinaceae	T
53	Pinus wallichiana A.B.Jacks.	Blue-pine	Pinaceae	T
54	*Plumeria rubra*	Tayoke-saga-phyu	Apocynaceae	ST
55	*Polyalthia longifolia* (Lam.) B. & Hook.f.	Ar-thaw-ka	Annonaceae	T
56	*Psidium guajava* L.	Malaka	Myrtaceae	ST
57	*Pterocarpus indicus* Willd	Padauk	Fabaceae	T
58	*Ravenala madagascariensis* Gmel.	Traveler's palm	Strelitziaceae	T
59	*Rosa centifolia* L.	Hnin-si	Rosaceae	S
60	*Saccharum officinarum* L.	Kyan-pin	Poaceae	G
61	*Sesbania grandiflora* (L.) Poir.	Pauk-pan-phyu	Fabaceae	ST
62	*Swietenia macrophylla* King.	Mahaw-gani	Meliaceae	T
63	*Syzygium campanulatum*	Ar-si-yan-thabye	Myrtaceae	T

64	*Tagetes erecta* L.	Kala-pan	Asteraceae	H
65	*Tamarindus indica* L.	Magyi	Caesalpinaceae	T
66	*Tecoma stan (*L.) Juss.ex Kunth	Sein-ta-chu	Bignoniaceae	S
67	*Tectona grandis* L.f	Kyun	Verbenaceae	T
68	*Terminalia mantaly* H.Perrier	Taiwam-benda	Combretaceae	T
69	Thunbergia erecta T. Anderson	Khwar-nyo	Acanthaceae	C/C
70	*Thyrsostachys siamensis* (Kurz ex Munro)	Hti-yo-wa	Poaceae	B
71	*Zea mays*L.	Pyaung	Poaceae	G

T = Tree
ST = Small Tree
H = Herb
S = Shrub
C = Climber
C/C = Climber/Creeper
B = Bamboo
G = Grass
F = Fern

Of the 321 species recovered 46 species are in the IUCN Red List, one species in Critically Endangered (CR), two species in Endangered (EN), three species in Near Threatened (NT) and 40 species in Least Concern (LC).

This is actually on a global perspective; in this context species that are supposed to be in IUCN List still thrive well.

In term of diversity the family Poaceae and Asteraceae dominates all other families follows by Fabaceae, Euphorbiaceae and Moraceae.

CR - Critically Endangered
EN - Endangered
NT - Near Threatened
LC - Least Concern

Abundance/dominance general pattern

A rapid study on the density of trees reveals a fairly abundance of plant individuals in some patches of forest.

Cultivated plants dominate the whole area. As for natural vegetation only grass and herb dominate the area.

Rare and vulnerable species

On the whole big trees were almost none existence. Big trees with GBH (Girth at Breast Height) of 300cm represented less than 1% of the whole study area. All of them are outside the project site especially around the village monastery. Forty six species of trees were in the IUCN Red list, as Critically Endangered (CR), Endangered (EN), Near Threatened (NT) and Least Concern (LC). They were as follows:

Bombax insigne Wall. (CR); *Dalbergia oliveri* Gamble, *Pterocarpus indicus* Willd (EN); *Dalbergia cultrata* Grah, *Dalbergia hupeana*, *Shorea obtusa* Wall (NT); *Acmella paniculata*, *Adiantum capillus-veneris*, *Alstonia scholaris* (L.) R.Br., *Alternanthera sessilis* L., *Amorphophallus paeoniifolius* (Dennst.), *Arundo donax* L., *Bauhinia acuminata* L., *Bauhinia anguina* Roxb., *Bauhinia glauca* (Wall.ex.Benth) Benth., *Bauhinia malabarica* Roxb., *Caryota urens* L., *Cassia fistula* L., *Centella asiatica* (L.), *Chukrasia tabularis* A.Juss, *Colocasia esculenta* (Linn.) Schott., *Croton oblongifolius* Roxb., *Cyperus compressus* L., *Cyperus diffusus* Vahl., *Dalbergia foliacea* Wall., *Desmodium pulchellum* Benth., *Echinochloa crusgalli* (L.) P Beauv., *Erythrina indica* Lam., *Fraxinus griffithii* C.B.Clarke., *Holarrhena pubescens* Wall.ex.G.Don, *Hydrocotyle javanica* Thumb., *Hydrocotyle vulgaris*, *Lasia spinosa* (L.) Thwaites., *Lindenbergia indica* (L.) Kuntze., *Ludwigia octovalvis* (Jacq). Raven, *Michelia champaca* L., *Mimosa pudica* L., *Mitragyna rotundifolia* (Roxb.) O.Kuntze., *Phragmites karka* (Retz.) Trin.ex.Steud., *Polygonum tomentosum* Willd., *Saccharum spontaneum* L., *Senna siamea* (Lam.) irwin & Barneby, *Sphaeranthus indicus* L., *Tamarindus indica* L., *Toona ciliata* m.Roem, and *Trema orientalis* (L.) (LC).

Species of Socio-economic interest

No big trees are left for the extraction of timbers.

This secondary vegetation still provided fuel wood for the villagers especially for the baking of limestone for production of lime.

Medicinal plants still existed in this secondary forest but were not economically viable due to the scarcity of the plants.

Ageratum conyzoides L., *Aloe vera* L., *Alpinia zerumbet* B.L Rurtt., *Alstonia scholaris* (L.) R.Br., *Alysicarpus vaginalis* (L.) DC., *Andrographis paniculata* (Burm.f.) Wall.ex.Nees, *Baliospermum axillare* Blume, *Cinnamomum obtusifolium* (Roxb.) Nees., *Clerodendrum serratum* Spreng., *Croton oblongifolius* Roxb., *Eclipta alba* Hassk., *Eupatorium odoratum* L., *Euphorbia heterophylla* L., *Hydrocotyle javanica* Thumb., *Millenttia auriculata* Baker., *Moringa oleifera* Lamk., *Polygonum tomentosum* Willd., *Stachytarpheta indica* (L.) Vahl. and *Stephania venosa* (Blume) Spreng are medicinal plants but are not plentiful to be commercially feasible.

Rudimentary bamboo thickets can be still found here and there at Myin Phyu mountain in the east.

Mushrooms and bamboo shoots were still available small quantity during the rainy season. These were collected either for household consumption.

The impact of the project on the biodiversity particularly vegetation if any would be very negligibly almost zero. There is/are no trees to be cut or cleared for the preparation of the construction works.

5.6.2 Fauna species

5.6.2.1 Avian fauna (birds)

Birds are very mobile animals and can be found in virtually all kinds of a land area (either living is or entering the area). The birds found during the EIA study are mostly either from the row of small trees and bush along the stream or from fruit/shade trees inside or around the villages. They are very rarely found in the small bush inside the project site and near vicinity.

The data are primary data during EIA study conducted by MESC team.

Radom surveys as well as transect line in the designated study area are carried out, going to places or spots including inside and around villages where birds are expected to be seen. The GPS position of transect points are as follow:

Coordinates	Elavation	Survey area
N. Lat. 22°11'04.4"; E. Long 96°43'20.0"	580m	Factory site
N. Lat. 22°10'51.9"; E. Long 96°43'23.1"		
N. Lat. 22°11'25.4"; E. Long 96°43'45.2"	599m	Yedakun Tawya
N. Lat. 22°11'23.5"; E. Long 96°44'09.3"		Nagarpayar
N. Lat. 22°11'47.3"; E. Long 96°45'02.1"	706m	Base of Mountain
N. Lat. 22°11'41.3"; E. Long 96°45'05.4"	772m	
N. Lat. 22°11'14.1"; E. Long 96°43'13.6"	615m	Field and farm
N. Lat. 22°11'20.1"; E. Long 96°43'13.3"	629m	
N. Lat. 22°11'21.8"; E. Long 96°43'10.4"	638m	Field and farm
N. Lat. 22°11'39.5"; E. Long 96°43'14.5"	654m	
N. Lat. 22°11'07.3"; E. Long 96°44'58.8"	605m	Base of Mountain
N. Lat. 22°11'10.6"; E. Long 96°45'01.8"	680m	
N. Lat. 22°10'36.3"; E. Long 96°44'57.4"	442m	Upper waterfall
N. Lat. 22°10'21.0"; E. Long 96°45'09.2"	569m	Opposite waterfall
N. Lat. 22°11'26.6"; E. Long 96°45'24.1"	826m	Shingee Shinlay Nutkunn area
N. Lat. 22°11'25.7"; E. Long 96°45'32.3"	916m	Moutain forest

Diversity

A total of 128 species of avian fauna (birds) belonging to 50 families were recorded. Inventory list of bird species is shown in **Table-12**.

Table-12: List of bird species recorded from and around the study area

Sr. No	Common New Name	*Scientific name*	IUCN (2021)
	PHASIANIDAE: PERDICINAE		
1	Chinese Francolin	*Francolinus pintadeanu*	LC
	PHASIANIDAE: PHASIANINAE		
2	Red Junglefowl	*Gallus gallus*	LC
	ANTIDAE: DENDROCYGNINAE		
3	Lesser Whistling-Duck	*Dendrocygna javanica*	LC
	ARDEIDAE: ARIDEINAE		
4	Black-crowned Night-Heron	*Nycticorax nycticorax*	
5	Pond-Heron	*Ardeola sp*	
6	Eastern Cattle Egret	*Bubulcus coromandus*	
7	Little Egret	*Egretta garzetta*	LC
	PHALACROCORACIDAE		
8	Little Cormorant	*Phalacrorax niger*	
	FALCONIDAE: FALCONINAE		
9	Collared Falconet	*Microhierax caerulescens*	
10	Common Kestrel	*Falco tinnunculus*	LC
	FALCONIDAE: ACCIPITRINAE		
11	Oriental Honey-Buzzard	*Pernis ptilorhynchus*	LC
12	Black -shouldered Kite	*Elanus caeruleus*	LC
13	Short-toed Snake-Eagle	*Circaetus gallicus*	
14	Crested Serpent-Eagle	*Spilornis cheela*	LC
15	Shikra	*Accipiter badius*	LC
16	Rufous-winged Buzzard	*Butastur liventer*	LC
17	Grey-faced Buzzard	*Butastur indicus*	LC
18	Changeable Hawk-Eagle	*Nisaetus limnaeetus*	
	TURNICIDAE		
19	Barred Buttonquail	*Turnix suscitator*	LC
	VANELLIDAE		
20	Red-wattled Lapwing	*Vanellus indicus*	LC
	SCOLOPACIDAE: TRINGINAE		
21	Green Sandpiper	*Tringa ochropus*	LC
	COLUMBIDAE: COLUMBINAE		
22	Rock Pigeon	*Columba livia*	LC
23	Oriental Turtle-Dove	*Streptopelia orientalis*	LC
24	Spotted Dove	*Streptopelia chinensis*	
	COLUMBIDAE: TRERONINAE		
25	Thick-billed Green-Pigeon	*Treon curvirostra*	

	PSITTACIDAE: PSITTACINAE		
26	Grey-headed Parakeet	*Psittacula finschii*	NT
27	Blossom-headed Parakeet	*Psittacula roseata*	NT
28	Red-breasted Parakeet	*Psittacula alexandri*	NT
	CUCULIDAE: CUCULINAE		
29	Asian Koel	*Eudynamys scolopacaceus*	
	CUCULIDAE: PHAENICOPHAEINAE		
30	Green-billed Malkoha	*Rhopodytes tristis*	
	CUCULIDAE: CENTROPODINAE		
31	Greater Coucal	*Centropus sinensis*	LC
	STRIGIDAE		
32	Collared Scops-Owl	*Otus lettia*	LC
33	Asian Barred Owlet	*Glaucidium cuculoides*	LC
	CAPRIMULGIDAE: CAPRIMULGINAE		
34	Large-tailed Nightjar	*Carprimulgus macrurus*	
	APODIAE: APODINAE		
35	Asian Palm-Swift	*Cypsiurus balas*	LC
36	House Swift	*Apus affinis*	LC
	CORACIIDAE		
37	Indian Roller	*Coracias benghalensis*	LC
	ALCEDINIDAE: HELCYONINAE		
38	White-throated Kingfisher	*Halcyon smyrnensis*	LC
	ALCEDINIDAE: ALCEDININAE		
39	Common Kingfisher	*Alcedo atthis*	LC
	MEROPIDAE		
40	Little Green Bee-eater	*Merops orientalis*	LC
	BUCEROTIDAE		
41	Oriental Pied Hornbill	*Anthracoceros albirostris*	LC
	RAMPHASTIDAE: MEGALAIMINAE		
42	Great Barbet	*Psilopogon virens*	LC
43	Lineated Barbet	*Psilopogon lineata*	LC
44	Blue-throated Barbet	*Psilopogon asiatica*	
45	Coppersmith Barbet	*Psilopogon haemaccephala*	
	PICIDAE: JYGNINAE		
46	Eurasian Wryneck	*Iynx torquilla*	
	PICIDAE: PICINAE		
47	Greater Yellownape	*Chrysophlegma flavinucha*	LC
	CAMPEPHAGIDAE		
48	Large Cuckooshrike	*Coracina macei*	LC
49	Indochinese Cuckooshrike	*Coracina polioptera*	LC
50	Scarlet Minivet	*Pericrocotus speciosus*	
	ORIOLIDAE		
51	Black-hooded Oriole	*Oriolus xanthornus*	LC
	ARTAMIDAE		

52	Ashy Woodswallow	*Artamus fuscus*	LC
	GENERA INCERTAE SEDIS:		
53	Bar-winged Flycatcher-Shrike	*Hemipus picatus*	LC
	AEGITHINIDAE		
54	Common Iora	*Aegithina tiphia*	LC
	DICRURIDAE		
55	Black Drongo	*Dicrurus macrocercus*	LC
56	Ashy Drongo	*Dicrurus leucophaeus*	LC
57	Bronzed Drongo	*Dicrurus aeneus*	LC
	MONARCHIDAE		
58	Black-nape Monarch	*Hypothymis azurea*	LC
	CORVIDAE		
59	House Crow	*Corvus splendens*	LC
60	Eastern Jungle Crow	*Corvus levaillantii*	LC
61	Eurasian Jay	*Garrulus glandarius*	LC
62	Rufous Treepie	*Dendrocitta vagabunda*	LC
63	Grey Treepie	*Dendrocitta formosae*	LC
	LANIIDAE		
64	Brown Shrike	*Lanius cristatus*	LC
65	Long-tailed Shrike	*Lanius schach*	LC
66	Grey-backed Shrike	*Lanius tephronotus*	LC
	NECTARINIIDAE		
67	Purple Sunbird	*Cinnyris asiaticus*	LC
68	Crimson Sunbird	*Aethopyga siparaja*	LC
	DICAEIDAE		
69	Scarlet-backed Flowerpecker	*Dicaeum cruentatum*	LC
	CHLOROPSEIDAE		
70	Blue-winged Leafbird	*Chloropsis cochinchinesis*	
	PLOCEIDAE		
71	Baya Weaver	*Ploceus philippinus*	LC
	ESTRILDIDAE: ESTRILDINAE		
72	White-rumped Munia	*Lonchura striata*	LC
73	Scaly-breasted Munia	*Lonchura punctulata*	LC
	PASSERIDAE:		
74	House Sparrow	*Passer domesticus*	LC
75	Plain-backed Sparrow	*Passer flaveolus*	LC
76	Eurasian Tree-Sparrow	*Passer montanus*	LC
	MOTACILLIDAE		
77	Olive-backed Pipit	*Anthus hodgsoni*	LC
78	Paddyfied Pipit	*Anthus rufulus*	LC
79	White Wagtail	*Motacilla alba*	LC
	STURNIDAE: STURNINAE		
80	Jungle Myna	*Acridotheres fuscus*	LC
81	Collared Myna	*Acridotheres albocinctus*	LC

82	Common Myna	*Acridotheres tristis*	LC
83	Vinous-breasted Myna	*Acridotheres burmannicus*	LC
84	Chestnut-tailed Starling	*Sturnus malabaricus*	LC
	MUSCICAPIDAE: SAXICOLINAE		
85	Siberian Rubythroat	*Calliope calliope*	LC
86	Daurian Redstart	*Phoenicurus auroreus*	LC
87	Blue Rock-Thrush	*Monticola solitarius*	LC
88	Grey Bushchat	*Saxicola ferreus*	LC
89	Eastern Stonechat	*Saxicola maurus*	
90	Pied Bushchat	*Saxicola caprata*	LC
91	Black-backed Forktail	*Enicurus immaculatus*	LC
92	Blue Whistling-Thrush	*Myophonus caruleus*	
	MUSCICAPIDAE: MUSCICAPINAE		
93	Verditer Flycatcher	*Eumyias thalassinus*	LC
	MUSCICAPIDAE: MUSCICAPINAE		
94	Taiga Flycatcher	*Ficedula albicilla*	LC
95	Asian Brown Flycatcher	*Muscicapa dauurica*	LC
96	Oriental Magpie-Robin	*Copsychus saularis*	LC
97	White-rumped Shama	*Copsychus malabaricus*	
	STENOSTIRIDAE		
98	Grey-headed Canary-Flycatcher	*Culicicapa ceylonensis*	LC
	PYCNONOTIDAE:		
99	Black-crested Bulbul	*Rubigula flaviventris*	LC
100	Flavescent Bulbul	*Pycnonotus flavescens*	LC
101	Streak-eared Bulbul	*Pycnonotus blanfordi*	LC
102	Red-whiskered Bulbul	*Pycnonotus jocosus*	LC
103	Red-vented Bulbul	*Pycnonotus cafer*	LC
104	Sooty-headed Bulbul	*Pycnonotus aurigaster*	LC
105	Olive Bulbul	*Iole virescens*	
	HIRUNDINIDAE: HIRUNDININAE		
106	Barn Swallow	*Hirundo rustica*	LC
107	Red-rumped Swallow	*Cecropis daurica*	LC
108	Striated Swallow	*Cecropis striolata*	
	CETTIIDAE		
109	Yellow-bellied Warbler	*Abroscopus superciliaris*	LC
	PHYLLOSCOPIDAE		
110	Bianchi's Warbler	*Phylloscopus valentini*	LC
111	Greenish Warbler	*Phylloscopus trochiloides*	LC
112	Yellow-browed Warbler	*Phylloscopus inornatus*	LC
113	Radde's Warbler	*Phylloscopus schwarzi*	LC
114	Dusky Warbler	*Phylloscopus fuscatus*	LC
	TIMALIIDAE		
115	Oriental White-Eye	*Zosterops palpebrosus*	LC
116	White-browed Scimitar-Babbler	*Pomatorhinus schisticeps*	LC

117	Rufous-fronted Babbler	*Sachyridopsis rufifrons*	
118	Pin-Striped Tit-Babbler	*Macronus gularis*	
119	Chestnut-capped Babbler	*Timalia pileata*	LC
120	Black-throated Laughingthrush	*Dryonastes chinensis*	
121	Greater Necklaced Laughingthrush	*Garrulax pectoralis*	LC
	ACROCEPHALIDAE		
122	Thick-billed Warbler	*Acrocrphalus aedon*	
	MEGALURIDAE		
123	Lanceolated Warbler	*Locustella lanceolata*	LC
124	Striated Grassbird	*Mengalurus palustris*	
	CISTICOLIDAE		
125	Zitting Cisticola	*Cisticola juncidis*	LC
126	Common Tailordbird	*Orthotomus sutorius*	LC
127	Rufescent Prinia	*Prinia rufescens*	LC
128	Grey-breasted Prinia	*Prinia hodgsonii*	LC

Rare and endangered species

Three species of Near Threatened (NT) and 98 species of Least Concern (LC) are in the IUCN Red List (2021).

The area is not near the designated Important Bird Area (IBA) or Protected Areas System (PAS) of Myanmar. There was no lake or wetland nearby which acted as birds sanctuary or area where birds aggregated.

No roosting places or nests were observed during the study.

Species of Socio-economic interest

Doves and barbets were also priced for their meat. In fact the local people consumed any available birds, big and small. There are no bird hunters or trappers.

There is no illegal trading of bird to Thailand such as the cases of red vented bulbul, streak ear bulbul and spotted dove which took place in Kayin and Mon states particularly, at the border area.

As there is little or no needs for clearing of vegetation during the early construction phase there will be little or no impact on the avian fauna due to the implementation of the project.

5.6.2.2 Herpetofauna (amphibian and reptiles)

As there is no natural forest but only farm land, bush and herb herpetofauna are rare to very rare.

The data for herpetofauna are also primary data during the EIA study conducted by consultant firm, MESC.

Diversity

A total of 14 amphibians and reptiles species were recorded. They belong to 8 families. There are 3 species of amphibian, 2 species of lizard and 4 species of snake. The inventory of list of herpetofauna species is shown in **Table-13**.

Table- 13: List of herpetofauna recorded from the study environs

No.	Family	Scientific name	Common name	IUCN (2021)
1.	Microhylidae	*Microhyla pulchra*	Sand Frog	LC
2.	Dicroglossidae	*Fejervarya limnocharis*	Paddy Frog	LC
3.	Ranidae	*Odorrana livida*	Burmese Rock Frog	DD
4.		*Sylvirana nigrovittata*	Dark-sided Frog	LC
5.	Agamidae	*Calotes versicolor*	Garden Fence Lizard	
6.		*Calotes mystaceus*	Blue-crested Lizard	
7.	Gekkonidae	*Hemidactylus brookii*	Brook's Gecko	
8.		*Hemidactylus frenatus*	Asian House Gecko	
9.	Scincidae	*Sphenomorphus maculatus*	Spotted Forest Skink	
10.		*Eutropis multifasciata*	Common Sun Skink	LC
11.	Colubridae	*Ahaetulla nasuta*	Long-nosed Whip Snake	
12.		*Flowea piscator*	Chequered Keelback Water Snake	
13.		*Ptyas korros*	Indochinese Rat Snake	
14.	Xenopeltidae	*Xenopeltis unicolar*	Sunbean Snake	LC

Rare and endangered species

Five species of Least Concern (LC) and one species of Data Defiecient (DD) are in the IUCN Red List (2021).

Species of socio-economic interest

The local people consume the meat of paddy frog.

The local people consumed the meat of snake if it is available. However there were no villagers hunting for snakes as in the neighbouring country, Thailand. There was also no illegal trading of snakes for export to China, taking place in this area.

As the need for clearing of vegetation is only during the early construction phase no more vegetation is to be cleared and therefore there will be no more impacts on the herpetofauna due to the operation of the project.

5.6.2.3 Mammalian fauna

The data on mammalian are primary data and secondary data collected during EIA study conducted by the consultant firm, MESC.

With the exception of a few rodents (rats) which are known to be in the area there are no wildlife in this area of farm land and bush.

The only rodent is Rattus rattus.

Diversity

A total of 8 species of mammal belonging to 6 families and 5 orders were found and recorded. The mammal species were confirmed through sighting or from other tell-tale evidences, eg- foot prints, scats and information from locals.

Table- 14: Recorded mammal species from the study area

No	Order	Family	Scientific name	Common name	Track & Sign	IUCN
1.	**INSECTIVORA**	Soricidae	*Suncus murinus*	House Shrew	sighting	LC
2.	**SCANDENTIA**	Ptilocercidae	*Tupaia belangeri*	Northern Treeshrew	sighting	LC
3.	**PRIMATE**	Cercopithecidae	*Trachypithecus phayrei*	Phayre's Langur	information	EN
4.			*Macaca mulatta*	Rhesus Macaque	information	LC
5.	**ATRIODACTYLA**	Cervidae	*Muntiacus muntjak*	Red Muntjac	information	LC
6.	**RODENTIA**	Sciuridae	*Callosciurus erythraeus*	Pallas's Squirrel	sighting	LC
7.		Muridae	*Rattus rattus*	House Rat	sighting	LC
8.			*Bandicota indica*	Greater Bandicoot Rat	sighting	LC

Of the 8 species found one species is in the IUCN Red List, EN and 7 species are in the IUCN Red List, LC (These are shown in the table).

Distribution, abundance/dominance

Since very few animals, both in species (biodiversity) and numbers (bio-mass) were found it was not practical to consider their distribution, abundance and dominance.

Small mammals such as squirrels and forest rats which are still quite common have different distribution patterns and habitats. Squirrels are tree dwellers living on trees either among the leaves or small branchy or either in nests (especially for nursing mothers and litters).

Rare and endangered species

With the exception of squirrels (especially Phayre's squirrel) and rats all other relatively large to large animals were almost them existence.

Species of socio-economic interest

None.

5.6.2.4 Aquatic organisms

The list of fish is secondary information. The following fish are known to exist in the stream.

The small stream nearly cannot support any small subsistence fishery. There are no real fishermen. Some local catch fish for household consumption only and only quantity is caught.

Table-15: List of fish species

No.	Scientific Name	Local Name	Family Name	IUCN
1	*Anabas testudineus*	Nga-byay-ma	Anabantidae	LC
2	*Channa striata*	Nga-yant	Channidae	LC
3	*Cirrhina morigala*	Nga-gyin	Cyprinidae	
4	*Clarius batrachus*	Nga-ku	Claridae	
5	*Sperata acicularis*	Nga-kyaung	Claridae	LC
6	*Heteropneustus fossilis*	Nga-gyee	Heterapneutidae	
7	*Lapidocephalichirys guntea*	Nga-tha-lei-doe	Cobitidae	

According to the IUCN red list (2021) three species are in LC.

5.7 Infrastructure and services

The proposed project site, the Sinn Shwe Li sugar factory No.2, and the nearby villages, namely Inn Wine, Taung Kya, Par He, Palaung Kone, Htone Kone, and Te Taik are accessible by cars.

The compnay has electrified all the five villages and one village (Htone Kone) is in the process of electrification.

Ngwe Yi Pale' ' company has constructed an asphalt road (access road) more than 5 miles long. It is a bifurcated road which meets the Mandalay-Lashio Highway at two points, one in the south west (at Bant Bwe village) and another in the north near Te Taik village.

The following table is about facts and figures of infrastructure and services for the nearby six villages.

Figure – 49: Inn Wine village

Figure – 50: Taung Kya village

Figure – 51: Par He village

Figure – 52: Palaung Kone village

Figure – 53: Htone Kone village

Figure – 54: Te Taik village

Table – 16: Infrastructures and services of six villages

Sr. No	Infrastructures and services	Name of villages					
		Inn Wine	Taung Kya	Htone Kone	Par He	Palaung Kone	Te Taik
1.	- Accessibility by car (road constructed by Sinn Shwe Li Sugar Factory No.2 (Ngwe Yi Pale' ` Co.Ltd).	√	√	√	√	√	√
2.	Access to gridline electricity - Access to gridline electricity provided by the factory	√	√	×	√	√	√
3.	Education facilities - Primary school	×	√	×	×	√	√
	- Number of student/teacher	×	26/3	×	×	24/2	97/5
	- Middle school	1 (Affiliated)	×	×	×	×	×
	- Number of student/teacher	247/10	×	×	×	×	×
4.	Health facilities Village clinic	×	×	×	×	×	×
	Private clinic	√	×	×	×	×	×
	Other health facility	×	×	×	×	×	×
5.	Other public facilities - Post office	×	×	×	×	×	×
	- Village library	√	×	×	×	×	×
	- Government building/office	×	×	×	×	×	×

Figure – 55: Inn Wine village library

5.8 Socio-economic component of the surrounding environment

Inn Wine and Te Taik villages are relatively large villages while Htone Kone, Palaung Kone, Te Taik, Taung Kya and Par He are small villages (hamlets). Inn Wine and Taung Kya are within the Kone Gyi Ywa Ma Village Tract group. Htone Kone, Palaung Kone and Par He are Kone Thar Village Tract group.

Table – 17: Data on the basic socio-ecnomic aspects of 6 villages

Sr. No	Socio-ecnomic aspects/parameters	Name of villages						
		Inn Wine	Taung Kya	Htone Kone	Par He	Palaung Kone	Te Taik	Remark
1.	Population	1088	140	160	67	70	335	
	Male	537	67	76	34	36	153	
	Female	551	73	84	33	34	172	
2.	Houses	283	39	50	28	28	88	
	Households	289	42	53	28	32	88	
3.	Religion (%)							
	Buddhists (%)	100%	100%	100%	100%	100%	97%	
	Chritians (%)	-	-	-	-	-	3%	
4.	Ethnicity (%)							
	Bamar	-	-	100%	1%	99%	8%	
	Shan	25%	-	-	-	-	-	
	Danu	75%	100%	-	99%	-	80%	
	Palaung	-	-	-	-	1%	-	
	Others	-	-	-	-	-	12%	Kachins, Gurkhas
5.	Education status							
	Literacy rate (adults)	90%	100%	100%	95%	95%	97%	
6.	Living conditions							
	2-storey houses	15 Nos	7 Nos	-	3 Nos	-	7 Nos	
	Brick houses	265 Nos	10 Nos	4 Nos	17 Nos	14 Nos	75 Nos	
	Wooden houses	3 Nos	22 Nos	46 Nos	8 Nos	14 Nos	6 Nos	

7.	Materials possession Car (sedan)	4 Nos	-	-	-	4 Nos	3 Nos	
	Truck	40 Nos	2 Nos	-	4 Nos	15 Nos	20 Nos	Mostly faw (China)
	Trawer G.	-	-	14 Nos	1 Nos	4 Nos	-	China
	Motorcycle (%)	95%	100%	100%	80%	100%	100%	
	Television set (%)	90%	60%	10%	20%	90%	90%	
	Hand phone (%)	100%	100%	100%	90%	100%	100%	

5.8.1 Livelihood and income

Table – 18: Data on main livelihoods and incomes of 6 villages

Sr. No	Livelihood and income	Name of villages						
		Inn Wine	Taung Kya	Htone Kone	Par He	Palaung Kone	Te Taik	Remark
1.	Livelihood/occupation (% of households) Planters/farmers	90%	95%	-	100%	100%	100%	Sugar cane, maize, rice, bean
	Other job (house shop)	5%	-	-	-	-	-	
	Seasonal/odd job	5%	5%	70%	-	-	-	
	Lime extraction	-	-	30%	-	-	-	
2.	Employed by the company (in numbers)	10	8	-	3	-	7	
3.	Government services (in numbers) Soldier	-	-	1	-	-	-	
	Teacher	-	-	-	-	4	4	
	Nurse	-	-	-	-	-	2	
4.	Annual income per household (%) Less than 10 lakh (Kyats)	10%	10%	10%	40%	20%	20%	
	11-20 lakh (Kyats)	25%	35%	25%	30%	50%	40%	
	21-30 lakh (Kyats)	15%	20%	15%	10%	10%	20%	
	31-40 lakh (Kyats)	5%	20%	5%	-	10%	10%	
	41-50 lakh (Kyats)	30%	10%	30%	-	-	-	
	51 and above	5%	5%	5%	-	-	-	
	Unknown (cannot estimate annual income)	10%	-	10%	20%	10%	10%	
*Base on HHI on 10% of households from each village encompassing main livelihoods.								
*The daily wages (Ks) Female		4000	4000	4000	5000 both	5000	5000	
Male		5000	5000	5000	5000 both	5000-7000	6000	

5.8.2 Access to public service and natural resources

As mentioned earlier all six villages are accessible by motor road. The access road (asphalt) is built by Ngwe Yi Pale' Co., Ltd for its Sinn Shwe Li Sugar Factory (2) and so these villages have now convenient access to the Mandalay-Lashio High Way (formerly there was only one dirt road or in some place only trail).

Public Electricity get from SSL(2) Boiler

Inn Wine, Palaung Kone, Te Taik, Taung Kya and Par He are electrified; the off grid electricity provided by Sinn Shwe Li Sugar factory (2) (from factory boiler).

Only one village is their own generators or many still use candles/lamps at night for lighting. The company has a plan for village electrification for this remaining village. The company will duly carry out this programme. (Now all five villages are electrified.).

All villages have shallow wells or tube wells for sourcing water. Only the company used Doe Gon chaung. As all villages are electrified water is now sourced from wells and tube wells by electric operated pumps.

There are no non-living natural resource- minerals, coal, limestone, etc in the area.

A few trees are cut for the extraction of charcoal for making lime. Edible wild vegetables mushroom and in certain cases bamboo shoot are collected by few people during certain part of the year, especially the raining season.

Figure – 56: A well at Inn Wine village

Figure – 57: A well at Taung Kya village

Figure – 58: Community water pond at Palaung Kone village

Figure – 59: A well at Htone Kone village

Figure – 60: Community water pond at Par He village

Figure – 61: A well at Te Taik village

5.8.3 Land use

The land use of the whole area is predominantly in the form of cultivated land, mostly farm land and few paddy, fields from and plantation with residential areas, the villages. There is no reserved forest or vacant or fallow land.

The original area of the sugar plant was farmlands which were bought by the company.

After the establishment of Sinn Shwe Li Sugar Factory (2) the premise of the factory become industrial land use. When the proposed project is implemented than there will be an additional industrial land use for the area.

On the whole the land uses pattern of the whole area has changed little during the last couple of decades. As the area is a rural agricultural area every village has sufficient lands for cultivation and most are fertile lands.

Sugar cane is the main cultivated plant while maize is the main crop. Water melon and sun flower, niger seeds (pann-nann) and common vegetables are also grown. Each village has common fruit trees and shade trees which are the norm of a rural village.

Figure – 62: Sugar cane field

Figure – 63: Maize field

Figure – 64: Niger seed field

Figure – 65: Sun flower field

The land use of Naunghkio Township (from secondary Information)

(a)	Cultivated land (acreage)	-	169,657 acres
	Paddy field	-	15,110 acres
	Farmland	-	131,238 acres
	Garden/orchard	-	21,910 acres
	Crude farm (Kaing)	-	1,399 acres
(b)	Fallow land	-	48,116 acres
(c)	Reserved forest/Protected area	-	146,003 acres
	Virgin forest	-	427,589 acres
	Virgin land	-	3,043 acres
(d)	Uncultivable land	-	15,584 acres

5.8.4 Population (Basic demography)

The basic demography, population, (male, female) and households of the six villages are shown in the following table.

Table – 19: Basic demography of six village

Sr.	Villages	Households	Population	Male	Female
1.	Inn Wine	289	1088	537	551
2.	Taung Kya	42	140	67	73
3.	Htone Kone	53	160	76	84
4.	Palaung Kone	32	70	36	34
5.	Par He	28	67	34	33
6.	Te Taik	88	335	153	172

5.8.5 Other socio-economic indicators

Table – 20: Basic data on other socio-economic status (poverty, unemployment, illiteracy rate)

Sr. No	Parameter	Name of villages					
		Inn Wine	**Taung Kya**	**Htone Kone**	**Par He**	**Palaung Kone**	**Te Taik**
1.	Poverty rate	Relatively high	Relatively high	Relatively high	High	High	High
2.	Unemployment	Very low	Very low	Very high	Low	Very low	Very low
3.	Illiteracy rate	10%	0%	0%	5%	5%	3%

Note: Base on HHI interview.

(a) Poverty: Poverty is high to very high, as it is the case of the large majority of rural villages in Myanmar. But when compared with most poor rural villages from the Dry Zone Area, Delta Area and Chin State these villages are on the whole better off.

(b) Employment: There is no data on the rate of unemployment, but the rate of unemployment seem to be low while that of employment seem to be relatively high. The large majority (more than 90%) of households are farmers. Except Htone Kone where 70% of the households are working odd jobs, there are very few odd jobbers or seasonal workers in the other 5 villages. The daily wages for women and men are Ks 4000 and Ks 5000, respectively, at Inn Wine, Taung Kya and Htone Kone while at Par He, Palaung Kone and Te Taik the daily wages for women and men are Ks 5000 and Ks 6000/7000, respectively.

(c) Education status: The literacy rate at Inn Wine, Taung Kya, Htone Kone, Par He, Palaung Kone and Te taik are,90%, 100%, 100%, 95%, 95% and 97%, respectively. 47% of adult have primary education; 20% have secondary education and less than 1% has tertiary education. (There is only one graduate in Inn Wine village with a population of over 1088.)

Baka (monastery) education is one of the main contributions to the high rate of rural literacy; virtually all adults can read, write and do simple sum.

Figure – 66: Inn Wine village Post B.E.P.S

Figure – 67: Palaung Kone village B.E.P.S

Figure – 68: Taung Kya village B.E.P.S

Figure – 69: Te Taik village B.E.P.S

5.9 Public Health Component of the surrounding environment

The health facilities of the area (of six villages) have been depicted earlier in the table .

Inn Wine has one private clinic runs by a medical staff from Bant Bwe Kone village. There is no village nurse or midwife.

Other villages have no village clinic or private clinic.

The nearest hospital for the area is Naunghkio Township Hospital about 10 miles away in the north east.

No data on village or area mortality and morbidity are available. The area is prone to malaria. There is also no data on occurence of diseases, accidents and injuries. There is no known case of HIV/AIDS. The common ailments are hyperpressure and paralysis. Cases of diarrhoea sometimes occur during the early monsoon season, it is learnt.

Figure – 70: At the entrance of Naunghkio Township hospital

Figure – 71: Inn Wine private clinic

Table – 21: Health status of six villages

Sr. No	Parameter	Name of villages					
		Inn Wine	**Taung Kya**	**Htone Kone**	**Par He**	**Palaung Kone**	**Te Taik**
1.	Health status (general)	Low	Low	Low	Low	Low	Low
2.	Health Facilities						
	- Village clinic	×	×	×	×	×	×
	- Private clinic	√	×	×	×	×	×
	- Noumber of nurse/midwife	×	×	×	×	×	×
	- Data on mortality and morbidity	NA	NA	NA	NA	NA	NA
	- HIV/AIDS	NA	NA	NA	NA	NA	NA
3.	Health issue						
	Malaria	-	-	-	-	-	-
	Dengue	√	-	-	-	-	-
	Chlolera	-	-	-	-	-	-
	High blood pressure	√	-	-	-	-	-

Note: Go to Naungkhio Hospital and/or Pyin Oo Lwin Hospital. The company clinic also provide treatment for many locals Malaria is not and issue in this area.

5.10 Cultural compound of the surround environment

(Religion, cultural, historical, archeological attributes, educational, etc)

Out of six villages two villages, Inn Wine and Te Taik have one Buddhist monastery each. But there are no Church, Mosque and Hindu temple in this whole area. Except Htone Kone village remaining five villages have village nat shrines.

Sr. No	Religious, cultural, historical, archeological, educational, recreational atributes etc.	Inn Wine	Taung Kya	Htone Kone	Te Taik	Palaung Kone	Par He
1.	Village pagoda	√	×	×	×	×	×
2.	Village monastery	√	×	×	√	×	×
3.	Number of monks,	2	×	×	2	×	×
	- novices,	28	×	×	×	×	×
	- nums etc	×	×	×	×	×	×
4.	Village "Nat" shrine, if any	√	√	×	√	√	√
5.	"Bo" tree or large sacred tree	×	×	√	×	×	×
6.	Nat worshipper present/absent	√	×	√	×	√	×
7.	Churches/mosques etc	×	×	×	×	×	×
8.	Historical monument (site/ structure)	×	×	×	×	×	×
9.	Archeological monument (site, structure, object, etc)	×	×	×	×	×	×

Note: - Normal religious events on full moon day, new moon day and the two 8th days of Burmese month.

- Nat festival at Inn Wine and Te Taik, Seasonal.

There is no famous pagoda is this area, but only in Mandalay and Pyin Oo Lwin cities. At Inn Wine a pagoda is still in construction. There is also no pagoda festival, or gand religion festival or annual "Nat" festival. The villagers, especially elders, go to the monastery during the Sabbath Day (full moon day, new moon day, and the two 8th days of the Burmese months). They take refuge and observe the eight or nine precepts (Thi-La) administered by the abbot monk of the monastery.

Many Bamars still worship the "nats" or guardian spirits and the locals here are not an exception. The Myanmar Buddhists believe in the 31 abodes (realms) of life. The lowest abode (realm) of "nats" or "Satu-maha-rit" is close to that of human abode and these "nats" are worshipped.

Many still keep this tradition of worshipping or rather propitiating the nats while the main faith in Buddhism. Offertory (Hnget-pyaw-pwei, Ohn-pwei) for the nat spirits usually included one coconut and three or fire combs of banana arranged on a recepticle, a large bowl or tray. Or the offertory can be a coconut (Nat-ohn-thee) hung up at a place as offering for the nat spirit/spirits.

A Bamar Buddhist village usually has a big sacred tree (usually a big ficus tree, *Ficus religiosa*) with a nat shrine underneath that tree. The nat spirst is believed to be the guardian spirit of the village.

Figure – 72: Inn Wine village monastery

Figure – 73: Inn Wine village pagoda

Figure – 74: Te Taik village monastery

Figure – 75: Inn Wine village nat shrine

Figure – 76: Taung Kya village nat shrine

Figure – 77: Te Taik village nat shrine

Figure – 78: Palaung Kone village nat shrine

Figure – 79: Par He village nat shrine

Regarding cultural, historical and archeological heritage there are no sites, structures and objects in this area. There are also no sites or objects of natural values such as scenic spot and outstanding landscape. There are also no sites or objects of spiritual values such as sacred sites, sacred trees, sacred rocks etc in the area.

There are no religious, cultural, historical and archeological sites or structures to be impacted due to the implementation of the project.

There are also no spots or area for educational and recreational purpose.

5.11 Visual components of the surrounding environment

The whole wide landscape includes cultivated land (farm, field), plantations and six residential areas (six villages) and lastly the Sinn Shwe Li Sugar Factory (2) premise. There is a green line of small trees and bush along both sides the small stream flowing between the

Factory (2) and proposed site. There are green spots here and inside or around the villages where there are fruit trees or shade trees.

There are no scenic spots, beautiful landscapes and outstanding landmarks/landscapes to be impacted due to implementation of the project. There is also no famous religious monument or historical monument to be impacted.

The emergence of a large sugar factory and its facilities has greatly altered the natural landscape of the area to agreat extent. But on the whole this large factory does not seriously impact the overall visual components of the area.

When trees planted around the No (2) factory and inside the factory compound are fully grow the factory complex will be in harmony with its surrounding to some extent. The factory complex does not stand out in too contrast with its surrounding.

The company has also plan for creating green zone for the proposed site.

The company shall avoid the excessive use of bright light at night to avoid the impact of light offensive to the neighbours at night.

6. IMPACTS AND RISKS ASSESSMENT AND MITIGATION MEASURES

6.1 Impacts and risk assessment methodology

The basic methodology comprises desktop survey (literature survey, if any), actual field and inspection, consultation meeting for gathering data and information and report writing.

The assessments are based from previous personal experience and also from theoretical knowledge from literature. Consideration, prediction, anticipation and identification of risks and impacts and subsequent assessment are made after visual inspection, testing and comprehension group discussions among EIA practitioners and appraisers.

In short the methodology is Experts Consensus method (Ad hoc method) in combination with matrix risks/impacts rating method. Risk/impact assessment for all impact are summarized at the end of impact and mitigation measure (at the end of section 6.2.1) later.

The tools and equipment used for assessment of impact on the physical components are the same as those mentioned earlier in chapter 5. eg, EPAS air sampler, EPAS Haz Scanner, EXTECH Sound Level meter, BEME-T ECH Vibration Meter and Portable Water Test Kit.

Water samples and soil samples were collected and analyzed at registered laboratories in Yangon.

Meteorological data/information for several years are secondary data gathered from Township Meteorological department to investigation if there is any trend of increase in temperature and rain fall etc over the years.

Visual inspection is an essential methodology for identifying all the impacts on the physical, biological, socio-economic, cultural and visual components of the environment. Therefore visual inspection and information/data gathering are the only effective tools.

The baseline data or background data for the physical, biological, socio-economic, cultural and visual components of environment were carried out. (These were already mentioned in **Chapter-5**). These baseline/background data could be one day in the future compared with the actual impacts during the Construction and Operation Phase.

Prediction, anticipation, identification and assessment of impacts/potential impacts are extrapolated from all the main activities involve in sugar project. The main activities such as clearing of vegetation for site and access road, the construction activities during the whole Construction Phase and most of all operation activities during the whole long Operation Phase and lastly all activities during the Decommissioning Phase.

Since impacts are the resultants of the above-mentioned activities. Each and every activity and the resultant impacts are considered, predicted, identified and assessed. Mitigation measure for each and every impact/potential impact is then prescribed.

6.2 Impact and risk identification, assessment and mitigation measures for each project phase

To uphold a standard EIA report the impacts assessment are made encompassing all the four phases, namely, Preconstruction, Construction, Operation and Decommissioning Phase. The assessments also cover all the five environmental components of the surrounding environment, namely, the physical, biological, socio-economic, cultural and visual components.

6.2.1 Identification and assessment of environmental impacts during the four phases of the project

6.2.1.1 During the Preconstruction Phase

Generally speaking there should be no negative impacts during this Pre-construction Phase. However negative/potential negative impacts of socio-economic aspects can happen as follows:

The potential hiking of prices of land and property and mitigation measure to be taken

During the Pre-construction Phase greedy speculators can hike the price of land and property. The price of land can go up considerably or exorbitantly even before the implementation of the projects. Even rumours can lead to the hiking of land and property prices.

As the area is a rural and relatively isolated area it is hoped that this impact will not be so high. On the other hand high inflation has become a common phenomenon and away of life in this country.

Mitigation (out line)

The project proponent will take the following mitigation measures:

There are no quick fix measures for this. Early public consultation meetings are necessary. The company shall uphold transparency and explain the true situation of the project. The company shall tell them not to have too high an expectation on the project. The company as well as the locals should realize that inflation is just a normal phenomenon of the country. There is no effective remedy for inflation. The officials of the company shall not involve in speculation activity.

6.2.1.2 During the Construction Phase

1) Impacts on air environment and mitigation measures to be taken

During the Construction Phase vegetation clearing, land leveling, removal of top soil, digging, and all kinds of earth works for construction and all construction works lead to the generation of dust.

The operations of machinery and vehicles also lead to the generation of smoke (gas emission) from the exhaust systems.

Dust of PM_{10} is nuisance but that of $PM_{2.5}$ and PM_1 are of serious health concern. Smoke and its constituent CO is hazardous to human.

(a) Nature of impact: dust

Dust is the main issue during Construction Phase. Wind direction plays an important role in the impact. The clearing of land and earth works such as excavation, digging and refilling of earth greatly generate dust.

Vehicular movements as well as operations of other equipment, engines and pumps emit lot of dust.

These processes together with wind erosion of open or disturbed ground would generate dust and could have quite a severe impact. Nuisance and health impact are associated with increased level of dust. The air dust pollution could cause eye problem, allergy, skin disease, respiratory and lung diseases.

Dust of PM_{10}, and above are a nuisance, but $PM_{2.5}$, PM_1 are of serious health concern.

(b) Nature of impact: smoke (fugitive emission)

Smoke generated during Construction Phase will be low. The source of emission is from vehicles and some machines used during construction works, such as engines and pumps.

Health impact associated with smoke increased with level of smoke. The emission of Green House Gas can leads to global climate change.

Mitigation (out line)

The project proponent shall take the following mitigation measures:

(a) Mitigation for dust

When clearing the ground vegetation must be removed together (mixed) so that the plant material helps to hold the soil. Or vegetation can be stripped and spread on the newly made soil stockpile; this will minimize emission of dust due to wind. As mentioned earlier, avoid clearing vegetation too far advance of construction.

Spray water regularly for suppression of dust. Plant trees at vacant spots; select hardy, fast growing species and create green zone and green belt. Trees play an important role in minimizing dust; they reduce wind speed and trap a lot of dust.

Restrict vehicular movements; car driven at reduced speed generates much lesser dust; maintain road clear of mud and dirt.

Limit open stockpile of earth and minimize drop height when loading and unloading earth. Stop earth works eg- digging, excavation, loading, unloading etc. for a while when strong wind is blowing.

Cover hauls trucks (earth, sand) with sheet or tarpaulin during transportation.

Provide Personnel Protection Equipment (PPEs) such as face mask, nose and mouth cover, to workers exposed to dust during earth works or other construction works and so on.

Manage dust and smoke as practical as possible. Try to meet the NEQ (emission) guideline values prescribed by ECD (NO_x 200µg/m^3, PM_{10} 50µg/m^3 and SO_2 20µg/m^3; **See Chapter-2, 2.4**).

The local community should be able to file complaints regarding dust and smoke.

(b) Mitigation for smoke

All the smoke/gaseous emission is fugitive smoke/emission (not point source smoke from a stack) and is temporary and intermittent.

Regularly check the engine of vehicles and other machines; well-maintained and operated engines reduce smoke emission; use fuel oil with low sulphur.

Use environmentally friendly up-to-date instrument, for example, engine with higher fuel efficiency.

Equip instruments and machines with air pollution control devices to minimize exhaust emission. (These may not be readily available but Ngwe Yi Pale' Sugar Co., Ltd should consider this for the near future.)

Avoid vehicles and instruments left running unnecessary.

Avoid open burning of solid wastes of all kinds, through segregate, recycle and then for disposal at approved dump site (land fill).

Keep equipment, machinery and vehicles well-maintained and well operated to minimize smoke.

Provide PPEs such as nose and mouth covers and face masks to workers exposed to smoke. Trees in the site will effectively sequestrate (remove) CO_2 in the smoke. Therefore plant trees along both sides of the access road; in all available spaces in the site and around the reservoir.

Try to meet the NEQ (emission) guideline values prescribed by ECD (NO_x 200µg/m^3, PM_{10} 50µg/m^3 and SO_2 20µg/m^3; **See Chapter-3**). The local community should be able to file complaints regarding dust and smoke.

2) Impact: noise and vibration and mitigation measure to be taken

Noise and vibration are generated during all kind of construction works: at the construction of access road and civil works at the site.

Movement of heavy machinery and heavy trucks generated loud noise and vibration. Gravel roads produce more noise and vibration than tarred ones.

The loading and unloading of materials also generate noise and vibration.

Normal civil works such as carpentary works involve noisy saws and planes, noisy drilling machine and also sound of hammer etc.

Environmental noise level that is acceptable rating level for noise (NEQEG) is 70dBA during daytime and night. Internationally accepted noise level in the work place should not exceed 85dBA.

Pump and generator are also sources of noise. Prolonged exposure above 85 dBA can impair hearing and can be a major health impact. Noise generally causes nuisance and disturbance to the community. Noise would scare away all the wildlife animals if any, including birds. High noise level can cause high blood pressure and heart attack.

Vibration is generated from machinery or mechanical operation during construction work and also from heavy vehicles on the access road. Vibration is usually associated with loud noise; it can damage machines and equipments and also buildings or structures. On the whole vibration during the Construction Phase will be low. However vibration can occur due to heavy machinery and heavy trucks.

Mitigation (out line)

The project proponent will take the following mitigation measures:

Plan and implement in the Preconstruction Phase for procurement of equipment and vehicles that are eco-friendly and emit lower noise level.

As the project site is isolated noise is not an issue for the community. Noise can have minor impact on the employees.

The best way to mitigate noise is at its source. Noise specification of equipment and vehicles should be taken into consideration when ordering equipments and vehicles. (This will be mentioned in EMP in Planning Phase.)

All noisy machines and equipment should be fitted with noise muffler or silencers if possible. Place noisier machines away from other working units.

No construction work at night. Schedule high noise activity only at certain period during day time hours.

Big trees and vegetation, if any, in and around the project site effectively absorb noise. Keep trees intact as far as possible; avoid unnecessarily cutting of trees.

Provide adequate PPEs such as ear muffs, ear plugs etc. to workers at all activities/locations that exceed permissible occupational noise level limit standard.

Vibration due to heavy truck from road can be mitigated by ensuring a flat and smooth road surface; paved road is much better than unpaved road; tarred road is better than concrete road. Limit the speed of vehicular movements to reduce noise and vibration.

Well-maintained and well-operated machine produce less vibration, therefore, give priority to maintenance and efficient operation of machines.

Foundation for the installation of the machine should be firm and durable. This reduces vibration and protects machinery and equipment from damage. It is standard practice to mount machines in such a manner to minimize vibration. Install vibration absorbers where possible.

Plan and execute the management of noise and vibration as practical as possible.

Try to meet the NEQ (emission) guidelines for noise level prescribed by ECD (Noise level for day time 55-70dBA; night time 45-70dBA; **See Chapter-3**).

The community should be able to file complaint regarding noise and vibration.

3) Impact on water environment and mitigation measure to be taken

The company will source Doe Gon stream. Although the demand for water during the Construction Phase may not be as high as during the Operation Phase the need for water during the Construction Phase is not so low either. Relatively large quantity of water has to be used in mason work or concrete work such as the mixing of cement, sand, lime with water. The domestic consumption of the water by more than 400 workers (350 nationals, 70 foreigers) can also have impact on the quantity of available water.

Water has to be used in occasional suppression of dust and washing of vehicles and machinery. The potential impacts on surface water and ground water can be:

(a) Surface water

- As there is a stream nearby there can be potential contamination of surface water due to spillages of hydrocarbons and contaminated runoff sources from contaminated soil.
- Potential altered surface flow dynamic due to removal of top soil and alteration in the on site topography.
- Increase of siltation in the stream with the runoff carrying sediment; increased runoff from cleared area (during the rainy season only).

(b) Ground water

- Potential groundwater contamination due to percolation of hydrocarbons, drill fluids and chemically contaminated water.
- Potential contamination due to seepage of ablutions and domestic wastes.
- Impact on the level of groundwater if tube well has to be used and large quantity of underground water have to be utilized (tube well may not be necessary in this area).

Mitigation (out line)

The project proponent will take the following mitigation measures:

Practice water conservation; minimize use of water and recycle, if possible. Minimize use of water by using low consumption appliances. Discipline worker for conservation of water for domestic uses. Harvest rain water for various uses during the rainy season, if necessary.

During the Construction Phase the use of water will be substantial for instance, cement batching, occasional dust suppression and washing of machinery and vehicle. Educate the workers for good water conservation practices.

Prevent the contamination of surface water by all means. Avoid the spillage of fuel oil and hydrocarbon into any surface water body eg- stream. Also avoid disposal of solid and liquid wastes into the water body.

Temporary latrines are not needed as there are toilets inside the sugar factory No.2.

Manage and prevent the contamination of soil by fuel spills which will enventually percolate into ground water. Oil spills should not be washed down with water but absorbent should be used instead.

4) Impacts on soil and mitigation measures to be taken

The impacts on land and soil are due to:

- The construction of access road involving land clearing, land cuts, digging and excavation and other earth works.
- The construction of the facility at the site that include the factory and all its facilities, buildings and structures involving land clearing, digging, excavation and other earth works.

The impact on the land and soil will be in the forms of:

- Destruction of original soil.
- Desturction of soil profile and soil structure.
- Soil impacted due to heavy machinery movement erosion and sedimentation.
- Soil contamination and subsequent ground water contamination due to oil spill and/or chemical spill.
- Soil pollution and subsequent ground water pollution due to unmanaged domestic wastes disposal.

Mitigation (out line)

The project proponent will take the following mitigation measures:

Plan and execute the management of soil as practical as possible.

Avoid unnecessarily digging or excavation of earth to minimize the destruction of soil.

Avoid the indiscrimate dumping of solid waste on land (also into the small stream).

Schedule the construction works so that large area of soil were not laid bare during the monsoon months. Do not clear the land in advance more than necessary. Phase the earth work (in the early period of construction) so that it was limited to workable size only to a minimum area.

Resurface and stabilized the exposed ground surface as soon as possible, that is, after earth work.

To prevent subsequent siltation or settlement, drain or ditch must have adequate backfill and after completion of back fill the surface should be restored to its original condition. Prevent wash water from carrying earth and materials into drainage system causing siltation.

Manage the overall erosion and sedimentation control during the Construction Phase, particularly during the rainy season.

Soil compacted by heavy and vehicles shall be raked and restored to original condition.

Pit and dents shall be backfilled and ground will be leveled after construction work.

5) Impact of wastes and mitigation measure to be taken

The waste here refers to construction tailings and debris and domestic waste (solid and liquid) generated by construction workers during the Construction Phase.

Solid waste generated during the construction phase will be large quantity of debris in the form of bits and pieces of building materials, iron materials, timber, soft wood, left over construction tailings.

Many of the leftover materials are unused or surplus materials because even well-experienced planning and design engineers may not be able to estimate the exact quantity of building materials to be used. There will always be unused or surplus timbers and other building materials. Unless systematically resold, reused and recycled and systematically disposed these materials can pose a great impact on the area. After one year of construction work, ill-disciplined workers without good house-keeping practice can also litter the site to a great extent.

Domestic waste (solid and liquid) comes from office; housings for workers, kitchen, messing hall etc.

The waste can be in the form of solid waste, waste water and spill or leak that contaminated the soil.

As there is no camp inside the proposed project site domestic wastes, if any, will be negligible.

The spill or leakage of fuel oil, and grease etc could be also substantial if there is a lack of discipline among the workers.

Mitigation (out line)

The project proponent will take the following mitigation measures:

Plan and execute the management of waste (solid and liquid) and try to meet the statutory requirements regarding waste (solid, liquid) disposal.

All unused or surplus building materials can be sold to others who need it. The large majority of debris can be also put up for sale since most can be reused or recovered. Even left over building materials can be sold. Those that should be disposed off should be disposed at an approved land fill.

Always avoid open burning of debris.

The best thing to do would be to hire a contractor for the clearing job after the construction phase.

There will not be any substantial waste water during the Construction Phase. All required water will be used mostly for domestic consumption.

Discipline workers for good house-keeping practice; demand the building contractor to do this and ask him to take responsibility for the conducts of his construction workers.

6) Potential impact on biodiversity and mitigation measure to be taken

There will be little or no impact on natural biodiversity as the area is vacant plots and in the adjacent are farm lands. However there are a few small trees and bush along the small stream. The impact will be negligible.

There are a number of big trees which are artificial vegetation, that is, fruit trees or shade trees in the vicinity. A few trees can be roosting places for common birds such as crows, sparrows and myna or habitat for insects.

The impact will be negligible.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Comply with Environmental Conservation Law, 2012 and Rules, 2014.
- Plan for the protection of biodiversity, if any.

- Execute minimum disturbance on the biodiversity and habitat.
- Restrict the clearing of vegetation including bush and grass; do not clear vegetation more than necessary for construction work.
- Keep big trees in the vicinity, if any, contact as far as possible.
- Minimize dust impact on nearby trees.
- Prevent spillage of fuel;
- Restrict the movement of vehicles and heavy machinery that can impact vegetation.
- Avoid open burning of debris.
- Educate workers on wildfire awareness.

7) Impact on traffic and mitigation measure to be taken

The site is within a rural area, not on a high way with heavy traffic. However activities during the Construction Phase have the potential for impact on traffic. The mobilization activities involve the mobilization of building materials, machinery and equipment and construction workers and amenities, and the transportion activities later. All these activities represent a noticeable increase in the number of vehicles travelling along the highway and then the access road. There can have impacts on traffic in the forms of traffic congestion, and traffic accidents. The later can involves vehicular collisions and collision with human and domestic animals.

Heavy trucks and all kinds of vehicles travelling through or travelling pass a village can cause nuisance and disturbance to the locals eg. noise, vibration, dust etc.

Although traffic on the whole is relatively light in this area drivers should be trained for defensive driving and zero accident, especially when passing through villages.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Plan and implement traffic management; schedule the timing for vehicular movement to avoid busy traffic hours.
- Educate the drivers for defensive driving and try to maintain zero accident.
- Also educate them for driving heavy truck, with slow speed; especially reduce the speed when passing near or through the village for prevention of road accident and for reducing the generation of dust due to trucks movements.
- Set up speed limit and traffic sign board along the road at suitable spots. Keep the vehicles well-maintained and well-operated for safety reason.
- Avoid over loading vehicles; comply with the requirement of Road Authority; always check the weight when loading.

- Avoid spilling of earth or other material from trucks during transportation.
- Keep a log book for each vehicle.
- Avoid driving at night as far as possible.
- The local community should be able to file complaint regarding traffic.

8) Occupational health and safety issue and mitigation measure to be taken

Accidents can occur from time to time during construction work either to construction workers or neighbours if they are close to construction site. This can also happen to passers-by near the construction site.

The slipshodness of the construction workers and the falling of bits and pieces of construction materials or tools from above can cause minor or major injury to other workers or passers-by.

Certain accidents can be fatal.

The 10 most common construction site accidents worldwide are:

- fall from heights (scalfolding); slip and fall; electrocution; falling debris, materials and objects; getting caught-in between objects and materials; fire and explosion; over exertion; machinery accidents; getting hit by a vehicle; and trench (for wiring and pipes) collapses.

Accidents in the workplace or at the site can happen due to unskilled workers or careless workers during the Construction Phase. Construction work is hectic in nature and so it is quite difficult to create an accident free (zero accident) working environment during the Construction Phase.

The potential for fire breakout cannot be totally ruled out. So too is the potential for vehicular accident and electrocution.

The lack of emergency and health service can be a constraint regarding provision of health care for workers in potential emergency. If an accident that effect many people occurs the available service in the area may be prone to inadequate. The township hospital at Naunghkio, of course, cannot solve such a serious problem. Most of the serious health cases are to be referred to the main District Hospital in Pyin Oo Lwin City in the southwest.

Mitigation (out line)

The project proponent will take the following mitigation measures:

First of all, effectively train workers for good working practice, good safety practice, good hygiene practices, good engineering practice and working practice. Since accidents used to occur due to unskilled and carless workers train them until these good practices are ingrained into their minds. Train them until these good practices become good habits for them.

Careful planning of emergency procedures shall be formulated and implemented. Train at least five workers for first aid training while another ten workers for firefighting.

Provide adequate First Aid Kits, Fire extinguishers (cylinder) and water jet pumps. Most of all provide Personnel Protection Equipment (PPE) to workers exposed to dust, smokes, heat, vibration etc.

Always try to prevent or reduce incidence and injuries during operation. Try to respond immediately and adequately in case of a serious accident.

For emergency response, organize regular mock drills for first aid works and also mock drills for firefighting.

Display phone numbers and addresses of nearest Red Cross Society, Ambulance Srevice, Fire Brigade, Police Station, Naunghkio Township Hospital and Pyin Oo Lwin City District Hospital on the wall so that every worker can see easily.

Measures for major accident and emergency

- Basic first aid and basic Firefighting trainings for workers
- Draw detail plan for prevention of fire and emergency plan for fire out break. (The company has already done this.)
- Training and drill work on emergency procedures including contingency measures.
- Effective emergency response plan (including displaying of phone number and address of nearest Fire Brigade, Ambulance Service, Hospital and Police Station).
- Draw up a plan for zero accident.
- Take out Insurance for the sugar factory and Insurance for Fire.

9) Potential social impacts and mitigation measure to be taken

As the proposed project site is near (0.9 mile) Inn Wine village and another two villages, Palaung Kone and Par He, are in the vicinity social impact can occur from time to time.

Theoretically, the potential impacts include:

- Physical displacement (of land, property, people etc).
- Loss of livelihood, mental agony, changes in social structure.
- People are affected due to pollution (air, water, land) as a result of the project.

In this sugar project the practical impacts are:

- Potential damage to existing road caused by movement of heavy trucks and machinery (that is prior to the construction of the 5 miles hard top road by the company).

- Continual uses of vehicles moving to and from the site impacting the safety of people and domestic animals.
- Generation of dust, noise and vibration causing potential disturbance or nuisance to the locals.
- Potential contamination of water; particularly during the rainy season.
- Frictions can occur between construction workers and local people.

Serious social issue can occur due to ill-social behaviour of workers or locals. Construction workers working during the short Construction Phase are usually not as well-disciplined as permanent workers during the long Operation Phase.

Quarrels and brawls, misappropriation of money and materials, vandalism, theft, unethical sexual practices or sexual offensives, and spread of Sexually Transmitted Diseases (STD) can happen during the Construction Phase.

All these have the potential to hinder or even jeopardize to smooth progress of the project.

Mitigation (out line)

The project proponent will take the following mitigation measures:

Education and disciplinery action are necessary. Ask the building contractor to discipline his construction workers and to take responsibility for the conducts of his workers. Take and apply punitive measures such as suspension or sacking of the wrongdoer.

Keep separate dormitory (housing) for male and females construction workers; the two housings must be appropriately far apart.(the two dormitories in factory are far apart). Provide adequate sanitation for workers eg- latrine, bath, small septic tank and adjoined soak pit for treatment of waste water.

Prohibit the drinking of alcohol and the use of narcotics in the site.

Educate the workers for dealing with the locals; educate them to respect the local culture, etiquette and custom. Do not let the construction workers mingle freely with the locals.

Prevent all kinds of quarrels and brawls taking place between the workers and the local community. Draw up a plan and manage misbehaviour and social illness among workers.

Plan to avoid the potential negative impacts on the socio-economic life of the locals as well as workers.

Try to build and maintain good relation with the locals; conduct public consultation from time to time so that the locals will have a positive perception of the project; consider and plan for more CSR activities.

Do not get involve in land and property speculation activities with the locals.

Community should be able to file complaints regarding any grievances.

As for dealing with the locals the company will educate the workers regarding local culture tradition and customs to achieve healthy community interactions.

The company will deal with the workers on a fair and square basis. The company will avoid the situation of worker protests and unrests as a result of underpaid, over worked, unfair dealing and unhealthy relation between the employer and employees.

10) Potential secrurity issue and mitigation measure to be taken

The Construction Phase is the period when it is usually difficult to maintain security. The working atmosphere is rather fluid and dynamic in nature. The in (entering the jobs) and out (quitting the jobs) of workers tend to happen almost all the time. This is the period when cases of thefts, misappropriations and vandalisms happen most.

Unlike the permanent employees during the Operation Phase who are well-disciplined, the temporary workers during the Construction Phase are usually quite difficult to discipline. The building contractor usually has no chance to hand pick them but to select them in haste due to the nature of construction work.

There is always the potential security issue for the factory compound. If left unchecked the construction workers can pose a potential for security issue.

The site is within the village area. So the site is not so isolate some of the locals may pose a potential security issue for the project.

Mitigation (out line)

The project proponent will take the following mitigation measures:

Draw up a plan and implement security management.

The fencing or walling of the whole compounds will be undertaken to keep the intruder at bay.

Access control will be implemented. Security gates will be set up; set up watch towers if necessary; no unauthorized access is permitted. The company and the building contractor must prohibit the workers from entering the neighboring village without preauthorization from the company or the elders of the villages. All entering and leaving of the site should be checked. Do not let the construction workers mingle freely with the locals.

Indentity Card (ID) for construction workers may not be necessary.

Heavy building materials (which cannot be lifted easily) such as iron bars, iron rod, big timber etc. and materials of less value, for example, bricks, sand, gravel etc. can be piled up in the open. Materials of certain value, for instance, iron work, timber work, frame, iron nails, and associates, corrugated iron sheets, glass panels, bags of cement etc. shall be kept in store or ware house under lock and key.

Ask the contractor to discipline his construction workers.

The condition should include punitive measures if found to be in contravention of the requirement, for instance, suspension or termination of the employment.

11) Positive (beneficial) impacts during the Construction Phase

The positive or beneficial impacts during the Construction Phase are in socio-economic aspects. The economic benefits to the region were substantial.

The proposed project will invigorate and boost the local economy and brought economic benefits to people who are involved in extraction/production and sale of building materials of all sorts, both raw materials and manufactured goods.

Contractors of raw materials such as sand, gravel and bricks will get the chance for doing lucrative and brisk business in providing these raw materials for sales. The extraction or production of these raw materials shall also provide jobs for many locals.

Timber merchants and merchants of soft wood and as well as merchants of construction merchandize such as iron rods, bars, iron works and nails, roofing, aluminum sheet, glass panels, cement and so on will promote their sales. At the same time more jobs for the locals will be provided by these merchants; small business men and small sub-contractors will be also benefited by the production, extraction and sale of these building merchandize.

The proposed project will provide jobs for about 420 construction workers for three years. Many workers including engineers and technicians will get technology and skill transfer from foreign engineers and technicians.

The access hard top road built by the company has greatly contributed to community's transportation and development.

The local sugar cane farmers will have the opportunities to sell their produces. The project will lead to the provision of market for food vendors and owners of nearby business premises. The food vendors will have the chance to increase their sales and income as a result of selling food to the company's workers. The owners of the nearby business premises will benefit as a result of the company's workers purchasing the items from their shops.

On the national level the benefits will accrue to the country in the form of direct investment of Ks 163,236.39 million; an increase in Gross Domestic Product (GDP) of the nation and also in the form of increase tax, duty and revenue for the national economy.

Ngwe Yi Pale' Sugar Co., Ltd will bear in mind that while negative impacts will be mitigated or minimized positive impacts will be promoted or enhanced.

6.2.1.3 During the Operation Phase

1) Impact on air quality environment and mitigation measure to be taken

Air emission includes dust, smoke and other gaseous emission.

Air emissions in sugar manufacturing are primarily related to particulate matter (PM) generates from bagasse-fired steam boiler. These are in the form of down ash and fly ash.

Exhaust gas emission produced by the combustion of organic materials in boiler for power and heat generation is the most significant source of air emissions in sugar processing activities.

Dust and PM are generated in sugar drying and packing activities. Dust and PM are also generated due to vehicular movements especially on unpaved road and open ground. The erosion of ground surface due to strong wind also generates dust. Dust is mainly in the form of suspended particulate matter SPM or particulate matter PM.

Emission from a sugar factory stack includes mainly SO_2, NO, NO_x, CO_2, CO, CH_4, VOCs, hydrocarbons and PM (PM_{25}, PM_{10}, $PM_{2.5}$, $PM_{1.0}$). It is easy to protect PM of larger particles (PM_{25}, PM_{10}) but not easy to protect PM of smaller particles ($PM_{2.5}$, $PM_{1.0}$), which pose more risks.

Emission (smoke) also comes from exhausts of vehicles and a variety of machinery such as pumps and generators etc.

Gases such as Fe_2, CO_2, CO, SO_2 and O_3 some of which are toxic are generated from workshop during welding works.

Excessive production of gas emission can lead to excessive concentration of CO_2 in the atmosphere which can lead to global warming and eventually to climate change. This is of international concern today.

As a general rule for every one ton of sugar produced 241kg of CO_2 is generated. In this proposed sugar factory context 241 × 1000 = 241000 kg (241 tons) of CO_2 is emitted.

Smoke and dust are health hazards for the employees as well as neighbours. Their impact is not only in the foot print of the factory but beyond. Strong wind can spread smoke and dust to the neighbourhood and onto agricultural land.

Increase level of smoke and dust has serious impact on health such as diseases associated with respiratory duct and lung eg. bronchitis, asthema to lung cancer.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Try to control and mitigate air emission as practical as possible.
- Comply with the National Environmental Quality (NEQ) guidelines for emission prescribed by ECD. (eg. SO_2 20µg/m^3, NO_2 200 µg/m^3, PM_{10} 50 µg/m^3 etc)
- Consider and procure equipment and vehicles with air emission specification in the first place. In other word procure eco-friendly equipment/vehicles that minimize emission and generate less smoke.
- Ensure that the height of the stack is suitable for a sugar mill. (The stack height will be 50 m according to Chinese experts).
- Ensure for complete combustion of bagasse fuel to reduce smoke and ash and harmful substance such as toxic organic gase e.g. flurin, dioxin etc.
- Apply smoke and fly ash reduction equipment or device eg. filter bag, fabric filter, wet scrubber, electrostatic precipitator (ESP), activated carbon absorption filter,dust collector etc. (The company will apply wet scrubber method. Regular water dozing (spraying) and occasional chemical water (lime water) dozing will be applied to mitigate smoke/emission. (The company will install dust collector for fly ash and will sprinkle water and will construct ash tank and ash pools for pragmatic collection of down ash.)
- Minimize gas emission (smoke) by proper training, operation and maintenance of machinery and vehicles.
- Regularly check all machinery and vehicles--- well-maintained and well-operated machinery and vehicles reduce smoke emission.
- If possible, use fuel oil with low sulphur content.
- Always avoid open burning of trash and debris; dispose debris at a landfill.
- Regularly spray water for dust suppression (wet suppression can reduce dust emission up to 75%).
- Restrict vehicular movement; set up speed limit for truck to minimize emission of dust (a speed reduction from 30km/hr to 15km/hr will reduce 50% of dust emission).
- Prevent spillage of lime and sulphur during transportation.
- Regular cleaning of road surface by cleaning.
- Try to control smoke and dust biologically. Plant trees and create a green belt around the factory premise. Trees are efficient dust trappers and controllers. Trees sequestrate CO_2 in smoke and produce O_2.

- Provide adequate personnel protective equipment (PPEs) eg face masks, nose and mouth covers for workers exposed to long hours of smoke and dust.

- The local community should be able to file complaint regarding smoke and dust; heed to the complaint.

2) Impact: noise and vibration and mitigation measures to be taken

Noise and vibrations result from a variety of sources inside a sugar factory eg. rotating machinery, cane milling, lime milling, ventilators, turbines, compressors, generators, motors, flow in pipe lines and internal and external transportation etc. On the whole the noise level inside a sugar factory is quite high.

The movements of heavy vehicles and heavy machinery also generate high level noises especilly if the road surface is not smooth.

Vibration is associated with high noise level. Noisy machinery generates vibration which can damage the machine if its foundation is not stable. Prolonged vibration can damage buildings and structures.

Increase of ambient noise level will cause disturbance or nuisance for the employees but working in noisy workplace for long hours can impair hearing; in severe case can lead to deafness.

Violent vibration can cause body vibration to employees which are a health hazards. Even small device such as lawn mowing equipment can cause hand, arm and body vibration to the employee. A drilling device can cause hand vibration if use for long hours.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Try to manage and mitigate noise vibration.

- Comply with the National Environment Quality Emission (NEQEG) guideline values for noise and vibration prescribed by ECD (eg. 70dBA for noise level; noise level at 85dBA and above can impair hearing).

- When procuring machinery and vehicles consider for noise specification. Procure machinery and vehicles that are eco-friendly, that is, generate lower noise level, in the first place.

- Procure only brand new machinery/equipment and vehicles, this will emit low noise level

- Modified old machinery/equipment and vehicles by incorporating small design change to reduce noise.

- Implement effective maintenece of machinery/equipment and vehicles (well-maintained and well-operated machinery/equipment/vehicle can reduce noise level by more than 50%).

- Install mufflers or silencers at air inlets/outlets of the fans and air compressors to reduce noise.
- Install noise barrier/noise containment/sound insulation for noisy machinery/equipment, if necessary.
- Limit the speed of heavy trucks/heavy machinery to reduce noise and vibration.
- Ensure that the road surface is smooth to reduce vibration.
- Install insulator or absorber (shock absorber), if necessary, on machinery/equipment that vibrate violently (prolonged vibration can damage the machine).
- Design for stable foundation in the first place for machinery/equipment that vibrates.
- Plant trees and create green belt around the factory compound to abate noise for the environment. Green belt absorbs noise and effectively acts as noise pollution sink.
- Provide adequate PPEs, ear muffs and ear muffs and ear protectors for employees exposed to long hours of high noise level. (Shall wear ear muffs when noise level is higher than 70dBA.)
- The local community should be able to file complaint regarding dust and smoke; heed to the complaint.

3) Impact of solid wastes and mitigation measure to be taken

Huge quantity of solid waste is produced from a sugar factory. Sugar cane leaves (if not trimmed before transportation to the factory), mud and soil arriving at the factory with the raw material cane are serious waste issue. (The sugar cane plants are trimmed at the field prior to transportation to the factory.)

During the various steps in processing and manufacturing of sugar huge quantity of solid wastes and by-products that are generated are: bagasse, molasse, mud (Sugar press mud or cachaza), lime solid (dry lime), and ash (fly ash and down ash).

- Bagasse fibre is generated in large quantity, after cane milling (pressing). As a general rule one ton of sugar cane generates 280 kg of bagasse. (In this proposed factory context which can mill 12,000 ton of cane per day 3,360 ton of bagasse will be produced per day.)
- Molasse is produced from final crystallization of sugar. Generally for every one ton of sugar produced 450 kg of molasses will be generated as a waste/by product. (In this proposed sugar factory context 450 tons of molasses will be produced per day.)
- Sugar press mud (cachaza) is generated as filtrate from clarification of juice after filtration. (Generally for every one ton of sugar produced 34 kg of cachaza will be generated. In this proposed sugar factory context the daily production of cachaza will be 34 tons/day.)

- Solid lime (dry lime) is also generated in the clarification process for cane juice. Ash is generated from steam boiler plant. (It is estimated that the burning of one ton of bagasse generates 100 kg of ash. In this context 336 tons of ash will be generated per day.)

Other solid wastes generated in small quantity during sugar manufacturing are:

- Spent filter materials, active carbon, resins from the ion exchange process, acid from chemical cleaning of equipment etc (If molasse-sugar juice is fermented for the production of ethanol then a spent wash known as vanasse is generated. The company is so far not producing ethanol yet.).

These huge quantities of solid wastes or by-products mentioned above can pose a serious environmental issue if not environmentally well-managed. However all, or almost all, of these wastes can be used as fuel, as construction material, made into fertilizers or reprocessed into a commercially viable products e.g. ethanol, alcohol, biogases etc.

Other solid wastes (domestic wastes) generated within a sugar factory premise are insignificant in quantity e.g. office waste, kitchen waste (food waste), other domestic wastes from the dormitory, trash and debris (dried leaves, grass etc). (There is no dormitory inside this proposed sugar factory). They will be regularly collected and burned or disposed at an approved landfill.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Plan and implement wastes management and waste mitigation, waste minimization and utilization.

- Environmental management for solid waste will be started at the origin, that is, sugar cane fields. Avoid the burning of leaves cut or trimmed for sugar cane plant after harvest. The trimmings from the sugar cane will be spread in the field to biodegrade and convert to natural organic fertilizer.

<u>For bagasse</u>

- Use bagasse (waste fibre or pulp) from the cane as fuel for steam and power generation. (This is exactly what Ngwe Yi Pale' Sugar Co., Ltd will do. And this is a very good pratice from environmental point of view. The bagasse waste issue is effectively tackled.) Using bagasse as a fuel can meet the factory energy demand and may even generate excess electrical energy for other uses, eg. electrification for the vicinity and nearly villages.

- If there is still surplus bagasse fibre it can be used for paper making and particle board manufacturing.

For molasse

- Systematically collect the molasse and reused (recycled) for the production of other grade molasse eg. "A" class molasse to "B" class molasse and than to "C" class molasse. (This is exactly what the company will do. Most of the molasse will be sold to business men who distill alcohols.)

- In the near future consider for using molasse beneficially as feedback for:

  - Fermentation and organic chemical manufacturing.

  - Production of citric acid and yeast.

  - Organic chemical manufacturing (eg. ethanol, alcohol).

For sugar press "mud" or cachaza

- Mud or cachaza can be composted into high quality organic fertilizer for agricultural production.

- Sugar press mud (cachaza) will be composted into high quality organic fertilizer; it will be made into EM in Bokashi organic fertilizer, press mud based gypsum fertilizer, press mud based dolomite fertilizer; also for the production of Triple sugar phosphate fertilizer, Potash (potassium chloride) fertilizer and ash etc. (actually all are used up as fertilizer and sold to cane farmers)

- Most organic materials in the wastes of the sugar factory can be also used for the production of biogases.

For dry lime (solid lime)

- Dry lime from the juice clarification process can be made into soil conditioning product for agriculture.

- Dry lime will be also used for suppression odour in the final discharge pond.

For ash

- Systematically collect ash (especially down ash) and mix it with cement for use as basic construction material. The ash is rich in potassium and can be partically used as fertilizer in small quantity. (The company has 4 ash pools where the ash is stored. The ash is regulary removed with over head crane and later used as fertilizer/bio compost/soil conditioner.)

- Ensure that ash pools are sealed to prevent the gradual percolation of ash into underground soil and impact underground water. (The company will plan and implement for systematic discharge of water from ash pools.)

For general domestic wastes

- Avoid open burning of solid waste (or any surplus bagasse, if any); dispose the solid waste at the landfill or dump site.
- Collect all domestic wastes (office waste, kitchen or food waste, and wastes from dormitory etc) regularly and dispose them at the landfill or dumping site.
- Follow the 5 Rs principles for waste: reduce, reuse, recover, recycle and redesign, wherever possible.
- Keep separate waste bins for recycleable and non-recycleable waste (kitchen waste can be composted).
- Educate and train workers for good working practice and good house-keeping practice.
- Also train them for proper handling of waste.
- Always avoid discharge of solid waste on land and into water body, the Doe Gon stream.
- Dispose waste only after waste prevention and recycling strategies have been undertaken as practial as possible.
- The local community should be able to file complaint reparling waste, if any, in their neighbourhood; heed to the complaint.

4) Impact of liquid waste and mitigation measure to be taken

The main waste water from the sugar factory is the industrial waste water. Industrial waste water can be categorized into--process waste water, waste water from utility operations, runoff from process and materials (cane) staging areas, miscellaneous waste water from laboratory, and from equipment maintenance shop.

Another form of waste water inside a sugar factory compound is the domestic waste water eg. from kitchen, and from living quarter and sanitary waste water (toilet, baths). However workers will not be camp inside this factory compound but at the nearby sugar factory No.2 compound. Therefore domestic waste water will be negligible.

Storm water (influx of rainwater), if contaminated, can be also termed waste water. The buildings roofs and pavement in the factory compound lead to the increase volume and velocity of storm water runoff flowing across the area.

Sugar processing waste water has a high content of organic material and subsequently a high content of organic material and subsequently a high biochemical oxygen demand (BOD), particularly because of the presence of sugars and organic material arriving with the cane. Waste water resulting from washing of cane may also contain crop pests, pesticides residual, and pathogens.

The sugar manufacturing activities require large quantity of quality water for: raw materials (cane) cleaning; sugar extraction; final sugar washing and cooling and cleaning equipment. Steam is essential to the evaporation and heating of various process steps in sugar processing.

The conservation of water and the effective management of waste water is necessary.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Plan and execute the management of waste water, and also plan and execute for the reduction of waste water.
- Promote awareness on the efficient use of water and conservation of water.
- Comply with the NEQEG effluent guideline values prescribed by ECD (Already mentioned in **Chapter-3**).

Boiling House - Recirculate water through cooling tower and a series of cooling ponds. (The company will do this); reuse the water for other purpose.

Boiling House - Water used for handling ash water flow through 4 sedimentation tanks; the sediments will be removed with the aid of over head crane and the supernatant water will be pumped out and use for cooling hot equipment eg.boiler auxilary. (The company will do this)

- Lime powder for lime mud will be used for controlling odour and the remaining small quantity of waste water will dry up in the final waste water pond. (The company will do this)

Process House - Segregate non-contaminated waste water stream from contaminated waste water stream; reuse the former cooling process.

Process House - Reduce the organic load of waste water by preventing the entry of solid waste (and concentrated liquid waste) into the waste water stream; apply screen and filter.

Process House - Fit and use floor drains and collection channels with grids and screen to trap and reduce the amount of solid entering the waste stream.

- Prevent direct runoff to water course, the small Doe Gon stream nearby.
- Duly undertake the waste water treatment task applying the conventional method which includes the following main steps:
  - Physical treatment: preliminary filtration for separation of filterable solid (use of screen or filter)
  - Flow and load equalization (sedimentation tank).
  - Chemical treatment: electrolysis follows by coagulation (not applicable yet)

- Biological treatment; involving araerobic treatment follows by aerobic treatment for reduction of soluable organic matter (aeration tank).(Not applicable yet.)
- Chlorination (if disinfection necessary)--(chlorination tank). (Not applicable yet.)
- Construct a network of drainage system for used water, rain water, influx and storm water.
- Final discharge (into surface water or onto approved land; no public sewer system in the area).

- Ensure that industrial used/waste water is duly treated by means of recirculation or at least applying basic physical treatment. (The main issue for a sugar factory is ash water and the company will take effort to tackle this issue.)
- Recycle the used water as practical as possible. (The company will recycle the used water as far as possible, including the building of one cooling tower together with a series of cooling ponds and the recirculate water.)
- Also treat the domestic waste water of lesser quantity or, build septic tank and soak tank for sanitary waste water (no sewer system in the area; septic tank is the only option).
- Educate and train the workers for good house-keeping practice and the proper handling of waste water. As sugar factory requires a large amount of water the efficient use and conservation of water is necessary.
- Educate and train workers for the efficient use and conservation of water.
- Implement dry precleaning of raw material (cane), equipment and production area (work place) before wet cleaning to reduce the use of water. (Sweep with a broom and pan where possible rather than hose down the place.)
- Check and monitor the daily or weekly consumption of water.
- Regularly check the water tanks, pipes, taps etc for water leakage and fix them immdiately.

5) Impact on water environment and mitigation measure to be put in place

The water environment here refers to the surface water environment, the small stream nearby, (the Doe Gon Chaung).

The impact on water can be on the quality (contamination, pollution) and on the quantity (reduction, lowering of water level) of water resource.

If solid waste and liquid waste are not well-managed these waste can get into the stream and contaminate the stream water. Both the solid and liquid wastes can eventually percolate into the ground water and contaminate the water.

There will be no dumping of solid waste and/or liquid waste into the stream.

There can be accidental spillage of fuel oil and chemicals or chemical substances (sulphur, lime powder, washing soda, sodium chloride etc.) into the stream, if not well-managed. Fuel spills from fuel depot and parking area can one way or another find their ways into the stream, especially during the rainy season.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Plan and manage for water environment protection and water conservation.
- Avoid by all mean the pollution of the nearby stream Doe Gon stream; manage so that no activity will impact the stream.
- Educate and train workers for good house-keeping practice (do not litter, do not dump anything into the stream).
- Follow rules and regulation (eg. conservation of water Resources and River Law, 2006; comply with NEQEG effluent guideline by ECD).
- Avoid disposing of solid and liquid waste of any kind into the stream.
- Fuel oil depot should be away from the stream; the depot should be bunded to protect surface water from oil spill.
- Avoid accidental spillage of fuel oil into the stream.
- Adequately maintain vehicles and machinery to prevent spillage resulting in groundwater contamination.
- Ensure that the ash in the ash pools does not percolate into underground water; seal the floors of the pools.
- Promote awareness of efficient use of water and water conservation.
- Ensure that the consumption of water is in the workframe stated earlier; 4,500,000 tons/year of 150 working days (30,000 tons/day).
- Monitor the daily, weekly and monthly consumption of water.
- Ensure that the amount of water needed is sustainable for all seasons and also does not affect the neighbourhood.
- Conserve water, minimize the use of water in house-keeping, cooking, machinery and vehicle maintenance and washing, ground maintenance for greens and lawns, and personal uses by employees.

- If possible recycle water; recycled water can be used for dust suppression and watering lawns and plants. (The company will recycle the used water for reuse.)
- Apply appropriate plumbing, and ensure there is no leaking of water.
- Build water tanks and ponds and harvest rainwater from the eaves of the roofing; rainwater can be used in washing of machinery and vehicles, suppression of dust, watering plants and for firefighting etc, if necessary.
- Select plants and grass species that need little water and design the landscape (garden) to reduce the use of water.
- Use water saving equipment including flush toilets, spray nozzles, urinals, faucets, low-flow shower heads, water spigots and pressure control values.
- Check the water quality at least twice a year (hire technicians to do this).
- The local community should be able to file complaint regarding pollution in the nearby small stream, if any; heed to their complaint.

6) Impact on traffic and mitigation measure to be put in place

The Mandalay-Lashio Highway has relatively heavy traffic with vehicles of various sizes and motorcycles, sometimes leading to traffic congestion of short duration. However the 5 miles bifurcate access road from Sinn Shwe Li Sugar Factory (2) to the highway constructed by Ngwe Ye Pale' Sugar Co., Ltd has on the whole, light traffic. But during the period when the sugar factory is in operation there are several dozens (may be even hundreds) of heavy trucks loaded with sugar cane coming to and leaving the factory. It is quite a common sight to see dozens of heavy trucks loaded with sugar cane queuing at the entrance of the sugar factory waiting for their turn to deliver sugar canes to the factory.

The existing factory has also a few vehicles eg. trucks, office cars while many locals have their own motorcycles. These heavy trucks, small vehicles and motorcycles can become a traffic issue if not well-managed. Road accidents that involve people and domestic animals can sometimes happen.

There can be a traffic issue at the intersection of the Mandalay- Lashio Highway and the access road to the sugar factory. Heavy trucks leaving or entering the highway can cause traffic congestion or traffic issue.

When the proposed sugar factory (No.3) is in operation there will be a considerable increase in traffic. More effective traffic management is necessary.

As the heavy trucks of sugar cane contractors or merchants are not under the control of Ngwe Yi Pale' Sugar Co., Ltd the mitigation measures on the impact on traffic on the highway are; of course, not practical. However the company wills take responsibility on the traffic on its 5 miles access road to the existing factory and the new factory to be materialized.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Try to achieve zero road accident on the access road.
- Set up signage or small sign board at the road intersection (of access road and highway) to direct heavy truck drivers to reduce speed at this intersection.
- Also set up speed limit signages at appropriate locations.
- If possible, schedule vehicular movement to avoid peak hours.
- Educate and train the factory drivers for defensive driving; to slow down speed when passing through or near villages.
- Heavy trucks with big load to be travelled at reduced speed.
- Avoid overloading the trucks.
- Deploy one or two factory employees to direct truck drivers at the entrance of the factory.
- Check and record the arrival and departure of all trucks; also all company's vehicles.
- The local community should be able to file complaint regarding traffic issue; heed to the complaint.

7) Occupation health and safety (OHS) issue and mitigation measure to be put in place

Common serious safety hazards in the work place of a sugar factory are:

- Falls, slips, trips (due to spillage of water or oil on floor; uneven floor).
- Machinery/equipment hazards (due to carelessness or lack of good training).
- Chemical hazards (due to inhalation and demal contact of lime, sulphur etc).
- Fire hazard (from engine, welding equipment, electrical equipment)
- Heat hazards (from boiler, heaters, hot equipment --- etc) and
- Working at height (fall) and/or working in confined space (O_2 depletion).

As regards occupational health and hazards most of the industrial disease in factories are caused by dust, chemical and fumes. Common industrial diseases are: occupational ashma, occupational dermatitis, industrial deafness, asbestos related disease, hand-arm-vibration syndrone, allergies and legionnaires disease.

Working in a sugar factory seems to be safe but when working for long hours over a long period unexpected occupational hazards and accident can happen. Shared dining, shared hygiene facility (eg. toilet, bath) and crowded condition can contribute to spreading of diseases. Monotonus nature of work at a work place can lead to psychological disorder eg. outbreak of hysteria.

Workers who are working standing up for long hours can suffer from stress and strain, sore feet, swelling of legs, general muscular fatigue, lower back pain etc. Minor injuries known as repititive strain injuries can happen when a worker is doing the same movement over and over wearing out bones, ligaments, cartilages, nervous system and muscles. Working repetitive work for long hours can lead to carelessness and slackness of attention resulting in accidents.

Occupational health and safety issues specifically associated with sugar manufacturing operations are:

- Physical hazards.
- Exposure to dust and biological hazards.
- Exposure to chemical (including gases and vapours).
- Exposure to heat.
- Exposure to noise and vibration.

Physical hazards

The most common risks are trips and falls caused by slippery floor, stairs and platforms (eg. packing and transport equipment); contact with process equipment (eg. milling machine); accidents involving conveyor belts and explosion. (eg. Sugar drying and storing, and from fuel oil storage, and boiler)

Repetitive work injuries

Sugar manufacturing activities include a variety of situation in which workers can be exposed to lifting, carrying, and repetitive work and work posture injuries.

Dust and biological hazards

Workers are exposed to dust (including microbiological agents) during sugar drying and packing processes.

Heat

Workers can be exposed to heat such as from boiler or hot equipment.

Noise and vibration

Noise and vibration from internal and external transportation, flow in pipelines, lime milling, rotating machinery, turbines and compressor.

The occupational health and safety (OHS) impact can be two ways. OHS can impact the workers while the impacted workers (in the form of sick leave, worker turnover) can have negative impact on the project (decline in productivity).

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Plan and manage for a safe and healthy atmosphere inside the factory.
- Create a safety work place and try to achieve zero accidents at the work place.
- Comply with Factory Acts 1974; Boiler Law, 2015; Myanmar Labour Law, 2016; the Social Security Law, 2012 and Workmen's Compensation Act, 1923.
- Comply with NEQEG guideline for emission and noise level, by ECD (Already mentioned in Chapter-3).
- Educate train and supervize workers for good working practice, good safety practice, good house-keeping practice and good health and hygiene practice until all these practices are ingrained in their mindsets and become good habits.
- Especially educate, train and supervize them for skill, for handling and operation of equipment, handling and application of chemicals.
- Educate and train them for environmental awareness and OHS hazards.
- Keep all machinery and equipment well-maintained, well-operated and well-lubricated (regular check necessary).
- Provide adequate PPEs eg. outfit, boots, helmet, gloves, face mask, goggles, ear muff etc where necessary.
- Beware of all the common accidents that used to happen and implement prevention, protection and mitigation measures.
- Carefully plan for emergency procedure including live saving and resuce operations.
- Organize first aid training and firefighting training for some workers.
- Set up a factory clinic for factory workers and nearby locals.
- Provide adequate First Aid Kits well-stocked with medicines and drugs.
- Provide adequate Fire Extinguisher, firefighting equipment and other associated device; keep water tank always full for firefighting.
- For emergency response organize mock drill and rehearsal from time to time.
- Phone numbers and addresses of Red Cross Society, Ambulance Service, Fire Brigade, Police Station, Naunghkio Hospital must be displayed so that everyone can see easily.
- Take out insurance for the sugar factory; and also take out fire insurance.

8) Potential social impacts and mitigation measure to be taken

These are already mentioned in the Construction Phase. Such cases are unlikely to occur during the Operation Phase as all workers are handpicked by the executive members of the factory. Unlike the blue collar construction workers who are employed for short term (three years) the workers in the Operation Phase are permanent workers. It is expected that they are better well-disciplined than the construction workers.

Any way the authority of the factory has to deal with these workers on a long term basis. Measures for creating a peaceful and productive atmosphere should be taken into account.

Impacts on the socio-economic component of the area can be in the form of:

- Continual uses of vehicles moving to and from the sites can impact the safety of people and domestic animals.
- Generation of dust, and noise causing potential disturbance or nuisance to the local people.
- Friction can happen between workers and locals.
- Ill-social behavior of workers or locals can lead to quarrels and brawls among themselves or with locals; theft, misappropriation of materials and money, vandalism, unethical sexual practice or sexual offences, spread of Sexually Transmitted Diseases (STD) and so on (as the site is near a village). These can have also certain negative impact on the project.

Mitigation (out line)

The project proponent will take the following mitigation measures:

Educate employees to be good workers who are dutiful, well-disciplined and diligent. Give them proper training on factory and work place regulation, and code of conducts.

Apply punitive measures such as termination of job or demotion to wrongdoer. Also apply incentives to boost production.

As for dealing with local community educate them regarding local cultural behavior and awareness to achieve responsible and healthy community interactions.

The company should deal with the employees on a fair and square basis. The company should be aware of widespread cases of workers unrest in Yangon as a result of overworked, underpaid, and unhealthy relation between the employees and the factory authority.

Conduct regular medical checkup.

- Consider hiring locals in the future when there are vacant posts, especially unskilled jobs

- Try to reduce the potential impact to quality of existing life style of the local community in the area
- Implement CSR programme for the community (certain CSR actions had been already taken by Ngwe Yi Pale' Sugar Co., Ltd)
- Maintain cordial relation with the local community
- Listen to the views, thoughts and opinion of the local people, heed to their concerns

The local community should be able to file complaint regarding social issues; heed to their complaint.

9) Potential security issue and mitigation measure to be put in place

Security issue can be in the form of theft, vandalism and sabotage. This is already mentioned in the Construction Phase. Unlike the hectic nature of works during the Construction the working atmosphere during the Operation Phase is stable.

However, security tends to slacken when sugar plant operation is going on for several years. So for the long term Operation Phase the plan for security should be more practical. It is expected that the permanent exmployees hand-picked by the company's authority will not pose any security threat to the mining site. But outsiders, the locals, can at one time or another can cause security issues such as theft and vandalism.

Sugar factory can become soft target for sabotage by terrorists.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Draw up a security management plan.
- Undertake effective walling of the whole factory compound.
- Effectively control all accesses; set up security gates, deploy adequate guards.
- Do not let the workers enter the neighbouring village without preauthorization.
- Do not let workers mingle freely with locals.
- Store certain valuable materials under lock and key as far as possible.
- Apply punitive measures, such as suspension or termination of employment, if necessary.
- Provide ID cards for all workers for easy identification.
- Also provide uniforms for all workers.
- Regularly monitor the security system; check wall or fence and gate and security guards to ensure effective security.

10) Potential visual impact and mitigation measure to be put in place

The operation of the sugar factory will change the landscape permanently and irreversibly. The usual rural landscape will alter into a semi-industrial landscape comprising the sugar factory complex and facility and the access road. When the proposed project is materialized there will be two sugar factories in the area.

Of course these sugar factories and facilities may not be in harmony with the rural and back ward surrounding background. But this will have to be accepted as a symbol of national industrial development. Moreover the site will be hidden from view; that is not near a high way road.

The visual impact during night time will be in the form of bright light. In this era of environmental awareness bright light at night is considered light pollution.

Conditions are dark at night in the surrounding area as there is no access to electricity. The local community can have the so-called lighting offensive (visual impact) at night from the sugar factories and facilities. Bright white light at night has the potential to attract hundreds of insects from the vicinity and kill them. Radical environmentalists consider this as committing an environmental crime.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Plan and execute for a sugar project that which is focused on visual appeal as practical as possible. Consider for long term aesthetic when planning and designing for the project in the first place.
- Plant fast growing shade trees along both side of access road; plant shade trees and fruit trees in and around the site; plan and execute for creation of green zone, green belt and aesthetic landscaping and conserve green area as far as possible. Also prioritize the planting of fast growing trees on the western border of the premise to act as a green buffer zone between the factory and the village monastery.
- Use aesthetically pleasing paints and colours for the buildings and structures, if possible.
- Reserve green belt along the Doe Gon Chaung as far as possible; also other green areas, if any.
- Provide appropriate lighting only for security reason; avoid excessive use of light at night. Conserve electricity at this plant to show good example for all. Follow the good example of Singapore (Dim City) rather than Hongkong (Bright City).
- Use yellow light instead of white light not to attract insect; if so many insect aggregate turn off the light for a while.
- To mitigate offensive light for surrounding, keep the lamps at the lamp post slanting downward slightly rather than projecting out wards.

11) Positive (beneficial) impacts during the Operation Phase

During the Construction Phase of the major project 350 workers will be employed for 3 years. The project will boost the local economy and bring economic benefit to the locals who are involved in extraction/production of building materials -- eg. sand, gravel, bricks. Timber merchants and merchant of construction merchandize -- eg. iron rod, bar, roofing, aluminium sheet, glass panel, cement etc will be able to promote their sales. Many jobs associated with construction sector will be created.

The food, goods and services needed during the project activities (both Construction and Operation Phase) will be purchased from the local markets. Therefore trade in the area will increase; there will be a significant increase in the economy of the area. In addition, transportation infrastructure for project activities within the area will be improved and this will allow the locals to reach easily to towns and cities. The access road already built by the Factory (2) has additionally given rise to a more dynamic social structure; within and across region interaction has been increased; improved social relation has been positively influenced the region.

The agricultural land loss due to project activities constitutes a very small percentage of the agricultural lands (just a few small unproductive farms). All land property damaged or loss has been compensated. There was/is no case of land grabbing, forced eviction and relocation. No one living in the area has lost his/her house, job and social networks because of project activities.

During the Operation Phase of the project 503 permanent jobs will be provided. More workers will be employed when the project progress smoothly. The Ngwe Yi Pale' Sugar Co., Ltd commits 2% of its net profit for the effective implementation of CSR programme. (The Ngwe Yi Pale' Group of companies has so far spent Kyats 7,105,578,825 for CSR and community assistance and development in Naunghkio area. The company will continue to implement more CSR programmes for this Inn Wine village area when the project commence).

So far the company has so far constructed 5 miles access road (bantbwe-konkyi-taungkya-innwine road) to Mandalay-Lashio Highway road and 8 miles access road (Le-gynn-gwae road) to Mandalay-Lashio Highway road which benefit many villages in transportation. It has donated 75 benches to the village Middle School and has involved in donation and charity for the social affairs of the local community. The company has employed many villagers in its No.2 factory and more will be employed when this proposed factory has materialized. (See ANNEX)

On national level this proposed project will bring to the country in the form of direct investment of Ks 163,236.39 million.

These investments will contribute to the increase in GDP of the nation. The country will benefit from increase in investment, increase in employment, increase in earning, increase in taxes, duties and revenue etc.

While Ngwe Yi Pale' Sugar Co., Ltd will try to mitigate or minimize negative impacts it shall, on the other hand, enhance and maximize the positive impacts to their optimum.

6.2.1.4 During the Decommissioning/Rehabilitation Phase

At the end of the long Operation Phase (30 plus years) the project will be terminated and decommissioning task will have to be undertaken. The decommissioning task, in brief, includes:

- Isolation of the site and shutdown.
- Dismantling and demolition of the buildings and structures.
- Put up machinery and equipment that is still useable for sale or send to smelting mill as iron scrape.
- Put up old construction materials for sale or disposed of at appropriate dump site.
- Restoration of the ecology of the site.

(In this proposed project context the sugar factory can probably be still operational after 30 plus years of operation. Ngwe Yi Pale' Sugar Co., Ltd will then decide if the plant will be redeployed or decommissioned.)

The two impacts anticipate and identify during the Decommissioning Phase are:

1) Occupational health and safety issue and mitigation measures to be taken

As in the case during the Construction Phase the impact such as accidents in work place, due to lack of management and training, can occur. This can be prevented and/or mitigated.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Plan and manage for safe and effective decommissioning work.
- Hire decommissioning contractor for the demolition of buildings and structures and dismantling of equipment; and also tidying up the site.
- Dispose those that are no longer useable at an approved land fill.

- Machinery and equipment that are obsolete must be made into iron scrap and sent to smelting mill.
- Remove all soil contaminated by oil spill and dispose off at an approved land fill or dump site.
- Put up for sale or reuse certain equipment that are still usable.
- Level the ground; plant trees and commence rehabilitation work and restore the site to its original condition.

2) Potential residual impacts and mitigation measures to be taken

After 30 plus years of operation the soil can be contaminated by fuel spills or residual chemicals including those that are hazardous. The contaminated soil has to be removed and disposed off to an approved landfill. The last chemical testing may be required. The soil structure/profile has to be restored to its quasi-original condition as practical as possible.

Mitigation (out line)

The project proponent will take the following mitigation measures:

- Plan and manage for effective removal and clearing of all residuals.
- Test the soil for any contamination by fuel oils or hydrocarbons; hire technicians
- Also test the air and water in the vicinity for pollutants; hire technicians.
- Remove soils contaminated by fuel oils and chemical-; dispose at an approved land fill.
- Ensure that all contaminates are removed; conduct final chemical testing.
- Also remove all other residuals, if any, resulting from 3 plus decades of activities.
- Test the air, water and soil for the last time to ensure that none are contaminated; no trace of pollution left.
- Restore the soil to its natural condition as far as possible and commence rehabilitation task; continue the work until a green zone is created (or) put up the plot for sale (or) redeploy the plot for any business.

6.2.1.5 Risks and impact assessment and outcome

Based from Experts Consensus method/Ad hoc method and IFC risk/impact table (matrix rating) the qualitative assessment of negative impact during the Construction Phase, Operation Phase and Decommissioning Phase are show in tabulated forms below:

Table (22): During the Construction Phase

Sr.	Imapct	Likeli -hood	Conse-quences	Actual outcome		Expected outcome after mitigation measures taken	Remarks
1	Impact on air environment (emission)	5	1	5 low	Mitigation measrues	Low	All can be mitigate
2	Noise and vibration	5	1	5 low		Low	
3	Impact on water environment	4	1	4 low		Low	
4	Impact on soil	5	2	10 medium (moderate)		Low	
5	Impact of waste	4	3	12 medium (moderate)		Low	
6	Imapct on biodiversity	2	2	4 low		Low	
7	Impact on traffic	2	2	4 low		Low	
8	Occupational health and safety issue (accidents at construction site)	1	4	4 low		Low	
9	Potential social issue	1	2	2 low		Low	
10	Potential security issue	1	2	2 low		Low	

Note – Positive impacts are simply narrated in the report. All impacts are short during Construction Phase. Extent of impact will be within the foot print of the project site and near vicinity, except traffic impact which will be beyond the vicinity.

Table (23): During the Operation Phase

Sr.	Imapct	Likeli -hood	Conse-quences	Actual outcome		Expected outcome after mitigation measures taken	Remarks
1	Impact on air environment (emission)	5	5	25 extreme	Mitigation measrues	Low	All can be mitigate
2	Noise and vibration	4	4	16 high		Low	
3	Impact: solid waste	5	4	20 extreme		Low	
4	Impact: liquid waste	5	4	20 extreme		Low	
5	Impact on water environment	3	2	6 loe		Insignificant (negligible)	
6	Imapct on traffic	3	2	6 low		Low	
7	Occupational health and safety issue	2	3	6 low		Insignificant (negligible)	
8	Potential social issue	1	2	2 low		Insignificant (negligible)	
9	Potential security issue	1	2	2 low		Insignificant (negligible)	
10	Potential visual impact	3	2	6 low		Low	

Note – Positive impacts are simply narrated in the report. All impacts are long duration; during the long Operation Phase. Extent of impact will be within the foot print of the project site and near vicinity, except traffic impact which will be beyond the vicinity.

Table (24): During the Decommissioning Phase

Sr.	Imapct	Likeli-hood	Conse-quences	Actual outcome		Expected outcome after mitigation measures taken	Remarks
1	Occupational health and safety issue (potential accidents during decommissioning works)	1	2	Low	Mitigation measrues	Low (negligible)	All can be mitigated
2	Potential residual impact	3	2	6 low		Low (negligible)	

6.2.2 Identification and assessment of the likelihood and severity of natural and industrial hazards relevant to the project

(A) During the Preconstruction Phase

There is no likelihood of natural and industrial hazards during this phase.

(B) During the Construction Phase

Ten negative/potential negative impacts are anticipated and identified for this phase (Already mentioned earlier in **6.2.1.2**). All these impacts, except "Impact of waste disposal" in the form of construction failing and debris will be of any significant, if not well-managed and well-mitigated. However none of these 10 impacts will not constitute any likelihood of natural and industrial hazards.

(C) During the Operation Phase

Ten negative/potential negative impacts are anticipated and identified for this phase (Already mentioned earlier in **6.2.1.3**).

Of these 10 impacts, three, namely:

- Impact on the air environment
- Impact of solid waste and
- Impact of liquid waste can pose any likelihood and severity of natural and industrial hazards unless these 3 impacts are not well-managed and well-mitigated.

As regards three impacts a sugar factory generates large quantity of smoke and ash. The factory also generates huge quantity of waste (bagasse) and also liquid waste. However none of these emission waste, solid waste and liquid waste, cannot be termed hazardous (no toxic or harmful emission, effluent and solid waste). Moreover virtually all bagasse waste is used as fuel for the boiler thus tackling the issue of waste pollution. The ash is also collected in ash pools and this can be mixed with cement and use as basic construction material. It can be also used partially as fartilizer. There can be no issue as regards the disposal of ash. The ash water is still remained an issue to be tackle later.

The impact on traffic can be quite significant if not well-managed. Several dozens heavy trucks loaded with sugar cane are involved in the transportation of sugar cane from the fields to the factory. Many trucks are also involved in the transportation of finished sugar product from the factory to elsewhere. There can be traffic congestion and and even road accidents. This issue can be mitigated if the mitigation measures described earlier are followed. So far, there is no known road accident both on human and animals this access road.

The remaining impact anticipated for the Operation Phase, namely, noise and vibration, impact on water environment (the stream), OHS, potential social impact, potential security issue and potential visual impacts can be termed insignificant. Of course, social issue and security issue can sometimes become significant but they have nothing to do with industrial hazards.

(D) During the Decommissioning/Rehabilitation Phase

Two impacts are anticipated for this phase (**See 6.2.1.4**); but both of them cannot pose any likelihood for industrial or natural hazards.

The potential residuals in this project context refer to the soil that can be likely contaminated by accidental spills of lubricating oils and fuel oils during the long Operation Phase of the project. There are no really hazardous materials such as residual of toxic substances and radioactive residuals (All the chemicals used, namely, sulphur, lime powder, washing powder, phosphoric acids, sodium chloride etc are not toxic or hazardous). The soil, if contaminated by fuel oils and the said chemicals, will be effectively removed and mitigated.

6.2.3 The design, layout, functioning, management and implementation of appropriate impact and risk mitigation measures

The option of mitigation measures to be taken for each and every impact is already described together with each and every impact.

The main waste is bagasse; all bagasse are reused as fuel burner and the issue is takled (no need for coal or fire wood).

Other major waste such as molasses, sugar press mud, etc. is also all reused in various wastes as already described earlier.

Main emission from stack is mitigated by wet scrubbing method.

Water is mostly recycled through the application cooling tower a series of 4 cooling pools. Waste water is physically treated (screening, filtration and sedimentation); supernatant water is reused.

The main issue remains is ash (bagasse ash). It will be used as compost and soil conditioner.

6.2.4 Characterizaton and assessment of any residual impacts and risks

6.2.4.1 Assessments of residual impacts

A sugar factory generates large quantity of industrial wastes especially bagasse, ash and solid lime and by-product (waste) such as molasse, and cachaza. There can be serious residual impact if these wastes are not well-managed. However as these wastes are either reused, recycled or removed no residual impact will remain.

During the construction large quantity of construction tailings and debris will be generated but there can be no issue of residual impacts as all the debris will be removed and cleared after completion of construction.

There can be certain small oil spills at the car park, at pump house, compress house, engine house etc but these will be remediated immediately (the use of absorbent rather than washing down with water to prevent the small spills percolating into underground water). Accidental oil spills on the whole will be minor ones.

During the long operation phase, large quantities of wastes and byproducts, namely bagasse, ash, solid lime, molasses, and cachaza, will be generated. But all bagasse will be reused as burner or fuel for boiler; ash will be systematically collected and disposed of; solid lime, molasses and cachaza will be reused or reprocessed in various ways. Most, if not all, waste issues can be effectively tackled. At the end of the operation phase there will be no chance of residuals left to impact the area.

After the long Operation Phase the decommissioning process will have to be effectively implemented. Everything that remained of the sugar factory has to be cleared; the soil if contaminated by fuel oils or chemicals will have to be removed and disposed at an approved landfill. After that subsequent rehabilitation work will follow. Trees will be planted and green zone created at the former site. In this way the site will be rehabilitated to its original condition or even to a better condition. The ecology of the site will be effectively restored.

Both the company authority and the EIA team (third party) really believe that there is no residual impact (s) to remain during or after the project. They also believe that if all the mitigation measures prescribed earlier are duly applied they can mitigate or remediate all the negative impacts mentioned earlier; and there will be no chance of residuals to remain.

Therefore, no substantial residual impacts are anticipated during the whole life of the project, from the Preconstruction Phase to the Decommissioning Phase.

However, in case there is any residual left the soil will be removed and disposed of at an approved landfill. After that the soil will be tested for the last time to ensure that there is no

residual left. The general guidelines for the removal of residuals and the hence the gudeline for deommissioning are:

The company will look into the nature of all those impacts and assess the risks and follow the preventive, corrective and mitigation measures prescribed in this EIA report.

6.2.5 Comprehensive monitoring plan

Monitoring of physical, biological and social environments is of paramount importance for the successful implementation of a project.

First of all the working environment shall be monitored for occupational hazards. But virtually all activities taken places at a project site need to be monitored for effective and successful implementation of the project.

Monitoring Plan (MP) is an essential tool for ensureing that mitigation measures for each and every negative impact is undertaken effectively throughout the life of the project. It is also an essential tool for ensuring that the positive (beneficial) impacts are enhanced, or CSR programme are effectively and meaninfully implemented. Monitoring will be planned, designed and implemented by professionals or specially trained personals eg. EMP cell.

Monitoring Plan (MP) is actually an integral part of Environmental Management Plan (EMP); these two are the different sides of the same coin.

Monitoring Plans for Construction, Operation and Decommissioning Phases of the project are shown in tabulated forms.

Table – 25: Overall monitoring plan during the Construction Phase

Sr. No	Component to be monitored	Frequency	Responsible persons
1.	Monitor the clearing of vegetation	Daily	EMP cell members
2.	Monitor the clearing of land and earth works	Daily	EMP cell members
3.	Monitor the construction works	Daily	EMP cell members
4.	Monitor the operation of machinery, equipment and vehicle (through log book)	Weekly	EMP cell members
5.	Monitor the consumption of fuel	Weekly	EMP cell members
6.	Monitor the quality of air (SO_2, NO_2, PM and others)	Once during Construction Phase	Hired Technicians
7.	Monitor the quality of water	Once during Construction Phase	Hired Technicians
8.	Monitor noise level and vibration	Once during Construction Phase	Hired Technicians
9.	Monitor the quality of soil	Once during Construction Phase	Hired Technicians
10.	Monitor the use of water and spraying of water for dust suppression	From time to time	EMP cell members
11.	Monitor the procurement of fuel oils	Weekly	EMP cell members

12.	Monitor the procurement of other materials (food, commodity)	Weekly	EMP cell members
13.	Monitor the conducts of workers	From time to time	EMP cell members
14.	Monitor, where possible, mitigation efforts	Weekly	EMP cell members
15.	Monitor effectiveness of mitigation activities	Weekly	EMP cell members
16.	Monitor the performance of security staffs	Weekly	EMP cell members

Table – 26: Overall monitoring plan during the Operation Phase

Sr. No	Component to be monitored	Frequency	Responsible persons
1.	Monitor weather, listen to weather forecast	Daily	EMP cell members
2.	Monitor the quality of air as well as emission (Re: NEQ emission guideline values, by ECD)	Bi-annually	Hired Technicians
3.	Monitor the quality of water as well as effluent (Re: NEQ effluent guideline values, by ECD)	Bi-annually	Hired Technicians
4.	Monitor the noise and vibration level (Re: NEQ guideline values, by ECD)	Bi-annually	Hired Technicians
5.	Monitor the soil condition	Bi-annually	Hired Technicians
6.	Monitor the water level and flow condition of Doe Gon Chaung (stream)	Weekly	EMP cell members
7.	Monitor the arrival of sugar cane trucks	Daily	EMP cell members
8.	Monitor quantity of cane arrived	Daily	EMP cell members
9.	Monitor cane preparation	Daily	EMP cell members
10.	Monitor milling and extraction work	Daily	EMP cell members
11.	Monitor juice clarification and evaporation	Daily	EMP cell members
12.	Monitor crystalization process	Daily	EMP cell members
13.	Monitor the final manufacturing process	Daily	EMP cell members
14.	Monitor the finished products and packing activity.	Daily	EMP cell members
15.	Monitor storage and transportation of sugar	Weekly (or every transport)	EMP cell members
16.	Monitor the generation of bagasse	Daily	EMP cell members
17.	Monitor the use of bagasse as well and the condition of the boiler	Daily	EMP cell members
18.	Monitor "mud" cachaza generation	Daily	EMP cell members
19.	Monitor waste water generated	Daily	EMP cell members
20.	Monitor generation, collection and storage of ash (ash pools)	Daily	EMP cell members
21.	Monitor the operation of machinery/equipment	Daily	EMP cell members
22.	Monitor the operation of vehicles	Daily	EMP cell members
23.	Monitor the procurement of fuel oil	Weekly or monthly	EMP cell members
24.	Monitor the procurement of other commodities	Weekly	EMP cell members
25.	Monitor the consumption fuel oil, and the storage and dump of used oil	Weekly or monthly	EMP cell members
26.	Monitor the consumption of water	Daily/weekly	EMP cell members

27.	Monitor the consumption of electricity	Weekly or monthly	EMP cell members
28.	Monitor the efficiency of workers, and the effectiveness of capacity building	From time to time	EMP cell members
29.	Monitor the conducts of workers	From time to time	EMP cell members
30.	Monitor the efficiency of workers, and the effectiveness of training and emergency procedures eg. drills, rehearsals	From time to time	EMP cell members
31.	Monitor the effectiveness of mitigation measures	From time to time	EMP cell members
32.	Monitor the creation of green belt/zone (planting of trees, landscaping)	Monthly	EMP cell members

Table – 27: Overall monitoring plan during the Decommissioning Phase

Sr. No	Component to be monitor	Frequency	Responsible persons
1.	Monitor the decommissioning works; dismantling, demolishing works	Daily or weekly	EMP cell members
2.	Monitor the clearing and tidying work, leveling of ground, restoration of soil	Weekly	EMP cell members
3.	Monitor the removal of contaminated soil, if any	Once	EMP cell members
4.	Monitor the testing of soil and water	For the last time	EMP cell members
5.	Monitor the rehabilition works; planting of trees, restoration of the ecology	Weekly or monthly	EMP cell members

All monitoring works will be carried out by members of EMP cells. However there are three exceptions, namely, the monitors of air quality, water quality and soil which need sophisticated equipment and chemicals will be carried out by hired technicians from the Health Department.

7. CUMULATIVE IMPCTS ASSESSMENT

The term cumulative impact refers to either

- The addition of impacts from many/several sources (combined impacts) at the same time (simultaneous impacts) or
- Successive addition of impacts (from one source or many sources) over a long period or both.

Green House Effect that leads to global warming is the result of the accumulation of CO_2 (in other word cumulative impacts of CO_2) in the atmosphere from different sources all over the world.

It is necessary to understand and minimize cumulative environmental impacts in order to prevent "death by a thousand cuts".

Cumulative impact assessment for the proposed Sinn Shwe Li Sugar Factory (3) can be best done if there are two or more sugar factories in the area. The combined impact at the same time and the addition of successive impact over along period can be appropriately and efficiently assessed. As Factory (2) is nearby when this proposed Factory (3) is in operation then a real cumulative impacts (simultaneous cumulative impact) can be assessed.

7.1 Methodology and approach

Usually cumulative effects are not considered if a factory or mill is a small one. But both the existing Factory (2) and the proposed Factory (3) are large factories. Therefore cumulative effects have to be considered and addressed. But applying Cumulative Impacts Assessment (CIA) to only two sugar factories cannot properly account for the whole regional context. CIA is best conducted in special industrial zone where a variety of factories, mills and other industrial activities are taking place simultaneously over a long period.

However, to uphold the standard of an EIA report an attempt is made to predict the general cumulative impacts due to this proposed project and the nearby project in operation and summarize the findings.

As the term "cumulative" implies the appropriate time to conduct CIA should be at least 5-10 years after the commencement of the Operation Phase. (This is due to the fact that there are no other projects in this area that have been in operation for several years. So it can be stated that at the moment there is no cumulative impacts of any kind in this area.)

Cumulative Impact Assessment (CIA) is more or less similar to EIA but only for the long term impact assessment and/or combined impact assessment.

The process of CIA can be put in this way:

- It is a process of analysizing the potential impacts and risks of the project in the context of potential effects of human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Component (VESC).
- It is a process of proposing concrete measures to avoid, reduce or mitigate such CIs and risks to the extent possible.

General process or steps for implementing CIA involves 5 steps:

Step – 1 : Scoping Phase

Step – 2 : Establish information or base line status of Valued Environmental and Social Components (VESC)

Step – 3 : Assess Cumulative Impacts (CI) on VESC

Step – 4 : Assess significance of predicted CI

Step – 5 : Management of CI; plan design and information

CIA and CIM (Cumulative Impact Management) are necessary whenever there is concern that a project may contribute to cumulative impact on one or more VESC. (For example- when more than one sugar factory occur within this area or when more than one project of any kinds occur within this area and impact the same VESC.)

Several methods/approaches are available for the CIA but there is no one method that could always be used.

For generalized CIA for all kinds of project the methods include: specialists opinions; undertake specific consultation and questionnaires with relevant stake holders; use checklist as a systematic way for ensuring; utilization of risk matrices; undertake computational and numerical modeling; the use of spatial Analysis/Geographic Information System (GIS); visual analysis and stimulation; undertake a review of available planning documents; develop indicators of VESCs and their functions and undertaken assessment of mitigation for incremental impact using past experience, BAT, good/best practices and expert opinions.

For CIA specifically for sugar factory project the following factors have to be considered:

- Site location, condition
- Capacity of sugar factory
- Wastes (solid and liquid) to be generated
- Land or water environment (surface and ground water) to be impacted
- Effective prevention/mitigation/remediation measures

- Any social economic impact and mitigation measures
- The predicted or anticipated environmental (physical, biological, socio-economic) situation at least 10 years from now (also 20 and 30 years from now).

In developed and industrialized the subjects of CIA and CIM have developed to a advanced phase. But actually these are the works of scholars or pure academicians that involve the application of computer programming, complex mathematical models, mathematical formulae, statistical calculations and manupulations. In short, CIA is a multi-disciplinaries task that involves scientists and social scientists and is beyond the scope of this EIA report.

7.2 Cumulative Impact Assessment (CIA) (Simplified version for the proposed sugar factory)

7.2.1 During the Construction Phase

Since the proposed factory is a large factory the main construction task is a major one. Various construction works will be carried out for the construction of this factory complex with various facilities. All these activities, both big and small, can be termed simultaneous cumulative impact. This simultaneous cumulative impact will continue for three years till the end of the Construction Phase. When compared with the long life of the project, three years is just a temporary phase. After the completion of construction works virtually all impacts are ceased and the environment on the whole will return to normal situation. So the simultaneous cumulative impact during the short Construction Phase will be temporary.

However, it should be noted that all kinds of construction tailings and debris will temporarily accumulate at the site. Certain domestic wastes from office, kitchen and dormitory/housing for workers will also accumulate during this phase.

The accumulation of construction failing, debris and other wastes during the Construction Phase can be termed "incremental" or "successive cumulative impact", which can be last for 3 years and, therefore, transient or temporary in nature. But all these failings and wastes will be removed after the Construction Phase is completed. Therefore there will be no accumulation of wastes (cumulative impact) after completion of construction work or end of the Construction Phase.

7.2.2 During the Operation Phase

As the proposed Factory No (3) can consume 12,000 ton/day of sugar cane the successive (incremental) accumulative impact on sugar cane resources in the areas, Naunghkio and Yart-sauk, can be high indeed. However, the factory is operational for only 150 days. The depleted sugar cane plants can be replenished (regrown) effectively by the sugar cane farmers. (Afterall the objective of sugar cane growers is to sell all their produces.)

The generation of the bagasse fibre waste is huge. As mentioned earlier 3,360 tons of bagasse will be produced per day. Multiply this 3,360 by 150 days (the operational days per year) and

the result is 504,000 tons/year. Multiply this result again by 30 years (the general duration for the Operation Phase) and the bagasse generated over 30 years will be 15,120,000 tons. The sugar factory No.2 has a capacity of milling 4,000 tons of sugar cane and producing 1,120 bagasse per day or 168,000 tons/year or 5,040,000 per 30 years. The final result for two factories is 20,160,000 tons of bagasse. The bagasse wastes from the two factories will become a very serious environmental issue if not managed. However, the authorities of the two factories have effectively reused all the bagasse as efficient fuel for the boilers.

Therefore the issue of bagasse is effectively/will be effectively tackled. The use of bagasse waste as fuel is a very environmental friendly practice and should be appreciated by all environmentalists.

Otherwise the generation of bagasse over the years will result in huge mounds of bagasse in the area and causing severe land pollution.

Ash is also generated in large quantity and if not well-managed can become a serious cumulative impact over a long period. As already mentioned earlier the proposed sugar factory will generate 336 tons of ash per day. Multiply this by 150 days (operational days per year) and again by 30 years (Operation Phase of project) the result is 1,512,000 tons of ash. The sugar factory No.2 has a capacity of 400 tons of sugar and 112 bagasse per day or 16,800 tons/year or 504,000 per 30 years. (When two factories are considered the result is 2,016,000 tons). Ash will be routinely removed with the aid of over head crane and stored in ash pools. Most of the ash can be used for conditioning soil or as partial fertilizer. So the cumulative impact of ash, if any, will be on the whole insignificant. Dust collectors will be also installed for trapping fly ash.

"Mud" or cachaza and molasse can be termed by-products rather than waste; both are of economic value. Cachaza is a good organic fertilizer while molasse can be fermented for the production of ethanol and various food products. As mentioned earlier 34 tons of cachaza (mud) and 450 tons of molasses will be generated from this proposed factory per day. From factory No.2 11.3 tons of cachaza (mud) and 150 tons of molassess were generated. As mentioned above, when 150 days of operation per year and 30 years of the Operation Phase are taken into consideration for sugar factory No.3 and No.2 combined the results are: 153,000 and 50,850 (203,850) tons of cachaza and 2,025,000 and 675,000 (2,700,000) tons of molasses are produced over 30 years.

Theoretically the cumulative impact (that is incremental/or successive cumulative impact) of the above-mentioned waste can be huge indeed and the potential impact can be very serious indeed if not well-managed. But as already mentioned above of the wastes generated some will be used as fuel (burner), some will be reused, reapplied and/or reprocessed. In this way the issue of industrial wastes can be effectively tackled. It can be simply stated that in the real world there can be no serious or substantial cumulative impact regarding sugar manufacturing after mitigaton measures are taken.

The smoke spewing out of the stack of the factory is of international concern. The acumulation of smoke (carbon emission or GHG) in the atmosphere in the long run can lead to global warming and eventually to climate change. This is at least from theroretical point of view. But unlike other industrialized countries (Europe, North America, China, Japan, Australia etc) where dozens of smoke stacks can be found in one limited area there will be only two stacks in this area. From pragmatic and realistic perspective the cumulative impact cannot be a serious one.

As a general rule for every one ton of sugar produced 241 kg of CO_2 is emitted. In this proposed factory context which can produce 1,200 tons of sugar a day the quantity of CO_2 emission per day will be 318 tons. Multiply this with 150 operational days per years and then again with 30 years of Operation Phase the result will be 1,431,000 tons of CO_2 per 30 years. For sugar factory No.2 which can produce 400 tons of sugar a day the quantity of CO_2 emission per day is 106 tons, 24,000 tons/year and 720,000 per 30 years. (When two factories are considered then the emission of CO_2 over a period of 30 years will be 2,151,000 tons.)

Theoretically CO_2 in the smoke coming from the factory stack will accumulate in the upper stratum of the atmosphere. But one has to remember that Myanmar, being an LCD, is among the least emitters of CO_2 in international community. It is China, USA, India, Russia, Japan, Korea and Germany who are among the top CO_2 emitters. (CO_2 emitted from these two factories can be just a very small fraction of a million when compared with these top CO_2 emitters.)

Unlike solid waste and liquid waste which can be managed (control, mitigate, remediate, minimize) CO_2 emission cannot be mitigated yet in the present context. The Best Available Technology, BAT, is not yet effective for this impact.

Finally there are no other sources of impacts in the area besides these two factories that will contribute to additional or simultaneous cumulative impact on the surrounding environment. And this project is not in competition with irrigation or any agricultural project that uses the water of the stream and the source of CI is only from these two sugar factories.

8. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Environmental Management Plan (EMP) is the key to ensure that the environmental quality of the area does not deteriorate due to the implementation of a project. EMP involves the management of the overall environmental issue including the physical, biological, socio-economic, cultural and visual issues. EMP is a long term systematic approach from planning, development, implementation, monitoring and feedback. EMP also involves management for quality of the project.

The overall EMP includes planning and design of an environmentally friendly sugar factory that fully utilized eco-friendly machinery, equipment and vehicles that emit less smoke, lower noise level, and those that are fuel and energy efficient; and also the conservation of water and recycling of water and waste as far as possible. EMP covers so many aspects of the project it is difficult to consider all the aspects of EMP.

8.1 Project description by project phase

This has been already described in details earlier in Chapter 4 and will be very briefly summarized as follows.

The project is for the construction and operation of a sugar factory, Sugar Factory No.3, by Ngwe Yi Pale' Sugar Co., Ltd near Inn Wine village 12 miles north west of Naunghkio Town, Shan State.

The area of the sugar factory compound is 49.75 acres. The proposed factory will have a capacity of producing 1,200 of sugar per day (daily consumption of sugar cane will be 12,000 tons). The technology will be conventional "squze" or "press" technology.

The estimated budget is Ks 163.263.39 million. The Construction Phase and Operation Phase are estimated to be 3 years and 30 plus years, respectively.

Water will be sourced from the nearby Doe Gon stream. Annual water requirement is estimated at 4,500,000 tons (150 days of working days) and 3,000 tons/day.

Electricity will be sourced from National Grid Line electricity and also from own generators (as back up) and also from boiler (surplus bagasse).

The annual raw materials (sugar cane) requirement is estimated at 18,000,000 tons. These will be procure from the various sugar cane fields in the vicinity and also from others fields in Naughkio Township area.

350 and 503 employees will be employed during the Construction and Operation Phase, respectively. 35 Chinese experts/technician will be employed during the Operation Phase, but only on temporary basis.

Working hours is 8 hrs/day, 48 hrs/week (150 working days a year).

60% of the sugar produced will be export while 40% will be for local markets.

1. The Preconstruction Phase/Planning phase/Design phase

The work, involve planning, designing and also a variety of official paper works, that is, bureaucratic procedures.

The planning involves hiring Chinese experts and technicians for drawing the design of the sugar factory and for the procurement of all machinery and equipment which are eco-friendly ones. (Those that emit less smoke, lower noise level and consume less fuel and energy). The foreigner experts will be required for the smooth operation of the sugar factory, maintenance and providing training for Myanmar nationals.

Two construction companies, namely, Soe Tint Industry Company and Lin Zaw Aung Company are contracted for the construction of the factory according to the designs given by Chinese Experts. Also the selection of eco-friendly building materials as far as possible.

A variety of official paper works involving many ministries and departments are to be undertaken for the official approval of the proposed project, for the approval of importing machinery and equipment. From environmental perspective the preparation and writing of Scoping Report and EIA report and submitting the reports to the authority. Meeting and discussion with local sugar cane farmers for procurement of sugar cane.

The Preconstruction Phase has lasted for 1 year.

2. The Construction Phase

The said two construction companies are hired for the construction and works are supervized by the Chinese expert.

All the buildings and structures including, main mill plant, 3 main preocess plants, turbines house, boiler house, cooling tower, cooling pools and various ponds, etc. as well as office building , central control room and various stores and warehouses etc. (In fact all the buildings, and structure required are built by the two contracted construction companies. All construction works can be categorized into: preparation works, earth work and foundation works, structural construction works (major construction works), installation works (machinery, electricity and plumbing), and finishing works.

The project is still in the Construction Phase it is expected to last for 3 years (or more due to unexpected outbreak of COVID – 19 pandemic diseases).

3. The Operation Phase

After completion of all construction works the Chinese experts will test run the factory. Then the routine operation of the factory and production of sugar will continue on a long term basis, (up to 30 plus years).

The Chinese experts and technicians will educate train and supervize Myanmar workers for good working practice and good safety practice in the daily routine operation of the factory for a certain period. Training in maintenance works will be also provided.

The daily routine operation works involve: regular procurement of sugar cane, and milling sugar cane involving a series of processes and steps for production of sugar (the final product); also involving the packing, storage and marketing. The daily or weekly consumption of the raw materials (sugar canes) and consumption of water, energy will be recorded. The daily production rate will be also recorded. The quality of sugar will be tested regularly for quality control.

It is expected that the long Operation Phase last for at least 30 years.

4. The Decommissioning Phase

A decommissioning contractor will be hired to do the works. The main works involve factory shutdown and isolation, demolishing of all buildings and structures, and dismantling of all machinery and equipment.

Old machinery and equipment as well as old building materials that are still useable or saleable will be put up for sale; those that are no longer useable will be discarded at the landfill.

The site will be cleaned and tidied up; soil contaminated, if any, will be removed.

The air, water and soil qualities will be tested for the last time to ensure that the ecology of the site is not severely deteriorated.

Afterwards, rehabilitation (reforestation) will be undertaken. A rehabilitation (reforestation) contractor and party will be hired for the final rehabilitation works.

The decommissioning and Rehabilitation Phase will last for at least 2 years, if rehabilitation is successful. It not the company will continue the rehabilitation until the situation is satisfactory. It is expected that after 2 years the project site will be rehabilitated to its quasi original situation.

8.2 Project environmental, socio-economic and health policies and commitments, legal requirement and institutional arrangement

The project environmental and socio-economic policies are already described in detail in Chapter 3 and will not be repeated here. (This is not a standalone EMP separate report). Only Health Policy, legal requirement and institutional arrangement are described below:

8.2.1 Health policy

The health policy of the Nation is "Health for All".

The policy guidelines for health service provision and development have been provided in the constitution. **Article-28** of the constitution of the Repullic of Union of Myanmar (2008) States that:

The Union shall:

i) earnestly strive to improve education and health of the people

Article 367:

Every citizen shall, in accord with the health policy laid down by the Union, have the right to health care.

National Health Policy (1993)

The National Health Policy was developed with the guidance of the National Health Committee in 1993.

The National Health Policy has placed "Health for All" goal as a prime objective. There are 15 main points regarding the National Health Policy (1993). The first main point No.1 is:

- to raise the level of health of the country and promote the physical and mental well-being of the prople with the objective of achieving "Health for All"

The main point, No.9 concerns environment which states:

- to intensity and expand environmental health activities including prevention and control of air and water pollution

Health Legislation

Certain portion of health legislation also addresses environmental sanitation and communicable disease prevention, as far as environmental affair is concerned. That includes the control of disposal of human and other wastes, concerns for water purity and hygiene of housing and food sanitation.

Certain health legislation that are relating in one way or another, to environmental affairs are:

- The Public Health Law (1972)

  Which includes environmental sanitation and cleanliness of food, among others

- Prevention and control of communicable Diseases Law (1995) (Revised 2011)

  This law describes measures to be taken in relation to environmental sanitation, among others.

- The control of smoking and consumption of Tobacco Product Law (2006)

  This law describes the creation of tobacco smoke free environment, among other. This is of relevant at the work place and project site where many employees are working.

Health Development Plan and Myanmar Health Vision 2030

This long term plan has been drawn up to meet any future health challenge. This plan has 9 main objectives and one of them is:

- to develop a health system in keeping with the changing political, socio-economic and environmental situations

8.2.1.1 National Environmental Health Agenda

Environmental Health is actually one of the intergral parts of Environmental Protection and Conservation aspect. EIA, IEE and EMP works normally encompass the physical, biological, socio-economic, cultural and visual components of the surrounding environment. The third component, that is, socio-eocnomic, includes public health component, (mortality and morbidity, diseases, accident and injuries etc.).

The Occupational and Environmental Health Division under the Department of Public Health is the focal point agency concerring Occupational and Environmental Health aspects.

This Department (Division) is involved in:

- environmental monitoring eg- air quality, water quality
- work place assessment eg- air quality, waste and water quality, heat stress, light, noise level

Health Impacts Assessment (HIA) and Social Impacts Assessment (SIA) are actually important parts of environmental protection and conservation works.

Commitments

The project proponent, Ngwe Yi Pale' Sugar Co., Ltd has made a sincere commitment to operate the proposed sugar factory in an ecofriendly manner as practical as possible.

The company will comply with the NEQEG guidelines (2018) as prescribed by ECD.

The company will duly implement the Environmental Management Plan (EMP) and Monitoring Plan (MP) as far as possible.

The company will do its best to take all pragmatic mitigation measures prescribed in this EIA report.

U Sein Myo Aung

Executive Director

Ngwe Yi Pale' Sugar Co., Ltd

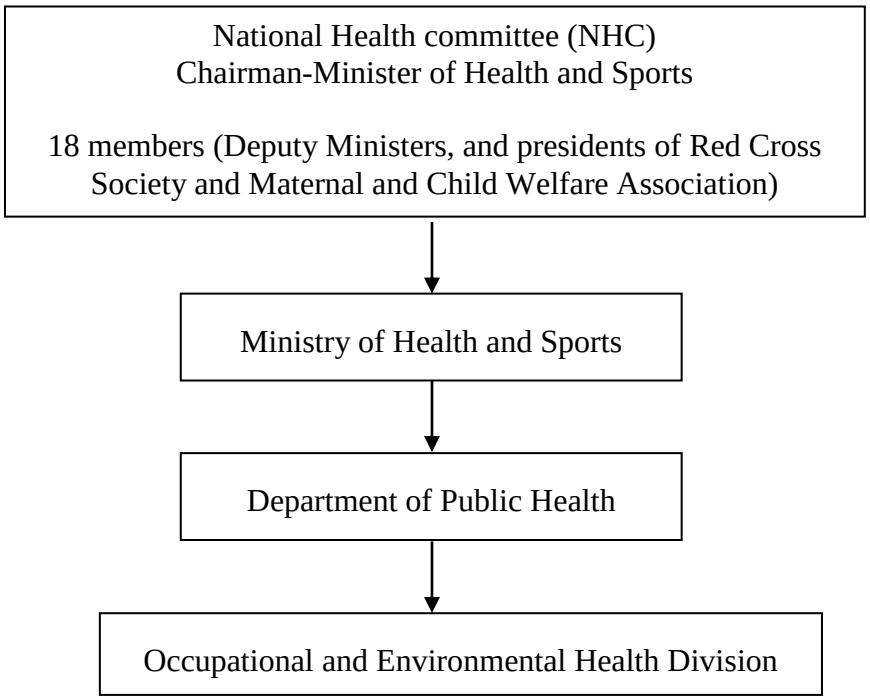
8.2.2 Legal requirements

These are already described in detail in **Chapter-3** and will not be repeated here. This is briefly summarized as below:

46 laws, rules, regulation are listed together with excerpts from relevant articles/sections are reproduced; national environmental quality (emission) guideline, 2015 are reproduced in Chapter 3. In addition corporate environmental and social policies are enumerated including environmental social standards as prescribed by IFC are reproduced.

8.2.3 Institutional Arrangement

Institutional Arrangement (organization)



The National Health Committee (NHC) is an umbrella organization comprising 18 members from 9 ministries and one member of Nay Pyi Taw Council, and presidents of Red Cross Society and Maternal and Child Welfare Association.

The Chairman of NHC is the Uinon Minister of Health and Sports while the Vice Chairman is the Union Minister of Labour. 9 deputy ministers under 9 ministries, a member of Nay Pyi Taw Council, the president of Red Cross Society, and the presidents of Maternal and Child Welfare Association are also members of NHC.

The Deputy Minister of Health and Sports is the secretarywhile the Director General of Department of Health Planning, is the Joint secretary.

The Occupational and Environmental Health Division (OEHD) under the Department of Public Health is the focal agency involves in environmental and health affairs.

The occupational and Environmental Health Division is involved in implementing Environmental Health Programme in the country.

At the moment it is involved in:

- Environmental monitoring: on air quality and water quality
- Medical monitoring: health assessment on workers (periodic medical examination, performing physical examination, chest X-ray, biomarker survey on workers)
- Work place assessment: eg- on air quality, waste (solid) and waste water, heat stress and light, noise level, soil quality, water sanitation and hygiene etc. in certain factories.
- Assessment of environmental health probably relted to climate change and general health impact assessment.

Institutional arrangement of the company for implement of EMP

The execute EMP and nucleus organization (EMP cell) is organized as follows:

The EMP cell members include the manager, who is the EMP cell lead and other staff members. To assist in community monitoring two villagers are added into the list of EMP cells which is tentatively setup.

Ngwe Yi Pale' Sugar Co., Ltd has tentatively formed the EMP cell as follow:

Sr no.	Name	Designation	Responsibility
1.	U Aung Myo Tun	Manager	EMP cell leader
2.	U Win Aung	Engineer	Cell member
3.	U Maung Maung Thet	Technician	Cell member
4.	U Win Thein	Technician	Cell member
5.	U Tin Soe	Technician	Cell member
6.	U Win Hlaing	Village administrator (Inn Wine)	Cell member
7.	U Tin Myint	Villager	Cell member

As project progress, more staffs will be added to the list of EMP cell.

The EMP cell leader and members are responsible for the implementation of EMP and MP. They will be specially trained for this task. They will also take part in training and supervision of other staffs for execution of monitoring plan and implementation of mitigation measures. Most, if not all, staffs will be made familiar with mitigation activities. While the effective operation of the sugar factory, that is, the production works will be the main task many staffs will have also to participate in mitigation, EMP and MP activities.

Management action by these EMP cell members will have to be taken on regular or routine basis, daily, weekly, monthly, bi-monthly and from time to time, depending on situation.

From time to time, or semi-annually or annually, experts and technicians will have to be hired for testing and monitoring works – eg- testing of air, water, soil qualities etc.

EMP and environmental monitoring is a new subject even in developed countries. EMP cell leader and members shall try to be aware of the latest information regarding environmental activities carried out in developed countries. As work progresses the small nucleus EMP cell organization will be reorganized into a bigger and probably more efficient organization.

The present approach is a pragmatic one based on the availability of qualified personal and materials and equipment. Capacity building and training for EMP cell members mentioned earlier will be an integral part of execution of EMP and MP.

8.3 Summary of impacts and mitigation measures

Table – 28: During the Construction Phase

Sr. No.	Impact	Mitigation
1.	Impact on air environment	- Manage dust and smoke - Avoid open burning of debris - Suppress dust with water spray - Restrict vehicular movements, reduce the speed - Stop earth work or loading and unloading of earth, sand when strong wind is blowing - Limit open stockpiles of earth, sand, lime powder - Minimize drop height when loading and unloading earth and other loose materials - Plant fast growing trees to trap dust - Procure equipment and vehicles that are eco-friendly eg. those that emit less smoke - Keep equipment and vehicle well-maintained and well-operated - Use fuel with low sulphur content - Provide adequate PPEs - Heed to complaint of the local concerning dust and smoke - Monitor the mitigation works
2.	Noise and vibration	- Comply with NEQ guideline of ECD - Procure eco-friendly equipment and vehicles that generate low noise level - Restrict noise to working hours only (no work at night) - Install silencers on certain machinery - Switch off or throttle down equipment during idle hours - Limit/restrict the movement and speed of vehicles - Keep equipment and vehicles well maintained and well-operated - Manage vibration (of machinery, vehicles); provide suitable foundation - Plant fast growing trees to absorb noise - Provide PPEs - Heed to the complaint of the local regarding noise - Monitor the mitigation effort
3.	Impact on water environment	- Avoid accidental sliding or erosion of stockpile of earth or sand into the water of Doe Gon rivulet - Avoid accidental dumping or spill of earth and newly mixed concrete into water - Avoid or minimize siltation and sedimentation

		- Avoid accidental spillage of oil and chemical into water - Manage domestic waste (solid and liquid); no disposal into rivulet - Manage the water level, flow and volume as practical as possible; also consider for seasonal change in hydrology - Heed to the complaint of locals regarding the quality of rivulet water, if any - Try to meet NEQEG values by ECD - Monitor the mitigation works
4.	Impact on soil	- Avoid unnecessarly earth work, earth moving, earth cuts - Avoid discriminate dumping of soil and wastes - Manage the soil - Avoid unnecessary destruction of soil profile - Separate top soil from sub-soil (separate stockpiles); top soil for revegetation; sub-soil for construction - Prevent soil erosion and siltation - Prevent wash water from carrying earth and materials into the stream - After construction work resurface and stabilize exposed ground - Do not keep the ground bare for long period during wet season - Rake and restore soil compacted by vehicles or machinery - Avoid fuel oil spill on soil; remove the spill immediately; do not wash down with water but use absorbent - Train workers for handling of fuel and cleanup of spills - Monitor the mitigation activities.
5.	Impact: waste	- Manage solid waste - Comply with rules and regulations - Avoid open burning of debris - Dump waste at approved landfills - Educate and train workers for goodhouse-keeping - Put up left over construction materials for sale - Hire a contractor for tidying up the site after completion of construction work - Monitor the mitigation works
6.	Potential impact on biodiversity	- Protect and conserve flora and fauna - Execute minimum disturbance on the biodiversity and habitat - Comply with Environmental Conservation Law, 2012 and Rules, 2014 - Restrict the clearing of vegetation - Keep big trees as contact as far as possible - Avoid open burning of debris - Monitor the mitigation works

7.	Potential impact on traffic	- Plan and manage traffic - Schedule the timing for vehicular movement, - Educate the drivers for defensive driving - Try to maintain zero road accident - Keep vehicle well-operated and well-maintained - Educate heavy truck driver for driving with reduced speed - Do not overload the truck; comply with regulation - Avoid spilling of earth or other materials from truck during transportation - Reduce the speed when driving near or through a village - Set up speed limit at appropriate spot along access road - Monitor the mitigation effort
8.	Occupational health and safety issue	- Educate, train and supervise workers for good working practice and good safety practice - Plan for emergency procedure; provide First Aid Kids, fire extinguisher etc. - Try to achieve zero accident - Display phone number and address of Red Cross Society, Ambulance Service, Nanghkio Hosiptal, Fire Brigade etc so that everyone can see - Train some staff for First Aid and Firefighting Trainings - Take out insurance for the company and Insurance for Fire - Monitor the mitigation works
9.	Potential social issue	- Avoid the potential negative impacts on the socio-economic life of the locals - Maintain good relation with the locals - Conduct public consultations from time to time; heed to their opinions - Educate workers for appropriate behaviours when dealing with locals - Manage misbehaviour and social illness of workers - Keep separate dormitories for male and female workers - Ask the construction contractor to discipline his workers - Apply punitive actions for wrong doer - Prohibit the drinking of alcohol during working hours; ban the use of narcotics - Train workers for good housekeeping - Heed to the voice of the locals - Monitor the mitigation works
10.	Potential security issue	- Manage for the security of site - Wall or fence the site - Control all accesses; set up gates and deploy security guards - Do not let workers enter the neighbouring village without pre-authorization;

		- Do not let them mingle freely with locals (Construction Phase only) - Keep certain materials under lock and key - Ask the building contractor to discipline his workers (construction phase only) - Take punitive actions for wrong doer - Monitor the mitigation works

Table – 29: During the Operation Phase

Sr. No.	Impact	Mitigations
1.	Impact on air environment	- Comply with NEQ emission guideline by ECD - Try to control and mitigate air emission as practical as possible - Procure eco-friendly equipment/machinery/vehicles that generate less smoke - Ensure for complete combustion of bagasse waste - Apply ash reduction equipment, eg. dust collector, filter bag - Apply wet scrubber system (water dozing) - Proper training, operation and maintenance of machinery/equipment - Avoid open burning of solid waste - Restrict vehicular movements - Prevent spillage of lime powder, - Plant trees around the compound to mitigate dust and smoke - Spray water for dust suppression. - Provide adequate PPEs to workers - Monitor the mitigation works
2.	Noise and vibration	- Comply with NEQEG guideline by ECD - Try to manage and mitigate noise and vibration - Procure machinery/equipment/vehicle that are eco-friendly; emitting lower noise level - Maintain and operate machinery/vehicle well - Install silencer - Install noise barrier/sound insulation - Limit the speed of truck - Install absorber on machine that vibrate violently - Implement stable foundation - Create green belt to absorb noise - Provide PPEs - Monitor the mitigation actions

3.	Impact of solid waste	- Plan and execute waste management, waste minimization and utilization - Use bagasse waste for fuel - Recycle molasse or put up for sale - Compost "mud" (cachaza) into high quality organic fertilizar - Use dry lime (solid lime) for soil conditioning and also suppression of odour - Systematically collect ash and store in ash pools; process ash into making fertilizer - Educate workers for proper handling of waste - Avoid open burning of solid waste - Follow the 5Rs principles for waste, if the is possible - dispose waste only at approved landfill or dumping site - Monitor the mitigation work
4.	Impact of liquid waste	- Comply with NEQ effluent guideline by ECD - Plan and execute the management of waste water and reduction of waste water - Promote awareness on the efficient use of water and conservation of water - Seggregate non-contaminated waste water stream from contaminated stream; reuse - Reduce the organic load of waste water by preventing the entry of solid waste into the waste water stream - Prevent direct run off to water course - Recycle process water and reuse - Duly treat waste water applying conventional method (physical treatment) - Ensure that industrial waste water in duly treated (physical treatment) - Educate and train workers for good housekeeping practice and proper handling of waste water - Check and monitor daily use of water - Regularly check the tanks, pipes, taps for water leakage and fix them immediately - Monitor the mitigation works
5.	Impact on water environment	- Plan and manage for water environment protection and water conservation - Follow rules and regulation (Conservation of Water Resources and River Law, 2006) - Comply with NEQ effluent guideline by ECD - Avoid by all means the pollution of Doe Gon rivulet - Avoid dispossing of solid and liquid waste into the rivulet (stream) - Avoid spillage of fuel oil into the rivulet

		- Promote awareness of efficient use of water and water conservation - Ensure that the consumption of water is in the workframe stated earlier (30,000 tons/day) - Recycle water, through cooling tower and series of cooling tanks - Apply appropriate plumbing and ensure that there is no leakage of water - Harvest rain water, if necessary - Monitor the mitigation works
6.	Impact on traffic	- Try to achieve zero road accident - Comply with Highway Law, 2000 - Set up signage for speed limit at appropriate places - Educate and train the drivers for defensive driving - Avoid over loading of truck - Conduct public education campaign for road safety - Keep a log book for each vehicle - Schedule vehicular movements - Monitor the mitigation actions
7.	Occupational health and safety issue	- Plan and manage for a safe and healthy atmosphere inside the factory - Try to achieve zero accidents - Comply with Factory Acts, 1974; Boiler Law, 2015; Workmen Compensation Act, 1923 - Also comply with NEQ guideline for emission and noise by ECD - Educate, train and supervise workers for good working practice, good safety practice and good health and hygiene practice - Educate, train and supervise them for skill, for operation of equipment, for handling for chemicals (eg. lime, sulphur) - Keep all machinery/equipment well-maintained and well-operated - Provide adequate PPEs - Carefully plan for emergency procedure - Provide First Aid and Firefighting training - Display addresses and phone numbers of Red Cross Society, Ambulance Service, Fire brigade etc. so that every one can easily see - take out insurance for the factory, also take out fire insurance - Monitor the mitigation actions

8.	Potential social issue	- Prevent or minimize negative impact on socio-economic life of the local - Build and maintain good relation with locals - Hold public consultation from time to time - Educate the workers for etiquette, and respect the custom and tradition of the locals - Manage misbehaviours and social illness of workers - Keep separate housing for male and female workers - Provide proper training on work place regulation and code of conducts - Provide welfare programme - Educate and discipline workers - Deal with workers on a fair and square basis - Take punitive action to wrong doer - Prohibit the drinking of alcohol during working hours; ban the use of narcotics - Provide adequate sanitation eg-toilet, baths etc. - Heed to the voice of the locals - Plan and implement CSR as practical as possible - Monitor the mitigation actions
9.	Potential security issue	- Manage security of the site - undertake effective fencing/walling of the site - Control all accesses; set up security gates; deploys guards - Do not let workers mingle freely with locals - Do not let the workers enter the neighbouring village without pre-authorization; - Put certain materials under lock and key - Apply punitive measures to wrong doer - Provide ID cards for all for easy idenfication - Provide uniform for all - Monitor the mitigation works
10.	Potential visual impact	- Plan and excute for a sugar factory project which is focused on visual appeal - Enhance the splendor and beauty of the factory - Plant shade trees along both sides of access road; plant shade trees, fruit trees and ornamental trees in and around the site; create green zones and belts - Conserve natural vegetation in the vicinity - Use eyes pleasing paints and colours for buildings and structure - Provide appropriate lighting at night only for security reason; avoid the use of excessive light - Use yellow light instead of white light to mitigate insect aggregation; if insect aggregrate turn off the light for a while - Monitor the mitigation works

Table-30: During the Decommissioning/Rehabilitation Phase

Sr. No.	Impact	Mitigation
1.	Occupational health and safety issue	- Manage for effective decommissioning of site. - Hire decommissioning contractor to do the work. - Dispose materials that are no longer useable; redeploy or put up for sale those that are useable - Restore the ground and soil profile. - Revegetate and rehabilitate the ground, select a variety of plant species. - Backfill pits, dents and depressions, if any remain after decommissioning; backfill first with overburden and then put top soil on top to facilitate revegetation. - Monitor the mitigation works
2.	Potential residual impacts	- Hired a decommissioning contractor to do the work - Clean and tidy up the site - Remove contaminated soil, if any - Test the quality of air, water and soil for the last time - Continue rehabitation (reforestation) work - Hired a rehabilitation contractor and party for effective reforestation

Impacts and mitigation measures to be put in place for each and every impact has been described in technical details earlier in **Chapter-6** and will not be repeated here as this is not a standalone EMP report.

8.4 Overall budget for implementation of the EMP

EMP is the key to ensure that the environmental quality of the area does not deteriorate due to the implement of a project. EMP involves the management of the overall environmental issues including the physical, biological, socio-economic, cultural and visual issues.

EMP encompasses the whole life of the project starting from the Preconstruction/Planning Phase, through Construction and Operation Phase to the end of Decommissioning Phase.

In the very early planning stage (Preconstruction Phase) EMP principles shall be followed for the application of environmentally sound idea and technology. EMP principle shall be also followed for the procurement of all ecologically friendly materials (building materials, equipment, machinery, vehicles, chemicals etc and a variety of environmental control equipment, instruments, firefighting and first aid facility, environment control Personal Protective Equipment (PPEs) etc.

The actual implementation of EMP will cover the Construction, Operation and Decommissioning/Rehabilitation Phases of the project life.

Since EMP involves the management of all environmental issues during the three phases of the project there has to be adequate budget of the implementation of EMP. This is particularly true for the long operation phase, the most important phase of the project life.

This budget will be only for the implementation of EMP but it will cover the procurement of certain equipment and devices for uses in monitoring, and certain materials for uses in emergency e.g. PPEs, firefighting and first aid facilities etc.

In order to effectively execute EMP and MP the company has set a side 1% of the budget, Ks 1,632,363,900 for the EMP fund which will cover the initial cost and recurring expense for the implementation of the EMP and MP.

8.4.1 Allotment of EMP fund

Of the Ks 1,632,363,900 alloted as EMP fund, sub-budget allotted for each programme under EMP and MP are as follows:

The EMP fund is then allotted for each programme, namely, cost of organizing EMP, cost for capacity building and training, cost for partial procurement of small equipment and device, cost for execution of mitigation, cost for monitoring, for emergency and miscellaneous. The detailed costs are as follows:

- Cost of organizing EMP — 2% of EMP fund (Ks 32,647,278)
- Cost for actual execution and dissemination of EMP in the forms of:
  - (a) Taking mitigation measure — 25% of EMP fund(Ks 1,224,250,000)
  - (b) Monitoring actions — 25% of EMP fund (Ks 1,224,250,000)
- Cost for partial procurement of equipment and materials — 20% of EMP fund (Ks 326,472,780)
- Cost for capacity building and training — 7% of EMP fund (Ks 114,265,473)
- Cost for emergency/contingency (for probable emergency cases) — 10% of EMP fund (Ks 163,236,390)
- Cost for reporting, documentation work — 8% of EMP fund (Ks 130,589,112)
- Miscellaneous (including casual fees for two villagers, who are EMP cell members) — 3% of EMP fund (Ks 48,970,917)

It is expected that the EMP fund can cover the whole life of the project of 30 plus years. If necesaary, more will be added to the fund. Labour cost will be kept at a minimum. Only staff will be involved in the implementation of EMP and MP. Staff will be first trained for the purpose.

Procurement for equipment and materials that are essential for the execution EMP such as firefighting equipment and accessories, Personal Protection Equipment (PPEs), First Aid Kid and medicine and drugs etc will be from the main projects budget, not the EMP budget.

Most of the EMP fund will be used for the implementation of mitigation measures (which are integral part of EMP) and implementation of MP (which is also integral part of EMP).

The above-mentioned cost estimation for EMP fund is based on the current unit price. Because the project will be implemented over many years (even decades) price fluctuation and inflation will be unavoidable. A contingency amount shall be prepared for any unavoidable event in the future. Unfortunately, if a major accident happens the EMP fund has to be greatly increases.

8.5 Management and Monitoring Sub-Plans (MMSP) by project phase

Environmental and Social Management sub-plans

The sub-plan covers all project phases (Preconstruction Phase, Construction Phase, Operation Phase and Decommissioning Phase).

This sub-plan address such environmental and social issues as: noise and vibration, waste, waste water and storm water, air quality, odour, water quality, erosion and sedimentation, biodiversity, occupational health and safety, community health and safety, cultural heritage, employment and training and emergency response plan. (EIA Procedures, 2015, ECD)

For pragmatic purpose these are outline in tabulated forms.

Table – 31: During the Construction Phase

Sr. No.	Potential issue	Sub-plans (mainly for taking mitigation measures)
1.	Noise and vibration	- Plan in the Preconstruction Phase for procurement of equipment, and vehicles that emit lower noise level. - Procure these eco-friendly machinery, equipment, and vehicle. - Comply with ECD's NEQEG guidelines for noise level. - Test/monitor air quality regularly - Install silencers and mufflers. - Avoid construction work at night. - Provide PPE to workers exposed to prolonged high noise level. - Manage vibration of machine, equipment and vehicle. - Limit the speed of vehicles.

2.	Waste	- Designate separate dumping site for vegetation waste; ensure that the site are stable; give away vegetable waste (trees) to locals for fire wood. - Regularly collect waste at camp in waste bins and dispose at approved landfill (or dumping) site.
3.	Hazardous waste	- Not generated.
4.	Waste water and storm water	- Create systematic drainage at the site to manage waste water; ensure that it does not enter the stream; also to manage storm water. - Create sustable drainage at site to manage storm water. - Keep natural drainage of the slope intact; do not block or alter as far as possible. (Ensure that the construction of series of assess road, in-mine road, ramps does not damage the natural drainage as far as possible.)
5.	Air quality	- Comply with ECD's NEQEG emission guidelines. - Plan in the Pre-Construction Phase for the procurement of equipment, vehicles that emit less smoke (to be certified for emission compliance) and procured them. - Test/monitor air quality regularly. - Keep equipment and vehicles well-maintained, well-operated and well-lubricated to reduce smoke emission. - Used machinery and vehicle with low emission rate; use fuel with low sulphur content. - Avoid open burning of debris. - Spray water for suppression of dust. - Restrict vehicular movement; maintain road clear of mud and dirt. - Limit open stockpile of earth, sand etc. - Provide PPE to workers who are exposed to smoke or dust for long period.
6.	Odour	- Not generated.
7.	Chemicals	- Not used during Construction Phase
8.	Water quality	- Avoid water bodies as far as possible when constructing or building roads - Test/monitor water quality regularly - Storage of fuel oil as well as used fuel oil should be done in a designated bunded side until removal - Maintain vehicles and machinery adequately to prevent spillages resulting in surface water contamination - When handling fuel oil avoid accidental spillages into the surface water; should spillages occur implement appropriate clean up immediately. - Avoid disposing of waste (both liquid and solid) into water bodies.

		- Top soil should be allowed to naturally vegetate in order to stabilize soil particles and thus preventing erosion and limiting siltation to avoid pollution of water by all means.
9.	Erosion and sedimentation	- Implement erosion control/management when the natural slope is more than 20^{o}. - The company will construct three layers of embarkment to control erosion - Minimize length and steepness of slope (conduct land cutting, land filling and land construction). - Minimize the area of bare soil exposed as practical as possible (do not clear the vegetation more than necessary leaving large area of bare land). - Run-off from areas adjacent to the site will be diverted around disturbed areas (construction of small diversion canal/drainage). - Control sediment (build sediment trap or dam where necessary). - Ensure that the slope of a stockpile is not more than 37^{o}. - Ensure that run-off from the site is discharged at non-erosive velocities; discharge will be to location that do not adversely impact the natural waterways (the stream).
10.	Biodiversity	- Do not clear vegetation more than necessary for the construction work. (only small vegetaion such as grass and herbs have to be cleared) - Prevent the spillages of hydrocarbons which has negative impact on plants especially on the root system - Avoid open burning of debris. - Educate workers for fire awareness and protection. - Identify sensitive species and habitats and try to avoid such spots as far as possible. - Promote environment awareness to workers. - Implement rehabilitation to promote natural vegetation establishment after completion of construction. - Restrict vehicular movement to the access road to prevent habitat disturbance of birds and animals. - Prevent the potential injury or dealth of wildlife due to vehicular movements especially during nigh time. - Avoid the use of excessive bright light for long hours at night to prevent the aggregation and eventual death of large number of insects (offensive bright light in the forest at night will also scare away wild animals from their natural foraging or breeding ground).
11.	Occupational Health and Safety	- Creation of a safe working place and working condition. - Facilities will have adequate space for all kinds of activities, e.g. excavation, transportation, site for stockpiles, etc.

		- Provision of adequate lavatory facility, bath and washing area; provision of adequate potable drinking; provision of health living spaces and clear eating areas, provision of first aid at all times for workers (the company has its own clinic). - For practical purpose provide First Aid Training for some workers with the assistance of Township Red Cross society; will provide adequate first aid facility including first aid kits, medicines and drugs. - Provide training for Occupational Health and Safety; training for good safety practice, for personal safety (preventing accidents, injuries), basic hazards awareness, and site specific hazards. - Provide training on safety handling and operation of machinery equipment, safety storage and handling of fuel oils. - Will provide adequate PPEs to workers where and when necessary to ensure the basic health protection and safety of workers. - Safe work procedure for all electrical works covering construction, operation and decommissioning and demolition works. - Educate and train drivers, particularly heavy truck drivers for safety driving and defensive driving; ensure that the access road is not bumpy and safe for driving. - Try to achieve zero accidents in excavation, hauling and transportation activities including traffic. - Ensure that workers are not subject to excessive repetitive motions, over exertion and excessive manual handling; if possible will use mechanical labour rather than manual labour as practical as possible to reduce fatigue, strain and injury on workers.
12.	Community Health and Safety	- Will control smoke and dust as practical as possible; will avoid open burning of debris and trash so that smoke will not reach the village; educate the driver to lower speed when passing through the village (the reduction of speed from 40 km to 35 km can reduce dust to 50%, it is learnt). - Local should be able to file complaints regarding dust, noise and vibration. - Ensure that the water ponds do not become breeding ground for mosquitoes; regularly changing of water; application of mild chlorination; annihilation of mosquito larvae by all means; educate workers to use mosquito's nets at night and provision of mosquito nets. - Also ensure that domestic solid wastes, liquid waste water and drainage do not become breeding ground for flies, mosquitoes and insect for prevention of vector borne diseases and water borne or water related disease. - Will prevent the occurrence and spread of infectious and communicable diseases by all means; will undertake health awareness and educations initiative (health education campaign) in local community as far as possible. During the long Operation Phase will set up a clinic at the site and provide htalth care for locals as practical as possible.

		- Avoid/minimize by all means, vector borne, water borne (water based, water related disease and communicable diseases that would result from project activities. Liaise with Township Health Authority regularly. - Avoid/minimize by all mean spread of diseases from workers. Educate long distance truck driver regarding sex education example for use of prophylactic condom; prevent spread of STD, HIV/AIDS. - Educate workers regarding code of conducts, social conducts, etiquette and local culture and tradition. - Educate drivers for safe driving and defensive driving and to comply with rules and regulation regarding traffic; also conduct road safety education campaign for the local community, if possible; local should be able to file complaint regarding traffic. - Comply with law and regulation relevant to transportation of hazardous materials such as fuel oils; also plan for measures for preventing and/or mitigation the consequence of accidental release/spill of hazardous materials (fuel oil); avoid/minimize community exposure to hazardous materials. - Develop emergency preparedness and emergency response plan and contingency plan (action plan) for effective implementation when necessary; provide operation manuals for external emergency plan and internal emergency plan for all workers. Conduct rehearsals or drills for such plan. Cooperation with local community and authority in preparation of emergency plan.
13.	Cultural heritage	- Ensure that the project has no impact on the Buddhist monastery. - Monitor the situation. - Pay courtesy visit (obeisance visit) occasionally to the abbot monk and offer cash and kinds and build good cordial relation. - Get involve in religious festivals; provide donations.
14.	Employment and training	- Plan for human resource development. - Prioritize employing locals as far as possible. - Organize new task employees for job training. - Also provide systematic induction training for new workers to enable them to do their jobs efficiently. - Induction training will cover: general training; skill training for efficiency and mandatory training relating to health and safety (e.g. safety operation of machinery and handling of hazardous materials). - Educate and train them for good working practice, good safety practice, good health and hygine practice and good environmental awareness practice until all these practices are ingrained in their mind sets and become good habits. - Educate and train them for familiarization with negative impacts and subsequent taking of mitigation measures.

		- Educate and train them for basic eco-friendly behaviours e.g. good house-keeping practice, do not litter, do not dirty your place, minimize the use of water, fuel.
15.	Emergency response	- Prepare Emergency Response Plan (ERP) and team to prevent fatilities and injuries, to reduce damage and to protect environment and community. - Prepare emergency preparedness plan and execute the plan. - (Emergency Response Plan will cover emergency resources, emergency preparedness and training, emergency response procedures, administration of the plan, communication and procedures, and debriefing and post-traumatic stress procedures.) - For practical purpose provide training for firefighting, training for First Aid and Rescue. - Provide facilities (e.g. firefighting equipment, suit, first aid kits, and emergency vehicle. - Display phone numbers of Firefighting Department, Ambulance Services, Red Cross Society, Hospital and Police Station.

Table – 32: During the Operation Phase

Sr.	Potential issue	Sub-plans (mainly for taking mitigation measures)
1.	Noise and vibration	- Comply with ECD's NEQEG noise level guidelines. - Restrict or limit vehicular and heavy machinery movements. - Plan for appropriate choice of machinery and vehicles (that emit low noise level); method of working, efficient material handling. - Ensure that the foundations of machinery and equipment are stable. - Installation of noise abating devices e.g. silencers, mufflers at air inlet and outlet of far and compressor; place noisier sources far away in overall design. - Well-operated and well-maintained vehicles and machinery generate lower noise level and prevent undesirable noise level. - Restrict or limit vehicular movement. - Create smooth road surface to mitigate vibration. - Develop green belt (plant trees) around the factory; trees abate noise and serve as noise sink (pollution sink). - If necessary install vibration absorbers or vibration absorbers or vibration abators. - Provide adequate PPE e.g. ear muffs, ear protectors to workers exposed to long hours of high noise level; - Conduct regular noise monitoring to ensure that the levels are within noise exposure standard (not higher than 70 dBA); hire technicians where necessary. - Implement GRM; local can file compliants regdarding noise. - Monitor noise and vibration; hire technicians.

2.	Waste	- Regularly remove bagasse ash and store in ash pond, it can be also use as fertilizer or soil conditioner - Instruct workers for proper handling and disposal of wastes, especially domestic waste, at land fill. - Follow the 5 Rs principle: reduce, reuse, recover, recycle and redesign, wherever possible. - Separate domestic solid waste into categories, use separate bins, disposed at approved landfill. - Dispose waste only after all waste preventive and recycling strategies have been undertaken. - No disposal of waste water outside (on land or into water body). - Educate and train workers for good house keeping practices. - Monitor waste regularly; - monitor effectvieness of mitigation measures taken.
3.	Hazardous waste	- No hazardous waste envisaged; all chemicals are mild chemicals used up in manufacturing of sugar - Used fuel oil, engine oil will be collected in drums and give away to recyclers.
4.	Waste water and storm water (water is mostly recirculated;	- Create systematic drainage at the site to manage waste water; ensure that it does not enter the stream; also to manage rain influx - Create suitable drainage at site to manage storm water. - Recirculated use water – e.g. cooling tower, cooling ponds - Apply conventional treatment (physical treatment such as screening, filtering, sedimentation and removal of sediment or sludge). - Brown waste water (kitchen, baths) will end up is waste water collection tank and dry up; no special treatment. - Black waste water (toilet) will end up in septic tanks and sock pits. - Avoid disposal of waste water either onto opeing ground or into the stream; educate workers for this. - Monitor waste water regularly – monitor effectiveness of mitigation measures taken.
5.	Air quality	- Comply with ECD's NEQ emission guideline. - Consolidate and compact all areas to prevent generation of dust due to wind. - Installed emission management system when necessary - Use wet scrubber system (lime water dozing or water sprinkling) for desulphurization). - Reduce NO_2 by control combustion (complete combustion). - Use dry bagasse as burner to achieve complete combustion and reduce NO_2, PM_{10} and $PM_{2.5}$ no need for coal - Regularly collect bagasse ash and dispose/collection in ash pond and use as fertilizer - Spray water adequately to suppress fugitive dust.(dry months)

		- Reduce the speed of vehile to reduce dust generation. - Restrict vehicular movement; maintain road, clear of mud and dirt. - Avoid open burning of debris or solid waste. - Keep equipment and vehicles well- maintained to reduce smoke. - Implement GRM (locals can file complainct regarding emission). - Provide PPE (eg. face masks, mouth and nose covers, gas masks) to workers exposed to long hours of dust and smoke; - Monitor air quality (hired technicians). - Monitor the effectiveness of mitigation taken.
6.	Odour	- No envisage. (If ash pond and waste water are not managed bad odour can occur. Apply lime powder to mitigate odour)
7.	Chemicals	- All chemicals are mild chemical used up in sugar manufacturing; no special treatment required.
8.	Water quality	- Plan and manage for preventing pollution on the water environment. - Manage so that factory's activities will not impact the water of Doe Gon stream. - Manage for the stability of top soil to prevent erosion and siltation; (the company has constructed the revetment) - Fuel oil depot should be away from the river; the depot should be bunded to protect surface water from oil spill. (fuel depot is inside the factory No.2 compound) - Avoid disposing of waste (liquid and solid) into the river by all means. - Manage water conservation; reduce water consumption; recirculated water through cooling tower and series of cooling ponds. - As most of the water is recirculated there is little industrial waste water; apply simple physical treatment: filtration/sedimentation and removal of sediment/sludge. - Adhere to the principle of conservation of water; educate workers for this. - Apply a monitoring plan for water quantity and quality based on simple parameter e.g. temperature, pH and total alkalinity. (hired technicians). - Also monitor the effectiveness of mitigation measures taken. - Adequately maintain vehicle and machinery to prevent spillages resulting in groundwater contamination. - Avoid spillage during the handling of fuel oil. - Should accidental spillages occur implement appropriate clean up immediately; do not wash down spill with water; use absorbents or saw dust for clean up. - Monitor water quality; hired technicians. - Monitor the effectiveness of mitigation taken.
9.	Erosion and sedimentation	- Implement erosion control/management when the natural slope is more than 20^{o}. (The company will construct three layers of embarkment to control erosion)

		- Ensure that activities do not impact soil structures. - Minimize the area of bare soil exposed as practical as possible (do not clear the vegetation more than necessary leaving large area of bare land). - Create sound drainage system. - Run-off from areas adjacent to the site will be diverted (construction of small diversion canal/drainage). - Control sediment. - Ensure that run-off from the site is discharged at non-erosive velocities; discharge will be to location that do not adversely impact the natural flow of the stream. - Ensure that soil profile of the site is stable and not easily eroded. - Regularly monitor erosion (rainy season). - Monitor the effectiveness of mitigation measures taken.
10.	Biodiversity	- Plan for minimum disturbance to the flora and fauna. - Do not clear vegetation more than necessary. - Restrict the movement of vehicles to the access road. - Avoid open burning of debris. - Educate workers for fire awareness and protection; get rid of all debris that can cause fire. - Identify sensitive species and habitats, if any, and try to avoid such spots as far as possible. - Implement rehabilitation to promote natural vegetation establishment after completion of work. - Restrict vehicular movement to the access road to prevent habital disturbance of birds and animals. - Prevent the potential injury or death of small wildlife due to vehicular movements especially during night time. - Avoid the use of excessive bright light for long hours at night to prevent the aggregation and eventual death of large number of insects. - Identify sensitive species which need to be avoided; (if any), avoid the disturbance of animal habitat such as nest and breeding ground. - Plant trees, create green belt around the factory. - Monitor the situation concerning biodiversity conservation; monitor the greening of the area. - Monitor the effectiveness of mitigation measures taken.
11.	Occupational Health and Safety	- Plan and manage for safe working environment. - Try to achieve zero accidents at work place. - Educate and train workers for good working practice, good safety practice and good health and hygiene practices. - Provide adequate PPEs for workers who are exposed to heat, dust, smoke, loud noise etc. - All workers must pass a medical examination in the first place before being employed.

		- Implement safe and effective procedures for storage, transportation and handling of hazardous materials (fuel) and chemicals. - Have detail plan for prevention of fire and emergency. - Organize basic First Aid Training and Fire Fighting Training. - Provision of firefighting equipment. - Set up a factory clinic for workers and local people. - Provision of First Aid Kits, medicines and drugs. - Organize mock drills for firefighting and first aid training. - Display addresses and phone numbers of Fire Bridge, Ambulance Service, Red Cross Society, Hospital and Police Station so that every can see easily. - Take out insurance for the factory and also fire insurance. - Provide adequate proper sanitation facility e.g. bath rooms, toilets etc. - Safe work procedure for all electrical works covering construction, operation and decommissioning and demolition works. - Educate and train drivers, particularly heavy truck drivers for safety driving and defensive driving; ensure that the access road is not bumpy and safe for driving. - Ensure that nobody parts (extremities such as hands, fingers) are kept out of harm way during operation of machinery and equipment. - Ensure that workers are not subject to excessive repetitive motions, over exertion and excessive manual handling; if possible will use mechanical labour rather than manual labour as practical as possible to reduce fatigue, strain and injury on workers.
12.	Community Health and Safety	- Will control smoke and dust as practical as possible; will avoid open burning of debris and trash so that smoke will not reach the village; educate the driver to lower speed when passing near or through the village (the reduction of speed from 40 km to 35 km can reduce dust to 50%, it is learnt). - Locals should be able to file complaints regarding dust, noise and vibration, (through GRM system). - Ensure that the water ponds do not become breeding ground for mosquitoes; regularly changing of water; application of mild chlorination; annihilation of mosquito larvae by all means; educate workers to use mosquito's nets at night and provision of mosquito nets. - Also ensure that domestic solid wastes, liquid waste water and drainage do not become breeding ground for flies, mosquitoes and insect for prevention of vector borne diseases and water borne or water related disease. - Will prevent the occurrence and spread of infectious and communicable diseases by all means; will undertake health awareness and educations initiative (health education campaign) in local community as far as possible. Set up a clinic at the site and provide health care for locals as practical as possible. - Avoid/minimize by all means, vector borne, water borne (water based, water related disease and communicable diseases that would result from project activities. Liaise with Township Health Authority regularly.

		- Avoid/minimize by all mean spread of diseases from workers. Educate long distance truck driver regarding sex education example for use of prophylactic condom. - Educate workers regarding code of conducts, social conducts, etiquette and local culture and tradition. - Educate drivers for safe driving and defensive driving and to comply with rules and regulation regarding traffic; also conduct road safety education campaign for the local community, if possible; locals should be able to file complaint regarding traffic,(through GRM system). - Comply with law and regulation relevant to transportation of hazardous materials such as fuel oils; also plan for measures for preventing and/or mitigation the consequence of accidental release/spill of hazardous materials (fuel oil and chemicals); avoid/minimize community exposure to hazardous materials. - Develop emergency preparedness and emergency response plan and contingency plan (action plan) for effective implementation when necessary; provide operation manuals for external emergency plan and internal emergency plan for all workers and if necessary also to local community and government inspectors. Conduct rehearsals or drills for such plan. Cooperation with local community and authority in preparation of emergency plan.
13.	Cultural heritage	- Ensure that factory's activities have no impact on the Village Buddhist monasteries of the nearby village. - Monitor the situation. - Pay courtesy visit (obeisance visit) occasionally to the abbot monk and offer cash and kinds and build good cordial relation. - Get involve in religious festivals; provide donations.
14.	Employment and training	- Plan for human resource development. - Prioritize employing locals as far as possible. - Organize new task employees for job training. - Also provide systematic induction training for new workers to enable them to do their jobs efficiently. - Induction training will cover: general training; skill training for efficiency and mandatory training relating to health and safety (e.g. safety operation of machinery and handling of hazardous materials, such as fuel. - Educate and train them for good working practice, good safety practice, good health and hygine practice and good environmental awareness practice until all these practices are ingrained in their mind sets and become good habits. - Educate and train them for familiarization with negative impacts and subsequent taking of mitigation measures. - Educate and train them for basic eco-friendly behiviours e.g. good house-keeping practice, do not litter, do not dirty your place, minimize the use of water, fuel.

		- More specific training for operation of specific machinery and equipment and heavy trucks will be oragnized. - Review on the affectiveness of training will be done for improvement. - Overall regular monitoring of activities at the site will be conducted.
15.	Emergency response	- Prepare Emergency Response Plan (ERP) and team to prevent fatilities and injuries, to reduce damage and to protect environment and community. - Prepare emergency preparedness plan; execute the plan. - (Emergency Response Plan will cover emergency resources, emergency preparedness and training, emergency response procedures, administration of the plan, communication and procedures, and debriefing and post-traumatic stress procedures.) - For practical purpose provide training for firefighting, training for First Aid and Rescue. - Provide facilities (e.g. firefighting equipment, suit, first aid kits, emergency vehicle. - Display phone members of Firefighting Department, Ambulance Services, Red Cross Society, Hospital and Police Station. - Review on the affectiveness of training will be done for improvement. - Regular monitoring of all activities at the project site will be conducted. - Mock drill for ERP will be conducted, on a regular basic; bi-annually.

Table – 33: During the Decommissioning/Rehabilitation Phase

Sr. No.	Potential issue	Sub-plans (mainly for taking mitigation measures)
1.	Air quality and water quality	- Test air quality and water quality each for the last time to ensure that it is within guideline values and that water do not remain polluted.
2.	Soil quality	- Test soil quality for the last time to ensure that the soil is not polluted or contaminated with fuel oil; ensure that the site is ecologically restored.
3.	Erosion and sedimentation	- Ensure that no erosion and sedimentation take place during the decommissioning Phase.
4.	Community health and safety	- Manage to ensure that community health and safety are not compromise during Decommissioning Phase; ensure that the site is safe for local community after rehabilitation phase.
5.	Biodiversity	- Ensure for effective rehabilitation (reforestation) - Ensure that replanted trees are all well-reestablished. - Continue regular tending (weeding, application of fertilizer, if necessary) of the replanted trees for at least 2 years.

8.6 Content of each sub-plan

8.6.1 Objective

- To ensure that EMP is thoroughly planned and effectively implemented
- To ensure that all the negative impacts (both significant and insignificant) anticipated identified and accessed are thoroughly studied and heeded
- Most of all, to ensure that mitigation measures to be taken are duly implemented and
- To ensure that the EIA report is not a formality but a meaningful tool for operating the project in an eco-friendly manner.

8.6.2 Legal requirement

The laws, rules and regulation of relevant are already described details earlier in Chapter 3.

The legal requirement for the implementation of this project and National Environmental Quality guideline values to be complied with are already described earlier in Chapter-3 also in part (environmental health) in the earlier part of this Chapter-8 (will not be repeated here).

8.6.3 Overview maps, layout map, images etc

These are already depicted in Chapter – 4 of this report, but some are reproduced below.

LEGEND

A. 22°11'13.18"N, 96°43'13.44"E
B. 22°11'5.43"N, 96°43'10.81"E
C. 22°10'59.27"N, 96°43'12.14"E
D. 22°10'53.50"N, 96°43'14.49"E
E. 22°10'56.33"N, 96°43'19.49"E
F. 22°10'51.25"N, 96°43'23.99"E
G. 22°10'53.37"N, 96°43'31.22"E
H. 22°11'10.44"N, 96°43'28.01"E

Figure – 80: Satellite image showing project site

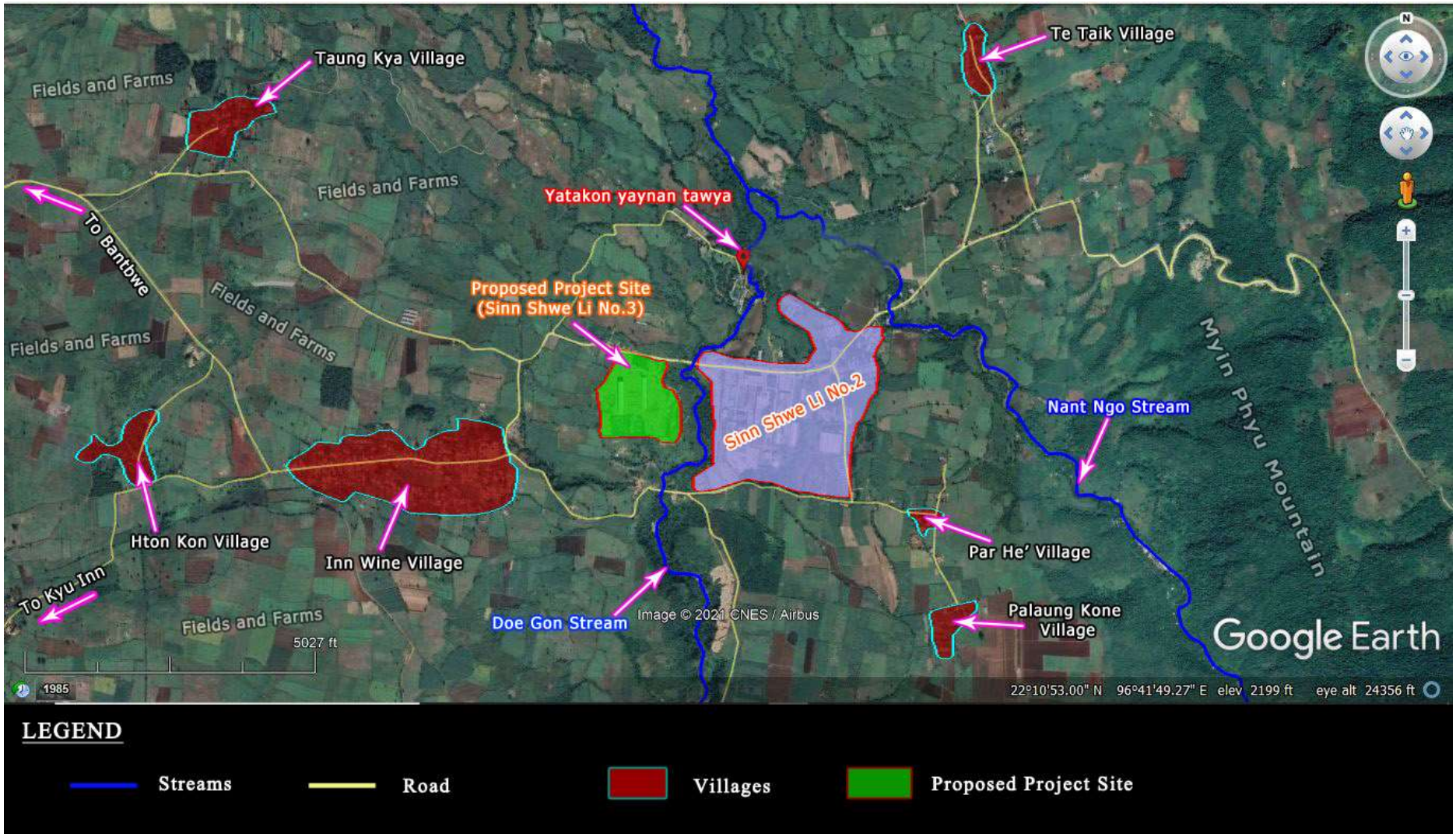


Figure – 81: Satellite image showing project site and its environs

8.6.4 Implementation schedule

The management and monitoring sub-plan (MMSP) will briefly cover all the four phases of the project.

During the Preconstruction (Planning) Phase

First of all the authority of the company will plan and manage for the application of environmentally sound idea and technology.

The authority of the company will plan and manage for the procurement of eco-friendly machinery, equipment, vehicles and materials etc (that generate less smoke, lower noise level, that consume less fuel oil, use fewer energy etc).

The authority will plan for prevention/mitigation of air, water and land pollution in implementing the project.

During the Construction Phase

The project proponent will plan and manage for the construction of the factory in an eco-friendly manner. The use of eco-friendly building materials and the application of ecologically sound methodology in construction activities will be applied. All the impact/potential impacts anticipated for this construction phase will be taken into consideration and subsequent mitigation measures duly taken during the construction of the factory. The construction works will be undertaken with environmental awareness always in mind. The anticipated impacts during this phase will be always kept in mind and the mitigation measures to be taken will be duly taken.

During the Operation Phase

During this long Operation Phase the main task will be for the efficient production of sugar, quality control works, sustainable operation of factory, maintenance and repair works.The task also involves the long term procurement and regular replenishment of raw materials and fuels etc., and the distribution and marketing of the finished products. These works will be undertaken with environmental awareness always in mind. The predicted or anticipated impacts during this long phase will be kept in mind and the subsequent mitigation measures to be taken will be duly put in place.

The implementation of EMP will be undertaken effectively and the progress will be evaluated from time to time. MP will be also duly implemented according to plan.In other words, the main production task and the EMP work will go hand in hand for the smooth and sustainable operation of the factory and the successful implementation of the project.

During the Decommissioning Phase/Rehabilitation Phase

After the end of the Operation Phase affective and meaningful decommissioning task will be carried out. The project proponent will ensure that there is no residual impact left and there is no contaminated soil or substance left. After that effective revegetation of the site will be undertaken. In the aftermath of the project the site will be restored to it original condition as far as possible.

The generalized implementation schedule is depicted follow.

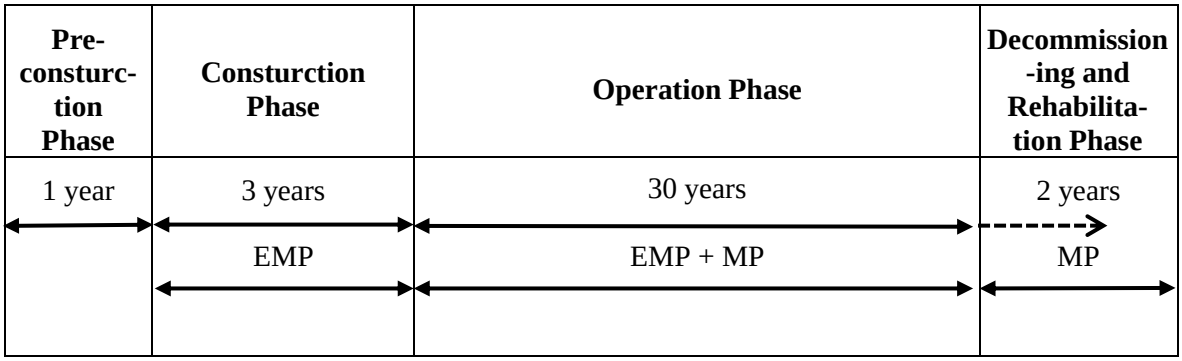


Figure – 82: Generalized time frame for planning and implementation of EMP and MP during the four phases of project life

8.6.5 Management actions

Overall environmental and social management sub-plans and implementation of sub-plans are already described earlier in 8.5 (in tabulated form), in accordance with EIA Procedures, 2015, prescribed by ECD.

The environmental management sub-plan cover: noise and vibration, waste, hazardous waste water and storm water, air quality, odour, chemicals, water quality, erosion and sedimentation and biodiversity.

The socio management sub-plans cover: Occupational Health and Safety, Community Health and Safety, Cultural Heritages, employment and training and emergency response.

For practical purpose management actions for environmental issues such as: air quality and emission, noise and vibration, water quality and waste water/effluent, waste, erosion and sedimentation and biodiversity are described here. (The nature of social management actions is quite defferent and is rather abstract, the implementation of social management sub-plans as already described earlier are more or less the same as taking management action; will be omitted here).

1. Air quality and emission management action plan

Objective **:** The main objecive is to mitigation/reduce emission (smoke or gaseous emission and fugitive dust emission) and control air quality as practical as possible.

Legal requirement **:** will comply with NEQEG emission standards guideline (2015), Code No.1.1 prescribed by ECD in EIA procedure (2015)

Implementation schedule : The action plan will be implemented during the Operation Phase of the project. (The factory being already in operation and, therefore, Preconstruction and Construction Phase are omitted for practical purpose).

Management actions : The following will be implemented for all emission (point soure emission or stationary emission and fugitive emission of smoke and dust), generated from the operation of the project. These have been extracted from mitigation measures described earlier in Chapter 6, 6.2.3 and overall environmental management sub-plans in Chapter 8, 8.5 (tabulated form) and are summarized as below:

- All air emission will comply with NEQEG emission standards values guideline mentioned above.
- Procure eco-friendly machinery that emits less smoke in the first place.
- Install emission management system between boiler and stack (as designed by Chinese experts).
- Apply wet scrubber (lime water dozing) or simply water sprinkling/dozing.
- Apply complete combustion method.
- Use dry bagasse as burner in the first place.
- Regular collection and disposal of bagasse ash, and long term storage in ash ponds.
- Spray water for fugitive emission of dust; daily or as required (during dry months).
- Restrict/reduce vehicular movement (speed limit 20 mph).
- Always avoid open burning of debris and trash.
- Develop green belt (plan fast growing trees) for trapping dust.
- Keep equipment and vehicles well-operated, well-maintained and well-lubricated to reduce smoke.
- Provide PPE (e.g. face mask, mouth and noise cover where necessary).
- Implement GRM, so that locals can file complaint regarding smoke and dust.

- Conduct regular monitoring (Preferable every 3 months; hire technicians for this).
- Conduct daily overall visual inspection of smoke and dust condition.
- Monitor effectiveness of mitigation measures taken, weekly or monthly.

2. Noise and vibration management action plan

Objective : The main objective is to mitigate/reduce noise and vibration level, generated from the operation of the factory.

Legal requirement : Will comply with NEQEG emission guideline, 2015, prescribed by ECD, Code No.1.3.

Implementation schedule : Will be implemented during the Operation Phase of the project (the project being already in Operation Phase).

Management actions : The following will be implemented for the control/mitigation of noise level and vibration generated from the operation of the factory.

These have been extracted from mitigation measures described earlier in Chapter 6, 6.2.1.3 and overall environmental management sub-plans described earlier in Chapter 8, 8.5 in tabulated form, and summarized as below:

- Will comply with NEQEG emission guideline (2015) prescribed by ECD, Code No.1.3
- Procure eco-friendly machinery that emits lower noise level in the first place.
- Install noise abating device e.g. silencer, muffler, where possible.
- Ensure that foundations for machinery/equipment are stable to mitigation vibration.
- Keep machinery and vehicle well-operated, well-maintained and well-lubricated to mitigate noise and vibration.
- Restrict/limit vehicular movement to mitigate vibration.
- Create smooth road surface to mitigate vibration.
- Develop green belt (plant fast growing grees) around the compound to abate noise.
- Provide PPE e.g. ear muffs, ear protectors where necessary.
- Conduct regular monitoring, preferably every 6 months; hire technicians for this.
- Conduct regular daily inspection of noise condition.
- Implement GRM (the locals can file complaints regarding noise).
- Regularly monitor the effectiveness of mitigation measures taken weekly or monthly.

3. Water qulaity and waste water management action plan

Objective : The main objective is not to impact the river water quality and to manage the waste water (effluent).

Legal requirement : Will comply with NEQEG emission guideline values (2015) prescribed by ECD, Code No.1.2 (generally application) and Code No.2.3.1.7 (sugar manufacturing).

Implementation schedule : The action plan will be implemented during the Operation Phase of the project.

Management action : The followings will be implemented to avoid the impact on the stream water (Doe Gon stream) quality and to control/mitigate and manage waste water.

These have be excerpted from mitigation measures described earlier in Chapter 6, 6.2.1.3 and overall environmental management sub-plans edscribed earlier in 8.5 (tabulated form) and summarized as below:

- Comply with NEQEG emission guideline values (2015) prescribed by ECD, Code No.1.2, and Code No.2.3.1.7.
- Ensure that all activities do not impact the Doe Gon stream.
- Prevent erosion (especially along the bank during rainy season).
- Avoid disposing of all waste, (solid and liquid) into the stream by all means.
- Prevent oil spills or oil spread into the stream; keep fuel depot away from the stream).
- Apply recirculation of water (for general conservation of water); deploy cooling tower and seeries of cooling ponds.
- Adhere to the principle of water conservation; educate staffs for this.
- (As water is mostly recirculated industrial waste water is not a serious issue.
- Set up network of drainage system for domestic waste water rain influx and storm water.
- Domestic waste water (brown water) from office, dormitory, kitchen, baths etc. will end up in waste water pond and dry up (no special treatment required).
- Black water for toilets will end up in septic tanks and soak pits.
- Monitor water quality regularly (preferably every 6 months, hire technicians for this).
- Conduct weekly visual inspection of water condition.
- Monitor effectiveness of mitigation measures taken, weekly or monthly.

4. Waste management action plan

Objectives : The main objective is to mitigate/reduce industrial waste and domestic waste.

Legal requirement : Will comply with Environmental Consrvation Law, 2012 and Environmental Conservation Rules, 2014. That is to discharge the wastes in accord with environmentally sound methods and not to pollute the environment.

Implementation schedule : The action plan will be implemented during the Operation Phase of the project.

Mangement actions : The following will be implemented for the management of wastes generated.

- Will comply with Environmental Conservation Law, 2012. Articles 14, 15, 32; Environmental Conservation Rules, 2014; Rule 69.
- Educate and train staffs for the proper handling of wastes, educate them for good housekeeping, and minimization waste as practical as possible.
- Use up all bagasse as burner for boiler (no need for coal), tackling the main waste issue.
- Sugar mud press (cachaza) can be used in various ways especially in compost fertilizer and many types, as EM solution in Bokash, (no need to discard).
- Molasses will be used in a variety of ways, e.g. for production of alcohols, vinegar, citric acid and in confectionary etc. (actually the company put up all molasses for sale as the demand is always high.)
- Collect bagasse ash daily and store in large ash ponds, reuse supernatant water for cooling hot machinery; give away the ash for use as fertilizer and soil conditioner.
- Separate domestic waste into recyclable and non-recyclable ones; dispose only those that are non-recyclable.
- As for domestic wastes (including negligible medical waste at clinic) collect them daily in small waste baskets or big garbage bins (waste baskets in office, clinic and dormitory; big bins placed in kitchen and elsewhere inside the compound) daily. Dump them temporary at the waste dump insides the compound and disposed them fortnightly at the landfill by company's trucks.
- Avoid open burning of solid wastes.
- Monitor waste management fortnightly or monthly.
- Monitor the effectiveness of mitigation measures taken.
- Implement GRM (locals can file complaint regarding waste).

5. Erosion and sedimentaion management action

Objectives : The main objective is to avoid and prevent soil erosion and prevent the destruction of soil structure and profile due to activities of the project.

Legal requirement : To comply with Environmental Conservation Law, 2012.

Implementation Schedule : The action plan will be implemented during the Operation Phase of the project.

Management action : The following will be implemented for the prevention of soil erosion and destruction of soil structure.

- Ensure that project activities do not impact soil structure (during the rainy season).
- Ensure that soil is stable and not easily eroded; compact soil where possible).
- The company will construct three layers of embarkment to control erosion.
- Minimize the area of bare soil exposed (plant, grass and trees where possible to prevent erosion).
- Control run off and storm water (create network of reliable drainage system; divert storm water so that it can flow out freely).
- Ensure that no erosion and sedimentation taking place along the bank.
- Prevent dirt and debris getting into the drainage causing siltation.
- Monitor the soil condition weekly during rainy season to prevent erosion.
- Monitor the effectiveness of mitigation measures taken (weekly or monthly during rainy season).

6. Biodiversity management actions

Objectives : To prevent or mitigate any impact on the flora and fauna of the area due to implementation of the project; to conserve the biodiversity as practical as possible.

There is no forest in the near and far vicinity, only fields (mostly sugar cane fields) and farms. There are patches of bushes have and there with few small trees, especially along the Doe Gon stream. Yet the floral diversity is high: 321 species of plants. (Actually there is almost no plants in the factory compound; but in the far vicinity there are vegetation with relatively high biodiversity.)

Legal requirement : To comply with Environmental Conservation Rule 2014, Rule 69 (b) – not to cause damage to the natural environment and ecosystem.

Implementation schedule : The action plan will be implemented during the Operation Phase of the project.

Management actions : The following will be implemented for the protection and conservation of the natural biodiversity of the area.

- Plan and execute for minimal disturbance to the flora.
- Do not clear vegetation more than necessary.
- Keep big trees intact as far as possible.
- Avoid open burning of debris.
- Prevent bush fire; educate staff or fire awareness and fire protection.
- Avoid the use of excessive bright light at night to prevent aggregation and eventual death of insects.
- Prevent the potential injury or death of small animals due to vehicular movements at night.
- Set up a plant nursery near the end of the Operation Phase for rehabilitation of the site.
- Plant trees; create green belt as practical as possible.
- Monitor the effectiveness of mitigation, monthly.

(As mentioned above the social management sub-plan for Occupational Health and Safety, Community Health and Safety, Cultural heritages, employment and training and emergency response described earlier are more or less the same as management action; in other words, they are different sides of the same coin. They will not be repeated here.

Monitoring Plan

In accordance with EIA format, overall and comprehensive monitoring plans are already described earlier in Chapter 6, 6.2.5.

The specific monitoring plans under the Environmental Management Plan (Chapter 8) are described in the following tabulated forms.

Regular monitoring will be made during the Construction, Operation and Decommissioning Phases and the report will be submitted to ECD on a regular basis (semi-annual short report).

Table – 34: Summary of monitoring plan during the Construction Phase

Sr.	Components/ issue	Parameters to be monitored	NEQEG guideline values	Monitoring spot/site	Frequency	Responsible person	Cost (once off)	Remark
1	Air quality	NO_2 O_3 PM_{10} $PM_{2.5}$ SO_2 VOC	200 µg/m^3 100 µg/m^3 50 µg/m^3 25 µg/m^3 20 µg/m^3 400 µg/m^3	At the factory Coordinate: 22°11'6.76"N, 96°43'17.87"E At Inn Wine village Coordinate: 22°10'53.47"N, 96°42'51.71"E	semi-annually semi-annual	EMP cell members and hired technicians EMP cell members and hired technicians	Ks 1,700,000 Ks 1,700,000	Technicians have to be hired Technicians have to be hired
2	Water quality	<u>Site runoff</u> BOD COD Oil and grease pH Total caliform Total nitrogen Total phosphorus Total suspended solid <u>Water quality</u> pH Chloride Total Hardness Total Iron	30 mg/l 125 mg/l 10 mg/l 6-9 STU 400 ml 10 mg/l 2 mg/l 2 mg/l 50 mg/l 6-9 S.U 205 mg/l 500 mg/l 0.3 mg/l	At site Coordinate: 22°11'4.50"N, 96°43'15.16"E At Doe Gon chaung Coordinate: 22°11'7.69"N, 96°43'28.81"E	semi-annually semi-annually	EMP cell members and hired technicians EMP cell members and hired technicians	Ks 80,000 Ks 80,000	Technicians have to be hired Technicians have to be hired Technicians have to be hired

		Sulphate Oil and grease Temperature increase Turbidity Manganese Total dissolved solids Copper Arsenic Zinc	250 mg/l 10 mg/l <3° 5 NTU 0.4 mg/l 600 mg/l 2 mg/l 0.01 mg/l 3 mg/l	At Water fall Coordinate: 22°10'41.52"N, 96°43'22.80"E	semi-annually	EMP cell members and hired technicians	Ks 80,000	
3	Noise level	dB(A) day and night	70 dB(A)	At the factory Coordinate: 22°11'6.76"N, 96°43'17.87"E At Inn Wine village Coordinate: 22°10'53.47"N, 96°42'51.71"E				
4	Solid waste	- monitor construction wastes and disposal - monitor trash/garbage generated and disposal	- -	At factory Coordinate: 22°11'5.97"N, 96°43'15.37"E	weekly	EMP cell members	Free of charges	
5	Soil	- monitor contamination of soil; testing soil quality	-	At site Coordinate: 22°11'4.58"N, 96°43'14.78"E	semi-annually	EMP cell members and hired technicians	Ks 140,000	Technicians have to be hired

		- monitor soil erosion if any, (rainy season)	-	At Inn Wine Coordinate: 22°10'53.30"N, 96°42'50.64"E At site Coordinate: 22°11'4.58"N, 96°43'14.78"E	monthly monthly	EMP cell members EMP cell members	Ks 140,000 Free of charges	Technicians have to be hired
6	Occupational health and safety	- monitor OHS measures taken - monitor provision of First Aid kit and stocking of medicines and drugs - monitor Emergency Preparedness and Response plan + actions	- - -	At site Coordinate: 22°11'1.76"N 96°43'15.95"E	monthly	EMP cell member	Free of charges	
7	Social issue, social illness	- check social illness/ill-social behavior - monitor conducts of workers - check disciplinary action taken	- - -	-	weekly and monthly	EMP cell member	Free of charges	

Table – 35: Summary of monitoring plan during the Operation Phase

Sr.	Components/ issue	Parameters to be monitored	NEQEG guideline values	Monitoring spot/site	Frequency	Responsible person	Cost (once off)	Remark
1	Air quality and emission	<u>Air quality</u> NO_2 O_3 PM_{10} $PM_{2.5}$ SO_2 VOC	 200 µg/m^3 100 µg/m^3 50 µg/m^3 25 µg/m^3 20 µg/m^3 400 µg/m^3	At the factory Coordinate: 22°11'6.76"N, 96°43'17.87"E At Inn Wine village Coordinate: 22°10'53.47"N, 96°42'51.71"E	semi-annually semi-annual	EMP cell members and hired technicians EMP cell members and hired technicians	Ks 1,700,000 Ks 1,700,000	Technicians have to be hired Technicians have to be hired
2	Water quality/ effluent	<u>Water quality</u> pH Chloride Total Hardness Total Iron Sulphate Oil and grease Temperature increase Turbidity Manganese Total dissolved solids	 6-9 S.U 205 mg/l 500 mg/l 0.3 mg/l 250 mg/l 10 mg/l <3° 5 NTU 0.4 mg/l 600 mg/l	At Doe Gon chaung Coordinate: 22°11'7.69"N, 96°43'28.81"E At Water fall Coordinate: 22°10'41.52"N, 96°43'22.80"E	semi-annually semi-annually	EMP cell members and hired technicians EMP cell members and hired technicians	Ks 80,000 Ks 80,000	Technicians have to be hired Technicians have to be hired

		Copper Arsenic Zinc <u>Effluent</u> 5 days BOD Biocide COD Oil and grease pH Temperature increase Total coliform Total nitrogen Total phosphorus Total suspended solids	2 mg/l 0.02 mg/l 3 mg/l 50 mg/l 0.05 mg/l 250 mg/l 10 mg/l 6-9 S.U <3° 400 mg/l 10 mg/l 2 mg/l 50 mg/l	At site, Coordinate: 22°10'53.84"N 96°43'23.75"E	semi-annually	EMP cell members and hired technicians	Ks 80,000	Technicians have to be hired
3	Noise and vibration level	dB(A) day and night	70 dB(A)	<u>Noise</u> At the factory Coordinate: 22°11'6.76"N, 96°43'17.87"E At Inn Wine village Coordinate: 22°10'53.47"N, 96°42'51.71"E	semi-annually semi-annually	EMP cell members and hired technicians EMP cell members and hired technicians	Ks 100,000 Ks 100,000	Technicians have to be hired Technicians have to be hired

				Vibration At the factory Coordinate: 22°11'2.25"N, 96°43'15.82"E At Inn Wine village Coordinate: 22°10'53.14"N, 96°42'51.23"E				
4	Solid waste	- monitor industrial wastes especially ash collection and storage at silos and reuse - monitor domestic wastes, collection and disposal	- -	At factory Coordinate: 22°11'5.97"N, 96°43'15.37"E At office (inside factory No.2 compound) 22°11'9.83"N, 96°43'21.67"E	weekly	EMP cell members	Free of charges	
5	Soil	- monitor contamination of soil; testing soil quality	- -	Inside the plant compound Coordinate: 22°11'4.58"N, 96°43'14.78"E At Inn Wine Coordinate: 22°10'53.30"N, 96°42'50.64"E	semi-annually semi-annually	EMP cell members and hired technicians EMP cell members and hired technicians	Ks 140,000 Ks 140,000	Technicians have to be hired

		- monitor soil erosion if any, (rainy season)		Coordinate: 22°10'58.74"N, 96°43'24.00"E				
6	Occupational health and safety	- monitor OHS measures taken - monitor provision of First Aid kit and stocking of medicines and drugs - monitor Emergency Preparedness and Response plan + actions - check the clinic treatment record	- - - -	At factory Coordinate: 22°11'1.76"N 96°43'15.95"E At clinic Coordinate: 22°11'10.31"N, 96°43'20.01"E	monthly	EMP cell member	Free of charges	
7	Social issue, social illness	- check social illness/ill-social behavior - monitor conducts of workers - check disciplinary action taken	- - -		weekly and monthly	EMP cell member	Free of charges	

Table – 36: Summary of monitoring plan during the Decommissioning Phase

Sr.	Components/ issue	Parameters to be monitored	NEQEG guideline values	Monitoring spot/site	Frequency	Responsible person	Cost (once off)	Remark
1	Air quality	NO_2 O_3 PM_{10} $PM_{2.5}$ SO_2 VOC	200 µg/m^3 100 µg/m^3 50 µg/m^3 25 µg/m^3 20 µg/m^3 400 µg/m^3	At the factory Coordinate: 22°11'6.76"N, 96°43'17.87"E At Inn Wine village Coordinate: 22°10'53.47"N, 96°42'51.71"E	semi-annually semi-annually	EMP cell members and hired technicians EMP cell members and hired technicians	Ks 1,700,000 Ks 1,700,000	Technicians have to be hired Technicians have to be hired
2	Water quality	<u>Effluent</u> 5 days BOD Biocide COD Oil and grease P^H Temperature increase Total coliform Total nitrogen Total phosphorus Total suspended solids <u>Water quality</u> pH Chloride Total Hardness Total	 50 mg/l 0.05 mg/l 250 mg/l 10 mg/l 6-9 S.U <3° 400 mg/l 10 mg/l 2 mg/l 50 mg/l 6-9 S.U 205 mg/l 500 mg/l	At old plant site Coordinate: 22°10'53.84"N 96°43'23.75"E	semi-annually	EMP cell members and hired technicians	Ks 80,000	Technicians have to be hired

		Iron Sulphate Oil and grease Temperature increase Turbidity Manganese Total dissolved solids Copper Arsenic Zinc	0.3 mg/l 250 mg/l 10 mg/l <3° 5 NTU 0.4 mg/l 600 mg/l 2 mg/l 0.03 mg/l 3 mg/l	At Doe Gon chaung Coordinate: 22°11'7.69"N, 96°43'28.81"E At Water fall Coordinate: 22°10'41.52"N, 96°43'22.80"E	semi-annually semi-annually	EMP cell members and hired technicians EMP cell members and hired technicians	Ks 80,000 Ks 80,000	Technicians have to be hired Technicians have to be hired
3	Noise level	dB(A) day and night	70 dB(A)	At old plant site Coordinate: 22°11'6.76"N, 96°43'17.87"E At Inn Wine village Coordinate: 22°10'53.47"N, 96°42'51.71"E	semi-annually semi-annually	EMP cell members and hired technicians EMP cell members and hired technicians	Ks 100,000 Ks 100,000	Technicians have to be hired Technicians have to be hired
4	Solid waste (decommissioning wastes, debris)	- monitor decommissioning works (dismantling, demolition) and generation of huge quentity of debris, and systematic disposal and tidying up of the site	-	At the old plant; Coordinate: 22°11'5.97"N, 96°43'15.37"E	weekly/ monthly	EMP cell members	Free of charges	- - -

5	Soil	- test soil quality	-	At the old plant; 22°11'4.58"N, 96°43'14.78"E At Inn Wine Coordinate: 22°10'53.30"N, 96°42'50.64"E	Semi-annually Semi-annually annually	EMP cell members and hired technicians EMP cell members and hired technicians EMP cell members and hired technicians	Ks 140,000 Ks 140,000 Ks 140,000	Technicians have to be hired -
6	Occupational health and safety	- monitor OHS measures taken - monitor First Aid kit and stocking of medicines and drugs - check the clinic treatment record - monitor emergency response plan	- - -	At the old plant site Coordinate: 22°11'1.76"N 96°43'15.95"E	monthly	EMP cell member	Free of charges	
7	Social issue, social illness	- check social illness/ ill-social behavior - monitor conducts of workers - check disciplinary action taken	- - -	-	weekly and monthly	EMP cell member	Free of charges	

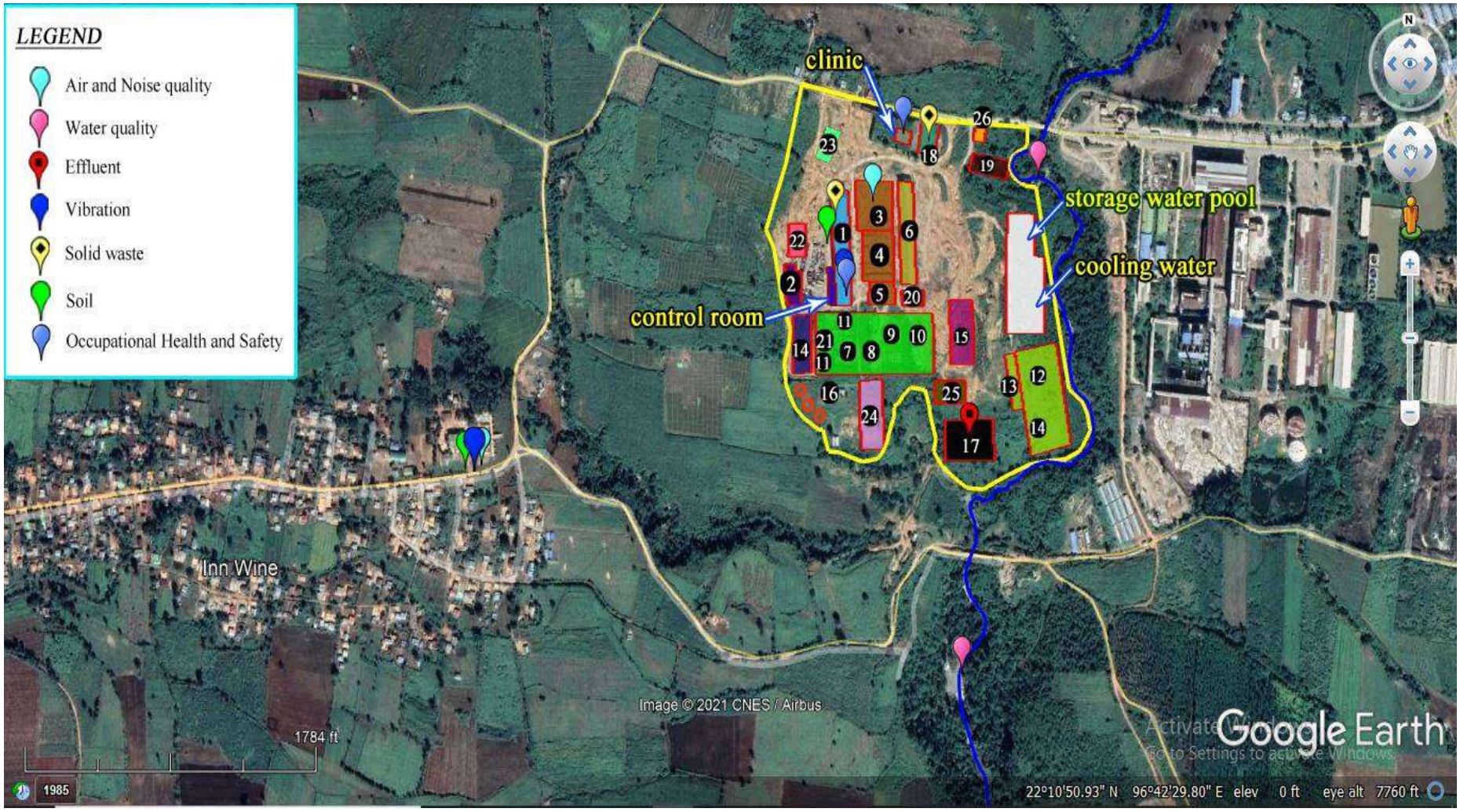


Figure – 83: Satellite image showing monitoring spots during operation and decommissioning phases

Sr. No	Name of buildings
1	Mill Plant
2	Row Sugar Milk of Lime Preparation Section
3	Process Plant Clarification. Heating and Evaporation Section
4	Process Plant Boiling Section
5	Process Plan Drying, Screening and Packing Section
6	Sugar Storehouse
7	The Turbine Workshop
8	Boiler House
9	Induced Draft Fan House
10	Chimney
11	Bagasse corridor
12	Cold Water Pool
13	Water Pump Station
14	Cooling Tower
15	Ash Pool
16	Molasses storage tank
17	Waste Water Pool
18	Administration Office
19	Sugar Belt Conveyor Car Packing
20	Central control room
21	Water softening room
22	Main Store
23	Weighting Scale
24	Bagasse Storehouse
25	Bagasse Yard
26	Main Gate

8.6.6 Projected budgets and reponsiblities

Overall budget for implementation of EMP was already described in the earlier part of this Chapter-8 (8.4); where 1% of the project budget (that is Ks 1,632,063,900) is set aside for implementation of EMP. The Sub-budget allotted for each programme is also described there.

25% of EMP budget, that is Ks 408,015,975, each is allotted for monitoring actions and mitigation actions, totally Ks 816,031,950.

The main expenses are for hiring experts/technicians for monitoring air quality/emission, noise and vibration, water quality/effluent and soil quality. The costs are already shown earlier in 8.6.6 for hiring technicians.

There are EMP contractors in many development countries and they are hired to undertake all EMP tasks. But as there are no EMP contractors in Myanmar yet the said experts/technicians from other departments or from private laboratories have to be hired regularly, every 6 months. The cost of hiring them is really high indeed; the main expense for monitoring works.

And as there are no EMP contractors in the nation yet, the authority of Ngwe Yi Pale' Sugar Co., Ltd has to make do with available staffs and resources. The EMP cell members (s) and specially trained staff (20) will be deployed for carrying out EMP tasks. All these 25 staffs are well-paid staff members and so there will be no extra cost for their specific fees; all will undertake monitoring works free of charge.

All mitigation measures will be also taken, free of charge, by these 25 staffs, (a few more staff will be deployed from time to time, where necessary). Therefore, there will be also no extra expense for carrying out mitigation actions.

However, there will be expenses for procurement of device or materials for taking mitigation measures. For instance, procurement of hoses for spraying water (dust suppression); water spraying to do undertaken once a day during the hot dry month; procurement of PPE, e.g. face masks, mouth and nose covers, ear muffs, boots helmets, gloves – etc. To be worn by worker exposed to long hour of dust and high level noise.

(Procurement and installation of noise abatour/silencers, vibration absorber will be borne by the project main budget. Procurement of fire engine (fire truck), fire extinguishers, hydrants, hoses, jet etc. will be from the main budget, not from EMP budget).

Responsibilities

To effectively implement EMP a nucleus organization, EMP cell, will is formed (later this EMP cell will become EHS unit of the company).

The duties and responsiblities of EMP cell members are as follow: -

1. **U Aung Myo Tun (Manager)**

    (i) He will doubles as EMP cell leader.

    (ii) Overall environmental officers; responsible for all social and environmental issues arising from the activities at the factory.

    (iii) Monthly meeting with all EMP cell members and 30 specially trained workers.

    (iv) Gather monthly information/data from 4 full time EMP cell members (2 villagers excluded).

    (v) Writing monthly report and submit the report to the company's authority.

    (vi) Submit a special quarterly report to the company's authority.

2. **U Win Aung (EMP cell membe**r)

   (i) Designated as environmental security officer.

   (ii) Responsible for all environmental issues arising from the activities at the factory.

   (iii) Supervision of EMP activities including monitoring works and execution of mitigation measures.

   (iv) Also participate (personally involve) regularly in EMP, MP and mitigation works.

   (v) Provide monthly data/information to EMP leader (Myanmar).

3. **U Maung Maung Thet (EMP cell member)**

   (i) Designated as work place security officer.

   (ii) Responsible for all social issues arising from the activities at the factory.

   (iii) Co-supervision of EMP activities including monitoring works and execution of mitigation measures.

   (iv) Regularly supervize activities at work places.

   (v) Also participate regularly in EMP, MP and mitigation works.

   (vi) Provide monthly data/information to EMP cell leader.

4. **U Win Thein (EMP cell member)**

   (i) Designated as liaison officer for dealing with locals

   (ii) Responsible for social issues, if any, comming from the local community.

   (iii) Co-supervision of EMP, monitoring works undertaken by 10 trained workers.

   (iv) Also participate in EMP, and MP works.

   (v) Provide monthly data/information to EMP cell leader.

5. **U Tin Soe (EMP cell member)**

   (i) Co-supervision of EMP, especially mitigation works undertaken by 10 trained workers.

   (ii) Also participate in EMP especially all mitigation measures taken.

   (iii) Supervize and participate in monitoring of water, fuel and electric energy consumption; regulate consumption.

   (iv) Provide monthly data/information of EMP cell leader.

6. **U Win Hlaing (EMP cell member/Village Administrator of Inn Wine)**

   (i) Appoint to monitor the transparency regarding the activities at the factory

   (ii) Work as part-time in environmental monitoring works with U Win Thein (no fixed working days or hours).

   (iii) Monthly regular visual inspection of activities.

   (iv) Provide information about the factory to follow villagers on a regular basis every 2 or 3 months.

7. **U Thein Myint (Villager/EMP cell member/part time)**

   (i) Appoint to monitor the transparency regarding the activities at the factory

   (ii) Work as part-time in environmental monitoring works with U Tin Soe (no fixed working days or hours).

   (iii) Monthly regular visual inspection of activities.

   (iv) Provide information about the factory to fellow villagers on a regular basis every 2 or 3 months.

8. **20 specially trained workers:**

   10 to be fully involved in monitoring work

   10 to be fully involved in taking mitigation work.

The EMP cell members and 20 specially trained workers will also involve in regular works (production works) as practical as possible.

9. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Public consultation is an integral part of EIA/IEE and EMP. Involving the public participation in the EIA/IEE/EMP work is fundamental to increasing the understanding and acceptance of the project.

Public consultation and participation should be started at early as possible in the preparation of EMP. And it has to be a continuous process, especially during the Operation Phase, carry out from time to time.

9.1 Purposes of the consultation during the preparation of the EIA/IEE/EMP report

- To enlighten the locals/stakeholders about the project.
- To increase the understanding and acceptance of the project.
- To give the locals/stakeholders the opportunity to present their views, opinions, perception of the project, express their concerns, complaints, grievances etc.
- To identify impacts and issues that are not immediately obvious to project proponent and the EIA/EMP team.
- To access social assistant and community development needs for the locals/stakeholders.
- To gain community consent and to interact with the people to further strengthen existing cordial relationship.
- To tap local knowledge and to negotiate for mutually beneficial future that is sustainable and locally relevant.

Requirements for public consultations:

- Public consultation should be conducted in the early phase of project
- Must ensure the direct involvement of the locals/stakeholders
- Must ensure that all locals/stakeholders who are interested will have the chance to fully participate, especially the vulnerable and marginalized group,
- It should be a continuous process --- throughout the entire phase of the project, especially during the long Operation Phase, and
- There must be an action plan or response programme such as complaints and grievances mechanism (CGM) to tackle any issue.

9.2 Methodology and approach

Standard methodology applied here includes:

(i) **Consensus building:** First of all a pre-sensitizing visits to the local authority (Village Administrator and party, elders) and briefing on the proposed project was carried out, and ask for their approval and assistant for holding the public consultation.

(ii) **Transect walk:** site visit (visit to the village) and conduct observation and visual inspection.

(iii) **Actual public consultation meeting:** mainly involves disclosure of the proposed project and giving complete and accurate information; consultation mainly in the form of two-way conversation --- listening and talking; waiting for their response; further discussion.

(iv) **Interviews and discussions:**

- In the form of KII/SS, (Key Informant Interview/Secondary Source) and HHI (Household Interview) for the gathering of secondary baseline socio-economical data and community profile with the aid of questionnaires.

- In the form of FGD (Focal Group Discussion); interview with few selected people (authority, knowledgeable persons) especially for ranking the pressing need of the locals for prioritizing the needs for community assistance and implementation of CSR.

9.3 Summary of consultation activities undertaken

(a) Preliminary consultation meeting during the scoping study by MESC

A preliminary public consultation was held on 27-5-2018 between the responsible officers of the company and the locals. The village administrator and members, village elders and interested person and stakeholders have attended the consultation meeting. It was actually a sensitizing visit and briefing, explaining the proposed project to the locals and stakeholders.

Minutes of meeting

The responsible officer of the company, U Aung Myo Htun explained to them in general about the proposed project. The scoping team leader, U Myint Kyaw Thura explained to them how the scoping survey will be conducted, and how the detail follow up EIA study will be conducted later.

As the villagers are already very familiar with Ngwe Yi Pale' Company and Sinn Shwe Li Sugar Factory No.2 the scoping team leader started the consultation promptly and invited them to express their view and opinion and gave comments.

U Win Hlaing, the village Administrator: Due to the existing Sinn Shwe Li No.2 Sugar Factory the village is electrified and the road has improved to an asphalt road. Many villagers are also employed. I therefore have nothing more to say.

U Myint Kyaw Thura: We would like to hear frank talks and discussions from all of you. Only then can we will be able to write a meaningful EIA report and the higher authority will decide the fate of the proposed project.

U Win Hlaing: As for us the greater the sugar factory (the more sugar factories) the better. As we are farmers (sugar cane farmers) we can sell all our produces to the factory, thus boosting the local economy. So far, there is no friction between the company and the local community. Everything is OK.

U Tin Myint, a local elder: For every project there can be positive as well as negative impacts. The most important thing is how to minimize or mitigate the impacts, eg. the odour. He refered to the odour from the existing factory 2, not this proposed factory.

U Myint Kyaw Thura: Yes, I agree. Even if the negative impacts cannot be completely eradicated they can be minimized or at least mitigated. Say for examples, the water spray to mitigate dust and planting of trees to mitigate odour.

U Aung Myo Htun; a local elder: All our villagers are good people, not like the villagers of Hsum Hsai village some of whom are trouble makers. As village electrification has materialized and the road has improved I have nothing more to say. My only request from the company is that, if possible, the company should donate a car for the Thar-yay-nar-yay (social occasion of joy and grief) for our villagers.

The comments are documented and will be incorporated into the follow up EIA report.

From extrapolation made from the discussion it is quite clear that the implementation of the project is welcome and the level of acceptance is high given the fact that the company has done a lot of good things (CSRs) for the area. Many local youth are already employed by the company and there are good chances for more employment. All sugar cane growers have now the chance to boost their business. The company on its part will prioritize the hiring of locals if they are qualified for the jobs. The company commits two percent of its annual profit for implementation of CSR programmes.

Figure – 84: Preliminary public meeting at the meeting hall of the existing factory No.2

During the follow up EIA study, public consultation meeting will be held with the villagers, not only from Inn Wine but also, from Taung Kya, Palaung Kone, Hton Kon, Par He and Te Taik villages.

The programme for public consultation to be undertaken during the follow up EIA study phase will strictly follow the procedures and, most of all, the format laid down by ECD, MONREC. The format includes such sub-sections and sub-topics such as, purpose, methodology and approach; summary of consultation activities, including dates, venues, attendance, topics; summary of main comments received from stakeholders and interested groups and issues raised; minutes of consultation meeting; identification on how the comment or issues were taken in account; information disclosure; and recommendation for future consultations.

Actual public consultation meeting will be held during the coming EIA study. And as a TOR for EIA all the afore-mentioned agenda or topics (sub-sections and sub-topics) will be addressed and reported in the EIA report.

Information disclosure in the form of press release will be made after the follow up EIA trip.

Finally, when the follow up EIA report is approved part of the report will be launched at the website of Ngwe Yi Pale' Sugar Co., Ltd., www.ngweyipale.com.

(b) Public consultation meeting during the EIA study

At hall of Ngwe Yi Pale' Sugar Factory (2)

Date : 5-12-2018

Time : 10:00 - 12:00 hours

Venue : Meeting hall of Ngwe Yi Pale' ' Sugar Factory (2)

Attendees : 54 persons (Including officers from Naungkhio Township General Administration Department, Township Development Committee, Village Administration from Inn Wine, Te Taik, Par He, Palaung Kone, Htone Kone and Taung Kya Villages, Village Elders, Stakeholders and Locals.)

Minutes of meeting

U Htay Linn Aung; Officers from Naungkhio Township General Administration Department: First of I thank all the officers from various governmental departments, village elders and everybody for attending this meeting. I am glad to have the opportunity for delivering the address. Since the cultivation of sugar cane and maize are the main economies of the township. The emergence of an industrial factory like this sugar factory is greatly appreciated. It will benefit the region as well as the nation. Formerly we used to export raw materials and have to imported value-added goods. Now we can produce the finished products by ourselves. The farmers can now sell their produces to the factory. This factory will also contribute greatly to employment opportunities for the locals. We therefore

encourage and appreciate the emergence of such a sugar factory. I wish that the EIA team has progress and success in their work.

U Sein Myo Aung, director of Ngwe Yi Pale' Co., Ltd: Our company has at the moment Sugar Factory (1) (capacity 1000 tons of sugar cane) at Hsan Sai village, and Sugar Factory (2) (capacity 4000 tons of sugar cane) at Inn Wine village. Now this Sugar Factory (3) has a capacity of 12,000 tons. The local sugar cane planters now no longer need to worry for selling all their produces. You can now plant more sugar cane for more profit. He then briefly explained to the audience about the project. He then said that his company stands out as No.7 in paying tax to the nation; and that the company will continue carrying out works for community development and community assistance.

U Myint Kyaw Thura, Leader of MESC: First of all greeted the participants and then briefly explained to them about the consultant firm, MESC, doing EIA work as a Third party. He said that whenever there is a project there can be both advantages and disadvantages; and that EIA will be conducted mainly within 3 miles radius on the physical (air, water, soil), biological (plant, birds, reptiles and amphibian, mammal), the socio-economic, and cultural components of the surrounding environment. The report will cover all the four phases (Preconstruction, Construction, Operation and Decommissioning Phases) of the project life. That the EIA team will collect and document base line data on the said components and impacts predicted, anticipated, identified and accessed will be described in the report.

He then invited the participants to discuss and give comment and express their views and opinions in candid way. From the comment received we will suggest and/or recommend the company to carry out appropriate measures for the mitigation of impacts such as noise, emission, effluent etc. and any socio-economic impacts.

U San Hsai, member of Village Administrator (Yar-ein-hmoo) from Pa Laung Kone: As a farmer I would like to quite frankly. Formerly (2007/2008) I was very difficult for us locals to travel to Bant Bwe Village. Now, thank to Ngwe Yi Pale' Company, we have good road and good communication. Now we have also access to electricity and water supply and also development in education and health sectors of the area. For me I feel as if coming out of darkness into bright light.

U Win Hlaing, Yar-ein-hmoo, Inn Wine Village: As for our village we have nothing to say bad thing about this project. Thank to this company we now have access to electricity and the overall living standard of the villager has improved.

What I want to say is not to discharge waste water in Yay Ta Gon Stream.

U Sein Myo Aung, director, of the company: You need not worry for the waste water. We will apply modern waste water treatment methodology. Officers from Ministry of Industry, Lashio City will come and inspect the project form the very beginning to the end. If there is anything to say about waste water please inform us immediately. We will tackle the issue.

U Kyaw Htoo, villager elder from Par He village: We the villagers of Par He has little to talk about this project. As we have water issue I would like to ask for help from the company.

Daw Nann Shwe Li, elder from Te Taik village: As mentioned by someone earlier we who are living in dark for long now have now electricity lighting. There are both advantages and disadvantages. Sometimes when the wind is blowing to the village we can smell a little bad adour and sometimes there is certain water pollution. (She refered to the odour from the existing factory 2, not this proposed factory).

U Sein Myo Aung, director, of the company: We will do our best for mitigating these issues when the Construction Phase commences. If the odour becomes worse please inform us immediately and we will fix the problem in time as far as possible.

U Myo Naing Oo, member, Naungkhio Town Development Committee: Since the EIA work is also related to Township Development Committee work and it is concerned with the local community I want to request the Third Party (EIA team) to carry out their work thoroughly. As there are advances in technology the factory should also try to apply the advanced technology effectively. I hope that the company and the local community will corporate successfully for this matter.

U Ohn Kyi, village elder, Te Taik village: After the emergence Ngwe Yi Pale' Factory (2) transportation has improved greatly. Since the area has good motor road there are now drivers and motorists who are driving recklessly and there is the potential for road accidents. Therefore for the sake of safety sign boards for speed limit should be set up at appropriate places.

U Sein Myo Aung, the company director: Yes. Thank you for your suggestion. We can know such issue only when you talk about it. Our company will duly undertake this matter of setting up speed limit signages. In fact the sugar factory and sugar cane planters are mutually dependent or have mutual reliance. We can corporate for greater improvement.

The meeting was over at 12:00 hours.

Figure – 85: Public consultation meeting during EIA study

Figure – 86 KII at Inn Wine village

Figure – 87: KII at Palaung Kone village

Figure – 88: KII at Pyaung Kya village

Figure – 89: KII at Htone Kone village

Figure – 90: KII at Par He village

Figure – 91: KII at Te Taik village

How comments are taken into account

The EIA team has recorded and documented all the questions asked and the comments given, by the stakeholders and the praticipants.

The responsible officer of the company has replied to all the questions asked and has tried to tackle the issue as far as possible. The main issue, ash water was reported back to the authority of the company. The EIA team has also incorporated all the minutes of the consultation meeting in its EIA report.

9.4 Results of consultations

On the whole the local community has a positive view on the project and rate of acceptance of the project is high. This is due to the fact that all the sugar cane produce in the region comprising Naungkhio, Kyaukme and Naung Pein Township will be purchased by the company. The sugar cane farmers can increase their production of the cane and thus boosting the local economy. Many locals will be also employed at the factory. The company on its part has done a lot for the execution of CSR programme. All villages are now accessible by cars; five villages have now access to electricity provided by the company. (All five villages are electrified by the company now; the remaining village, Htone Kone village is the process of electrification). The group of companies has so far spent Ks 7,105,571,825 for the implementation of CSR programme for community assistance and community development. Many locals view the company has as their true benefactors and redeemer.

9.5 Future ongoing consultations

As mentioned earlier public consultation shall be a continuous process throughout the project period, from the Pre-construction Phase, through the Construction Phase and Operation Phase to the Decommissioning Phase. More public consultation meeting shall be held later. As regards the long Operation Phase (30 years) there shall be regular public consultations annually or bi-annually depending on the situation, or from time to time whenever there is a need for public consultation. This is very important for maintaining the long term cordial relationship with the locals and hence the long term benefit for the business.

The Complaints and Grievances Mechanism (CGM) programme shall be implemented throughout the entire project period. It shall be practical and applicable and effective, not a formality. The public relation officer and EMP cell leader should always give special attention to CGM.

The complaints handling and response shall be effective. The address and phone numbers of the company and the factory will be made available at the Village Administrator Offices of each village. A hotline for complaint shall be set up. The date and time of complaints; detail of complaint; action taken and if no action is required the reason why shall be explained and all recorded and documented. The name, address and phone number of the complainant will be recorded. The log book for CGM/GRM will be kept and all the complainants recorded and all the subsequent actions taken will be documented later. If necessary further meeting with the complainant will be held and the issues, if any remain, will be tackled.

Future public consultation shall involve the continuation of CSR programme (affordable programme) and donation and charity works as far as possible.

CSR programme

Ngwe Yi Pale' Group of company holds that for national future development provision of education for qualified youths is essential. In order to contribute to education development "Ngwe Yi Pale' Foundation" was established in January, 2012. Approved from the Ministry of Home Affairs was obtained in July, 2013 (Registration No.2019. dated 30-7-2013).

Since then the company was/is involved in monthly donations to all schools in the region and awarding stipends/grants to outstanding students who have passed the matriculation examination but cannot afford to go to university. More than Ks 20000 lakhs have been already spent for this.

The company is also involved in: spent for this.

The company is also involved in: construction of school buildings, class rooms and toilets for school and donation of benches, tables, chairs and furniture for schools.

In addition the company has constructed village water tanks/ponds, village roads and bridges and electrification of villages.

CSR programme implemented (mainly for infrastructure development)

1) Transformer for Inn Wine village
2) Transmission line inside Inn Wine
3) 11 KV transmission line from Sun Shwe Li, sugar plant to Inn Wine village
4) Khe Taw Pyon Bridge No.(1) at Le Chin Kwae road
5) Khe Taw Pyon Bridge No.(2) at Le Chin Kwae road
6) Le Chin Kwit Bridge at Le Chin Kwae road
7) Nat Sin Bridge at Inn Wine road
8) Culvert No.(1) at Le Chin Kwae road
9) Culvert No.(2) at Le Chin Kwae road
10) Culvert No.(11) at Le Chin Kwae road
11) Culvert No.(12) at Le Chin Kwae road
12) Culvert No.(13) at Le Chin Kwae road
13) Culvert No.(14) at Le Chin Kwae road
14) Culvert No.(15) at Le Chin Kwae road

15) Culvert No.(16) at Le Chin Kwae road
16) Culvert No.(17) at Le Chin Kwae road
17) Culvert No.(18) at Le Chin Kwae road
18) 1000 gallons tanks, Pa Laung Kone village
19) Culvert upgraded to bridge Par He village
20) Transmission tower between Par He village and the factory
21) 1000 gallons tanks, Par He village
22) PVC pipe for the aid tank
23) Hpaung Aung bridge on Le Chin Kwae road
24) Tarred road (8 miles road)
25) Tarred road (5 miles road)
26) Primary School, Tae Taik village
27) Extension of school building, Inn Wine village
28) Culvert No.(1) on Bant Bwe road
29) Culvert No.(2) on Bant Bwe road
30) Tansformer area and transmission line, Tae Taik village
31) Power line inside Tae Taik village
32) 11 KV line for Tae Taik
33) 400 KV overhead line
34) 1000 gallons tank at Taung Kya village
35) Pump for tube well at Taung Kya village
36) Bridge No.(1) (Tae Taik – Zee Pin Kyar)
37) Bridge No.(2) (Tae Taik – Zee Pin Kyar)
38) Yay Ta Kon Bridge at Bant Bwe road
39) Mingalar Bridge at Bant Bwe road
40) School building, Kon Kyi village (2016)
41) School building, Pa Laung Kon village (2016)
42) Pebble road, Kone Thar, Ngar Hsu, Kyauk Taw (2015)

43) Bridge near Kyauk Taw village (2017)

44) Bridge at Ngoke Kalay intersection, (2018)

45) Bridge at Wa Bo Kone intersection, (2018)

46) Canal by the bridge side at Wa Bo Kone intersection, (2018)

47) Bridge, Ngar Hsu Ywar village (2018)

48) Culvert between Kone Thar and Ngar Hsu Ywar (2018)

49) Bridge between Kone Thar and Ngar Hsu Taung Kyar (2017) (See ANNEX)

Figure – 92: Bantbwe-konkyi-taungkya-innwine road constructed by the company

Figure – 93: Le-gynn-gwae road constructed by the company

9.6 Information Disclosure

Public consultations made at the five villages mentioned above involving the local community, responsible persons from the company and EIA team was made public.

When this EIA report is approved the company shall launch part of this report onto its website.

Public consultation meeting held at the hall of Ngwe Yi Pale' Sugar Factory (2) on 5-12-2018 involving the government officials from vanous departments, the local community, responsible persons from the company and EIA team was made public. The information was released and the news appeared, in brief, in a Daily Newspaper, The 7 Day Daily, on 24-12-2018 (**See ANNEX** for part of the newspaper). The information was launched at the facebook website of MESC, www.myanmar environment sustainable conservation.com.

When this EIA report is approved by the authority whole or part of this report (eg. Executive Summary) will be made public by launching at the website of the company, www.ngweyipale.com. Copies of the report will be kept at the office of the company for anyone who is interested in this EIA report for perusal.

REFERENCES

1) Asian Development Bank (ADG). Environmental Assessment guideline, 2003.

2) Barbour, T.2007. Guide Line for involving Social Assessment Specialists in EIA process. Dept. Environ. Affairs and Development Planning, S.Africa.

3) Brownlie, S.2005. Guide Line for involving Biodiversity Specialists in EIA process. Dept. Environ. Affairs and Development Planning, S.Africa.

4) Chanard, T 2003. A photographic guide to Amphibian in Thailand. Se-education Public Co., Ltd, Thailand, pp.176

5) Das, I. 2010. A field guide to the reptiles of Thailand and S.E.Asia. Asia Book Co., Ltd, Thailand, pp 376.

6) Decommissioning Process guide. http://its.edu>--arch.

7) EIA study report for the Proposed Busia Sugar Factory Complex for Africa Polysack Limited (Busia sugar Co., Ltd). October, 2013. Nirobi, Kenya.

8) Fransis, C.M.2008. A field guide to the mamals of Thailand and S.E. Asia. Asia Book Co., Ltd, Thailand, pp.392

9) Guidelines for Structural Engineering.

10) Hazards of Sugar factory. https://rishumanco.com>tag>hazards

11) Hundly, H.G 1987. List of trees, shrubs, herbs and principal climber etc 4th Revised Ed, Shwe Daw Oo Press, Yangon.

12) IBC. International Building Code.

13) IFC's. Environmental, Health and Safety General Guidelines. April 30, 2007

14) IFC's. Environmental, Health and Safety Guidelines for Sugar Manufacturing. April 30, 2007

15) ILO Standards on Occupational Safety and Health (OSH). ilo.org.global>standards

16) ISO. 91. Construction materials and building. https://www.iso.org>ics

17) IUCN. 2017. Red List of Threatened species. Version 2017.3. www.iucnrelist.org.

18) List of Freshwater fishes reported from Myanmar-Fishbase. www.fishbase.org>countrychecklist

19) MOECAF, Administrative Instruction of Environmental Impact Assessment Procedure. The Ministry of Environmental Conservation and Forestry (MOECAF). 29-12-2015 (In Burmes and in English)

20) MOECAF. National Environmental Quality (Emission) Guide Line. The Ministry of Environmental Conservation and Forestry (MOECAF). 29-12-2015.

21) MOECAF. 2014. Website www.fdmoecaf.gov.mm/com, EIA guideline, 2014

22) Pry Davies, 2013. Republic (IFC & Australia Aid) 2017, Cumulative impact Assessment, March, 2012, Energy, water & food Dept, Welsh Government. CAPITA SYMONDS.

23) Queensland Government. HS code for sugar industry. http://www.dir.qld.gov.au/workplace/law/codes/sugar/index.htm.

24) Sugar cane process waste. http://www.jstor.org>stable

25) Sugar milling Safety. http://www.worksafe.qd.gov.au>

26) Sugar milling, Waste Minimization and Energy Effeciency. NSW. http://www.deh.gov.au/settlement/industry/nswsugar.htm/

27) Sugar production. www.carmeuse.agriculture.com>sugar

ANNEX

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်
သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန
ပြည်ထောင်စုဝန်ကြီးရုံး

စာအမှတ် (သစ်တော)၃(၂)/၁၆(ဃ)(၁၈၀၃/၂၀၂၁)
ရက်စွဲ ၂၀၂၁ ခုနှစ် ၊ ဇူလိုင် လ ၂ ရက်

အကြောင်းအရာ။ ရှမ်းပြည်နယ်(မြောက်ပိုင်း)၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ်၊ အင်းဝိုင်းကျေးရွာရှိ အမှတ်(၃)ဆင်းရွှေလီသကြားစက်ရုံ (ငွေရည်ပုလဲကုမ္ပဏီလီမိတက်) မှ တင်ပြလာသော Scoping Report (နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအစီရင်ခံစာ)အပေါ် အတည်ပြုနိုင်ပါကြောင်း စိစစ်တင်ပြခြင်း

ရည်ညွှန်းချက် ။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ ၂၄-၆-၂၀၂၁ ရက်စွဲပါစာအမှတ်၊ အီးအိုင်အေ-၁/၄-က(၁၁၀၇/၂၀၂၁)

ငွေရည်ပုလဲကုမ္ပဏီလီမိတက်မှ ရှမ်းပြည်နယ်(မြောက်ပိုင်း)၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ်၊ အင်းဝိုင်းကျေးရွာရှိ အမှတ်(၃) ဆင်းရွှေလီ သကြားစက်ရုံအတွက် နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းနှင့် လုပ်ငန်းတာဝန်များ (Scoping Report and Terms of Reference (ToR) ကို စိစစ်သုံးသပ်နိုင်ပါရန် တင်ပြလာသော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (EMP)သည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့် ကိုက်ညီပါသဖြင့် အတည်ပြုနိုင်ပါကြောင်းနှင့် အတည်ပြုပြုန်ကြားရာတွင် ဆောင်ရွက်ရန် လိုအပ်ချက်များအား ပြန်ကြားနိုင်ရေး ရည်ညွှန်းပါစာဖြင့် တင်ပြလာခြင်းအပေါ် ပြည်ထောင်စုဝန်ကြီး၏ မိန့်မှတ်ချက်အရ ဥပဒေ၊ လုပ်ထုံးလုပ်နည်းနှင့်အညီဆက်လက်ဆောင်ရွက်ရန် အကြောင်းကြားအပ်ပါသည်။

ပြည်ထောင်စုဝန်ကြီး(ကိုယ်စား)
(ကျော်ဇော၊ ဒုတိယအမြဲတမ်းအတွင်းဝန်)

ညွှန်ကြားရေးမှူးချုပ်
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

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ဝန်ထမ်းများသက်သာချောင်ချိရေးနှင့် သာယာပျော်ရွှင်ရေး အစီအမံများ

ကျွန်တော်တို့၏ Ngwe Yi Pale' Sugar Co., Ltd ရှိ ဝန်ထမ်းများ၏ သက်သာချောင်ချိရေးနှင့် သာယာပျော်ရွှင်ရေးအတွက် ရက်မှန်ကြေး၊ အချိန်ပိုကြေးနှင့် နှစ်သစ်ကူးကာလများတွင် ဝန်ထမ်းများ လှူဒါန်းသုံးစွဲနိုင်ရေး နှစ်သစ်ကူးအပိုဆုကြေးများ ထုတ်ပေးသွားမည် ဖြစ်ပါသည်။

ဝန်ထမ်းများ ကျန်းမာရေးအတွက် အရေးပေါ် ဆေးကုသရေးအတွက် ဆေးပေးခန်းနှင့် လိုအပ်သောဆေးဝါးများလည်း ထားရှိပေးထားပြီး ဖြစ်ပါသည်။ မြို့နယ်လူမှုဖူလုံရေးအသင်း၏ အသင်းဝင်ရောက်စေမည်ဖြစ်ပြီး နာမကျန်းဖြစ်ပါက ရသင့်သည့် ဝန်ထမ်းအခွင့်ရေးများ အပြည့်အဝ ခံစားခွင့်ပေးပြီး ဆေးကုသမှုခံယူစေမည် ဖြစ်ပါသည်။

လေးစားစွာဖြင့်

ဦးစိန်မျိုးအောင်
အမှုဆောင်ဒါရိုက်တာ
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ပတ်ဝန်းကျင်ညစ်ညမ်းမှုမရှိစေရေး ဆောင်ရွက်ထားမှု အခြေအနေတင်ပြခြင်း

ကျွန်တော်တို့၏ မြန်မာနိုင်ငံကုမ္ပဏီများ အက်ဥပဒေအရ ဖွဲ့စည်းတည်ထောင်ထားသော Ngwe Yi Pale' Sugar Co., Ltd မှ လုပ်ငန်းဆောင်ရွက်ရာတွင် စက်ရုံနှင့်ပတ်ဝန်းကျင်ညစ်ညမ်းမှု မရှိစေရန် သန့်စင်ခန်းများအား အလုံအလောက်ထားရှိခြင်း၊ အမှိုက်ပုံးများထားရှိခြင်း၊ လုပ်ငန်းခွင်ပတ်ဝန်းကျင်အား သန့်ရှင်းရေး လုပ်ငန်းများဆောင်ရွက်ခြင်းကို အစဉ် ပြုလုပ်မည်ဖြစ်ပါကြောင်း ဝန်ခံကတိပြု အပ်ပါသည်။

လေးစားစွာဖြင့်

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မီးဘေးကြိုတင်ကာကွယ်မှု အစီအစဉ် တင်ပြခြင်း

လုပ်ငန်းခွင်အတွင်းရှိအဆောက်အအုံများနှင့် သတ်မှတ်နေရာများတွင် မီးသတ်ဆေးဗူးများ ချိတ်ဆွဲထားရှိမည့်အပြင် မီးလောင်မှုဖြစ်ပွားပါက အရေးပေါ်အခြေအနေတွင် မီးငြိမ်းသတ်နိုင်ရန် ဝန်ထမ်းများအား မီးသတ်သင်တန်း များသို့စေလွှတ်ပြီး သင်တန်းများပေးသွားမည် ဖြစ်ပါသည်။

လေးစားစွာဖြင့်

ဦးစိန်မျိုးအောင်
အမှုဆောင်ဒါရိုက်တာ
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Corporate Social Responsibility (CSR)

Ngwe Yi Pale' Sugar Co., Ltd မှ CSR နှင့်ပတ်သက်၍ အောက်ပါလုပ်ငန်းများကို ဆောင်ရွက်ပါမည် -

၁။ **ကျန်းမာရေး**

ဝန်ထမ်းများ ကျန်းမာရေးမကောင်းသည့်အခါ လိုအပ်သည့် ငွေကြေးများ ထောက်ပံ့ပေးသည့်အပြင် နာမကျန်းဖြစ်သည့်ရက်များအတွက် လစာအပြည့် ခံစားခွင့် ပြုပါသည်။

ဝန်ထမ်းများ လုပ်ငန်းခွင်တွင် ပျော်ရွှင်စေရေး၊ လုပ်ငန်းခွင်တွင် အလုပ်ကို အာရုံအပြည့် စူးစိုက်စေနိုင်ရေးအလို့ငှာ ဝန်ထမ်းမိသားစုများ နေမကောင်းဖြစ်သည့်အခါ စိတ်ပူပန်မှုမရှိစေရန် ရောဂါအခြေအနေပေါ် မူတည်ကာ ဆေးဖိုးထုတ်ပေးပါမည်။

၂။ **ပညာရေး**

ဝန်ထမ်းများ၏ ပညာရေးနှင့်ပတ်သက်၍ ကဏ္ဍအသီးသီးရှိ ဝန်ထမ်းများ၏ ပညာရေးများကို Advance ဖြစ်အောင် အမြဲတမ်းစီစဉ်ဆောင်ရွက် ပေးပါသည်။

၃။ **လူမှုရေး**

New Year နှင့် သင်္ကြန်ရက်များတွင် ဝန်ထမ်းများအား နှစ်အလိုက်ရပိုင်ခွင့်များ အပြည့်အဝ ခံစားနိုင်စေရန် ဆောင်ရွက်ပေးပါသည်။

ပညာရေးကျောင်းများ၊ မိဘမဲ့ကလေးများကိုလည်း လိုအပ်သလို အလှူငွေများ ထောက်ပံ့ပေးပါသည်။

၄။ **လမ်းပန်းဆက်သွယ်ရေး**

စီမံကိန်းဝန်းကျင်ရှိ လမ်းများ၊ ကျေးရွာနှင့် ဆက်သွယ်ထားသည့် လမ်းပိုင်းများ၊ ကောင်းမွန်ရေးအတွက် သက်ဆိုင်ရာအဖွဲ့အစည်းများ၊ ဌာနဆိုင်ရာများနှင့်ပူးပေါင်း၍ လမ်းတိုးချဲ့ခြင်း၊ ပြုပြင်ခြင်း လုပ်ငန်းများအား ပူးပေါင်းဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း တင်ပြအပ်ပါသည်။

လေးစားစွာဖြင့်

ဦးစိန်မျိုးအောင်
အမှုဆောင်ဒါရိုက်တာ
Ngwe Yi Pale' Sugar Co., Ltd

NGWE YI PA LÈ SUGAR CO., LTD.
SINN SHWE LI
WHITE SUGAR
NO. (62), 15th STREET, BET (87-88) STREET, MANDALAY. TEL: 02-31941, 09-91007169
NO. (157), 33rd STREET, BET (75-76) STREET, MANDALAY, MYANMAR. TEL: 02-71424

CSR ရံပုံငွေထားရှိမည်ဖြစ်ပါကြောင်း ၀န်ခံကတိပြုခြင်း

မြန်မာနိုင်ငံကုမ္ပဏီများ အက်ဥပဒေအရ ဖွဲ့စည်းတည်ထောင်ထားသော ကျွန်တော်တို့၏ Ngwe Yi Pale' Sugar Co., Ltd သည် ရှမ်းပြည်နယ်၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ်၊ အင်းဝိုင်းဒေသတွင် သကြားထုတ်လုပ်ခြင်းစီမံကိန်းအတွက် ကနဦး (၃၀)နှစ်နှင့် တစ်ကြိမ်လျှင် (၁၀)နှစ်ဖြင့် သက်တမ်းတိုးမြှင့် လုပ်ငန်းဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။

အဆိုပြုလုပ်ငန်း၏ နှစ်စဉ်အသားတင်အမြတ်ငွေမှ ၂% အား CSR ရံပုံငွေအဖြစ် ထားရှိသုံးစွဲမည် ဖြစ်ကြောင်း ၀န်ခံကတိပြုပါသည်။

လေးစားစွာဖြင့်

ဦးစိန်မျိုးအောင်
အမှုဆောင်ဒါရိုက်တာ
Ngwe Yi Pale' Sugar Co., Ltd

Land form (7) for the project site

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံလက်မှတ် သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

တိုင်းဒေသကြီး/ပြည်နယ် ရှမ်း/မြောက်	
ခရိုင် ကျောက်မဲ	
မြို့နယ်/မြို့နယ်ခွဲ နောင်ချို	
ရွာ/ကျေးရွာအုပ်စု ကွန်းကြီး/ရွာမ	
ကွင်း/အကွက်အမှတ်နှင့်အမည် ၂/နောင်ဝိုင်းရွာ	
ဦးပိုင်အမှတ်/မြေကွက်အမှတ် ၁၂၁	

ဦးပိုင်အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့်အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၂၁	ဦးသိန်းဖြင့်	လုပ်ပိုင်ခွင့်	ယာ	၃.၂၄	
ရေးကူးပေးသည့်အကြောင်းအရာ	လယ်သမားမြေလုပ်ပိုင်ခွင့် လက်မှတ် လျှောက်ထားရန်				

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - ဦးသိန်းဖြင့်

လျှောက်လွှာတင်သည့်နေ့စွဲ - ၁၅.၆.၂၀၁၈

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ - ၂၀.၈.၂၀၁၈

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၈-၂၀၁၉) ခုနှစ် အတွက် နောက်ဆက်တွဲ တိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -

နေ့စွဲ -

(ဟန်ဝင်းအောင်)
မြေတိုင်း-၄
လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန
နောင်ချိုမြို့

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -

လက်ထောက်ဦးစီးမှူးလက်မှတ် -

နေ့စွဲ -

လက်ထောက်ဦးစီးမှူး
မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန
နောင်ချိုမြို့

စိစစ်အတည်ပြုပါသည်။

မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ်

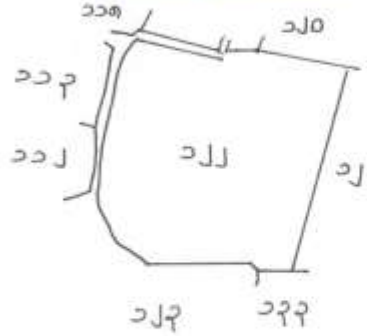
နေ့စွဲ -

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ / (သက်သေမခံ) သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

ရုံးခွန်

တိုင်းဒေသကြီး/ ပြည်နယ် ရှမ်း/မြောက်	
ခရိုင် ကျောက်မဲ	
မြို့နယ်/ မြို့နယ်ခွဲ နောင်ချို	
ရပ်ကွက်/ ကျေးရွာအုပ်စု ကွန်းမြိုးရွာ	
ကွင်း/ အကွက်အမှတ်နှင့်အမည် ၂၂ နင်းပိုင်းကွက်ကွင်း	
ဦးပိုင်အမှတ်/ မြေကွက်အမှတ် ၁၂၂	



ဦးပိုင် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၂၂	ဦးသိန်းမြင့်	လုပ်ပိုင်ခွင့်	ယာ၁	၅.၄၈	
ရေးကူးပေးသည့်အကြောင်းအရာ	လယ်ယာမြေလုပ်ပိုင်ခွင့်လက်မှတ် လျှောက်ထားရန်				

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - ဦးသိန်းမြင့်

လျှောက်လွှာတင်သည့်နေ့စွဲ - ၁၅.၆.၂၀၁၈

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ - ၂၀.၈.၂၀၁၈

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၈ . ၁၉) ခုနှစ် အတွက် နောက်ဆက်တွဲ တိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

(တင်ဝင်းအောင်)
မြေတိုင်း-၄

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -

နေ့စွဲ -

ရုံးတံဆိပ်

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -

လက်ထောက်ဦးစီးမှူးလက်မှတ် -

နေ့စွဲ -

လက်ထောက်ဦးစီးမှူး
မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန
နောင်ချိုမြို့

စိစစ်အတည်ပြုပါသည်။

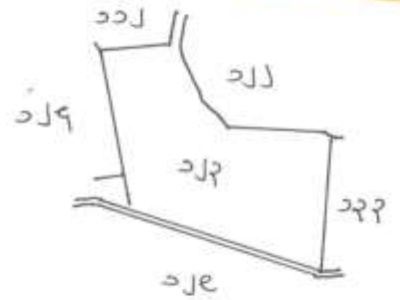
မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ်

နေ့စွဲ -

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ / ~~သက်သေမခံ~~ သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

ရုံးခွန်တံဆိပ်ခေါင်း

~~တိုင်းဒေသကြီး~~/ ပြည်နယ် ရှမ်း / မြောက်	
ခရိုင် ကျောက်မဲ	
မြို့နယ်/ မြို့နယ်ခွဲ နောင်ချို	
~~ရပ်ကွက်~~/ ကျေးရွာအုပ်စု [illegible]	
ကွင်း/ အကွက်အမှတ်နှင့်အမည် ၂ / [illegible]	
ဦးပိုင်အမှတ်/ မြေကွက်အမှတ် ၁၂၃	

ဦးပိုင် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၂၃	ဦးသိန်းမြင့်	လုပ်ပိုင်ခွင့်	ယာ	၃.၆၁	

ရေးကူးပေးသည့်အကြောင်းအရာ - [illegible]

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - ဦးသိန်းမြင့်

လျှောက်လွှာတင်သည့်နေ့စွဲ - ၁၁.၆.၂၀၁၈

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ -

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၈ - ၂၀၁၉) ခုနှစ် အတွက် နောက်ဆက်တွဲ တိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

(တန်ဝင်းအောင်)
မြေတိုင်း-၄
[illegible]

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -

နေ့စွဲ -

ရုံးတံဆိပ်

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -

လက်ထောက်ဦးစီးမှူးလက်မှတ် -

နေ့စွဲ -

လက်ထောက်ဦးစီးမှူး
[illegible]
နောင်ချိုမြို့

စိစစ်အတည်ပြုပါသည်။

မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ် နေ့စွဲ -

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ

...းရန်ပုံစံ

...င်းကပ်ရန်

တိုင်းဒေသကြီး/ ပြည်နယ် [illegible]	
ခရိုင် [illegible]	
မြို့နယ်/ မြို့နယ်ခွဲ [illegible]	
ရပ်ကွက်/ ကျေးရွာအုပ်စု [illegible]	
ကွင်း/ အကွက်အမှတ်နှင့်အမည် [illegible]	
ဦးပိုင်အမှတ်/ မြေကွက်အမှတ် ၁၅၄	

ဦးပိုင် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၅၄	ဦးသိန်းမြင့်	[illegible]	[illegible]	၁၀.၆၉	
	[illegible]				
ရေးကူးပေးသည့်အကြောင်းအရာ	[illegible]				

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - ဦးသိန်းမြင့်

လျှောက်လွှာတင်သည့်နေ့စွဲ - ၁၅-၆-၂၀၁၈

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ -

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၈ - ၂၀၁၉) ခုနှစ် အတွက် နောက်ဆုံးတွဲ ပိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -

နေ့စွဲ -

([illegible])

မြေတိုင်း-၄

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -

လက်ထောက်ဦးစီးမှူးလက်မှတ် -

နေ့စွဲ -

လက်ထောက်ဦးစီးမှူး

စိစစ်အတည်ပြုပါသည်။

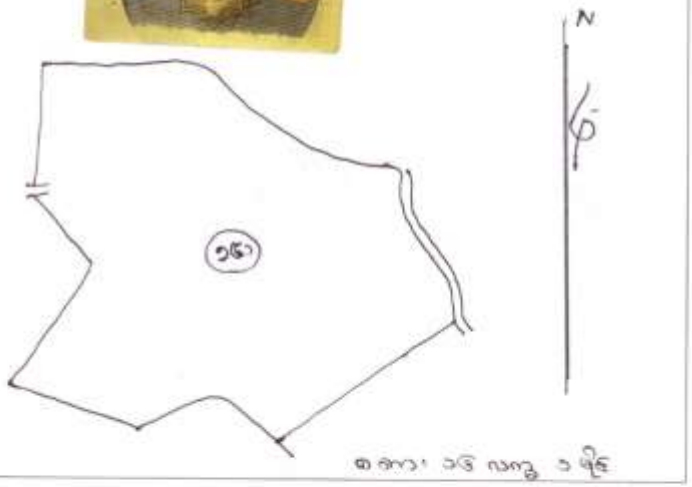
မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ်

နေ့စွဲ -

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ / သက်သေမခံ သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကားရန်ပုံစံ

တိုင်းဒေသကြီး/ပြည်နယ်	
ခရိုင်	
မြို့နယ်/မြို့နယ်ခွဲ	
ရပ်ကွက်/ကျေးရွာအုပ်စု	
ကွင်း/အကွက်အမှတ်နှင့်အမည်	
ဦးပိုင်အမှတ်/မြေကွက်အမှတ်	၁၆၁



ဦးပိုင်အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ဂရန်ရှင်/အင်္ဂါဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့်အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၆၁	-	လုပ်ပိုင်ခွင့်	လယ်	၁၃.၁၀	
ရေးကူးပေးသည့်အကြောင်းအရာ					

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - ဦး
လျှောက်လွှာတင်သည့်နေ့စွဲ - ၂၅.၄.၂၀၁၅
လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ - ၁၀.၁၂.၂၀၂၅

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၅) ခုနှစ် အတွက် နောက်ဆက်တွဲ မိုင်းတောခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

ရုံးတံဆိပ်

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -
နေ့စွဲ -

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -
လက်ထောက်ဦးစီးမှူးလက်မှတ် -
နေ့စွဲ -

စိစစ်အတည်ပြုပါသည်။
မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ် ဦးစီးအရာရှိ
နေ့စွဲ -

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ / သက်သေမခံ သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

တိုင်းဒေသကြီး/ပြည်နယ်	
ခရိုင်	
မြို့နယ်/မြို့နယ်ခွဲ	
ရပ်ကွက်/ကျေးရွာအုပ်စု	
ကွင်း/အကွက်အမှတ်နှင့်အမည်	
ဦးပိုင်အမှတ်/မြေကွက်အမှတ်	

ဦးပိုင်အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
ရေးကူးပေးသည့်အကြောင်းအရာ					

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် -
လျှောက်လွှာတင်သည့်နေ့စွဲ -
လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ -

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော ( ) ခုနှစ် အတွက် နောက်ဆက်တွဲ တိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

ရုံးတံဆိပ်

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -
နေ့စွဲ -

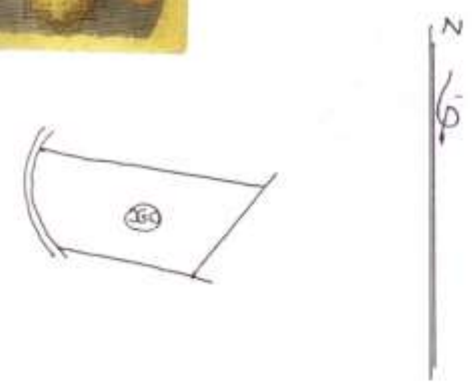
တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -
လက်ထောက်ဦးစီးမှူးလက်မှတ် -
နေ့စွဲ -

စိစစ်အတည်ပြုပါသည်။
မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ် -
နေ့စွဲ

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ / သက်သေမခံ သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

တိုင်းဒေသကြီး/ ပြည်နယ် [illegible]	
ခရိုင် [illegible]	
မြို့နယ်/ မြို့နယ်ခွဲ [illegible]	
ရပ်ကွက်/ ကျေးရွာအုပ်စု [illegible]	
ကွင်း/ အကွက်အမှတ်နှင့်အမည် [illegible]	
ဦးပိုင်အမှတ်/ မြေကွက်အမှတ် [illegible]	



ဦးပိုင် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၆၀	-	လုပ်ပိုင်ခွင့်	ယာ	၂.၂၂	

ရေးကူးပေးသည့်အကြောင်းအရာ	[illegible]

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - [illegible]

လျှောက်လွှာတင်သည့်နေ့စွဲ - [illegible]

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ - [illegible]

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၅ / ၁၆) ခုနှစ် အတွက် နောက်ဆက်တွဲ တိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

ရုံးတံဆိပ်

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -

နေ့စွဲ -

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -

လက်ထောက်ဦးစီးမှူးလက်မှတ် -

နေ့စွဲ -

စိစစ်အတည်ပြုပါသည်။

မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ် [illegible] နေ့စွဲ

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း- သက်သေခံ / သက်သေမခံ သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

တိုင်းဒေသကြီး/ပြည်နယ်	
ခရိုင်	
မြို့နယ်/မြို့နယ်ခွဲ	
ရပ်ကွက်/ကျေးရွာအုပ်စု	
ကွင်း/အကွက်အမှတ်နှင့်အမည်	
ဦးပိုင်အမှတ်/မြေကွက်အမှတ်	

ဦးပိုင်အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်စွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
ရေးကူးပေးသည့်အကြောင်းအရာ					

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် -

လျှောက်လွှာတင်သည့်နေ့စွဲ -

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ -

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော ( ) ခုနှစ် အတွက် နောက်ဆက်တွဲ မြို့နယ်/ဒေသခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

ရုံးတံဆိပ်

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -

နေ့စွဲ -

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -

လက်ထောက်ဦးစီးရုံးလက်မှတ် -

နေ့စွဲ -

စိစစ်အတည်ပြုပါသည်။

မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ် -

နေ့စွဲ -

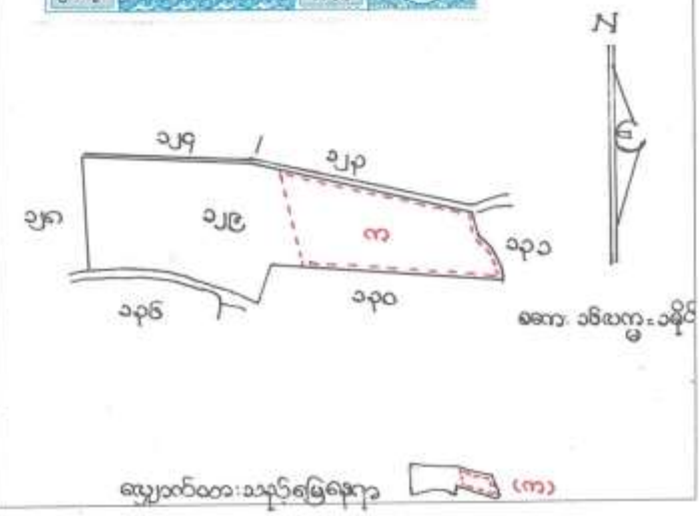
ဦး ဘိုဖြူ ဖော်
စကားတော်

မြေစာရင်းပုံစံ – ၁၀၅

2017 – 020621

မှန်ကန်ကြောင်း သက်သေခံ / ထောက်ခံသော ———— သောလက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

DALMS

တိုင်းဒေသကြီး/ပြည်နယ် ရှမ်း / မြောက်	
ခရိုင် ကျောက်မဲ	
မြို့နယ်/မြို့နယ်ခွဲ နောင်ချို	
ရပ်ကွက်/ကျေးရွာအုပ်စု ကုန်းကြီးရှမ	
ကွင်း/အကွက်အမှတ်နှင့်အမည် ၂ / နင်းပိုင်းရှာကွင်း	
ဦးပိုင်အမှတ်/မြေကွက်အမှတ် ၁၂၉	လျှောက်ထားသည့်မြေနေရာ (က)

ဦးပိုင် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ ဂရန်ရှင်/အငှားဂရန်ရှင်အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၂၉	ဒေါ်ခင်အေး	ဘိုးဘွားပိုင်	ယာ	မူလဧရိယာ	မူလဧရိယာမှ
				၄၅.၉၂၂ဧက	ကွင်းမှ (၂.၂၅)
				ဖောက်ကွင်းမှ	ဧကကိုသာလျှောက်
				(၂.၂၅)ဧက	ထားခြင်းဖြစ်ပါသည်

ရေးကူးပေးသည့်အကြောင်းအရာ	MIC သို့ တင်ပြရန်

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - ဦးသိန်းမြင့်

လျှောက်လွှာတင်သည့်နေ့စွဲ - ၃၀ . ၈ . ၂၀၁၈

လျှောက်ထားသူသို့ထုတ်ပေးသည့်နေ့စွဲ - ၃၁ . ၈ . ၂၀၁၈

ယခုအထက်တွင်ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော(၂၀၁၈/၁၉)ခုနှစ် အတွက် နောက်ဆုံးတိုင်းခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -

နေ့စွဲ -

(တန်မင်းအောင်)
မြေတိုင်း-၄
ကျောက်မဲခရိုင်မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေး နှင့်စာရင်းအင်းဦးစီးဌာန
နောင်ချို
၃၁.၈.၂၀၁၈

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည်။
ဦးစီးမှူးလက်မှတ် -

နေ့စွဲ -

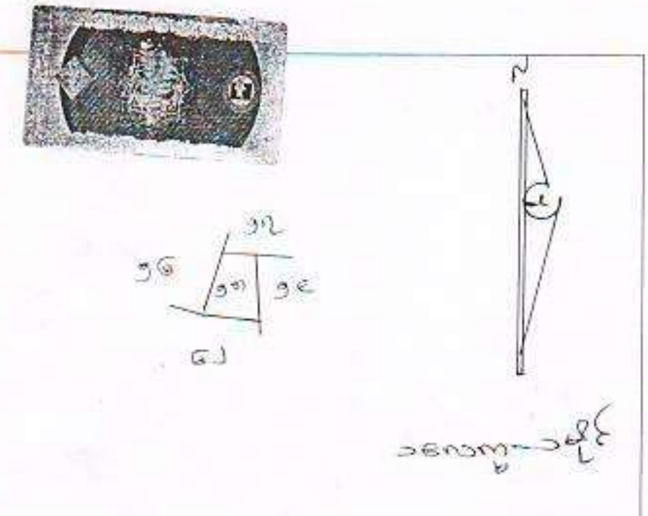
လက်ထောက်ဦးစီးမှူး
မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန
နောင်ချို

စိစစ်အတည်ပြုပါသည်။
မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့် စာရင်းအင်းဦးစီးမှူးလက်မှတ်

နေ့စွဲ

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ / သက်သေမခံ သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ



တိုင်းဒေသကြီး/ ပြည်နယ် ရှမ်း/မြောက်	
ခရိုင် ကျောက်မဲ	
မြို့နယ်/ မြို့နယ်ခွဲ နောင်ချို	
ရပ်ကွက်/ ကျေးရွာအုပ်စု [illegible]	
ကွင်း/ အကွက်အမှတ်နှင့်အမည် [illegible]	
ဦးပိုင်အမှတ်/ မြေကွက်အမှတ် [illegible]	

ဦးပိုင် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
[illegible]		[illegible]	[illegible]	[illegible]	
ရေးကူးပေးသည့်အကြောင်းအရာ	[illegible]				

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - [illegible]

လျှောက်လွှာတင်သည့်နေ့စွဲ - [illegible]

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ - [illegible]

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော ([illegible] - ၂၀၁၄) ခုနှစ် အတွက် နောက်ဆက်တွဲ တိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

ရုံးတံဆိပ်

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -

နေ့စွဲ -

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည်

လက်ထောက်ဦးစီးမှူးလက်မှတ် -

နေ့စွဲ -

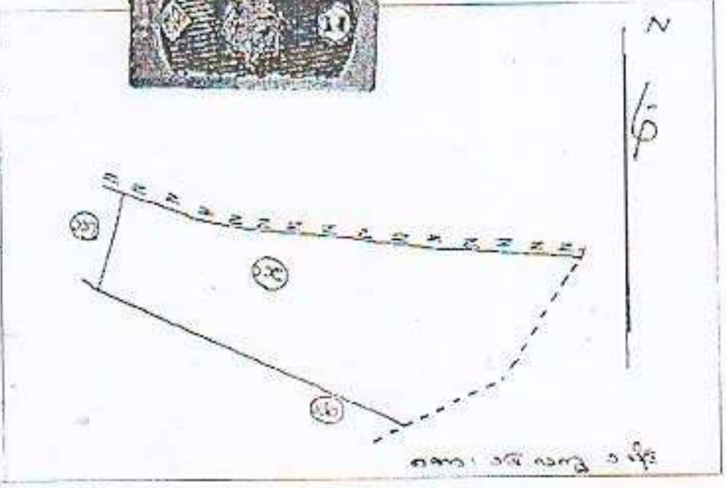
စိစစ်အတည်ပြုပါသည်။

မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ်

နေ့စွဲ -

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ / သက်သေမခံ သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

တိုင်းဒေသကြီး/ ပြည်နယ် [illegible]	
ခရိုင် [illegible]	
မြို့နယ်/ မြို့နယ်ခွဲ [illegible]	
ရပ်ကွက်/ ကျေးရွာအုပ်စု [illegible]	
ကွင်း/ အကွက်အမှတ်နှင့်အမည် [illegible]	
ဦးပိုင်အမှတ်/ မြေကွက်အမှတ် ၁၁၉	

ဦးပိုင် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၁၉	-	[illegible]	ယာ	၇.၅၀	6.24

ရေးကူးပေးသည့်အကြောင်းအရာ	[illegible]

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - [illegible]
လျှောက်လွှာတင်သည့်နေ့စွဲ - ၂၅.၇.၂၀၁၅
လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ - ၁.၁၁.၂၀၁၅

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၅ / ၁၆) ခုနှစ် အတွက် နောက်ဆက်တွဲတိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

ရုံးတံဆိပ်

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -
နေ့စွဲ -

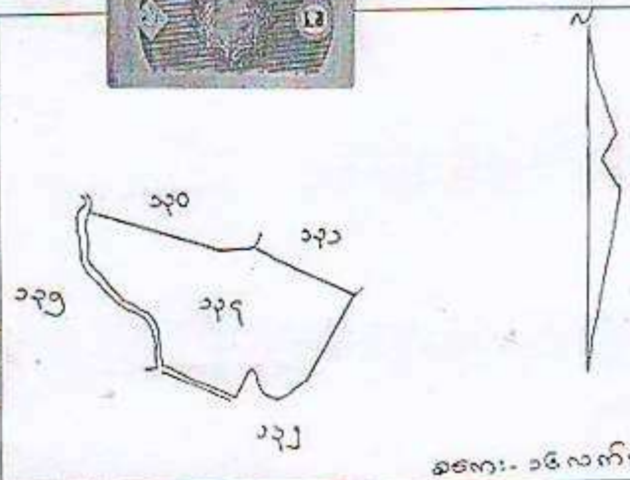
တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -
လက်ထောက်ဦးစီးမှူးလက်မှတ် -
နေ့စွဲ -

စိစစ်အတည်ပြုပါသည်။
မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ်
နေ့စွဲ -

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ / ထောက်ခံသော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

တိုင်းဒေသကြီး/ ပြည်နယ် ရှမ်း/မြောက်	
ခရိုင် ကျောက်မဲ	
မြို့နယ်/ မြို့နယ်ခွဲ နောင်ချို	
ရပ်ကွက်/ ကျေးရွာအုပ်စု ကွန်းမြီး ရွာမ	
ကွင်း/ အကွက်အမှတ်နှင့်အမည် ၂ / နာင်းပိုင်းရွာ ကွင်း	
ဦးပိုင်အမှတ်/ မြေကွက်အမှတ် ၁၃၄	



စကေး - ၁၆ လက်မ ၁ မိုင်

ဦးပိုင် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၃၄	ဦးလှဝင်း(၁) ရှမ်းအိ	လုပ်ပိုင်ခွင့်	ယာ	၃.၆၁	

ရေးကူးပေးသည့်အကြောင်းအရာ	လယ်ယာမြေလုပ်ပိုင်ခွင့်လျှောက်ထား၍

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - ဦးလှဝင်း (ခ) ရှမ်းအိ
လျှောက်လွှာတင်သည့်နေ့စွဲ - ၁၅.၆.၂၀၁၈
လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ -

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၈-၂၀၁၉) ခုနှစ် အတွက် နောက်ဆက်တွဲ တိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

(ဟန်ဝင်းအောင်)
အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် - မြေတိုင်း-၄
နေ့စွဲ - လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန
နောင်ချိုမြို့

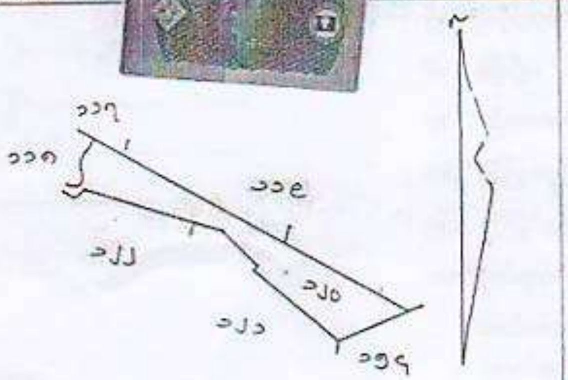
တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -
လက်ထောက်ဦးစီးမှူးလက်မှတ် - လက်ထောက်ဦးစီးမှူး
နေ့စွဲ - မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန
နောင်ချိုမြို့

စိစစ်အတည်ပြုပါသည်
မြို့နယ်မြေစီမံခန့်ခွဲရေးဦးစီးဌာနမှူးလက်မှတ်
နေ့စွဲ -

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ (လက်မှတ်ပါ) သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

ရုံးခွန်တံဆိပ်ခေါင်း

တိုင်းဒေသကြီး/ပြည်နယ် ရှမ်း / မြောက်	
ခရိုင် ကျောက်မဲ	
မြို့နယ်/မြို့နယ်ခွဲ နောင်ချို	
ရပ်ကွက်/ကျေးရွာအုပ်စု ကုန်း ကြီး ရွာ	
ကွင်း/အကွက်အမှတ်နှင့်အမည် ၂ /	
ဦးပိုင်အမှတ်/မြေကွက်အမှတ် ၁၂၀	

ဦးပိုင် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၂၀	[illegible]	လုပ်ပိုင်ခွင့်	ယာ	၁.၆၉	
	[illegible]				

ရေးကူးပေးသည့်အကြောင်းအရာ [illegible]

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - [illegible]

လျှောက်လွှာတင်သည့်နေ့စွဲ - ၁၅.၆.၂၀၁၈

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ - ၂၀.၈.၂၀၁၈

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၇-၂၀၁၈) ခုနှစ် အတွက် နောက်ဆက်တွဲ တိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -

နေ့စွဲ -

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -

လက်ထောက်ဦးစီးမှူးလက်မှတ် -

နေ့စွဲ -

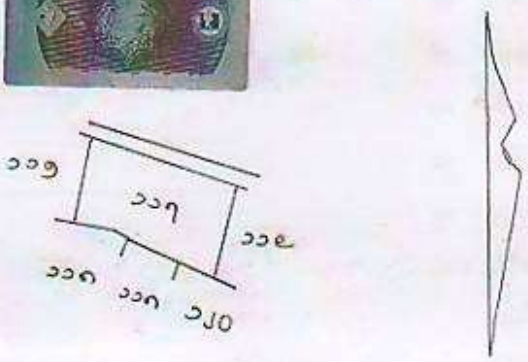
စိစစ်အတည်ပြုပါသည်။

ခရိုင်/မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ် -

နေ့စွဲ -

မြေစာရင်းပုံစံ - ၁၀၅

မှန်ကန်ကြောင်း သက်သေခံ / နောက်ဆေးမစ်၏ သော လက်ရှိမြေပုံတွင် ယခုနှစ်အသုံးပြုသော ဦးပိုင်မြေပုံ လက်ခံရေးကူးရန်ပုံစံ

တိုင်းဒေသကြီး/ ပြည်နယ် ရှမ်း/မြောက်	
ခရိုင် ကျောက်မဲ	
မြို့နယ်/ မြို့နယ်ခွဲ နောင်ချို	
ရပ်ကွက်/ ကျေးရွာအုပ်စု [illegible]	
ကွင်း/ အကွက်အမှတ်နှင့်အမည် ၂ / နောင်ပိုင်းကွင်း	
ဦးပိုင်အမှတ်/ မြေကွက်အမှတ် ၁၁၇	စကေး ၁၆ လက်မ ၁ မိုင်

ဦးပိုင် အမှတ်	အခွန်စည်းကြပ်ခံရသူ/ပိုင်ရှင်/ ဂရန်ရှင်/အငှားဂရန်ရှင် အမည်	ပိုင်ဆိုင်ခွင့်	မြေမျိုးနှင့် အတန်း	ဧရိယာ (ဧက)	မှတ်ချက်
၁၁၇	ဦးလှဝင်း(၁) ရှင်းဆီ	မူလပိုင်ဆိုင်ခွင့်	ယာ	၁.၇၃	

ရေးကူးပေးသည့်အကြောင်းအရာ — ယခင်ယာမြေ ... ပိုင်ဆိုင်မှုလက်မှတ်လျှောက်ထား၍

(အထက်ဖော်ပြပါအကြောင်းအရာအတွက်သာ အသုံးပြုခွင့်ရှိသည်)

လျှောက်ထားသူအမည် - ဦးလှဝင်း (၁) ရှင်းဆီ

လျှောက်လွှာတင်သည့်နေ့စွဲ - ၁၅.၆.၂၀၁၈

လျှောက်ထားသူသို့ ထုတ်ပေးသည့်နေ့စွဲ - ၂၀.၈.၂၀၁၈

ယခုအထက်တွင် ပြဆိုသောမြေပုံမှာ မှန်ကန်သေချာစွာ ရေးကူးထားသော (၂၀၁၈ - ၂၀၁၉) ခုနှစ် အတွက် နောက်ဆက်တွဲ တိုင်းတာခြင်း မြေပုံဖြစ်ကြောင်း သက်သေခံလက်မှတ် ရေးထိုးပါသည်။

(ဟန်ဝင်းအောင်)
မြေတိုင်း-၄
လယ်ယာမြေစီမံခန့်ခွဲရေး နှင့်စာရင်းအင်းဦးစီးဌာန
နောင်ချိုမြို့

အမှုတွဲထိန်း/မြေတိုင်းစာရေးလက်မှတ် -
နေ့စွဲ -

ရုံးတံဆိပ်

တိုက်ဆိုင်စစ်ဆေးပြီး မှန်ကန်ပါသည် -
လက်ထောက်ဦးစီးမှူးလက်မှတ် -
နေ့စွဲ -

လက်ထောက်ဦးစီးမှူး
မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန
နောင်ချိုမြို့

စိစစ်အတည်ပြုပါသည်။
မြို့နယ်မြေစာရင်းဦးစီးဌာနမှူးလက်မှတ်
နေ့စွဲ -

CSR programmes for the area

အင်းဝိုင်းကျေးရွာတွင်တပ်ဆင်ထားသော Transformer

အင်းဝိုင်းကျေးရွာအတွင်း လျှပ်စစ်မီးသွယ်တန်းထားပုံ

ဆင်းရဲလိမ်သကြားစက်ရုံမှအင်းဝိုင်းကျေးရွာသို့
သွယ်တန်းထားသော 11 KV ဓါတ်အားလိုင်း

အင်းဝိုင်းကျေးရွာအတွင်းလျှပ်စစ်မီးသွယ်တန်းထားပုံ

ဆင်းရဲလိမ်သကြားစက်(၂)-လယ်ချင်းကွေ့လမ်းရှိ ဧရာတံတားအမှတ်(၂)

ဆင်းရဲလိမ်သကြားစက်(၂)-လယ်ချင်းကွေ့လမ်းရှိ လယ်ချင်းကွေ့တံတား

ဆင်းရွှေလီသကြားစက်(၂)-လယ်ချင်းကျေးလမ်းရှိ လယ်ချင်းကျေးတံတား

ဆင်းရွှေလီသကြားစက်(၂)-လယ်ချင်းကျေးလမ်းရှိ စဲစေတာပြွန်တံတားအမှတ်(၁)

ဆင်းရွှေလီသကြားစက်(၂)-လယ်ချင်းကျေးလမ်းရှိပြွန်အမှတ်(၁၁)

ဆင်းရွှေလီသကြားစက်(၂)-လယ်ချင်းကျေးလမ်းရှိပြွန်အမှတ်(၁၂)

ဆင်းရွှေလီသကြားစက်-လယ်ချင်းကျေးလမ်းရှိပြွန်အမှတ်(၁၃)

ဆင်းရွှေလီသကြားစက်-လယ်ချင်းကျေးလမ်းရှိပြွန်အမှတ်(၁၄)

ဆင်းရွှေလီသကြားစက်(၂)-လယ်ချင်းကျေ့လမ်းရှိပြွန်အမှတ်(၁၄)

ဆင်းရွှေလီသကြားစက်(၂)-လယ်ချင်းကျေ့လမ်းရှိ ပြွန်တံတားအမှတ်(၁၅)

ဆင်းရွှေလီသကြားစက်(၂)-လယ်ချင်းကျေ့လမ်းရှိပြွန်အမှတ်(၁၈)

ဆင်းရွှေလီသကြားစက်(၂)-လယ်ချင်းကျေ့လမ်းရှိ ပြွန်တံတားအမှတ်(၁၆)

ပလောင်ရွာတွင်လှူဒါန်းထားသောဂါလံ(၁၀၀၀)ဆံ့ရေကန်

ပါဟဲ့ရွာအဝင်ပြွန်တံတားအား
ကျောက်ရိုးစီကွန်ကရစ်တံတားအဖြစ်ပြန်လည်ပြုပြင်ထားပုံ

ဆင်းရွှေလီသကြားစက်မှ ပါဟဲကျေးရွာသို့
လျှပ်စစ်မီးသွယ်တန်းရန် ဓါတ်တိုင်များစိုက်ထူထားပုံ

ဆင်းရွှေလီသကြားစက်မှ ပါဟဲကျေးရွာသို့
လျှပ်စစ်မီးသွယ်တန်းရန် ဓါတ်တိုင်များစိုက်ထူထားပုံ

ပါဟဲကျေးရွာတွင်လှူဒါန်းထားသောဂါလံ(၁၀၀၀)ဆံ့ရေကန်

ပါဟဲကျေးရွာတွင်လှူဒါန်းထားသောဂါလံ(၁၀၀၀)ဆံ့ရေကန်အတွက်သွယ်တန်း
ထားသောရေပိုက်လိုင်းများ

ဆင်းရွှေလီသကြားစက်(၂)-လယ်ချင်းကွေ့လမ်းရှိ ဖောင်းအောင်တံတား

ဆင်းရွှေလီသကြားစက်(၂)-လယ်ချင်းကွေ့လမ်းရှိ ဖောင်းအောင်တံတား

လယ်ကျင်းကွေ့ ဆင်းရွှေလီသကြားစက်လမ်းအား ကတ္တရာလမ်းခင်းပြီးပုံ

လယ်ကျင်းကွေ့ ဆင်းရွှေလီသကြားစက်လမ်းအား ကတ္တရာလမ်းခင်းပြီးပုံ

ဘန့်ဘွေး-ဆင်းရွှေလီသကြားစက်လမ်းအား ကတ္တရာခင်းပြီးပုံ

ဘန့်ဘွေး-ဆင်းရွှေလီသကြားစက်လမ်းအား ကတ္တရာခင်းပြီးပုံ

ဆင်းရွှေလီသကြားစက်(၂)-ဘန့်ဘွေးလမ်းရှိ ခြွန်တံတားအမှတ်(၁)

ဆင်းရွှေလီသကြားစက်(၂)-ဘန့်ဘွေးလမ်းရှိ ခြွန်တံတားအမှတ်(၂)

တဲတိုက်ကျေးရွာ မူလတန်းကျောင်း စာသင်ကျောင်းဆောင်

အင်းဝိုင်းကျေးရွာ စာသင်ကျောင်း တိုးချဲ့ဆောင်

တဲတိုက်ကျေးရွာလျှပ်စစ်မီးရရှိရေး
Transformer တိုင်မည်နေရာနှင့်မိတ်အားလိုင်း

တဲတိုက်ကျေးရွာအတွင်းလျှပ်စစ်မီးသွယ်တန်းထားမှု

တဲတိုက်ကျေးရွာလျှပ်စစ်မီးရရှိရေး 11KV မိတ်အားလိုင်း

တဲတိုက်ကျေးရွာအပေါ်ပိုင်းလျှပ်စစ်မီးရရှိရေး 400V မိတ်အားလိုင်း

တောင်ကျချောင်းရေရရှိရေးအတွက်လှူဒါန်းထားသောဂါလံ(၁၀၀၀)ဆံ့ရေကန်

တောင်ကျချောင်းရေရရှိရေးအတွက်လှူဒါန်းထားသောအဝီစိတွင်းရေမောင်းစက်

တဲတိုက် - စီးပင်ကြားအမှတ်(၁)တံတား

တဲတိုက် - စီးပင်ကြားအမှတ်(၂)တံတား

ဆင်းရွှေလီသကြားစက်(၂)-တန့်ဆွေးလမ်းရှိ ရေထုတ်ခွန်တံတား

ဆင်းရွှေလီသကြားစက်(၂)-တန့်ဆွေးလမ်းရှိ ရေထုတ်ခွန်တံတား

ဆင်းရွှေလီသကြားစက်(၂)-အနီးချောင်းလမ်းရှိ ရေထုတ်ခွန်တံတား

ဆင်းရွှေလီသကြားစက်(၂)-အနီးချောင်းလမ်းရှိ မင်္ဂလာတံတား

တဲတိုက်ကျေးရွာ မူလတန်းကျောင်း စာသင်ကျောင်းဆောင် (၂၀၁၄)

တောင်ကျကျေးရွာစာသင်ကျောင်းသို့ စာရေးကိရိယာများလှူဒါန်းခြင်း (၂၀၁၆)

အင်းဝိုင်းကျောင်းသို့ စာရေးကိရိယာများ လှူဒါန်းခြင်း (၂၀၁၆)

ကုန်းကြီးရွာမစာသင်ကျောင်းဆောင်သစ်ဆောက်လုပ်လှူဒါန်းခြင်း (၂၀၁၆)

ပလောင်ကုန်းကျေးရွာ စာသင်ကျောင်းဆောင် ဆောက်လုပ်လှူဒါန်းခြင်း(၂၀၁၆)

တိုက်တဲကျေးရွာ အ.လ.က ကျောင်း
ပညာရေးစုံညီပွဲတော်အတွက်လှူဒါန်းခြင်း (၂၀၁၇)

ကုန်းသာ-ငါးဆူ-ကျောက်တောလမ်း မြှုန်းခင်းလမ်း (၂၀၁၅)

ကျောက်တောရွာအနီး ချောင်းတံတား (၂၀၁၇)

ငုကွေးလေးလမ်းဆုံတံတား (၂၀၁၈)

ငါးဘို့ကုန်းလမ်းဆုံတံတား (၂၀၁၈)

ဝါးဘိုးကုန်းလမ်းဆုံတံတားဘေးရေမြောင်း (၂၀၁၈)

ငါးဆူဇွာလယ်တံတား (၂၀၁၈)

ကုန်းသာ-ငါးဆူတောင်ကြားတံတား (၂၀၁၇)

ကုန်းသာ-ငါးဆူကြားရှိ မြွန်တံတား (၂၀၁၈)

List of machinery

Cane Yard

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
1	1-1	Cane Feed Loader		4x15M,60T	4					
				380v,50Hz,IP 55	8				75	
2	1-2	Feed Conveyor		5x59.5m,1-13m/s	1					
		Motor			1				280	
3	1-3	Levelling Device		ϕ1800x5000mm	1					
		Motor			1				240	
4	1-4	Levelling Device		ϕ1300x5000mm	1					
		Motor			1				240	
5	1-5	Device			1					
		Motor			2				15	
6	1-6	Belt Conveyor		B=1000mm,1m/s,L=8m	1					
		Motor			1				11	
7	1-7	Belt Conveyor		B=1000m,1m/s,L=24m	1					
		Motor			1				11	
8	1-8	Waste Stage			1					
		Motor			1				1.1	
9	1-9	Submersible Pump		Q=25m³/h,H=10m	2	1				
		Motor			2	1			1.5	
10	1-10	Weight Table	TLB6x6	6000mm,6000mm,7.8m/min	1					
		Gear Box		I=48.308	1					
		Motor		750r/min	1				7.5	
11	1-11	Feed Table	TLB6x8.5	6000mm,8500mm,	1					
				8m/min						
		Gear Box		I=50	1					
		Motor		750r/min	1				11	
12	1-12	Plat form			1					

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
1	2-1	1st Cane Carrier		2.6m,65.35m,	1					
				1-15m/min,20°						
		Gear Box			1					
		Motor			1				200	
		Oil Pump			1					
		Motor			1				4	
2	2-2	1st Shredder		B2600,12,Π ϕ1200x2600,	1					
				Πϕ1600mm						
		Motor		10Kv,50Hz,IP54	1				200	
3	2-3	1st Shredder		25L/min 0.4MPa	1					
		Oil Pump			2	1			2	
4	2-4	2nd Shredder		B2600,12,Πϕ1200x2600,	1					
				Πϕ1600mm						
		Motor		10Kv,50Hz,IP54	1				200	
5	2-5	2nd Shredder		25L/min,0.4MPa	1					
		Oil Pump			2	1			2	
6	2-6	Leveller		B=2600,ϕ=800mm,	1					
				100~120r/min						
		Motor			1				100	
7	2-7			≥750,400mm,30KW	1					
8	2-8	Cane Carrier		2.6m,48m,1-15m/min	1					
				20°						
		Gear Box			1					
		Motor			1				200	
		Oil Pump			1					
		Motor			1				4	
9	2-9	Shredder		B=2600,12,Πϕ1200x2600	1					
				Πϕ1600mm						
		Motor		10Kv,50Hz,IP54	1				2000	
10	2-10	Oil Pump		25L/min,I0.4MPa	1					
		Motor			2	1			2	

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity Total	Quantity Spare	Unit	Weight (T)	Power KW	Remark
11	2-11	Leveller		B=2600,ϕ=800mm,	1					
				70 ~ 80 r/min						
		Gear Box			1				100	
		Motor			1					
12	2-12	Rubber Belt		B2600x9000mm,	1					
				100m/min ICS 14						
		Gear Box			1					
		Motor			1				75	
13	2-13	Magnetictor		B=2600mm,20KW	1					
14	2-14	Double Roller		ϕ1200x2400mm	1					
15	2-15	Double roller Gear Box		600KW,90T,m,i=81.6	1					
				$12m^3/h$	1					
		Motor			2	1			4	
16	2-16	Double Roller Motor		660V,500/1000r/min		1			600	
17	2-17	Mill (No.1)		ϕ1200x2400mm	1					
18	2-18	No(1)Mill Gear Box		i=138,260t,m,	1					
		Motor for oil pump			2	1			6.3	
19	2-19	No(1)Mill DC Motor		660V,500-1000r/min	1				1500	
20	2-20	No(2)Mill		ϕ 1200x2400mm	1					
21	2-21	No(2)Mill Gear Box		i=138,260 t	1					
		Motor for oil pump			2	1			6.3	
22	2-22	No(2)Mill Motor		660V,500-1000r/min	1				1500	
23	2-23	No(3)Mill		ϕ1200x2400mm	1					
24	2-24	No(3)Mill Gear Box		i=138,260t,m,	1					
		Motor for oil pump			2	1			6.3	

Sr. No	Equipm-ent No	Description	Model or Manufacture No	Specification and Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
25	2-25	No(3)Mill DC Motor		660V,500-1000r/min	1				1500	
26	2-26	No(4)Mill		ϕ1200x2400mm	1					
27	2-27	No(4)Mill Gear Box		i=138,260t,m,	1					
		Motor			2	1			6.3	
28	2-28	No(4)Mill DC Motor		660V,500-1000r/min	1				1500	
29	2-29	No(5)Double Roller		ϕ1200x2400mm	1					
30	2-30	No(5)Double Roller		600KW,90t,m,i=81.6	1					
		Gear Box								
				$12m^3/h$						
		Motor			2	1			4	
31	2-31	No(5)Double Roller		660V,500/1000r/min	1				600	
		Motor								
32	2-32	No(5)Mill		ϕ1200x2400mm	1					
33	2-33	No(5)Gear Box		i=138,260t,m,	1					
					1					
		Motor			2	1			6.3	
34	2-34	No(5)DC Motor		660V,500-1000r/min	1				1500	
35	2-35	Intermediate Carrier		B=2400mm,15m,	4					
				P=304.8mm,3,3mm						
				=17:31,0.25-0.76m/s						
		Gear Box			4					
		Motor			4				90	
36										
	2-36	Nitrogen Bot		Q=40L,P=31.5MPa	12					
37	2-37	Hydraulic Pump		Q=14L/min p=31.5MPa	1					
		Station			2	1				
		Motor			2	1			7.5	

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
38	2-38			35MPa	1					
		Motor			1				2.2	
39	2-39	Grease Station								
				40MPa,630mL/min	1					
		Motor			2	1			1.5	
40	2-40				3					
41	2-41				1					
42	2-42	Hot Water Tank		2500x3000mm,3mm	1					
43	2-43	Hot Water Pump		Q=200m³/h,H=50m	2	1				
		Motor			2	1			22	
44	2-44	Juice Tank		1800x2000mm,3mm	3					
45	2-45	Macceration Pump		Q=300m³/h,H=13m	6	3				
		Motor			6	3			75	
46	2-46	Juice Tank		2000x2000mm,3mm	1					
47	2-47	Unscreened Juice Pump		Q=850m³/h,H=13m	2	1				
		Motor			2	1			250	
48	2-48	Rotary Screen		ϕ1800x5000mm,25m²,	2					
		Motor			2				15	
49	2-49	Screw Conveyor		800mm,9000mm,48r/min	1					
		Gear Box			1					
		Motor			1				15	
50	2-50	Plat form		2000x2000mm,3mm	1					
51	2-51	Mixed Juice Pump		Q=850m³/h,H=60m	2	1				
		Motor			2	1			250	
52	2-52	Tank		ϕ2000x2018mm	1					
		Motor			1				3	

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
53	2-53			2.4m	5					
54	2-54			2.4m	5					
55	2-55			2.4m	5					
56	2-56				1					
57	2-57				1					
58	2-58	Blower		69427~80570m^3/h,	2	1				
				2659~ 3411Pa						
		Motor			2	1			90	
59	2-59	Overhead Crane		32/5,A6~ ,16m?	1					
				25.5mOT,76m/min?						
				7.2m/min						
		Motor			1				26	
		Motor			1				17	
		Motor			1				4	
		Motor			2				7.5	
60	2-60	Overhead Crane		50/70,A6,16m	1					
				25.5m,76m/min						
				7.2m/min						
		Motor			1				55	
		Motor			1				26	
		Motor			1				7.5	
		Motor			2				13	

Sr. No	Equipment No	Description	Model or Manufacture No	Specification & Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
1	6A-01	180 t/h Boiler		Rated Capacity : 180 t/h , 3.82 Mpa (g) , 450 Feed Water Temperature: 104°	1					The boiler plant is equipped
		Match: Boiler Feed Water Station		The boiler thermal efficiency guarantee : 86% the exhaust temperature of						The boiler plant is equipped
		Match:the boiler air force seeding cool system								The boiler plant is equipped
		Match:furnace exhaust steam blowing system			1					The boiler plant is equipped
		Match:top maintenance electric hoistlifting	CD 12? 40A	Weight:2 tons , lifting height:~45m	1				3	The boiler plant is equipped
		Match: boiler ceiling and water chamber			1					The boiler plant is equipped
2	6A-02	FD Fan	G4-73-11? 14D	Q=160000 m^3/h , P=4700 Pa,20 , left 135°	1				400	
		VS Motor	Y 450 - 4	1450 r/min , 10KV , IP 44	1					
3	6A-03	FD Fan	G4-73-11 Nos 14D	Q=160000 m^3/h , P=4700 Pa,20 , left 135°	1					
		VS Motor		1450 r/min , 10KV , IP 44	1					
4	6A-04	Secondary Air Fan	Y8-39 No 14D	Q=110000 m^3/h , P=5000 Pa,210 , left 45°	1					
		Motor	Y2-315 M-4	1450 r/min , 380V , IP 44	1				110	
5	6A-05	Secondary Air Fan	Y8-39 No 44D	Q=110000 m^3/h , P=5000 Pa,210 , left 45°	1					
		Motor	Y2 315 M 4	1450 r/min , 380V , IP 44	1					
6	6A-06	Gush Bagasse Fan	Y8-39 No 10D	Q=30000 m^3/h , P=5000 Pa,210 , left 45° 90°	1					
		Motor	Y2-280 S-4	1450 r/min , 380V , IP 44	1				75	
7	6A-07	Gush Bagasse Fan	Y8-39 No 10D	Q=28000 m^3/h , P=5000 Pa,210 , left 45° 90°	1					
		Motor	Y2-280 S-4	1450 r/min , 380V , IP 44	1				75	
8	6A-08	ID Fan	Y4-73-11 No 22F	Q=337000 m^3/h , P=4300 Pa,140 , right 45° x 135°	1					
		VF Motor	YPT-560 - 6	960 r/min , 10KV , IP 44	1				710	
9	6A-09	ID Fan	Y4-73-11 No 22F	Q=337000 m^3/h , P=4300 Pa,140 , right 45° x 135°	1					
		VF Motor	YPT-560 - 6	960 r/min , 10KV , IP 44	1				710	

Sr. No	Equipment No	Description	Model or Manufacture No	Specification & Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
10	6A-10	Continuous Blow Down Tank		Ø1500,V=5.5m^3, P=0.2MPa,t=260	1					
11	6A-11	Feed Bagasses Conveyor		B=2500mm, =1.25 m/s,L=61.1m, Groove	1					
		Motor,Gear Box Bagasse Plough, actuator			16				75	
12	6A-12	Ragasse Feeder	ZWG 1100	5? 23 t/h	6					
		VF Motor	YVP-132-4		6					
13	6A-13	Stone Water Film Duster		Flue Gas Quantity 520000 m^3/h , Resistance ≤ 1200 Pa	1					
14	6A-14	Steel Stack		H=50m , Ø 4500	1					
15	6A-15	Intermittent Blow Down Expander		Ø 2000 , V=12m^3 , P ≤ 0.15 MPa	1					
16	6A-16	Drainage Wells		2500 x 2500 x 2000	1					CONCRETE
17	6A-17	Boiler Fix Muffler		P=4.35 Mpa (a) 450 , Q=60 t/h	1					
18	6A-18	Gas Pulse sootblower		4~5	18					
19	6A-19	Model Electric Hoist		5T , 9m	1					
		Lifting Motor		1400 r/min , 380V , 18A	1					
		Traversing Motor		1400 r/min , 380V , 2.4A	1					

Sr. No	Equipment No	Description	Model or Manufacture No	Specification & Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
1	6C-01	Floc adding Device			1					
		Motor			2	1			0.25	
2	6C-02	Sterilization Device			1					
		Motor			2	1			0.37	
		Motor for agitator			1				0.25	
3	6C-03	Deoxidizer adding device			1					
		Motor			2	1			0.25	
4	6C-04	Antistudying adding device			1					
		Motor			2	1			0.25	
5	6C-05	Amonia adding device			1					
		Motor			2	1			0.25	
6	6C-06	Multi Media Filter		Ø 3200 , H=4050mm , 100 t/h	2	1				
7	6C-07	Active Carbon Filter		Ø 3200 , H=4050mm , 100 t/h	2	1				
8	6C-08	Cartridge Filter		Ø 600 , H=1400mm	2					
9	6C-09	High Pressure Water Pump		Q = 50m³/h , P=140m	2					
		Motor			2				55	
10	6C-10	Reverse osmosis unit		Q = 50m³/h , recorery=75%	2					
11	6C-11	Intermediate Water Tank		Q = 35m³/h , Ø 3200 , 4500	1					
12	6C-12	Decarbonizator		Ø1400 , H=3850mm , 75 t/h	1					
13	6C-13	Decarbonization Fan		Q = 1668m³/h , P =1300 Pa	1					
		Motor			1				2.2	
14	6C-14	Intermediate Water Pump		Q = 39m³/h , P = 29.8m	3	1				
		Motor		n=2900 r/min	3	1			5.5	
15	6C-15	Mixed bed exchanger		Ø1500 , H=4390mm	2	1				
16	6C-16	Resin Trap		Ø325 , L 1020mm	2					
17	6C-17	Acid Metering Box		Ø700 , H=1600mm	1					
18	6C-18	Alkali Metering Box		Ø700 , H=1600mm	1					
19	6C-19	Acid Tank		Ø1800 , L 4250mm	1					

Sr. No	Equipment No	Description	Model or Manufacture No	Specification & Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
20	6C-20	Alkali Tank		Ø1800 , I 4750mm	1					
21	6C-21	Acid ejector	WGP-1500	Ø1500 mm	1					
22	6C-22	Alkali ejector	WGP-1500	Ø1500 mm	1					
23	6C-23	Moist Absorber		Ø 350 , H=1500mm	1					
24	6C-24	Acid unloading Pump		Q = 10.8 m^3/h , P=20m	1					
		Motor		n= 2900 r/min	1				4	
25	6C 25	Alkali unloading Pump		Q = 10.8 m^3/h , P=20m	1					
		Motor		n= 2900 r/min	1				4	
26	6C-26	Regeneration Pump		Q = 18 m^3/h , P=34.5m	2	1				
		Motor		n=2900 r/min	2	1			5.5	
27	6C-27	RO Cleaning Tank		V=5 m^3	1					
28	6C-28	RO Cleaning Pump		Q = 27 m^3/h , P=32m	2	1				
		Motor		n=2900 r/min	2	1			5.5	
29	6C-29	Ultra Filter		Ø 500 , H=1400mm	1					
30	6C-30	Concentration Water Tank		Ø 3200 , H=4500mm	1					
31	6C-31	Concentration Water Pump		Q = 27 m^3/h , P=32m	2	1				
		Motor		n=2900 r/min	2	1			5.5	
32	6C-32	Back Wash Pump		Q = 280 m^3/h , P=16m	2	1				
		Motor		n=2900 r/min	2	1			22	
33	6C-33	Acid Metering Box		Ø 700 , H=1600mm	1					
34	6C-34	Alkali Metering Box		Ø 700 , H=1600mm	1					
35	6C-35	Neutralization Pump		Q = 10 m^3/h , P=20 m	2	1				
		Motor		n=2900 r/min	2	1			2.2	
36	6C-36	Neutralization Pool		5000 , 4000 , 4000mm	1					CONCRETE
37	6C-37	Condensate Pump		Q = 150 m^3/h , P=0.86 Mpa	3					
		Motor		n=2960 r/min	3	1			55	
38	6C-38	Demineralized Water Pump		Q = 100 m^3/h , P=0.86 Mpa	2					
		Motor		n=2960 r/min	2	1			37	

Boiler House

Sr. No	Equipment No	Description	Model or Manufacture No	Specification & Technical Data	Quantity Total	Quantity Spare	Unit	Weight (T)	Power KW	Remark
39	6C-39	Feed Water Pump		Q=150 m³/h , P=6.5 Mpa ,T=105°C	3					
		VF Motor		n=2950 r/min , 10 KV	3	1			400	
40	6C-40	Deaerator		Q = 350 t/h , V=80m³ , T=105°C	1					
41	6C-41	Demineralized Water Tank		Q = 300 m³ , Ø 6500 , H=9500	1					
42	6C-42	Condensate Tank		Q = 300 m³ , Ø 6500 , H=9500	1					
43	6C-43	Phosphate dosing system		Q = 25 L/h , P=10 MPa	1					
		Pump Motor			3	1				
		Motor (For Agitator)			2	1				
		Motor (For Agitator)			1					
44	6C-44	Compressor Air Tank		Q = 10 m³ , P=0.7 MPa	1					

(Ash Pool)Boiler House

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity Total	Quantity Spare	Unit	Weight (T)	Power KW	Remark
1	E-1	Overhead Crane	QZ-5	Load=5T,B=16M	1					
				L=22.5M,40m/min						
		Motor	YZR132M1-6	380V	1				2.2	
		Motor	YZR160M1-6	380V	2				5.5	
		Motor	YZR225M1-6	380V	2				30	
2	E-2	Ash Pump	4p¹¹	q=200m3/h,P=37m	3	1				
		Motor	Y250m-4	380V,n=1480rpm	3	1			45	
3	E-3	Water Treatment	≤1000NTU	Q=600m³/h	1					
4	E-4	Filter			4					
5	E-5	Chemical Dosing			1					
		System								
		Motor			1				3	
		Motor			3				1.5	
6	E-6	Chemical System			1					
		Motor			1				3	
		Motor			3				1.5	
7	E-7	Circulation Pump	KQW200/315-55/4	q=400m³/h,P=32m	2	1				
		Motor		380V,n=1480rpm	2	1			55	
8	E-8	Vacuum Tank	ϕ 550mm		5					
9		Ash Pool		33000x20000x6000 (mm)	1					

Sr. No	Equipment No	Description	Model or Manufacture No	Specification & Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
1	3B-1	Cold Water Tank		V=62.5 m3,5000 x 5000 x 2500mm	1					
2	3B-2a	Warm Water Tank		V=62.5m^3 ,5000 x 5000 x 2500mm	1					
	3B-2b	Hot Water Tank		V=62.5m^3 ,5000 x 5000 x 2500mm	1					
3	3B 3	Syrup Tank		V=62.5m^3 ,5000 x 5000 x 2500mm	12					
4	3B-4	Dilution Tank		V=17.1m^3 , Ø 2700 x 3000mm	8					
		Motor			8				4.2	
5	3B-5	TPG 80 Vacuum Pan		V=80m^3 ; with stirrer	6					
		Motor			6				75/55	
6	3B-6	TZK 65 seed tank		V=65m^3	5					
		Motor			5				7.5	
7	3B-7	Condenser		Ø1500 mm (Pan Condenser)	6					
8	3B-8	Condenser		Ø 900 mm (Seed Tank Condenser)	2					
9	3B-9	Electric Hoist		5t , 20M	1					
		Motor			1				7.5	
		Motor			1				0.8	
10	3B-10	TZL 80 Crystallizer		V=80m^3	14					
		Motor			14				11	
11	3B-11a	Balance Tank		Ø 1000 x 1550 mm	6					
	3B-11b	Balance Tank		Ø 1400 x 1700 mm	4					
12	3B-12	A- massecuite distributor		Ø 1000 x 1550 mm	1					
		Motor		Ø 1200 x 33000 mm	2				15	
13	3B-13	B- massecuite distributor		Ø 1000 mm x L=15500 mm	1					
		Motor			2				7.5	
14	3B-14	C- massecuite distributor		Ø 1000 mm x L=13500 mm	1					
		Motor			1				15	
15	3B-15	A- Batch Centrifugal		Max Charging 1.75 t / time	6					
		Motor			6				250	
16	3B-16	B- Continous Centrifugal		Capacity 28 ~ 40 t/h	3					
		Motor			3				132	

Sr. No	Equipment No	Description	Model or Manufacture No	Specification & Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
17	3B-17	C- Continous Centrifugal		Capacity 22 ~ 30 t/h	3					
		Motor			3				132	
18	3B-18	Sugar Vibration Machine		Air Pressure 114 Pa,Q=18269m³/h	2					
		Motor			2				11	
19	3B-19	Air Compressor		Discharge Pressure 0.8 Mpa, Q= 28.3 m³/m	4					
		Motor			4				160	
		Motor			4				2.2	
		Motor			4				2.2	
20	3B-20	Air Cleaner		30 m³/min	4					
21	3B-21	Air Dryer		V= 30 m³/min	4					
		Motor			4				6	
22	3B-22	B-Sugar Screw Conveyor		Ø 800 x 11500mm	1					
		Motor			1				15	
23	3B-23	C-Sugar Screw Conveyor		Ø 800 x 11500mm	1					
		Motor			1				15	
24	3B-24a	Crane for Centrifugal		Capacity ; 5t , Lift height 12 m	1					
		Motor			2				0.8	
		Electric Hoist			1				7.5	
	3B-24b	Crane for Centrifugal		Capacity ; 5t , Lift height 12 m	1					
		Motor			2				0.8	
		Electric Hoist			1				7.5	
25	3B-25	Magma Remelter		Ø 2000 x 5000 mm	2					
		Motor			2				15	
26	3B-26	Molasses Tank		V=31.4 m³ , Ø 4000 x 2500mm	3					
27	3B-27	C - Molasses Tank		V=17.67 m³ , Ø 3000 x 2500mm	2					
28	3B-28	Gas Transportation Tank		V=2.5 m³ , Ø 1200 x 2500mm	11					
29	3B-29	Molasses Scales		50 t/h	1					
30	3B-30	Desuper Heating & Reducing Device		Steam Inlet tem; =390 °C Steam Inlet Press=3.82 MPa Steam outlet tem; =165 ~ 230 °C Steam outlet press =0.5 ~ 0.9 MPa Steam flow 20 t/h	1					

Sr. No	Equipment No	Description	Model or Manufacture No	Specification & Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
31	3B-31	B Seed Tank		Capacity 150m^3 , L=12000	1					
32	3B-32	1300 mm			2					
33	3B-33	C Seed Tank		175m^3 , L=12000	1					
34	3B-34	Pump		Q=25 m^3 /h , H=60m	3	1				
		Motor			3	1			22	
35	3B-35	C - Molasses Pump		Q=30 m^3/h , H=180m	2	1				
		Motor			2	1			30	
36	3B-36	C - Crystallizer		Capacity 380 m^3	2					
		Motor			2				15	
37	3B-37	C - Molasses Pump		Q=30 m^3/h , H=36 m	2	1				
		Motor			2	1			11	
38	3B-38			Capacity 680 m^3	1					
39	3B-39	Tank		Ø 2500 x 2000 mm	1					
40	3B-40	Pump		Q=120 m^3/h , H=40 m	2	1				
		Motor			2	1			22	
41	3B-41	Waste Water Pump		Q=60 m^3/h , H=40 m	2	1				
		Motor			2	1			11	
42	3B-42	Axial Flow Fan		Air Pressure 184 Pa ,Q=9090 m^3/h	15					
		Motor			15				0.75	
43	3B-43	Pipe Line Pump		Q=65 m^3/h , H=70 m	1					
		Motor			1				22	
44	3B-44	Sugar Vibrating Conveyor		BXL = 2200 x 11000 mm	2					
		Motor			4				7.5	
45	3B-45	Sugar Vibrating Conveyor		2200 x 9500 mm	2					
		Motor			4				7.5	
46	3B-46	Sugar Rubber Conveyor		B=1200 mm , L=30m , 15°	1					
		Motor			1				11	
47	3B-47	Sugar Belt Conveyor		B=1200 mm , L=30m , 15°	1					
		Motor			1				18.5	
48	3B-48				1					
49	3B-49			6000 x 1800 mm	2					
		Motor			4				3.7	

Sr. No	Equipment No	Description	Model or Manufacture No	Specification & Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
50	3B-50			7500 x 1800 mm	2					
		Motor			4				3.7	
51	3B-51			3500 ~ 40000 m^3/h , 4000Pa, 1450 rpm	2					
		Motor			2				55	
52	3B-52			45000~50000m^3/h ,3500~4000Pa, 1380 rpm	2					
		Motor			2				75	
53	3B-53			35000 ~ 40000 m^3/h , 4000Pa, 1450 rpm	2					
		Motor			2				75	
54	3B-54			Ø 2500 , 4500 mm	2					
55	3B-55			Q=25m3/h , H=15m , 1450 rpm	2					
		Motor			2				5.5	
56	3B-56			50000~55000m^3/h ,3500~4000Pa, 1450 rpm	2					
		Motor			2				90	
57	3B-57			Ø 2800 , 4500 mm	2					
58	3B-58			Q=25m3/h , H=15m , 1450 rpm	2					
		Motor			2				55	
59	3B-59			Ø 25 , 2.0 , Ø 50 , 0.3 mm	2					
60	3B-60	Sugar Vibrating Frying Machine		8XL=2200 x 12000 m	4					
		Motor			8				7.5	
61	3B-61	Sugar Vibrating Screener		8XL=2200 x 13500 m	2					
		Motor			4				15	
62	3B-62	Screw Conveyor		Ø 400 , 12500 mm	2					
		Motor			2				5.5	
63	3B-63	Sugar Remelter		Ø 1200 , 5000 mm	1					
		Motor			1				7.5	
64	3B-64	C Molasses Storage Tank		V=10000 m^3	2					
65	3B-65	Cross Rotary Pump		Q=25m3/h , H=30 m	2	1				
		Motor			2	1			2.5	
66	3B-66	Air Tank		Max Working Press;0.8Mpa,V=20m^3	1					
67	3B-67	Air Tank		Max Working Press;0.8Mpa,V=10m^3	3					
68	3B-68			Q=150 m3/h , H=35 m	2	1				
		Motor			2	1			30	

Process Plant Sugar Drying and Packing Section

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
1	3C-01	Conveyor		1200mm,37.5m,13°	1					
				1.25m1s						
		Gear Box	ZSY180-40-II	i=40	1					
		Motor	Y160M-4		1				17	
2	3C-02	Belt Conveyor		1200x30M	1					
		Gear Box	ZSY160-40-II	i=40	1					
		Motor			1				11	
3	3C-03	Dryer		6000x1800mm	2					
		Motor	YB60376-w		4				3.7	
4	3C-04	Dryer		7500x1800mm	2					
		Motor	YB60376-w		4				3.7	
5	3C-05	Magnetic Iron Catcher			2					
6	3C-06	Vibrating Screen		10000x2000mm	2					
		Motor	Y6-160L-6		4				11	
7	3C-07	Crane		60x20.197m	2					
		Gear Box	YVP-160L-4		2				18.5	
8	3C-08	Chute			2					
9	3C-09	Chute			2					
10	3C-10	Auto Machine			2	1			9.5	
11	3C-11	Counter		1500x650mm	2				0.75	
12	3C-12	Conveyor		2000x730x650mm	2				0.4	
13	3C-13	Weigher		1100x650mm	2				0.75	
14	3C-14	Conveyor		1400x770x650mm	2				0.75	
15	3C-15	Conveyor		1200x680x650mm	2				1.5	
16	3C-16	Conveyor		1200x730x650mm	2				0.4	
17	3C-17	Pile Machine			2				15	
18	3C-18	Run Way			6				3.7	

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity Total	Quantity Spare	Unit	Weight (T)	Power KW	Remark
19	3C-19	Blower	Y250M-4	35000~40000 m^3/h,	2					
		C-19		4000Pa						
		Motor		1450rpm	2				55	
20	3C-20	Blower	Y280S-4	45000~50000m^3/h,	2					
				3500~4000 Pa						
		Motor		1380 rpm	2				75	
21	3C-21	Blower	Y280S-4	35000~40000m^3/h,	2					
				4000Pa						
		Motor		1450rpm	2				75	
22	3C-22	Dust Collector		ϕ 2500,4500m	2					
23	3C-23	Pump		Q=25m^3/h,H=15m	2					
		Motor		1450rpm	2				5.5	
24	3C-24	Blower	Y280M-4	50000~ 55000m^3/h,	2					
				3500~4000 Pa						
		Motor		1450 rpm	2				90	
25	3C-25	Dust Collector		ϕ2800x4500mm	2					
26	3C-26	Pump		Q=25m^3/h,H=15	2					
		Motor		1450 rpm	2				5.5	
27	3C-27	Heat Exchanger		ϕ25,2.0,ϕ50,0.3mm	2					
				3mm						
28	3C-28	Remelter		5000x1200x1400mm	1					
		Motor			3				5.5	
29	3C-29	Machine		V=1.0,ϕ900x1000mm	1					
30	3C-30	Machine			8					
31	3C-31	Machine			1				200	

Turbine House

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
1	B1-1	Turbine	C30-3.43/0.27	30000KW,3000rpm						
				3.43MPa,140t/h	1					
		Turning Motor	Y132V2	380VAC,n=1000rpm	1				5.5	
2	B1-2	Governor	QF-25-2		1					
3	B1-3	Cooler			1					
4	B1-4	Oil Tank			1					
		Blower Motor		380VAC,n=2900rpm	1				0.75	
5	B1-5	Pump			1					
		Motor	Y200L2-2	380VAC,n=2950rpm	1				37	
6	B1-6	Pump			1					
		Motor		220VDc,n=1000rpm	1				5.5	
7	B1-7	Pump			1					
		Motor		380VAC,2950rpm	1				5.5	
8	B1-8	Oil Cooler			2					
9	B1-9	Oil Cooler			2					
10	B1-10	Oil Cooler			2					
11	B1-11	Oil Cooler			1					
12	B1-12	Oil Cooler			1					
13	B1-13	Vacuum System			1					
14	B1-14	Pump		$40m^3/h$,H=60m	1					
		Motor		380VAC,2900rpm	1				20	
15	B1-15	Pump		$40m^3/h$,H=60m	1					
		Motor		380VAC,2900rpm	1				20	
16	B1-16	Desuper Heater			1					
17	B1-17	Tanker		$3m^3$	1					
18	B1-18	Tanker		$3m^3$	1					
19	B1-19	Overhead Crane		25T/5T	1					
				Span 16.5m(20m/min)						
		Motor		0.2~2m / min	1				2.2	
		Motor		10m/min	2				5.5	
		Motor		380V	2				30	

Process Plant Clarify and Filtration Section

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
1	3A-1	Adjustable Juice		Size ϕ13000x4500mm	1					(12000TCD)
		Settler								
		Motor		(Frequcency Convestion)	1				3	
2	3A-2	Exhauster		Sizeϕ 4500x6500	1					
3	3A-3	Curved Screen		Sizeϕ5000x2500x1200mm	2					
4	3A-4	Adjustable Juice		Sizeϕ6600x3500mm	1					(3000TCD)
		Settler								
		Motor		(Frequency Convestion)	1				3	
5	3A-5	Exhauster		Size ϕ2800x5500mm	1					ϕ6600mm
6	3A-6	Curved Screen		Size ϕ4000x2500x1200mm	1					ϕ6600mm
7	3A-7	Adjustable Juice		Sizeϕ7500x3500mm	1					
		Settler								
		Motor		(Frequency Conversion)	1				3	
8	3A-8	Exhauster		Size ϕ3000x5500mm	1					
9	3A-9	Curved Screen		Size ϕ5000x2500x1200mm	1					
10	3A-10	Flocculant mixing		Size ϕ2200x2500mm	2					
		Tank								
11	3A-11	Flocculant tank		Size ϕ2200x2500mm	2					
12	3A-12	Metering Pump		Q=3.2m^3/h,H=50m	2	1				(12000TCD)
		(Flocculant)								
		Motor		(Frequency Conversion)	2	1			2.2	
13	3A-13	Metering Pump		Q=1m^3/h,H=50m	2	1				(3000TCD)
		(Flocculant)								
		Motor		(Frequency Conversion)	2	1			1.1	
14	3A-14	Metering Pump		Q=1m^3/h,H=50m	2	1				
		(Flocculant)								
		Motor		(Frequency Conversion)	2	1			1.1	
15	3A-15	Mud Juice tank		Sizeϕ4000x3000mm	1					
		Motor			1				18.5	

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity		Unit	Weight (T)	Power KW	Remark
					Total	Spare				
16	3A-16	Mud Juice Pump		Q=200m^3/h,H=60m	2	1				
				Mechanical Seal						
		Motor		(Frequency Conversion)	2	1			75	
17	3A-17	Hot water tank		Sizeϕ3000x3000mm	1					
				(For Washing mud)						
18	3A-18	Hot Water Pump		Q=100m^3/h,H=52m	2	1				
				Mechanical Seal						
		Motor		(Frequency Conversion)	2	1			37	
19	3A-19	No Filter Cloth		A=85m^2,Capacity=40m^3/h	4					
		Vacuum Filter								
		Motor			4				4	
		Motor			4				2.2	
20	3A-20	Set Juice tank		Sizeϕ1000x2200mm,	8					
				Stainless Steel						
21	3A-21	Condenser		Sizeϕ 1000mm,	4					
				Stainless Steel						
22	3A-22	Water Circulating		P=3.3KPa(-0.098MPa)	4					
		Vacuum Pump		Q=46m^3/min						
		Motor			4				90	
23	3A-23	Balancing tank		Sizeϕ4000x3000mm	1					
		(For Filter)								
24	3A-24	Filter Juice Pump		Q=200m^3/h,H=50m	2	1				
				Mechanical Seal						
		Motor		(Frequency Conversion)	2	1			45	
25	3A-25	Cyclone Separator		Sizeϕ1800mm	1					
26	3A-26	Star Feeder		Sizeϕ800x800mm	1					
27	3A-27	Fan		Total Pressure 289Kg/m,	1					
				Q=25240m^3/h,P=3032Pa						
		Motor			1				30	
28	3A-28	Mud mixer		Sizeϕ1800x4500mm	1					
		Motor			1				7.5	
29	3A-29	Electric hoist		weight 3T,Lifting	1					
				height 15m						
		Lifting motor			1				4.5	
		Running Motor			1				0.4	

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity Total	Quantity Spare	Unit	Weight (T)	Power KW	Remark
1	3A2-1	Milk of Lime mixing Tank		Size ϕ2000x2500mm	1					
		Motor			1				7.5	
2	3A2-2	Mixed Juice Tank		Sizeϕ6500x3500mm	1					
3	3A2-3	Mixed Juice Pump		Q=850m³/h,H=60m	2	1				
		Motor			2	1			250	
4	3A2-4	Mixed Juice Heater		Heating Area =600m², Complete with double way valve	3	1				
5	3A2-5	Neutral Juice SO_2 absorption tower		Sizeϕ1300mm,multiple-nozzle,adjustable vertical main material ss316,ss340	2	1				
6	3A2-6	Neutral Juice reaction tank		Size;ϕ2200mm, Vertical	1					
7	3A2-7	Neutral Juice tank		Size:ϕ6500x3500mm	1					
8	3A2-8	Neutral Juice pump		Q=850m³/h,H=60m, mechanical seal	2	1				
		Motor			2	1			250	
9	3A2-9	Neutral Juice heater		Heating area = 600m², complete with double way valve	4	1				
10	3A2-10	Clear Juice tank		Size;ϕ6500x3500mm	1					
11	3A2-11	Clear Juice pump		Q=850m3/h,H=60m mechanical seal	2	1				
		Motor			2	1			250	
12	3A2-12	Clear Juice heater		Heating area=600m², complete with double way valve	2					
13	3A2-13	Pipe desuperheater		Steam inlet temp=185c inlet pressure = 0.29MPa (a)Steam outlet temp=130?,Outlet Pressure = 0.29MPa(a)Steam flow 325t/h	1					
14	3A2-14	IWX 4500 ?evaporator evaporator		Heating area=6100m² Stainless steel heating pipe	3					
15	3A2-15	TWX IV evaporator ? IV evaporator?		Heating area = 3000m² Stainless Steel heating Pipe	1					
16	3A2-16	TWX 2000 evaporator ? V and by-turn evaporator?		Heating area = 2000m² Stainless Steel heating Pipe	2					
17	3A2-17	Jet automized condensate		Size;ϕ2000mm material Stainless Steel	1					

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity Total	Quantity Spare	Unit	Weight (T)	Power KW	Remark
18	3A2-18	Raw Syrup balance tank		Size;ϕ2000x2500mm	1					
19	3A2-19	Raw Syrup Pump		Q=200m³/h,H=60m, mechanical seal	2	1				
		Motor			2	1			75	
20	3A2-20	Raw Syrup tank		Size ϕ3200x2800mm	1					
21	3A2-21	Raw Syrup pump		Q=200m³/h,H=60m, mechanical seal	2	1				
		Motor			2	1			75	
22	3A2-22	Condensate tank (I effect,II effect)		Sizeϕ1800x2500mm, complete with self Supporting liquid control valve	6					
23	3A2-23	Condensate tank (end effect)		Sizeϕ1800x2500mm, Complete with self supporting liquid control valve	3					
24	3A2-24	Condensate pump (I,II effect)		Q=400m³/h,H=55m mechanical seal	4	2				
		Motor			4	2			110	
25	3A2-25	Condensate pump (end effect)		Q=400m³/h,H=55m, mechanical seal	2	1				
		Motor			2	1			110	
26	3A2-26	Syrup So_2 absorption tower		Size;ϕ1000mm,multiple nozzle, adjustable vertical main material ss 316, ss 304	2	1				
27	3A2-27	Syrup reaction tank		Size;ϕ1800mm,vertical	1					
28	3A2-28	Cold water tank		Size;ϕ1200x2000mm, for high pressure cleaning machine	1					
29	3A2-29	High pressure Cleaning machine		Pressure 100MPa, Flow 80L/min	3					
		Motor			3				160	
30	3A2-30	Clear Syrup tank		Sizeϕ3200x2800mm	1					
31	3A2-31	Clear Syrup Pump		Q=200m³/h,H=60m mechanincal seal	2	1				
		Motor			2	1			75	
32	3A2-32	Filtrated Juice heater		heating area=300m², complete with double way valve	2					
33	3A2-33	Motor hoist		Capacity . 3t , height;15m	1					
		Lifting motor			1				4.5	
		Running motor			1				0.4	

Clearification and Evaporation

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity Total	Quantity Spare	Unit	Weight (T)	Power KW	Remark
34	3A2-34	Pipe Pressure reducer and attemperator		Steam inlet temp=390? inlet pressure=3.82MPa(a) Steam outlet temp = 185? outlet pressure = 0.29MPa (a)Steam Flow 80t/h	1					
35	3A2-35	Hot water tank		Size;φ3600x3000mm (for boiling section condensate)	2					
36	3A2-36	Hot water pump		Q=250m³/h,H=50m, mechanical seal	4	2				
		Motor			4	2			75	
37	3A2-37	Waste water Pump		Q=60m³/h,H=40m mechincal seal	2	1				
		Motor			2	1			11	
38	3A2-38	High efficiency sulfur burning system		the capacity of cane treatment: 15000 tons per day, low temperature type	1 set					
39	3A2-39	Vertical desuperheater		Steam inlet temp=185? inlet pressure=0.29MPa(a) Steam outlet temp=130? outlet pressure =0.29MP(a) (a)Steam flow 285t/h	1					

Process Plant Lime Emulsification Section

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity Total	Quantity Spare	Unit	Weight (T)	Power KW	Remark
1	4-1	Efficient Lime Powder Storage tank		Size φ4200x14500mm	1					
		Motor			1				3	
2	4-2	Lime spiral conveyor		Sizeφ250x4850mm	1					
		Motor			1				4	
3	4-3	Lime concelling tank		V=6.28m³φ2000x 2000mm?R=21r/min	1					
		Reducer			1				4	
4	4-4a	Lime milk mixer,		V=83m³φ5500mm? R=21r/min	1					
		Motor			1				15	
	4-4b	Lime milk mixer		V=83m³φ5500x3500 mm?R=21r/min	1					
		Motor			1				15	
	4-4c	Lime milk mixer		V=83m³φ5500x3500 mm?R=21r/min	1					
		Motor			1				15	
	4-4d	Lime milk mixer		V=83m³?φ5500x3500 mm?R=21r/min	1					
		Motor			1				15	
5	4-5a	Lime emulsion pump	Homogeneous emulsion pump	Q=25m³/h?H=15m	1					
		Motor			1				11	
	4-5b	Lime emulsion pump	Homogeneous emulsion pump	Q=25m³/h?H=15m	1					
		Motor			1				11	
6	4-6a	Lime emulsion pump	Homogeneous emulsion pump	Q=35m³/h?H=40m	1					
		Motor			1				45	
	4-6b	Lime emulsion pump	Homogeneous emulsion pump	Q=35m³/h?H=40m	1					
		Motor			1				45	
7	4-7	Eye bath		Q=0.2 ~ 0.3L/s	1					

Sr. No	Equipment No	Description	Model or Manufacture No	Specification and Technical Data	Quantity Total	Quantity Spare	Unit	Weight (T)	Power KW	Remark
		Pump House								
1		Water Pump	DFG25-315A	Q=500~625m³/h	2	1			55	
				H=28~20m						
2		Water Pump	DFG300-400	Q=500~625m³/h	2	1			132	
				H=52~50m						
3		Cleaner System		Q=350~m³/h	2					
4		Chemical Dosing		Capacity=0.3m³	2					
		System								
5		Over head Crane		ZT;6m	1					
6		Pump		Q=120L/S,P=1.20MPa	1				2.2	
6		Mill Circulation	Water System							
7		Cooling Tower	LTPW-450	Q=450m³/h,T in=42°C						
				T out=32°C	1				18.5	
8		Circulation Pump	DFG250-400B	Q=450m³/h,H=38m	2	1			75	
		Process Water Circulation System								
9		Cooling Tower	LTPWF - 3000	Q=3000m3/h	4				110	
				Tin=42°C, T ont=32°C						
10		Water Pump	DFss 900-24H	Q=6100m³/h,H=20m	3	1			450	
11		Water Pump	DFss 800-14H	Q=6100m³/h,H=50m	3	1			1120	
12		Water Pump	DFG 200-315H	Q=339~ 463m³/h						
				H=28 ~ 25 m	2	1			55	
13		Pump		Q=20m³/h,H=10m	2	1			2.2	
14		Overhead Crane		10Z,12m,12.5m					0.75	
		Turbine								
15		Cooling Tower	LTPWf-3000	Q=3000m³/h,Tin=42°C						
				Tout=32°C	3				110	
16		Pump	DFSS800-17N	Q=3130m³/h,H=38m	4	1			500	
17		Pump	DFG65-200 (I)B	Q=30m³/h,H=38m	2	1			7.5	
18		Overhead Crane		5T,6m,7.5m(Lift)						
		Waste Water Pool								
19		Pump		Q=200m³/h,H=16m	3	1			18.5	
20		Pump		Q=480m³/h,H=20m	3	1			45	
21		Pump		Q=20m³/h,H=10m	2	1			2.2	
22		Overhead Crane		2T,12m	1				0.55	
23		Stainer		n=480rpm	8				5	
24		Chemical Pump		D=2000mm,H=1200m						
				V=3m³	2				0.55	
25		Blower		Q=67.53m³/min						
				P=60KPa	5	1			110	
26		Machine								
27		Scraper		ϕ25.m	4				0.75	
28		Pump		Q=480m³/h,H=12m	3	1			22	
29		Scraper		ϕ10m	1				0.75	
30		Pump		Q=48m³/h,H=30m	1				0.75	
31		Chemical Pump		4.5 ~ 22.5 Kg/h	4	1				
32		Chemical Pump		Q=0.2 ~ 3 m³/h,P=0.8						
				Mpa	2	1			2.2	
33		Machine		JT150,DN150x500x4	2					
34		Tank(with stirrer)		D=1200m,H=1500mm,						
				V=1.8m³	2				0.75	
35		Pump		Q=0.50t/h,H=2	2				6	
36		Conveyor		650mmx10m	2				2.2	
37		Compressor		Q=2m³/min,P=0.8MPa	2	1			3	
38		Pump		Q=25m³/h,H=50	2	1			7.5	
39		Overhead Crane		10T,6m	1				0.75	
40		Machine		com253-Dx0005,cos41	4					
41		COD,CCTV		CODMoy	1					
42		CCTV		Amtax Compact	1					
43		PHCCTV		PH-10C	1					
44		Flow Meter		WL-1A1	1					
45		Tool			1					
46		Laboratory			1					

ISO TECH LABORATORY

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Issue Date - 01-12-2012
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WATER QUALITY TEST RESULTS FORM

Client	MESC Co.,Ltd.
Nature of Water	DK Stream Water
Location	Naung-Cho
Date and Time of collection	7.12.2018
Date and Time of arrival at Laboratory	8.12.2018
Date and Time of commencing examination	9.12.2018
Date and Time of completing	14.12.2018

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
pH	7.6		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	13	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate	Nil	mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

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

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

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

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WATER QUALITY TEST RESULTS FORM

Client	MESC Co.,Ltd.
Nature of Water	DK Stream Water
Location	Naung-Cho
Date and Time of collection	7.12.2018
Date and Time of arrival at Laboratory	8.12.2018
Date and Time of commencing examination	9.12.2018
Date and Time of completing	14.12.2018

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25.0	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate ($N.NO_3$)	0.5	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	8	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (Si)		mg/l	

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

Tested by

Signature:

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

Approved by

Signature:

Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
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Fax: +9567-431139, +951-223824

Sample Name:	Waste Water	**Received Date:**	7.12.2018
		Reported Date:	17.12.2018
Address:	Myanmar Environment Sustainable Conservation.	**Reg no:**	245/2018
Site Name:	DK Stream Water (ချောင်းရေ)		

Analyses	Ref: Value	Unit	Results	Method
Oil and Grease	10	mg/L	8.23	*Standard method Of Waste Water Analysis*

Reference: National Environmental Quality (Emission) Guidelines

Tested by	Checked by	Signed by
OH (Lab)	Daw Aye Aye Thinn	Dr. Kay Khine Aye
Ma Zin Min Thu	Laboratory Officer	Deputy Director
MLT. G. II		Occupational and Environmental Health Division

OEHD Laboratory Results- 2018/ Waste Water (MESC)

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
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Issue Date - 01-12-2012
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WATER QUALITY TEST RESULTS FORM

Client	MESC
Nature of Water	Stream Water (DK)
Location	Naung Cho
Date and Time of collection	24.11.2021
Date and Time of arrival at Laboratory	25.11.2021
Date and Time of commencing examination	26.11.2021
Date and Time of completing	28.11.2021

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH			6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	10	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	150	mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron	0.37	mg/l	0.3 mg/l
Chloride (as CL)	4	mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids		mg/l	
Total Dissolved Solids	144	mg/l	1000 mg/l
Manganese	Nil	mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

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

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

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

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Laboratory Technical Consultant: U Saw Christopher Maung
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WTL-RE-001
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WATER QUALITY TEST RESULTS FORM

Client	MESC
Nature of Water	Stream Water (DK)
Location	Naung Cho
Date and Time of collection	24.11.2021
Date and Time of arrival at Laboratory	25.11.2021
Date and Time of commencing examination	26.11.2021
Date and Time of completing	28.11.2021

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia Nitrogen (NH_3)		mg/l	
Ammonium Nitrogen (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)		mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)		mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)	Nil	mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (SiO_2)		mg/l	

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

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

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

(a division of WEC Co., Ltd.)

Results of water analysis from the Doe Gon stream

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
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W1218 199

WATER QUALITY TEST RESULTS FORM

Client	MESC Co.,Ltd.
Nature of Water	WF Stream Water
Location	Naung-Cho
Date and Time of collection	7.12.2018
Date and Time of arrival at Laboratory	8.12.2018
Date and Time of commencing examination	9.12.2018
Date and Time of completing	14.12.2018

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.0		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	22	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate	Nil	mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

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

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

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

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W1218 199

WATER QUALITY TEST RESULTS FORM

Client	MESC Co.,Ltd.
Nature of Water	WF Stream Water
Location	Naung-Cho
Date and Time of collection	7.12.2018
Date and Time of arrival at Laboratory	8.12.2018
Date and Time of commencing examination	9.12.2018
Date and Time of completing	14.12.2018

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)	25.0	°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate ($N.NO_3$)	0.3	mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	32	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	10	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (Si)		mg/l	

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

Tested by

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

Approved by

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

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Tel: +9567-431139, 431138, +951-221387, 210844,
Fax: +9567-431139, +951-223824

Sample Name: Waste Water		**Received Date:**	7.12.2018
		Reported Date:	17.12.2018
Address:	Myanmar Environment Sustainable Conservation.	**Reg no:**	244/2018
Site Name:	WF Stream Water (ရေနံချောင်း)		

Analyses	Ref: Value	Unit	Results	Method
Oil and Grease	10	mg/L	7.34	*Standard method Of Waste Water Analysis*

Reference: National Environmental Quality (Emission) Guidelines

Tested by

OH (Lab)
U Zin Min Thu
MLT. G. II

Checked by

Daw Aye Aye Thinn
Laboratory Officer

Signed by

Dr. Kay Khine Aye
Deputy Director
Occupational and Environmental Health Division

OEHD Laboratory Results- 2018/ Waste Water (MESC)

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
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Issue Date - 01-12-2012
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Issue No - 1.0/Page 1 of 2

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WATER QUALITY TEST RESULTS FORM

Client	MESC
Nature of Water	Stream Water (WF)
Location	Naung Cho
Date and Time of collection	24.11.2021
Date and Time of arrival at Laboratory	25.11.2021
Date and Time of commencing examination	26.11.2021
Date and Time of completing	28.11.2021

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH			6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	18	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	160	mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron	0.47	mg/l	0.3 mg/l
Chloride (as CL)	3	mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids		mg/l	
Total Dissolved Solids	148	mg/l	1000 mg/l
Manganese	Nil	mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

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

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

Approved by
Signature:
Name: B.E(Civil)
Assistant Technical Officer

(a division of WEG Co. Ltd.)

ISO TECH LABORATORY

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Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W1121 481

WATER QUALITY TEST RESULTS FORM

Client	MESC
Nature of Water	Stream Water (WF)
Location	Naung Cho
Date and Time of collection	24.11.2021
Date and Time of arrival at Laboratory	25.11.2021
Date and Time of commencing examination	26.11.2021
Date and Time of completing	28.11.2021

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia Nitrogen (NH_3)		mg/l	
Ammonium Nitrogen (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)		mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)		mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)	Nil	mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (SiO_2)		mg/l	

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

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

Approved by
Signature:
Name: [illegible]
B.E(Civil)
Assistant Technical Officer
ISO TECH Laboratory

(a division of IWEC Co. Ltd.)

Results of water analysis from the water fall

ISO TECH LABORATORY

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

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

W1121 483

WATER QUALITY TEST RESULTS FORM

Client	MESC
Nature of Water	Drain Water
Location	Naung Cho (Project Site)
Date and Time of collection	24.11.2021
Date and Time of arrival at Laboratory	25.11.2021
Date and Time of commencing examination	26.11.2021
Date and Time of completing	1.12.2021

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	7.3		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity		NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	500 mg/l
Total Solids		mg/l	1500 mg/l
Total Suspended Solids	605	mg/l	
Total Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

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

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

Approved by
Signature:
Name: Thinzar Theint Theint
B.E(Civil)
Assistant Technical Officer
ISO TECH Laboratory

ISO TECH LABORATORY

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

WTL-RE-001
Issue Date - 01-1-2016
Effective Date - 01-1-2016
Issue No - 1.0/Page 1 of 1

M1121 031

WATER QUALITY TEST (MICROBIOLOGY) RESULTS FORM

Client	MESC
Nature of Water	Drain Water
Location	Naung Cho (Project Site)
Date and Time of collection	24.11.2021
Date and Time of arrival at Laboratory	25.11.2021
Date and Time of commencing examination	25.11.2021
Date and Time of completing	26.11.2021

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Total Coliform Count	180	CFU/100ml	Not detected
Thermotolerant (fecal) Coliform Count	80	CFU/100ml	Not detected
pH	7.3		6.5 - 8.5
Turbidity	580	NTU	5 NTU
Colour (True)	300	TCU	15 TCU
Free Chlorine	Nil	mg/l	
Total Chlorine	Nil	mg/l	

*Date And Time Sample Collection Error.

Remark : Unsatisfactory for drinking purpose.

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

: < - Less than

Tested by

Signature:

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr.Chemist
ISO Tech Laboratory

Approved by

Signature:

Name: Thiwar Theint Theint
B.E(Civil)
Assistant Technical Officer
ISO TECH Laboratory

(a division of WEC Co. Ltd.)

ISO TECH LABORATORY

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

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

W1121 483

WATER QUALITY TEST RESULTS FORM

Client	MESC
Nature of Water	Drain Water
Location	Naung Cho (Project Site)
Date and Time of collection	24.11.2021
Date and Time of arrival at Laboratory	25.11.2021
Date and Time of commencing examination	26.11.2021
Date and Time of completing	1.12.2021

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia Nitrogen (NH_3)		mg/l	
Ammonium Nitrogen (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	96	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	34	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (SiO_2)		mg/l	

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

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

Approved by
Signature:
Name: Thiwar Theint Theint
B.E(Civil)
Assistant Technical Officer
ISO TECH Laboratory

(a division of WEC Co. Ltd.)

Green Myanmar
Environmental Services Co., Ltd

No.115, Kanaung Min Thar Gyi Road, Industrial Zone (1), Hlaing Thar Yar Industrial City, Yangon, Myanmar
Tel: 09 897 978 296,09-5081451 E-mail: gmescompany@gmail.com, info@gmes-mm.com

WASTEWATER QUALITY TEST RESULT FORM

Name of Customer: Ko Myint Kyaw Thuya

Name of Person: -

Contact: 09: 420105071

Date of Sample Collection: 25.11.2021

Date of Sample Arrival to Lab: 25.11.2021

Date of Issued of Result: 30.11.2021

WASTEWATER QUALITY ANALYSIS RESULT

Sr. No.	Parameters	Unit	Analysis Value	Minimum Measurement Range of Methods	National Environmental Quality (Emission) Guidelines General Application
			Drain Water		
1.	Oil and Grease	mg/l	5	5	10
2.	Total Nitrogen	mg/l	<5	5	-
3.	Total Phosphorous	mg/l	7	0.02	2

Analyzed By

Daw Tun Eaindra Soe
Technician (Laboratory)

Approved By

U Thet Min Paing
In-Charge (Laboratory)

Results of runoff water analysis from project site

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL INTERPRETATION OF RESULTS

Division - Shan MESC (10.12.2018) Sheet No. 1

Township - NaungCho Sr No. S-1/18-19

Sr No.	Sample plot	pH	Texture	Total N	Available Nutrient
					P
1	မြေနမူနာ	Slightly alkaline	Clay	Low	Low

Khin Win Mar
Deputy Director
Laboratory Incharge
Land Use Division

DEPARTMENT OF AGRICULTURE (LAND USE)
SOIL ANALYTICAL DATA

Division - Shan

Township - NaungCho

MESC (10.12.2018)

Sheet No. 1

Sr No. S-1/18-19

Sr No.	Sample plot	Moisture %	pH Soil : Water 1 : 2.5	Texture				Total N %	Available Nutrient
				Sand %	Silt %	Clay %	Total %		P ppm (Olsen)
1	[illegible]	5.63	7.10	38.76	10.64	50.60	100.00	0.19	0.42

Khin Wiu Mar
Deputy Director
Laboratory Incharge
Land Use Division

DEPARTMENT OF AGRICULTURE (LAND USE)

SOIL INTERPREATATION OF RESULTS

MESC(25.11.2021)

Division - နောင်ချို

Township - အင်းဝိုင်းကျေးရွာ

Sheet No. 1

Sr No. S 1/2021

Sr	Sample	pH Soil:Water 1:2.5	Texture	Total N	Available Nutrients
					P
1	မြေနမူနာ	Moderately alkaline	Sand	Low	Medium

(ဒေါက်တာသန္တာညီ)

ဒုတိယညွှန်ကြားရေးမှူး

ဓာတ်ခွဲခန်းတာဝန်ခံ

မြေအသုံးချရေးဌာနခွဲ

DEPARTMENT OF AGRICULTURE (LAND USE)

SOIL ANALYTICAL DATA SHEET

MESC(25.11.2021)

Sheet No. 1

Sr No. S 1/2021

Division - နေပြည်တော်

Township - အင်းဝိုင်းကျေးရွာ

Sr	Sample	Moisture %	pH Soil:Water 1:2.5	Texture				Total N %	Available Nutrients
				Sand %	Silt %	Clay %	Total %		P ppm(O)
1	မြေနမူနာ	6.69	7.79	86.64	9.72	3.64	100.00	0.19	25.29

O= Olsen Method

(ဒေါက်တာသန္တာညီ)

ဒုတိယညွှန်ကြားရေးမှူး

ဓာတ်ခွဲခန်းတာဝန်ခံ

မြေအသုံးချရေးဌာနခွဲ

ကျေးရွာအမည် အင်းဝိုင်းကျေးရွာ　　　　　　　　　　နေ့စွဲ ၂၇-၉-၂၀၁၈

အစည်းအဝေးတက်ရောက်သူများစာရင်း

စဉ်	အမည်	လက်မှတ်	မှတ်ချက်
၁	ဦးကျော်ဝင်းထွန်း		[illegible]
၂	ဦးဖေအောင်ကျော်		ရပ်မိရပ်ဖ
၃	ဦးထွန်းမြိုင်		"
၄	ဦးနိုင်မောင်		"
၅	ဦးတင်မြင့်		ရပ်မိရပ်ဖ
၆	ဦးသိန်းလှိုင်		"
၇	ဦးဝေလျှိုင်		ကျေးရွာ တာဝန်ခံ
၈	ဦးသော်ထွန်း		ရပ်မိရပ်ဖ
၉	ဦးကျော်ဇော်ထွန်း		"

List of attendees during scoping survey

ရှမ်းပြည်နယ်၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ်၊ အင်းဝိုင်းကျေးရွာအုပ်စုတွင် ကျင်းပပြုလုပ်သော
တစ်နေ့လျှင် ကြံတန်ချိန် (၁၂၀၀၀) ကြိတ်ဝါးမည့်
အမှတ် (၃) သကြားစက်ရုံ (အင်းဝိုင်း) တည်ဆောက်ရေးစီမံကိန်း
EIA-SIA-HIA ဆိုင်ရာ လူထုတွေ့ဆုံပွဲအခမ်းအနား တက်ရောက်သူများမှတ်တမ်း

ရက်စွဲ ။ ၂၀၁၈ ခုနှစ်၊ ဒီဇင်ဘာလ (၅) ရက်

စဉ်	အမည်	ရာထူး	ဌာန	လက်မှတ်
၁				
၂				
၃				
၄				

ရှမ်းပြည်နယ်၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ်၊ အင်းဝိုင်းကျေးရွာအုပ်စုတွင် ကျင်းပပြုလုပ်သော
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ရက်စွဲ ။ ၂၀၁၈ ခုနှစ်၊ ဒီဇင်ဘာလ (၅) ရက်

စဉ်	အမည်	နိုင်ငံသားစိစစ်ရေးကတ်အမှတ်	နေရပ်လိပ်စာ	လက်မှတ်
၁	[illegible]	[illegible]	[illegible]	[illegible]
၂	[illegible]	[illegible]	[illegible]	[illegible]
၃	[illegible]		[illegible]	[illegible]
၄	[illegible]		[illegible]	[illegible]
၅	[illegible]	[illegible]	[illegible]	[illegible]
၆	[illegible]		[illegible]	[illegible]
၇	[illegible]		[illegible]	[illegible]
၈	[illegible]	[illegible]	[illegible]	[illegible]
၉	[illegible]		[illegible]	[illegible]
၁၀	[illegible]	[illegible]	[illegible]	[illegible]

ရှမ်းပြည်နယ်၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ်၊ အင်းဝိုင်းကျေးရွာအုပ်စုတွင် ကျင်းပပြုလုပ်သော
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ရက်စွဲ ။ ၂၀၁၈ ခုနှစ်၊ ဒီဇင်ဘာလ (၅) ရက်

စဉ်	အမည်	နိုင်ငံသားစိစစ်ရေးကတ်အမှတ်	နေရပ်လိပ်စာ	လက်မှတ်
၁၁				
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၂၀				

ရှမ်းပြည်နယ်၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ်၊ အင်းဝိုင်းကျေးရွာအုပ်စုတွင် ကျင်းပပြုလုပ်သော
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စဉ်	အမည်	နိုင်ငံသားစိစစ်ရေး ကတ်အမှတ်	နေရပ်လိပ်စာ	လက်မှတ်
၂၁	[illegible]	[illegible]	[illegible]	[illegible]
၂၂	[illegible]	[illegible]	[illegible]	[illegible]
၂၃	[illegible]	[illegible]	[illegible]	[illegible]
၂၄	[illegible]	[illegible]	[illegible]	[illegible]
၂၅	[illegible]	[illegible]	[illegible]	[illegible]
၂၆	[illegible]	[illegible]	[illegible]	[illegible]
၂၇	[illegible]	[illegible]	[illegible]	[illegible]
၂၈	[illegible]	[illegible]	[illegible]	[illegible]
၂၉	[illegible]	[illegible]	[illegible]	[illegible]
၃၀	[illegible]	[illegible]	[illegible]	[illegible]

ရှမ်းပြည်နယ်၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ်၊ အင်းဝိုင်းကျေးရွာအုပ်စုတွင် ကျင်းပပြုလုပ်သော
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စဉ်	အမည်	နိုင်ငံသားစိစစ်ရေး ကတ်အမှတ်	နေရပ်လိပ်စာ	လက်မှတ်
၁	[illegible]		[illegible]	[illegible]
၂	[illegible]		[illegible]	[illegible]
၃	[illegible]	[illegible]	[illegible]	[illegible]
၄	[illegible]	[illegible]	[illegible]	[illegible]
၅	[illegible]		[illegible]	[illegible]
၆	[illegible]		[illegible]	[illegible]
၇	[illegible]	[illegible]	[illegible]	[illegible]
၈	[illegible]		[illegible]	[illegible]
၉	[illegible]	[illegible]	[illegible]	[illegible]
၁၀	[illegible]	[illegible]	[illegible]	[illegible]

ရှမ်းပြည်နယ်၊ ကျောက်မဲခရိုင်၊ နောင်ချိုမြို့နယ်၊ အင်းဝိုင်းကျေးရွာအုပ်စုတွင် ကျင်းပပြုလုပ်သော
တစ်နေ့လျှင် ကြံတန်ချိန် (၁၂၀၀၀) ကြိတ်ဝါးမည့်

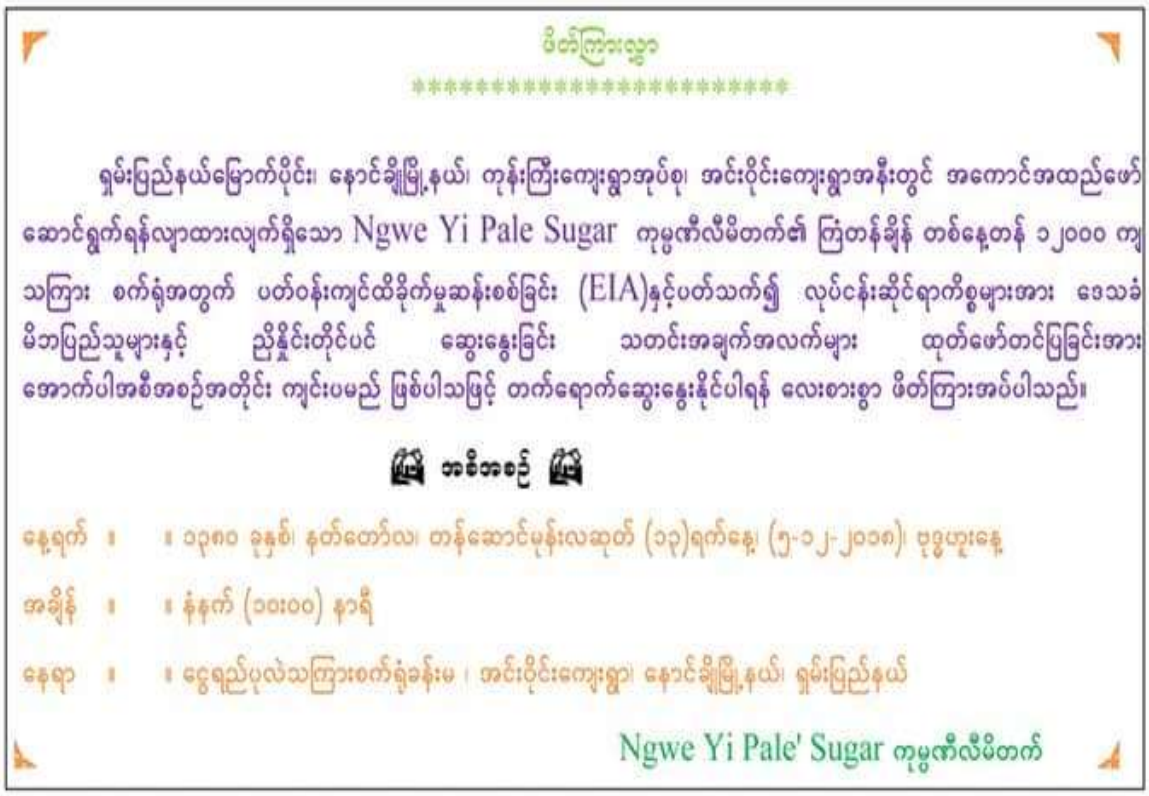
အမှတ် (၃) သကြားစက်ရုံ (အင်းဝိုင်း) တည်ဆောက်ရေးစီမံကိန်း

EIA-SIA-HIA ဆိုင်ရာ လူထုတွေ့ဆုံပွဲအခမ်းအနား တက်ရောက်သူများမှတ်တမ်း

ရက်စွဲ ။ ၂၀၁၈ ခုနှစ်၊ ဒီဇင်ဘာလ (၅) ရက်

စဉ်	အမည်	နိုင်ငံသားစိစစ်ရေးကတ်အမှတ်	နေရပ်လိပ်စာ	လက်မှတ်
၄၁	နို	တဲလ	တဲလိုက်	နို
၄၂	လိုင်		မောင်ကျ	လိုင်
၄၃	ရွှေးမြ		အင်းဝိုင်း	[illegible]
၄၄	မောင်နိုင်		အင်းဝိုင်း	နိုင်
၄၅	အိုက်ခမ်း		အင်းဝိုင်း	[illegible]
၄၆	[illegible]	၁၃/နခတ(နိုင်) ၀၇၉၂၈၃	အင်းဝိုင်းပါဟဲ	[illegible]
၄၇	ဦးနေရဲထွန်း	၁၃/နခတ(နိုင်) ၀၆၇၆၃၃	အင်းဝိုင်း	[illegible]
၄၈	[illegible]		အင်းဝိုင်း	[illegible]
၄၉	[illegible]	၁၃/နခတ(နိုင်) ၀၁၀၀၁၈	အင်းဝိုင်း	[illegible]
၅၀	ဦးအောင်မြင့်ထွန်း	၅/တဆတ(နိုင်) ၁၁၂၁၀၄	[illegible]	Aung

Lists of attendees during EIA study



ဖိတ်ကြားလွှာ

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ရှမ်းပြည်နယ်မြောက်ပိုင်း၊ နောင်ချိုမြို့နယ်၊ ကုန်းကြီးကျေးရွာအုပ်စု၊ အင်းဝိုင်းကျေးရွာအနီးတွင် အကောင်အထည်ဖော်ဆောင်ရွက်ရန်လျာထားလျက်ရှိသော Ngwe Yi Pale Sugar ကုမ္ပဏီလီမိတက်၏ ကြံတန်ခိုရိန် တစ်နေ့တန် ၁၂၀၀၀ ကျသကြား စက်ရုံအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA)နှင့်ပတ်သက်၍ လုပ်ငန်းဆိုင်ရာကိစ္စများအား ဒေသခံမိဘပြည်သူများနှင့် ညှိနှိုင်းတိုင်ပင် ဆွေးနွေးခြင်း သတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းအားအောက်ပါအစီအစဉ်အတိုင်း ကျင်းပမည် ဖြစ်ပါသဖြင့် တက်ရောက်ဆွေးနွေးနိုင်ပါရန် လေးစားစွာ ဖိတ်ကြားအပ်ပါသည်။

အစီအစဉ်

နေ့ရက် ။ ။ ၁၃၈၀ ခုနှစ်၊ နတ်တော်လ၊ တန်ဆောင်မုန်းလဆုတ် (၁၃)ရက်နေ့ (၅-၁၂-၂၀၁၈)၊ ပုဒ္ဓဟူးနေ့

အချိန် ။ ။ နံနက် (၁၀း၀၀) နာရီ

နေရာ ။ ။ ငွေရည်ပုလဲသကြားစက်ရုံခန်းမ ၊ အင်းဝိုင်းကျေးရွာ၊ နောင်ချိုမြို့နယ်၊ ရှမ်းပြည်နယ်

Ngwe Yi Pale' Sugar ကုမ္ပဏီလီမိတက်

Invitation card

နောင်ချိုဌ်သကြားစက်ရုံ တည်ဆောက်မည်

နိုင်နိုင်စိုး

ရန်ကုန်– နေ့စဉ် ကြံတန်ချိန်တစ်သောင်းနှစ်ထောင်ကြိတ်နိုင်မည့် သကြားစက်ရုံကို ရှမ်းပြည်နယ် မြောက်ပိုင်း နောင်ချိုဌ်ခရိုင်တွင် တည်ဆောက်မည်ဖြစ်သည်။

နောင်ချိုဌ်ခရိုင်နယ် ကုန်းကြီးရွာမကျေးရွာအုပ်စု အင်းဝိုင်းကျေးရွာအနီး မြေ ၄၉ ဒသမ ၇၅ ကေယော်တွင် ဆင်းရွှေလီသကြားစက်ရုံအမှတ် (၃)ကို ၂ နှစ်တွင်း တည်ဆောက်မည်ဖြစ်သည်။

နောင်ချိုဌ်ခရိုင်နယ် ကုန်းကြီးကျေးရွာဝန်းကျင်သည် ကြံကို အဓိကစိုက်ပျိုးသဖြင့် ဒေသခံတောင်သူများစိုက်ပျိုးသည့် ကြံများကို ဝယ်ယူ၍ သကြားစက်ရုံတွင် အသုံးပြုမည်ဖြစ်ပြီး တည်ဆောက်ရေးကာလနှင့် စီမံကိန်းကာလအတွင်း ဒေသခံများဖြင့် စက်ရုံလည်ပတ်မည်ဖြစ်သည်။

ယင်းစက်ရုံတည်ဆောက်ခိုင်ရန် ဒီဇင်ဘာပထမပတ်တွင် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ချက်(EIA)နှင့် လူထုတွေ့ဆုံခဲ့ပြီး ဒေသခံများက စက်ရုံတည်ဆောက်ရန် သဘောတူသည်ဟု ဆိုသည်။

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ချက်ကို စီမံကိန်းရေးယာအတွင်းရှိ အင်ဝိုင်း၊ ထုံးကုန်း၊ ပလောင်ကုန်း၊ ပါဟဲ၊ တဲတိုက်နှင့် တောင်ကျတို့တွင် ပြုလုပ်ခဲ့ပြီး စက်ရုံစီမံကိန်းကြောင့် လေ၊ ရေ၊ မြေနှင့် ဇီဝဗျူးစိတ်များထိခိုက်မှုကြီးကြီးမားမားမရှိဟု Myanmar Environment Sustainable Conservation (MESC)ကုမ္ပဏီအုပ်ချုပ်မှုဒါရိုက်တာဦးမြင့်ကျော်သူရက ပြောသည်။

'ဆားစေးလုပ်ခဲ့သလောက်ကတော့ ပတ်ဝန်းကျင်ထိခိုက်မှုမရှိသလောက်ပဲ။ စက်ရုံခန်းကျင်းလည်းကြံစိုက်တဲ့လယ်မြေတွေပဲရှိတော့" ဟု ထင်းကဆက်လက်ပြောကြားသည်။

ဆင်းရွှေလီသကြားစက်ရုံအမှတ်(၃) ကို ဌေရည်ပုလဲကုမ္ပဏီက အကောင်အထည်ဖော်တည်ဆောက်မည်ဖြစ်ပြီး ဆင်းရွှေလီသကြားစက်ရုံ အမှတ်(၁)နှင့် (၂)ကို နောင်ချိုဌ်တွင် တည်ဆောက်ထားသည်။

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