MYANMAR ENGINEERING SOCIETY

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT & REPORT

FOR

I&H PRECAST CONCRETE FACTORY

PREPARED FOR:

I&H ENGINEERING COMPANY LIMITED

PREPARED BY:

ESIA TEAM

MYANMAR ENGINEERING SOCIETY (MES)

MAY, 2019 (Revision 2)

Commitment

This Environmental Impact Assessment Report for **I&H Precast Concrete Factory Project** was prepared by **Myanmar Engineering Society (MES)** on behalf of **I&H Engineering Company Limited,** I hereby issue my letter of endorsement to confirm:

(a) the accuracy and completeness of the EIA;

(b) that the EIA has been prepared in strict compliance with applicable laws including the EIA Procedure and with the ToR for the EIA; and

(c) that the Project will at all times comply fully with the commitments, mitigation measures, and plans in the EIA Report.

Signed

Name : …….

Position : …….

Organization : …….

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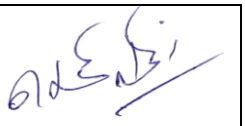
ENVIRONMENTAL COMMITTEE

ESIA TEAM FOR I&H PRECAST CONCRETE FACTORY

This ESIA report has been done with resonable skills, care and diligence in accordance with the standing laws, rules, regulations, notifications, orders and procedures of the Republic of the Union of Myanmar. We have signed this report to certify that all the information in it are true and convincing to the best of our knowledge.

Team Manager	**U LIN**	**Vice President**	**Overall Management**	
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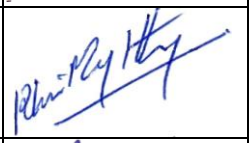
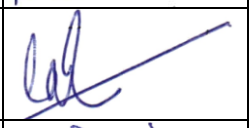
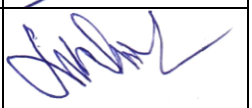
Team Members	**U KHIN MAUNG HTAEY**	**Vice President**	**Water Pollution Control**	
	U HLA BAW	**CEC**	**Water Resources**	
	U KHIN MAUNG MAUNG	**CEC**	**Urban Planning**	
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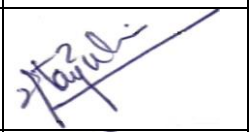
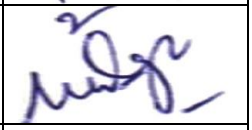
	DAW HTAY HTAY WIN	**CEC**	**Geology and Soil**	
	DAW MU MU AYE	**JGS**	**Bio Diversity**	
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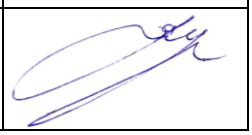
	U YAN NAING AUNG	**Workgroup Member**	**Facilitation of Meeting and Reporting**	

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LISTS OF ABBREVIATION

BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
ECD	Environmental Conservation Department
ECL	Environmental Conservation Law
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
IFC	International Finance Corporation
MEMs	Mitigation and Enhancement Measures
MOECAF	Ministry of Environmental Conservation and Forestry
NCEA	National Commission for Environmental Affairs
NEQG	National Emission Quality Guideline
NSRs	Noise Sensitive Receivers
MES	Myanmar Engineering Society
SIA	Social Impact Assessment
STP	Sewage Treatment Plant
WHO	World Health Organization

အနှစ်ချုပ်အစီရင်ခံစာ

၁။နိဒါန်း

ယခုအစီရင်ခံစာ အကျဉ်းချုပ်ပါ အချက်အလက်များသည် I&H Engineering ကုမ္ပဏီလီမိတက် မှ ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ကွန်ကရိပစ္စည်း စက်ရုံ တည်ဆောက်ရေးစီမံကိန်း အတွက်ဖြစ်ပါသည်။ စီမံကိန်း သည် မြောင်းတကာစက်မှုဇုန်၊ အကွက်အမှတ် (၃) ရှိ မြေဧရိယာ (၁၆) ဧကပေါ်တွင် တည်ရှိပါသည်။ စီမံကိန်းကို ဆောက်လုပ်ရေးဝန်ကြီးဌာန၊ လမ်းဦးစီးဌာနနှင့် စက်ံပူ နိုင်ငံမှ IHI Asia Pacific Pte, Ltd. တို့က ဖက်စပ် အကောင်အထည်ဖော် ဆောင်ရွက်မည် ဖြစ်ပါသည်။

စက်ရုံမှ ထုတ်လုပ်မည့် ပစ္စည်းများမှာ ပိုင်တိုင်များ၊ တံတားဘောင်များ၊ ရေပြွန်များ၊ ဇလီဘား တုံးများ၊ အဆောက်အဦးပစ္စည်းများ စသည်တို့ ဖြစ်ကြ ပါသည်။ လည်ပတ်လုပ်ဆောင်မည့် လုပ်ငန်းများ မှာ ကွန်ကရိဖျော်စပ်ခြင်း၊ ပုံဆင်ခြင်း၊ ကွန်ကရိ လောင်းခြင်း၊ အခြောက်ခံခြင်း၊ ပုံဖြုတ်ခြင်း၊ သိုလှောင်သိမ်းဆည်းခြင်း နှင့် သယ်ပို့ရောင်းချခြင်း စသည်များ ဖြစ်ပါသည်။ ပြည်တွင်းမှ ဝန်ထမ်းအင်အား (၁၅၁) ဦးနှင့် နိုင်ငံခြားသား (၅) ဦးဖြင့် ဆောင်ရွက်မည် ဖြစ်ပါသည်။

ဤစီမံကိန်းလုပ်ငန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (ESIA) လုပ်ငန်းများကို မြန်မာနိုင်ငံ အင်ဂျင်နီယာအသင်း (MES)က ၂၀၁၆ ခုနှစ်၊ ဇူလိုမှ စတင်ဆောင်ရွက်ခဲ့ပြီး လုပ်ငန်းများကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ၂၀၁၂၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေနှင့် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ထုံးလုပ်နည်း ၂၀၁၅ ပါ ပြဋ္ဌာန်းချက်များအတိုင်း လိုက်နာဆောင်ရွက် ထားပါသည်။

၂။ရည်ရွယ်ချက်

စီမံကိန်းလုပ်ငန်းရပ်များ၏ဥပဒေနှင့် ညီညွတ်မှုရှိ/မရှိအားအကဲဖြတ်ရန်၊ စီမံကိန်းတည်ရှိရာဒေသ၏ နောက်ခံလူမှုစီးပွားအခြေအနေများ၊ ပတ်ဝန်းကျင် ဆိုင်ရာများကို လေ့လာသုံးသပ်ရန်၊ စီမံကိန်းဆိုင်ရာ အချက်အလက်များကို အများပြည်သူအား ထုတ်ဖော်ကာဆွေးနွေးညှိနှိုင်းခြင်း၊ အကြံပြုချက်ရယူခြင်းများ ဆောင်ရွက်ရန်၊ စီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွားသက်ရောက်မှုများကို လေ့လာတွက်ဆရန်နှင့် ဆိုးကျိုးသက်ရောက်မှုများကို လျော့ချကုစားရန်နည်းလမ်းများ၊ ကောင်းကျိုး သက်ရောက်မှုများကို ဆပွားမြှင့်တင်ရန် နည်းလမ်းများရှာဖွေဖော်ထုတ်ရန်ဟူသည့် ရည်ရွယ်ချက်များဖြင့် အမှီကိမ့စွမ်းအင်ထုတ်စက်ရုံ တည်ဆောက်ရေးစီမံကိန်းအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (ESIA) လုပ်ငန်းများကို ဆောင်ရွက်ခဲ့ပါသည်။

၃။ ဥပဒေရေးရာသုံးသပ်ချက်

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပညာရှင်အဖွဲ့သည် စီမံကိန်းလုပ်ငန်းရပ်များအား ဥပဒေနှင့် ညီညွတ်မှုရှိ/မရှိကို သက်ဆိုင်ရာတည်ဆဲဥပဒေများနှင့် တိုက်ဆိုင်စိစစ်ခဲ့ပါသည်။ အဖွဲ့က တိုက်ဆိုင်စိစစ်ခဲ့သည့် ဥပဒေအချို့မှာ နိုင်ငံခြားရင်းနှီးမြှုပ်နှံမှု ဥပဒေ၊ ရပ်ကွက်သို့မဟုတ် ကျေးရွာအုပ်စု အုပ်ချုပ်ရေး ဥပဒေ၊ ၁၉၅၁ ခုနှစ် အလုပ်ရုံများ ဥပဒေနှင့် အခြားသက်ဆိုင်ရာဥပဒေများ ဖြစ်ကြပါသည်။

၄။လေ့လာရေးလုပ်ငန်းရပ်များ

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ငန်းကို စီမံကိန်းတည်ရှိရာ အမှတ် (၃) မြောင်းတကာစက်မှုဇုန်နှင့် အနီးတဝိုက်ရှိ ဆောက်လုပ်ရေးဝန်ကြီးဌာန ဝန်ထမ်းအိမ်ယာနှင့် ကုလားကုန်းကျေးရွာတို့ကို အခြေပြုဆောင်ရွက်ခဲ့ပါသည်။ လေ့လာရေးလုပ်ငန်းစဉ်တွင် ပါဝင်သည့် လုပ်ငန်းရပ်များမှာ ကနဦးလေ့လာမှု၊ နယ်ပယ်အတိုင်းအတာများ သတ်မှတ်ခြင်း၊ လူထုပါဝင်ဆောင်ရွက်ရန် ရှင်းလင်းတင်ပြခြင်း၊ အသေးစိတ် အချက်အလက်များ တိုင်းတာကောက်ယူခြင်း၊ သက်ရောက်မှု ဖော်ထုတ်ခြင်းနှင့် အကဲဖြတ်ခြင်း၊ အစီရင်ခံစာမူကြမ်းပြုစုခြင်း၊ တွေ့ရှိချက်များကို အများပြည်သူအား ထုတ်ဖော်ခြင်းနှင့် အပြီးသတ် အစီရင်ခံစာပြုစုခြင်း တို့ဖြစ်ကြပါသည်။

အသေးစိတ်အချက်အလက်များ ကောက်ယူရာတွင် တိုက်ရိုက်လေ့လာခြင်း၊ တစ်ဦးတစ်ယောက်ခြင်းဖြစ်စေ အဖွဲ့လိုက်ဖြစ်စေ တွေ့ဆုံမေးမြန်းခြင်းများ ပြုလုပ်ခဲ့ပါသည်။ သက်ရှိ အရင်းအမြစ်များကို လေ့လာရာတွင် စီမံကိန်းတည်ရှိရာနေရာတွင် ပေါက်ရောက်သည့် သစ်ပင်များကို စာရင်းပြုစုခြင်း၊ ကျေးငှက်တိရစ္ဆာန်များနှင့် ရေနေသတ္တဝါများကို လေ့လာခြင်းများပါဝင်သည်။

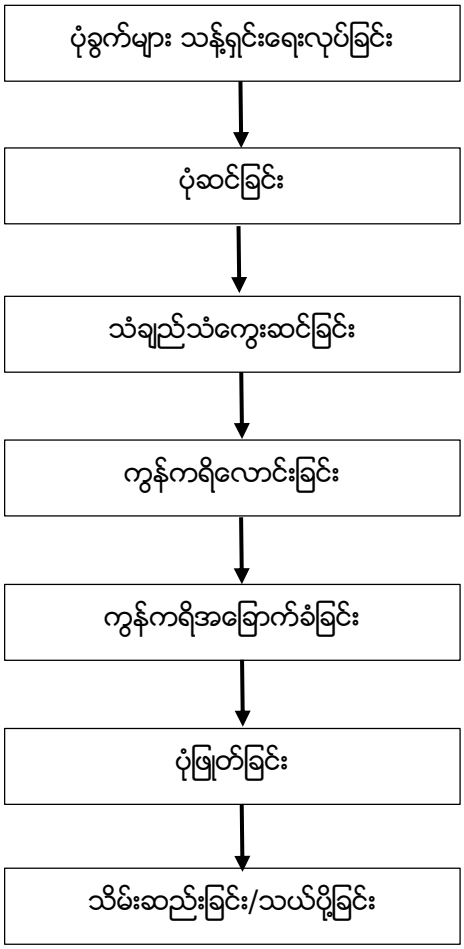
၅။ စီမံကိန်းလုပ်ငန်းစဉ်များ

စီမံကိန်းတွင် အောက်ပါ အဆောက်အဦးများကို တည်ဆောက်မည်ဖြစ်ပါသည်။

စဉ်	အဆောက်အဦး	အကျယ်အဝန်း (စတုရန်းမီတာ)
၁	စက်ရုံ အဆောက်အဦး	၅၈၆၄
၂	ပစ္စည်း စုပုံကွင်း	၆၀၈၀
၃	ကွန်ကရိ ဖျော်စက်ရုံ	၈၀၀
၄	ဗြုန်း သိုလှောင်ရုံ	၅၀၀
၅	ရုံးအဆောက်အဦး	၇၆၈
၆	စားသောက်ခန်း	၃၂၄

၇	ဝန်ထမ်းရိပ်သာ	၄၅၁
၈	ကားပါကင်	၂၅၇
၉	တံတားဘောင် ထုတ်လုပ်ရေး ဇရိယာ	၂၅၆၀

ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ကွန်ကရစ်ပစ္စည်းများ ထုတ်လုပ်ပုံကို အောက်တွင်ဖော်ပြထားပါသည်။



၆။ တွေ့ဆုံဆွေးနွေးမှုများမှဆွေးနွေးချက်များ

နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းလုပ်ငန်းစဉ်အနေဖြင့် အနီးအပါး ဒေသခံများနှင့် တိုင်ပင်ဆွေးနွေးမှုများ ပြုလုပ်ခဲ့ပါသည်။ ဆောက်လုပ်ရေးဝန်ထမ်းအိမ်ယာဝန်းမှ ဝန်ထမ်းမိသားစုများက အောက်ပါအချက်များကို ဆွေးနွေးခဲ့ကြပါသည်။

(၁) ဝန်ထမ်း မိသားစုများ အပေါ် လက်လွတ်စပယ် မလုပ်ဟု မျှော်လင့်ပါကြောင်း

(၂) တွေ့ဆုံပွဲလုပ်ကာ ပွင့်လင်းစွာ ဆွေးနွေးခွင့်ရမည်ဖြစ်သဖြင့် ဝမ်းမြောက်ပါကြောင်း

(၃) စီမံကိန်းဆိုင်ရာ အချက်အလက်များ ကို မသိရှိရသေးသဖြင့် သို့လော သို့လော တွေးနေရပါကြောင်း

(၄) လျှပ်စစ်မီး ကိစ္စ မိတာ ကိုယ်ထူကိုယ်ထ ဆောင်ရွက်ကြရပါကြောင်း။ ဧည့်ဂေဟာမိတာခ အပါအဝင်ကို ဝန်ထမ်းအိမ်ယာမှ ကျခံနေရပါကြောင်း

(၅) လက်ရှိဆောက်လုပ်ရေး ကုမ္ပဏီနှင့် မိတာကိစ္စ ညှိနှိုင်း ထားပါကြောင်း။ ကုမ္ပဏီမှ တာဝန်ယူ ဆောင်ရွက်ပေးမည် ဖြစ်ပါကြောင်း

(၆) စက်ရုံနှင့် ဝန်ထမ်းအိမ်ယာအကြား ဆက်သွယ်ဆောင်ရွက်ပေးနိုင်မည့် ဆက်ဆံရေး အဖွဲ့တစ်ခု ရှိသင့်ပါကြောင်း

(၇) စက်ရုံအတွက် မြေအောက်ရေ ကို ထုတ်ယူသုံးစွဲမည် ဆိုပါက ဘေးပတ်ဝန်းကျင်တွင် မြေအောက်ရေ မျက်နှာပြင် နိမ့်ဆင်းမှု ဖြစ်လာမည်ကို စိုးရိမ်ပါကြောင်း။ ယခင်စက်ရုံများ ကြောင့် ပေ (၂၀) ခန့် နိမ့်ဆင်းသွားသည်ကို ကြုံရပါကြောင်း။ ဖြစ်လာသည့်အခါလည်း ဒေသခံများကို ကူညီဆောင်ရွက်နိုင်ရန် စီမံထားပေးစေလိုပါကြောင်း

(၈) အနီးအပါးရှိ ချမ်းအေးရိပ်သာမှ SEPTIC TANK မြေနေရာကို ချန်လှပ်ပေးရန် တင်ပြထားပါကြောင်း

(၉) အမှုန်အမွှားကိစ္စကို အထူးအလေးပေး လေ့လာစေလိုပါကြောင်း

(၁၀) ယာဉ်အွန္တရာယ် ကျရောက်နိုင်မှု ဂရုပြုပေးစေလိုပါကြောင်း

(၁၂) အဝင်အထွက်လမ်းများကို ချဲ့ထွင်ခြင်း၊ အဆင့်မြှင့်တင်ခြင်းများ ပြုလုပ်ပေးစေလိုပါကြောင်း

(၁၃) လမ်းဘေးရေနွှတ်မြောင်း များကို စနစ်တကျ ပြုလုပ်ပေးစေလိုပါကြောင်း၊ ရေဝပ်လွှဲ ရှိသည့် နေရာဖြစ်ပါကြောင်း

(၁၄) ဘိလပ်မြေဖျော်စပ်၊ အခြောက်ခံရာတွင် ဓာတုပစ္စည်းများ အသုံးပြုရာတွင် အထူးဂရုပြုစေလိုပါကြောင်း၊ သယ်ယူ/သိုလှောင်/ အသုံးပြုမှုများတွင် ဘေးအွန္တရာယ် ကင်းရှင်းရေး အထူးဂရုပြုစေလိုပါကြောင်း

ကုလားကုန်းကျေးရွာ အုပ်ချုပ်ရေးမှူးနှင့် တွေ့ဆုံဆွေးနွေးခဲ့ရာ အုပ်ချုပ်ရေးမှူးမှ အောက်ပါ အချက်များကို ဆွေးနွေးခဲ့ပါသည်။

(၁) ယခင် EIA လုပ်ငန်းများ လာရောက် လုပ်ကိုင်ကြသည်များ ကြုံဖူးပြီး ဖြစ်ပါကြောင်း

(၂) အနီးတွင် ဘုန်းကြီးကျောင်း ရှိပါကြောင်း။ စက်ရုံနှင့်ကျောင်းကြား မြေကိစ္စ အဆင်မပြေမှု အချို့ ရှိပါကြောင်း

(၃) ယခင် စက်ရုံများမှ မီးခိုးခေါင်းတိုင် စသည် ညစ်ညမ်းမှု များ အဆင်မပြေမှုများ ရှိပါကြောင်း။ ယခု စက်ရုံတွင် သတ်မှတ်ချက်များ အညီ လုပ်ဆောင်ပေးစေလိုပါကြောင်း

(၄) စက်ရုံအနီးတွင် ဘုရားတစ်ဆူ နှင့် ဘုန်းတော်ကြီးကျောင်း နှစ်ကျောင်း၊ ရိပ်သာတစ်ခု နှင့် နောက်ကြောဘက်တွင် အိမ်စုများ ရှိပါကြောင်း။ မြေယာကိစ္စ ကို သေချာစွာ လေ့လာရန်လိုပါကြောင်း။ မြေယာကိစ္စ မရှင်းလင်းသည်များ ရှိပါက နောင်လုပ်ငန်း လုပ်ဆောင်နေချိန်များတွင် အဆင်မပြေမှုများ ဖြစ်ပေါ်လာနိုင်ပါကြောင်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ငန်းများ လုပ်ဆောင်ရန်အတွက် နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ရေး လူထုတွေ့ဆုံပွဲကို (၃.၄.၂၀၁၆) ရက်နေ့က ကျင်းပခဲ့ပြီး ဆွေးနွေးချက်များမှာ အောက်ပါအတိုင်း ဖြစ်ပါသည်။

(၁) စီမံကိန်းနှင့် ချမ်းအေးရိပ်သာကြား မီးတားလမ်းလေးပေါ်တွင် ရိပ်သာမှ Septic Tank နှစ်ခုရှိပြီး စက်ရုံမှ မည်သို့ဆောင်ရွက်မည့် အစီအစဉ်ရှိသည်ကို သိလိုပါကြောင်း

(၂) ရိပ်သာဘက်ခြမ်းတွင် တံတိုင်းကာရန်နှင့် လမ်းဖောက်ရန် အစီအစဉ် ရှိ၊မရှိ သိလိုပါကြောင်း

(၃) ဝန်းထမ်းအိမ်ယာမှ ဝန်ထမ်းများ၏ အထွက်လမ်းကို ကောင်းအောင်လုပ်ပေးစေလိုပါကြောင်း

(၄) မူလတန်းကျောင်းလေးရှိပြီး ကျောင်းသား (၁၅၀) ခန့် ရှိပါကြောင်း။ လေထုညစ်ညမ်းမှုများ ဖြစ်မည်ကို စိုးရိမ်ပါကြောင်း

(၅) ဝန်ထမ်းမိသားစုများ၏ မိသားစုဝင်များကို အလုပ်အကိုင် အခွင့်အလမ်း ဦးစားပေး စေလိုပါကြောင်း

(၆) ရေမည်မျှသုံးမည်ကို သိလိုပါကြောင်း၊ ရေအသုံးပြုမှုများပါက ထိခိုက်မှု ရှိနိုင်၊ မရှိနိုင်ကို သိရှိလိုပါကြောင်း

(၇) စက်ယန္တယားကြီးများ သွားလာမှုကြောင့် အမှုန်အမွှား လွင့်ပျံ့မှုများကို မည်သို့ ထိန်းသိမ်း ဆောင်ရွက်မည်ကို သိရှိလိုပါကြောင်း

(၈) မြေအောက်ရေ မျက်နှာပြင် နိမ့်ကျမည်ကို စိုးရိမ်မိပါကြောင်း

(၉) စက်ရုံမှ ထွက်ရှိမည့် စွန့်ပစ်ပစ္စည်း၊ အညစ်အကြေးများကို မည်သို့ စွန့်ပစ်မည်ကို သိလိုပါကြောင်း၊ ၎င်းတို့ကြောင့် ဝန်ထမ်းအိမ်ယာကို ထိခိုက်မှုရှိမည်ကို စိုးရိမ်ပါကြောင်း

၇။ သက်ရောက်မှု ဖော်ထုတ်ဆန်းစစ်ခြင်းနှင့်ကုစားရန်နည်းလမ်းများ

ဖြစ်ပေါ်လာနိုင်သည့် လူမှုစီးပွားသက်ရောက်မှုများကို ဖော်ထုတ်ရန်စီမံကိန်းလုပ်ငန်းစဉ်များကို သက်ရောက်ခံပတ်ဝန်းကျင်နှင့် ချိတ်ဆက်ကာ ဆက်စပ်ဖော်ထုတ်ခဲ့ပါသည်။ စီမံကိန်းကြောင့် ၎င်း၏ ပတ်ဝန်းကျင်တွင် ဖြစ်ပေါ်သည့် ပတ်ဝန်းကျင်နှင့် လူမှုစီးပွား သက်ရောက်မှုများ အနက်မှ (၇) ခုကို အောက်တွင် ရှင်းလင်း ဆွေးနွေးထားပါသည်။

၁။ မြေထုပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု

စက်ရုံ အကြီးတည်ဆောက်ရေးနှင့် တည်ဆောက်ရေး လုပ်ငန်းများ ဖြစ်သည့် စက်ရုံ မြေနေရာ ရှင်းလင်းခြင်း၊ မြေညှိခြင်း၊ မြေတူးခြင်း၊ မြေသားများ အတင်/အချ ပြုလုပ်ခြင်း၊ မြေသားများ သယ်ယူ ပို့ဆောင်ခြင်း၊ မြေသားဖိသိပ်ခြင်း၊ ပိုင်လုပ်ငန်း ဆောင်ရွက်ခြင်း၊ သံကူကွန်ကရစ်လုပ်ငန်း ဆောင်ရွက်ခြင်း၊ စက်များတပ်ဆင်ခြင်း၊ ပန်းရံလုပ်ငန်းများ ဆောင်ရွက်ခြင်း၊ လမ်းလုပ်ငန်းများ ဆောင်ရွက်ခြင်း စသည်တို့ကြောင့် မြေသားများ ဖယ်ထုတ်ခံရခြင်း၊ မြေသားဂုဏ်သတ္တိပြောင်းလဲမှုများ ဖြစ်ပေါ်နိုင်ပါသည်။ စက်ရုံ လည်ပတ်ချိန်တွင်မူ မြေထုပတ်ဝန်းကျင်အပေါ် သက်ရောက်စေမည့် လုပ်ငန်းရပ်များ မရှိသည်ကို တွေ့ရပါသည်။

သက်ရောက်မှု လျော့ချ/ကုစားရန်

(၁) မြေဖို့ခြင်းနှင့်မြေတူးလုပ်ငန်းများကို မိုးရွာသွန်းမှု နည်းပါးချိန်တွင်ဆောင်ရွက်ခြင်း

(၂) မြေဖို့ခြင်းနှင့်မြေတူးလုပ်ငန်းများ ဆောင်ရွက်ပြီးချိန်တွင် တည်ဆောက်ရေးလုပ်ငန်းများကို ဆောလျှင်စွာ ဆောင်ရွက်ခြင်းဖြင့် မလိုအပ်သော မြေဆီလွှာပြုန်းတီးမှုများ မဖြစ်ပေါ်အောင် ဆောင်ရွက်ခြင်း

(၃) မြေသားလုပ်ငန်း ဆောင်ရွက်ထားသည့် နေရာများတွင် ရေစီးကြောင်းများ ဖြတ်သန်းစီးဆင်းမှု မရှိအောင် ဆောင်ရွက်ခြင်း

(၄) တည်ဆောက်ရေးလုပ်ငန်းများ ပြီးစီးပါက သင့်လျော်သည့် အပေါ်ယံ မြေဆီလွှာများ ပြန်လည်ဖြည့်တင်း ပြီး မြေဆီလွှာထိန်းသိမ်းနိုင်သည့် သစ်ပင်ပန်းမံများ ပြန်လည်စိုက်ပျိုးခြင်း

၂။ ရေထုပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု

သံကူကွန်ကရစ်လုပ်ငန်း နှင့် ပိုင်လုပ်ငန်းများဆောင်ရွက်ခြင်းတို့မှလည်း ဘိလပ်မြေနှင့် ရွှံစေးများပါရှိသည့် စွန့်ပစ်ရေများထွက်ရှိမည် ဖြစ်ပါသည်။ စက်ရုံအနီးပတ်ဝန်းကျင်တွင် လူအများ အသုံးပြုသည့် မြစ်ချောင်းနှင့် ရေကန်များ မရှိသည်ကို တွေ့ရပါသည်။ စီမံကိန်းပတ်ဝန်းကျင်ဇရိယာတွင် ရေနှုတ်မြောင်းများ မလုံလောက်မှုကြောင့် မိုးရာသီများတွင် ပုံမှန် ရေဝပ်ရေလျှံလေ့ရှိကြောင်း ဆွေးနွေးကြပါသည်။

အနီးအပါးဒေသခံများ၏ အဓိက ဆွေးနွေးချက်မှာ မြေအောက်ရေမျက်နှာပြင် (Water Table) နိမ့်ကျမည်ကို စိုးရိမ်ပူပန်မှုများ ဖြစ်ပါသည်။ ဒေသခံများက စက်မှုဇုန်ပေါ်ပေါက်လာပြီးနောက် ရှိရင်းစွဲ ရေတုံဘိုင်များမှာ ၁၅-၂၀ ပေခန့် ရေဆုတ်သွားသည်ကို ကြုံခဲ့ရကြောင်း ဆွေးနွေးကြပါသည်။ စီမံကိန်း၏ ရေသုံးစွဲမှုမှာ တစ်နှစ်လျှင် ၆၀၂၅ ကုဗမီတာခန့်ရှိမည်ဟု ခန့်မှန်းထားသည်ကို တွေ့ရပါသည်။ အနီးအပါးရှိ

ဆောက်လုပ်ရေးဝန်ထမ်းအိမ်ယာဝင်း တွင် အိမ်ခြေ (၁၅၀) ခန့်ရှိပြီး နေ့စဉ် ရေသုံးစွဲမှုမှာ ၃၅ ကုဗမီတာခန့်ရှိသဖြင့် တစ်နှစ်ရေသုံးစွဲမှု ၁၂၇၇၅ ကုဗမီတာခန့် ရှိပါသည်။ စက်ရုံ၏ ရေသုံးစွဲမှုမှာ ဝန်ထမ်းအိမ်ယာရေသုံးစွဲမှု၏ ထက်ဝက်ခန့်ရှိကြောင်း တွေ့ရပါသည်။

သက်ရောက်မှု လျော့ချ/ကုစားရန်

(၁) စီမံကိန်း တည်ဆောက်ရေး လုပ်ငန်းများ လုပ်ဆောင်နေချိန် ဘိလပ်မြေနှင့် လောင်စာဆီများ ယိုဖိတ်ခြင်းမရှိအောင်အထူးသတိပြုဆောင်ရွက်ခြင်း

(၂) တည်ဆောက်ရေးကာလတွင် ထွက်ရှိသည့် စွန့်ပစ်ရေများကို အနည်ထိုင်ကန်များတွင် စုစည်းအနည်ထိုင်စေပြီး ကြည်လင်သောရေကိုသာ စွန့်ပစ်ခြင်း

(၃) စီမံကိန်းပတ်ဝန်းကျင်ရှိ ရေနုတ်မြောင်းများကို စနစ်တကျ ပြုပြင်တည်ဆောက်ခြင်း

(၄) စီမံကိန်းအတွက် မြေအောက်ရေရယူရာတွင် ဝန်ထမ်းအိမ်ယာမှ ရေတွင်းများထက် ပိုမိုနက်ရှိုင်းသည့် အောက်ဘက် ရေကြောမှ ရေကို ထုတ်ယူသုံးစွဲခြင်း

(၅) ဝန်ထမ်းအိမ်ယာမိသားစုများအတွက် သောက်ရေ၊ သုံးရေ ဖြန့်ဝေကူညီပေးနိုင်မည့် အစီအစဉ်များကို လူမှုရေးတာဝန်သိအစီအစဉ် (CSR) တွင်ထည့်သွင်းဆောင်ရွက်ခြင်း

(၆) မိုးရေစုဆောင်းသိုလှောင်ပြီး အသုံးပြုနိုင်မည့် အစီအမံများ စီမံထားရှိခြင်း

(၇) ရေသုံးစွဲမှု လျော့ချချွေတာနိုင်မည့် အစီအစဉ်များ စီမံထားရှိခြင်း

(၈) ရေသုံးစွဲမှု လျော့ချနိုင်မည့် အိမ်သာနှင့် သန့်စင်ခန်းသုံးပစ္စည်းများ အသုံးပြုခြင်း

၃။ လေထုပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု

စက်ရုံ အကြိုတည်ဆောက်ရေးနှင့် တည်ဆောက်ရေး လုပ်ငန်းများ ဆောင်ရွက်ခြင်းမှ ဖုန်မှုန့်နှင့် အမှုန်အမွှားများ ထွက်ရှိမည် ဖြစ်ပါသည်။ မြေသားလုပ်ငန်းများမှ ထွက်ရှိလာမည့် မြေစာများကို သယ်ယူပို့ဆောင်ခြင်း တို့မှ ဖုန်မှုန့်များ ထုတ်လွှတ်မည်ဖြစ်ပါသည်။ မြေစာများကို သယ်ယူပို့ဆောင်သည့် ကားများမှာ သင့်လျော်သည့် အဖုံး၊ အကာများ မရှိပါက သယ်ယူပို့ဆောင်ရာ လမ်းကြောင်းတလျှောက် အမှုန်အမွှားများ ထုတ်လွှတ်မည် ဖြစ်ပါသည်။

စက်ရုံ လည်ပတ်ချိန်တွင် ကွန်ကရိပစ္စည်းများ ထုတ်လုပ်မည့် ကုန်ကြမ်းပစ္စည်းများနှင့် ထုတ်ကုန်ကွန်ကရိပစ္စည်းများ သယ်ယူခြင်း၊ အတင်အချပြုလုပ်ခြင်းတို့ကြောင့် ဖုန်မှုန့်၊ အမှုန်အမွှားများနှင့် မော်တော်ယာဉ်များမှ မီးခိုးငွေ့များ ထွက်ရှိမည် ဖြစ်ပါသည်။ ကွန်ကရိဖျော်စက်အတွင်း ကုန်ကြမ်းများ ဖြည့်သွင်းခြင်းမှလည်း ဖုန်နှင့် အမှုန်အမွှားထွက်ရှိနိုင်ပါသည်။ ကုန်ကြမ်းပစ္စည်းများ အတင်အချပြုလုပ်ခြင်းနှင့်

ကွန်ကရစ်ဖျော်စက်အတွင်း ကုန်ကြမ်းများ ထည့်သွင်းခြင်းမှ ထွက်ရှိမည့် အမှုန်အမွှားများကို ထိန်းချုပ်ရမည် ဖြစ်ပါသည်။

သက်ရောက်မှု လျော့ချ/ကုစားရန်

(၁) မြေသားလုပ်ငန်း ဆောင်ရွက်ရာတွင် ဖုန်မှုန့်နှင့် အမှုန်အမွှားများ လွင့်ပျံနိုင်သည့် နေရာများနှင့် မြေသားလမ်းများကို အနည်းဆုံး တစ်နေ့လျှင် နှစ်ကြိမ် ရေဖြန်းရန်

(၂) စီမံကိန်းဧရိယာတွင် မောင်းနှင်သည့် မော်တော်ယာဉ်များကို တစ်နာရီလျှင် (၁၅) မိုင်နှုန်းထက် ကျော်လွန်မောင်းနှင်ခြင်း မပြုစေရေးကြေပ်မတ်ထိန်းသိမ်းရန်

(၃) မြေစာသယ်မည့်ကားများကို လိုအပ်သည့် အဖုံးအကာများ ဖုံးအုပ်ရေးကြေပ်မတ်ပေးရန်

(၄) အဆောက်အဦးများအတွင်းမှ ထွက်ရှိသည့် အမှုန်အမွှားများကို လေစုပ်ပန်ကာ (Exhaust Fan) များဖြင့် စုပ်ထုပ်ပြီး လေထုအတွင်းတိုက်ရိုက်မှုတ်မထုတ်ဘဲ အမှုန်အမွှားများ ဖမ်းယူခြင်း

(၅) အဆောက်အဦးပြင်ပ အမှုန်အမွှားများ ကျရောက်တတ်သည့် နေရာများကို ပုံမှန် ရေဖြန်းခြင်း၊ လှဲကျခြင်း

(၆) စက်ရုံသို့ ကုန်ကြမ်းသယ်ပို့သည့်ကားများတွင် လိုအပ်သည့် အဖုံးအကာများ ဖုံးအုပ်ရေး ကြေပ်မတ်ခြင်း

(၇) လေပြင်းတိုက်ခတ်ချိန်များတွင် အမှုန်အမွှားထွက်ရှိမှု များပြားသည့် လုပ်ငန်းများကို ယာယီရပ်နားထားခြင်း

(၈) လုပ်ငန်းလည်ပတ်ချိန်တွင် အမှုန်အမွှားလွင့်ပျံမှုနှင့် ပတ်သက်၍ ဆက်သွယ်ဆောင်ရွက်နိုင်မည့် တာဝန်ခံတစ်ဦးထားရှိပြီး ဆက်သွယ်ဆောင်ရွက်နိုင်မည့် အချက်အလက်များကို အနီးအပါးနေထိုင်သူများထံ ဖြန့်ဝေထားရှိခြင်း

(၉) စက်ရုံခြံစည်းရိုးပတ်လည်တွင် လေကာပင်များ စိုက်ပျိုးခြင်း

၄။ ဆူညံသံနှင့်တုန်ခါမှု

စက်ရုံ အကြိုတည်ဆောက်ရေးနှင့် တည်ဆောက်ရေး လုပ်ငန်းများ ဖြစ်သည့် မြေနေရာရှင်းလင်းရေးလုပ်ငန်းများနှင့် မြေသားလုပ်ငန်းများ ဆောင်ရွက်ခြင်း၊ စက်ရုံတည်ဆောက်ရေးနှင့် တပ်ဆင်ရေးလုပ်ငန်းများ ဆောင်ရွက်ခြင်းကြောင့် မော်တော်ယာဉ်များမှ အသံများနှင့် စက်ယန္တရားကြီးများ အလုပ်လုပ်သောကြောင့် ဆူညံသံများ ထွက်ပေါ်မည်ဖြစ်ပါသည်။

စက်ရုံ လည်ပတ်ချိန်တွင် မော်တော်ယာဉ်များနှင့် စက်ယန္တရားကြီးများ အလုပ်လုပ်ရခြင်း တို့ကြောင့်လည်း ဆူညံသံများထွက်ပေါ်လာမည် ဖြစ်ပါသည်။ စက်ရုံအဆောက်အဦးနေရာ၏ အရှေ့ဘက် ပေ

(၂၅၀) ခန့် အကွာတွင် ချမ်းအေးရိပ်သာ တည်ရှိပြီး အနောက်ဘက် ပေ (၁၅၀) ခန့်အကွာတွင် ဆောက်လုပ်ရေး ဝန်ထမ်းအိမ်ယာများ တည်ရှိပါသည်။

သက်ရောက်မှု လျော့ချ/ကုစားရန်

(၁) စက်ယန္တရားများကို စနစ်တကျ ပြုပြင်ထိန်းသိမ်းခြင်းဖြင့် မလိုအပ်သော ဆူညံသံများ မဖြစ်ပေါ်အောင် ထိန်းသိမ်းခြင်း

(၂) ဆူညံသံ ထွက်ပေါ်မှု မြင့်မားသည့် တည်ဆောက်ရေး လုပ်ငန်းများကို ညဘက်လူခြေတိတ်ချိန်တွင် ဆောင်ရွက်မှု မပြုခြင်း

(၃) မီးစက်များ၊ အင်ဂျင်များတွင် အသံထိန်းစနစ် (Silencer/Muffler) များ တပ်ဆင်အသုံးပြုခြင်း

(၄) အသံဆူညံမှု မြင့်မားသည့် နေရာများတွင် အလုပ်လုပ်ကိုင်ရသည့် လုပ်သားများအတွက် လိုအပ်သည့် လုပ်ငန်းခွင်သုံး ကာကွယ်ရေးပစ္စည်းများ လုံလောက်စွာ စီစဉ်ထားရှိပြီး စနစ်တကျအသုံးပြုရေး ကြပ်မတ်ဆောင်ရွက်ခြင်း

(၅) အသံဆူညံမှုနှင့်ပတ်သက်၍ ဆက်သွယ်ဆောင်ရွက်နိုင်မည့် တာဝန်ခံတစ်ဦးထားရှိပြီး ဆက်သွယ်ရန် အမည်နှင့်ဖုန်းနံပါတ်များပါဝင်သည့် ကြေညာစာများကို စီမံကိန်းပတ်ဝန်းကျင် ဒေသများတွင် ဖြန့်ဝေထားရှိခြင်း

၅။ အများပြည်သူဘေးအန္တရာယ်ကင်းရှင်းရေး နှင့် ကျန်းမာရေး

စီမံကိန်းတည်ဆောက်ရေးနှင့် စက်တပ်ဆင်ရေးလုပ်ငန်းများ ဆောင်ရွက်ချိန်၌ အနီးဝန်းကျင်တွင် ဖုန်များ၊ စွန့်ပစ်ပစ္စည်းများ၊ အသံများထွက်ရှိနိုင်ပါသည်။ သို့သော် စီမံကိန်းတည်ဆောက်ချိန်တွင်သာ ဖြစ်ပေါ်သောကြောင့် ပြင်းထန်သော သက်ရောက်မှု မရှိကြောင်းတွေ့ရှိရပါသည်။ စီမံကိန်း တည်ဆောက်ချိန်နှင့် စီမံကိန်းလုပ်ငန်းများ လည်ပတ်ချိန်တွင် စီမံကိန်းအတွက်လိုအပ်သော ကုန်ပစ္စည်းများနှင့် ကြီးမားလေးလံသော စက်အစိတ်အပိုင်းများကို သယ်ယူပို့ဆောင်ရာတွင်လည်း အများပြည်သူ အသုံးပြုရာ လမ်းများကို အသုံးပြုရမည်ဖြစ်သဖြင့် ဒေသခံများအတွက် ယာဉ်အန္တရာယ် ကျရောက်နိုင်ချေ၊ ယာဉ်ကြောကြပ်တည်းမှုဖြစ်နိုင်ချေ အထိုက်အလျောက်တိုးပွားလာမည် ဖြစ်ပါသည်။

စက်ရုံသည် ရန်ကုန်-ပြည်လမ်းမှ ပေ (၅၀၀) ခန့်ကွာဝေးပြီး အဝင်အထွက်လမ်းကို ဝန်ထမ်းအိမ်ယာ မိသားစုများနှင့် မျှဝေအသုံးပြုရမည် ဖြစ်ပါသည်။ စက်ရုံအနီးရှိ ရန်ကုန်-ပြည်လမ်းမှာ (၂၄) ပေအကျယ်ရှိပြီး စက်ရုံသို့ ဝင်ထွက်သွားလာသည့်ကားများ အဆိုပါ လမ်းမကြီးပေါ်သို့ အတက်အဆင်းပြုမည့် နေရာမှာလည်း ယာဉ်အန္တရာယ် ကျရောက်နိုင်မှု နှင့် ယာဉ်ကြောပိတ်ဆို့နိုင်မှု မြင့်မားပါသည်။

ဒေသခံများနှင့် တိုင်ပင်ဆွေးနွေးမှုများ ပြုလုပ်ချိန်တွင် ဒေသခံများက စီမံကိန်းနှင့် ပတ်သက်၍ ၎င်းတို့၏ စိုးရိမ်ပူပန်မှုများ အဖြစ် စက်ရုံအဝင်အထွက်လမ်းတွင် ယာဉ်အန္တရာယ် ကျရောက်နိုင်မှု၊ စက်ရုံမှ အမှုန်အမွှားများ လွင့်ပျံ့မည်ကိုစိုးရိမ်မှု၊ စွန့်ပစ်ပစ္စည်းများကြောင့် ထိခိုက်မည်ကို စိုးရိမ်မှု စသည်တို့အား ဆွေးနွေးခဲ့ကြ ပါသည်။

သက်ရောက်မှု လျော့ချ/ကုစားရန်

(၁) စက်တပ်ဆင်ရေးအတွက် ကြီးမားလေးလံသော စက်ပစ္စည်းများ သယ်ယူရာတွင် ယာဉ်အသွားအလာ များပြားသော လမ်းကြောင်းနှင့် အချိန်များကို ရှောင်ရှားခြင်း

(၂) ဒေသခံများနှင့် စက်ရုံမှ တာဝန်ရှိသူများ အပြန်အလှန် ဆက်သွယ်နိုင်မည့် ဆက်သွယ်ရေး လမ်းကြောင်းတစ်ခု ထားရှိခြင်း

(၃) ပြည်လမ်းမကြီးမှ စက်ရုံသို့ အဝင်လမ်းကို လုံလောက်သည့် အကျယ်အဝန်းရှိအောင် ခင်းကျင်းခြင်း

(၄) စက်ရုံ ဝင်/ထွက်လမ်းနှင့် ပြည်လမ်းမကြီး ဆုံသည့်နေရာကို လုံလောက်သည့် အကျယ်အဝန်းရှိအောင် ခင်းကျင်းခြင်း

(၅) ကုန်ကြမ်းပစ္စည်းများ အတင်အချပြုလုပ်ရန် လုံလောက်သည့် ဇရိယာထားရှိခြင်း

(၆) ကုန်ချောပစ္စည်းများ အတင်အချပြုလုပ်ရန် လုံလောက်သည့် ဇရိယာ ထားရှိခြင်း

(၇) အဝင်၊ အထွက်ယာဉ်များအတွက် စနစ်ကျနသည့် လမ်းကြောင်းစီမံခန့်ခွဲမှုများ ထားရှိခြင်း

(၈) လူမှုရေးတာဝန်သိအစီအစဉ်ဖြင့် ဒေသခံများအတွက် ကျန်းမာရေးစောင့်ရှောက်မှု လုပ်ငန်းများ ဆောင်ရွက်ပေးခြင်း

၆။ လုပ်သားကျန်းမာရေးနှင့် လုပ်ငန်းခွင်အန္တရာယ် ကျရောက်နိုင်မှု

ကွန်ကရိပစ္စည်း ထုတ်လုပ်ရေး လုပ်ငန်းများတွင် လုပ်ကိုင်သည့် လုပ်သားများ ကြုံတွေ့ရနိုင်သည့် လုပ်ငန်းခွင် အန္တရာယ်များမှ ဘိလပ်မြေအမှုန်များကြောင့် မျက်စိ၊ နှာခေါင်း၊ လည်ချောင်းနှင့် အသက်ရှူအင်္ဂါများ ယားယံခြင်း၊ ကွန်ကရိအစိုများနှင့် ရေရှည်ထိတွေ့သဖြင့် အရေပြား ယားယံခြင်းနှင့် တခါတရံ အသေးစား လောင်စားမှုဖြစ်ခြင်း၊ အကာအရံမဲ့စက်ပစ္စည်းများဖြင့် ထိခိုက်မိခြင်း၊ အမြင့်မှ ပြုတ်ကျသည့် ပစ္စည်းများကြောင့် ထိခိုက်မိခြင်း၊ အလေးအပင်များ သယ်မရာတွင် နည်းစနစ်မမှန်မှု၊ ကိုယ်နေဟန်ထားမမှန်မှု စသည်တို့ကြောင့် ဒဏ်ဖြစ်ခြင်းစသည်တို့ ဖြစ်ကြပါသည်။ စက်ရုံဝန်ထမ်းများ၊ အလုပ်သမားများ အနေဖြင့် မော်တော်ယာဉ်များနှင့် အခြား ရွေ့လျားနေသည့် စက်အစိတ်အပိုင်းများကြောင့် ဖြစ်ပေါ်သည့် လုပ်ငန်းခွင် အန္တရာယ်ကျရောက်နိုင်မှုများ ရှိနေမည် ဖြစ်ပါသည်။

သက်ရောက်မှု လျော့ချ/ကုစားရန်

(၁) ကုန်ကြမ်းကုန်ချော သယ်ယူပို့ဆောင်သည့်ယာဉ်များနှင့် လုပ်ငန်းခွင်သုံးယာဉ်များတွင် ယာဉ်နောက်ဆုတ်ချိန် သတိပေးသံ၊ သတိပေးမီး များ တပ်ဆင်ထားရှိခြင်း

(၂) အလုပ်သမားများအတွက် အလုပ်ခွင်မဝင်မီနှင့် အလုပ်သိမ်းချိန်များတွင် ဆေးကြောသန့်စင်မှု ပြုလုပ်နိုင်မည့်နေရာ၊ အဝတ်လဲခန်း စသည်တို့ကို လုံလောက်စွာ စီမံထားရှိခြင်း

(၃) သတ်မှတ်ထားသည့်နေရာမှအပ အခြားနေရာများတွင် အစားအစာများ စားသောက်ခြင်း၊ ဆေးလိပ်သောက်ခြင်း စသည်တို့ကို ကန့်သတ်တားမြစ်ခြင်း

(၄) စက်ရုံသန့်ရှင်းရေးလုပ်ငန်းများကို စနစ်ကျနစွာဖြင့် ပုံမှန် ပြုလုပ်ခြင်း

(၅) ကုန်ကြမ်းကုန်ချောများကို စနစ်တကျစုပုံခြင်း၊ ထပ်စီခြင်းဖြင့် အရာဝတ္ထုများ အမြင့်မှ ပြုတ်ကျမှုကို ကာကွယ်ခြင်း

(၆) ကျန်းမာရေးနှင့် ညီညွတ်ပြီး လုံခြုံမှု အပြည့်အဝ ပေးနိုင်သည့် အလုပ်သမား တန်းလျားများ စီစဉ်ထားရှိခြင်း

(၇) ဝတ်စုံ၊ လက်အိတ်၊ မျက်နှာဖုံး၊ နားကြပ်၊ ဦးထုပ် စသည်ဖြင့် လိုအပ်သည့် လုပ်ငန်းခွင်သုံး တစ်ကိုယ်ရေကာကွယ်ရေးပစ္စည်း (PPE) များ လုံလောက်စွာ စီစဉ်ထားရှိပြီး စနစ်တကျ ကိုင်တွယ် အသုံးပြုရေး ကြပ်မတ်ကွပ်ကဲခြင်း

(၈) လုပ်ငန်းခွင် အန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာများကို လုပ်သားများအား ပညာပေးပြီး စနစ်တကျ လိုက်နာ ကျင့်သုံးစေရေး ကြပ်မတ်ကွပ်ကဲရန်

(၉) လုပ်ငန်းခွင်အန္တရာယ်ကင်းရှင်းရေး အရာရှိ (Safety Officer) တစ်ဦးထားရှိပြီး လုပ်ငန်းခွင် အန္တရာယ် ကင်းရှင်းရေးလုပ်ငန်းများ စနစ်တကျ ဆောင်ရွက်ခြင်း

၈။ ပတ်ဝန်းကျင်ရေးရာစောင့်ကြည့်အဖွဲ့

I&H Engineering ကုမ္ပဏီလီမိတက် မှ ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ကွန်ကရိပစ္စည်း စက်ရုံ တည်ဆောက်ရေး စီမံကိန်းအတွက် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် (Environmental Management Plan) ကိုအောင်မြင်စွာ အကောင်အထည်ဖော်ဆောင်ရွက်နိုင်ရန်အတွက် ပတ်ဝန်းကျင်ရေးရာစောင့်ကြည့် အဖွဲ့ကိုဖွဲ့စည်းရန် လိုအပ်မည်ဖြစ်ပါသည်။ စောင့်ကြည့်အဖွဲ့တွင် ဌာနဆိုင်ကိုယ်စားလှယ်များ၊ ဒေသခံကိုယ်စားလှယ်များနှင့် စီမံကိန်းလုပ်ငန်းရှင်ကိုယ်စားလှယ်များ ပါဝင်သင့်ပါသည်။

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို အပြည့်အဝ အကောင်အထည်ဖော်ဆောင်ရွက်ရန် လုပ်ငန်း အဆိုပြုသူတွင် တာဝန်ရှိပါသည်။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၏ အစိတ်အပိုင်းတစ်ရပ်ဖြစ်သော

ပတ်ဝန်းကျင်ဆိုင်ရာစောင့်ကြည့်တိုင်းတာရေးအစီအစဉ် (Environmental Monitoring Programme) ကိုလုပ်ငန်းအဆိုပြုသူက လိုက်နာဆောင်ရွက်ကာ တိုင်းတာတွေ့ရှိချက် စီရင်ခံစာများကို ပတ်ဝန်းကျင်ရေးရာ စောင့်ကြည့်အဖွဲ့မှ အဖွဲ့ဝင်ကိုယ်စားလှယ်များထံ မိတ္တူပေးပို့ရမည်ဖြစ်ပါသည်။ လူမှုစီးပွားတာဝန်သိ အစီအစဉ် (Corporate Social Responsibility) အနေဖြင့် စီမံကိန်းက ဒေသခံများအတွက် ပေးအပ်သော ကူညီထောက်ပံ့မှုများကို စောင့်ကြည့်အဖွဲ့မှ ဒေသခံကိုယ်စားလှယ်များထံမှတစ်ဆင့် ဒေသခံများထံသို့ ပေးအပ်ရမည်ဖြစ်ပါသည်။ ပတ်ဝန်းကျင်ရေးရာနှင့်စပ်ဆိုင်သော အကြောင်းတစ်စုံတစ်ရာ ပေါ်ပေါက်ပါကဒေသခံများ အနေဖြင့် စောင့်ကြည့်အဖွဲ့မှ အဖွဲ့ဝင်ဒေသခံကိုယ်စားလှယ်များမှတစ်ဆင့် စီမံကိန်းနှင့် ဆက်သွယ်ဆောင်ရွက်နိုင်မည် ဖြစ်ပါသည်။

(၁)ရည်ရွယ်ချက်

(က) စီမံကိန်း၏ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်အား လိုက်နာဆောင်ရွက်မှု အခြေအနေများကို ဒေသခံများ စဉ်ဆက်မပြတ်သိရှိနိုင်ရန်

(ခ) ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြည့်တိုင်းတာရေး အစီအစဉ်မှ တိုင်းတာတွေ့ရှိချက်အစီရင်ခံစာ များကို ဒေသခံများသိရှိနိုင်ရန်

(ဂ) ပတ်ဝန်းကျင်ရေးရာနှင့် စပ်ဆိုင်သော အကြောင်းကိစ္စများအတွက် အပြန်အလှန် ဆက်သွယ် ဆောင်ရွက်နိုင်ရန်

(ဃ) လူမှုစီးပွား တာဝန်သိအစီအစဉ်အရ ပေးအပ်သည့် ကူညီထောက်ပံ့မှုများကို စနစ်တကျ စီမံခန့်ခွဲမှုများအား စောင့်ကြည့်ထိန်းကြောင်းနိုင်ရန်

(၂) ဖွဲ့စည်းပုံ

ပတ်ဝန်းကျင်ရေးရာစောင့်ကြည့်အဖွဲ့တွင်အဓိကအားဖြင့်သက်ဆိုင်ရာအစိုးရဌာနများ၊ စီမံကိန်းမှ တာဝန်ရှိသူများနှင့် ဒေသခံကိုယ်စားလှယ်များဟူ၍အစုအဖွဲ့ (၃) ဖွဲ့ပါရှိပါသည်။ ဒေသခံကိုယ်စားလှယ်များကို သက်ဆိုင်ရာ ရပ်ကွက်အလိုက် ဒေသခံများက အများသဘောတူ ရွေးချယ်ပေးပြီး ထည့်သွင်းဖွဲ့စည်းရန် ဖြစ်ပါသည်။ အဆိုပြုကိုယ်စားလှယ်ဦးရေပါဝင်မှုအချိုးအစားမှာအောက်ပါအတိုင်းဖြစ်ပါသည်။

ဇယား (၃) ပတ်ဝန်းကျင်ရေးရာစောင့်ကြည့်အဖွဲ့ကိုယ်စားလှယ်ဦးရေပြဇယား

စဉ်	ကိုယ်စားလှယ်	ဦးရေ
	အစိုးရဌာနများ	
၁*	မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန (မော်ဘီမြို့နယ်)	၁

၂*	မြို့နယ်ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန(မော်ဘီမြို့နယ်)	၁
၃*	မြို့နယ်လမ်းလုပ်ငန်းဦးစီးဌာန (မော်ဘီမြို့နယ်)	၁
၄*	မြို့နယ်ပညာရေးမှူးရုံး(မော်ဘီမြို့နယ်)	၁
၅*	မြို့နယ်ကျန်းမာရေးဦးစီးဌာန(မော်ဘီမြို့နယ်)	၁
စီမံကိန်းမှတာဝန်ရှိသူများ		
၁	အုပ်ချုပ်မှုဒါရိုက်တာ	၁
၂	ဒါရိုက်တာ	၁
၃	စက်ရုံမှူး	၁
ဒေသခံကိုယ်စားလှယ်များ***		
၁**	အိမ်ယာ အုပ်ချုပ်ရေးအဖွဲ့ (ဆောက်လုပ်ရေးဝန်ထမ်းအိမ်ယာ)	၅
၂**	အုပ်ချုပ်ရေးမှူး (ကုလားကုန်းကျေးရွာ)	၁

*ဌာနလက်ရှိတာဝန်ထမ်းဆောင်သူများဖြင့်သာဖွဲ့စည်းရန်

**ဒေသခံများကမိမိတို့ကျေးရွာအလိုက်အများသဘောတူခန့်အပ်ခြင်း၊လဲလှယ်ခြင်းများပြုလုပ်ရန်

***ဒေသခံကိုယ်စားလှယ်များအစုအဖွဲ့မှကိုယ်စားလှယ်များကိုအခြားအစုအဖွဲ့များမှကိုယ်စားလှယ်များကခန့်အပ်ခြင်း၊လဲလှယ်ခြင်းများပြုလုပ်ခွင့်မရှိစေရ

(၃)တာဝန်များ

(က) စီမံကိန်းနှင့်ဒေသခံများအကြား ပတ်ဝန်းကျင်ရေးရာကိစ္စများ ဆက်သွယ်ဆောင်ရွက်နိုင်ရန် ဒေသခံကိုယ်စားလှယ်များက ကြားခံဆောင်ရွက်ပေးရန်

(ခ) စီမံကိန်းမှလူမှုစီးပွား တာဝန်သိအစီအစဉ်အရ ကတိကဝတ်အတိုင်းပေးအပ်သည့် ကူညီထောက်ပံ့မှုများကို ဒေသခံကိုယ်စားလှယ်များမှတစ်ဆင့် ပေးအပ်ရန်

(ဂ) စီမံကိန်းကပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြည့်တိုင်းတာရေး အစီအစဉ်မှ တိုင်းတာတွေ့ရှိချက်အစီရင်ခံစာများကို အစိုးရဌာနများမှ ကိုယ်စားလှယ်များနှင့် ဒေသခံကိုယ်စားလှယ်များအားလုံးထံဖြန့်ဝေကာ ဒေသခံများသိရှိနိုင်အောင် ဆောင်ရွက်ရန်

(ဃ) စီမံကိန်းမှ အလုပ်သမားခန့်ထားရေးဆိုင်ရာကိစ္စရပ်များအတွက် ဒေသခံကိုယ်စားလှယ်များ၏အကူအညီဖြင့် ဒေသခံများအားလုံး သိရှိနိုင်အောင်ဆောင်ရွက်ရန်

(c) ဒေသခံများ၏လူမှုရေး၊ ဘာသာရေးနှင့် ယဉ်ကျေးမှုဆိုင်ရာအစီအစဉ်များတွင် စီမံကိန်းက ပါဝင်ဆောင်ရွက်နိုင်ရေးအတွက် ဒေသခံကိုယ်စားလှယ်များမှ စီမံကိန်းတာဝန်ရှိသူများနှင့် ပူးပေါင်းဆောင်ရွက်ရန်

(စ) ပတ်ဝန်းကျင်ရေးရာစောင့်ကြည့်အဖွဲ့ကို စီမံကိန်းတည်ဆောက်ရေးလုပ်ငန်းများ မစတင်မီ စီမံကိန်းမှ တာဝန်ရှိသူများက တာဝန်ယူကာဖွဲ့စည်းရန်

(ဆ) စီမံကိန်းတည်ဆောက်ရေးလုပ်ငန်းများ စတင်သည်မှ (၇) ရက်အတွင်း စီမံကိန်းက တည်ဆောက်ရေးလုပ်ငန်းများ စတင်ကြောင်းကို တည်ဆောက်ရေးလုပ်ငန်းအစီအစဉ်များနှင့်တကွ အစီရင်ခံစာပြုစုကာ စောင့်ကြည့်အဖွဲ့ထံဖြန့်ဝေရန်

(ဇ) စောင့်ကြည့်အဖွဲ့သည် တည်ဆောက်ရေးလုပ်ငန်းများစတင်ကြောင်း အစီရင်ခံစာရရှိသည့်နေ့တွင် စတင်အသက်ဝင်သည်

(ဈ) စီမံကိန်းသည်ဝန်အားပြည့် စတင်လည်ပတ်သည်မှ (၇) ရက်အတွင်း စောင့်ကြည့်အဖွဲ့ထံ စတင်လည်ပတ်ကြောင်းကို အကြောင်းကြားရန်

(ည) စောင့်ကြည့်အဖွဲ့၏ စုံညီအစည်းအဝေးကို အနည်းဆုံး (၁၂) လလျှင် တစ်ကြိမ်ကျင်းပကာ စောင့်ကြည့်အဖွဲ့၏ ရည်ရွယ်ချက်များနှင့် တာဝန်များကို ဆွေးနွေးညှိနှိုင်းပြီး ပိုမိုကောင်းမွန်သော မူဝါဒများချမှတ်ရန်

၉။တွေ့ရှိချက်များအားထုတ်ဖော်ခြင်း

ယခုအစီရင်ခံစာအကျဉ်းချုပ်ပါ အချက်အလက်များသည် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း လုပ်ငန်းမှ တွေ့ရှိချက်များကို အနှစ်ချုပ်ဖော်ပြထားခြင်းဖြစ်ပါသည်။ ဤအစီရင်ခံစာပါအချက်အလက်များကို ရပ်မိရပ်ဖများအနေဖြင့် သေချာစွာဖတ်ရှုလေ့လာပြီး ဆွေးနွေးလိုသည်များ၊ အကြံပြုလိုသည်များကို လူထုတွေ့ဆုံပွဲတွင်ရင်းနှီးပွင့်လင်းစွာ ဆွေးနွေးအကြံပြုကြပါရန် မြန်မာနိုင်ငံအင်ဂျင်နီယာအသင်းက မေတ္တာရပ်ခံအပ်ပါသည်။

၁၀။နိဂုံး

I&H Engineering ကုမ္ပဏီလီမိတက် မှ ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ကွန်ကရိပစ္စည်း စက်ရုံ တည်ဆောက်ရေးစီမံကိန်း အတွက် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းလုပ်ငန်း (ESIA) ပြုလုပ်နေပါသည်။ စီမံကိန်းလုပ်ငန်းစဉ်များနှင့် သက်ရောက်ခံပတ်ဝန်းကျင်၏အချိတ်အဆက်၊ ရပ်မိရပ်ဖများ၏ သဘောထား အမြင်များ၊ ဆွေးနွေးအကြံပြုချက်များအပေါ် မူတည်ကာအဓိကကျသည့် ပတ်ဝန်းကျင်ဆိုင်ရာနှင့် လူမှုစီးပွားသက်ရောက်မှုများကို ဖော်ထုတ်ထားပြီး ၎င်းတို့အနက်မှ (၆) ခုကိုဤအနှစ်ချုပ်အစီရင်ခံစာတွင်

ရှင်းလင်းတင်ပြထားပါသည်။ ဆိုးကျိုးသက်ရောက်မှုများကို လျော့ချကုစားရန်နည်းလမ်းများကိုလည်း အကျဉ်းရုံးတင်ပြထားပါသည်။ ရပ်မိရပ်ဖများကလေ့လာဖတ်ရှုပြီးဆွေးနွေးတိုင်ပင်ကြခြင်းအားဖြင့် စီမံကိန်း အကောင်အထည်ဖော်ရန် စဉ်းစားဆုံးဖြတ်မှုလုပ်ငန်းစဉ်တွင် ဒေသခံများကိုယ်တိုင်ပါဝင်ဆုံးဖြတ်ခွင့် ရကြမည်ဖြစ်ပါသည်။ ထို့ကြောင့် ဤအနှစ်ချုပ်အစီရင်ခံစာပါ အချက်အလက်များကို လေ့လာဖတ်ရှုပြီးရင်းနှီးပွင့်လင်းစွာ တိုင်ပင်ဆွေးနွေး အကြံပေးကြပါရန် မြန်မာနိုင်ငံအင်ဂျင်နီယာအသင်းမှ လေးစားစွာဖိတ်ခေါ်အပ်ပါသည်။

သက်ရောက်မှုများနှင့်အရေးယူဆောင်ရွက်ရန်နည်းလမ်းများ

စဉ်	သက်ရောက်မှု	ဆောင်ရွက်ရန်
၁	မြေထုပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု	(၁) မြေဖို့ခြင်းနှင့်မြေတူးလုပ်ငန်းများကို မိုးရွာသွန်းမှု နည်းပါးချိန်တွင်ဆောင်ရွက်ခြင်း (၂) မြေဖို့ခြင်းနှင့်မြေတူးလုပ်ငန်းများ ဆောင်ရွက်ပြီးချိန်တွင် တည်ဆောက်ရေးလုပ်ငန်းများကို ဆောလျှင်စွာ ဆောင်ရွက်ခြင်းဖြင့် မလိုအပ်သော မြေဆီလွှာပြုန်းတီးမှုများ မဖြစ်ပေါ်အောင် ဆောင်ရွက်ခြင်း (၃) မြေသားလုပ်ငန်း ဆောင်ရွက်ထားသည့် နေရာများတွင် ရေစီးကြောင်းများ ဖြတ်သန်းစီးဆင်းမှု မရှိအောင် ဆောင်ရွက်ခြင်း (၄) တည်ဆောက်ရေးလုပ်ငန်းများ ပြီးစီးပါက သင့်လျော်သည့် အပေါ်ယံ မြေဆီလွှာများ ပြန်လည်ဖြည့်တင်း ပြီး မြေဆီလွှာထိန်းသိမ်းနိုင်သည့် သစ်ပင်ပန်းမံများ ပြန်လည်စိုက်ပျိုးခြင်း
၂	ရေထုပတ်ဝန်းကျင်အပေါ် သက်ရောက်မှု	(၁) စီမံကိန်း တည်ဆောက်ရေး လုပ်ငန်းများ လုပ်ဆောင်နေချိန် ဘိလပ်မြေနှင့် လောင်စာဆီများ ယိုဖိတ်ခြင်းမရှိအောင်အထူးသတိပြုဆောင်ရွက်ခြင်း (၂) တည်ဆောက်ရေးကာလတွင် ထွက်ရှိသည့် စွန့်ပစ်ရေများကို အနည်ထိုင်ကန်များတွင် စုစည်းအနည်ထိုင်စေပြီး ကြည်လင်သောရေကိုသာ စွန့်ပစ်ခြင်း (၃) စီမံကိန်းပတ်ဝန်းကျင်ရှိ ရေနှုတ်မြောင်းများကို စနစ်တကျ ပြုပြင်တည်ဆောက်ခြင်း (၄) စီမံကိန်းအတွက် မြေအောက်ရေရယူရာတွင် ဝန်ထမ်းအိမ်ယာမှ ရေတွင်းများထက် ပိုမိုနက်ရှိုင်းသည့် အောက်ဘက် ရေကြောမှ ရေကို ထုတ်ယူသုံးစွဲခြင်း

		(၅) ဝန်ထမ်းအိမ်ယာမိသားစုများအတွက် သောက်ရေ၊ သုံးရေ ဖြန့်ဝေကူညီပေးနိုင်မည့် အစီအစဉ်များကို လူမှုရေးတာဝန်သိအစီအစဉ် (CSR) တွင်ထည့်သွင်းဆောင်ရွက်ခြင်း (၆) မိုးရေစုဆောင်းသိုလှောင်ပြီး အသုံးပြုနိုင်မည့် အစီအမံများ စီမံထားရှိခြင်း (၇) ရေသုံးစွဲမှု လျှော့ချချွေတာနိုင်မည့် အစီအစဉ်များ စီမံထားရှိခြင်း (၈) ရေသုံးစွဲမှု လျှော့ချနိုင်မည့် အိမ်သာနှင့် သန့်စင်ခန်းသုံးပစ္စည်းများ အသုံးပြုခြင်း
၃	လေထုပတ်ဝန်းကျင်အပေါ်သက်ရောက်မှု	(၁) မြေသားလုပ်ငန်း ဆောင်ရွက်ရာတွင် ဖုန်မှုန့်နှင့် အမှုန်အမွှားများ လွင့်ပျံနိုင်သည့် နေရာများနှင့် မြေသားလမ်းများကို အနည်းဆုံး တစ်နေ့လျှင် နှစ်ကြိမ် ရေဖြန်းရန် (၂) စီမံကိန်းဇရိယာတွင် မောင်းနှင်သည့် မော်တော်ယာဉ်များကို တစ်နာရီလျှင် (၁၅) မိုင်နှုန်းထက် ကျော်လွန်မောင်းနှင်ခြင်း မပြုစေရေးကြပ်မတ်ထိန်းသိမ်းရန် (၃) မြေစာသယ်မည့်ကားများကို လိုအပ်သည့် အဖုံးအကာများ ဖုံးအုပ်ရေးကြပ်မတ်ပေးရန် (၄) အဆောက်အဦးများအတွင်းမှ ထွက်ရှိသည့် အမှုန်အမွှားများကို လေစုပ်ပန်ကာ (Exhaust Fan) များဖြင့် စုပ်ထုတ်ပြီး လေထုအတွင်းတိုက်ရိုက်မှုတ်မထုတ်ဘဲ အမှုန်အမွှားများ ဖမ်းယူခြင်း (၅) အဆောက်အဦးပြင်ပ အမှုန်အမွှားများ ကျရောက်တတ်သည့် နေရာများကို ပုံမှန် ရေဖြန်းခြင်း၊ လှဲကျင်းခြင်း (၆) စက်ရုံသို့ ကုန်ကြမ်းသယ်ပို့သည့်ကားများတွင် လိုအပ်သည့် အဖုံးအကာများ ဖုံးအုပ်ရေး ကြပ်မတ်ခြင်း (၇) လေပြင်းတိုက်ခတ်ချိန်များတွင် အမှုန်အမွှားထွက်ရှိမှု များပြားသည့် လုပ်ငန်းများကို ယာယီရပ်နားထားခြင်း (၈) လုပ်ငန်းလည်ပတ်ချိန်တွင် အမှုန်အမွှားလွင့်ပျံမှုနှင့် ပတ်သက်၍ ဆက်သွယ်ဆောင်ရွက်နိုင်မည့် တာဝန်ခံတစ်ဦးထားရှိပြီး ဆက်သွယ်ဆောင်ရွက်နိုင်မည့် အချက်အလက်များကို အနီးအပါးနေထိုင်သူများထံ ဖြန့်ဝေထားရှိခြင်း

		(၉) စက်ရုံခြံစည်းရိုးပတ်လည်တွင် လေကာပင်များ စိုက်ပျိုးခြင်း
၄	ဆူညံသံနှင့်တုန်ခါမှု	(၁) စက်ယန္တရားများကို စနစ်တကျ ပြုပြင်ထိန်းသိမ်းခြင်းဖြင့် မလိုအပ်သော ဆူညံသံများ မဖြစ်ပေါ်အောင် ထိန်းသိမ်းခြင်း (၂) ဆူညံသံ ထွက်ပေါ်မှု မြင့်မားသည့် တည်ဆောက်ရေး လုပ်ငန်းများကို ညဘက်လူခြေတိတ်ချိန်တွင် ဆောင်ရွက်မှု မပြုခြင်း (၃) မီးစက်များ၊ အင်ဂျင်များတွင် အသံထိန်းစနစ် (Silencer/Muffler) များ တပ်ဆင်အသုံးပြုခြင်း (၄) အသံဆူညံမှု မြင့်မားသည့် နေရာများတွင် အလုပ်လုပ်ကိုင်ရသည့် လုပ်သားများအတွက် လိုအပ်သည့် လုပ်ငန်းခွင်သုံး ကာကွယ်ရေးပစ္စည်းများ လုံလောက်စွာ စီစဉ်ထားရှိပြီး စနစ်တကျအသုံးပြုရေး ကြပ်မတ်ဆောင်ရွက်ခြင်း (၅) အသံဆူညံမှုနှင့်ပတ်သက်၍ ဆက်သွယ်ဆောင်ရွက်နိုင်မည့် တာဝန်ခံတစ်ဦးထားရှိပြီး ဆက်သွယ်ရန် အမည်နှင့်ဖုန်းနံပါတ်များပါဝင်သည့် ကြေညာစာများကို စီမံကိန်းပတ်ဝန်းကျင် ဒေသများတွင် ဖြန့်ဝေထားရှိခြင်း
၅	အများပြည်သူ ဘေးအန္တရာယ်ကင်းရှင်းရေး နှင့် ကျန်းမာရေး	(၁) စက်တပ်ဆင်ရေးအတွက် ကြီးမားလေးလံသော စက်ပစ္စည်းများ သယ်ယူရာတွင် ယာဉ်အသွားအလာ များပြားသော လမ်းကြောင်းနှင့် အချိန်များကို ရှောင်ရှားခြင်း (၂) ဒေသခံများနှင့် စက်ရုံမှ တာဝန်ရှိသူများ အပြန်အလှန် ဆက်သွယ်နိုင်မည့် ဆက်သွယ်ရေး လမ်းကြောင်းတစ်ခု ထားရှိခြင်း (၃) ပြည်လမ်းမကြီးမှ စက်ရုံသို့ အဝင်လမ်းကို လုံလောက်သည့် အကျယ်အဝန်းရှိအောင် ခင်းကျင်းခြင်း (၄) စက်ရုံ ဝင်/ထွက်လမ်းနှင့် ပြည်လမ်းမကြီး ဆုံသည့်နေရာကို လုံလောက်သည့် အကျယ်အဝန်းရှိအောင် ခင်းကျင်းခြင်း (၅) ကုန်ကြမ်းပစ္စည်းများ အတင်အချပြုလုပ်ရန် လုံလောက်သည့် ဇရိယာထားရှိခြင်း (၆) ကုန်ချောပစ္စည်းများ အတင်အချပြုလုပ်ရန် လုံလောက်သည့် ဇရိယာ ထားရှိခြင်း (၇) အဝင်၊ အထွက်ယာဉ်များအတွက် စနစ်ကျနသည့် လမ်းကြောင်းစီမံခန့်ခွဲမှုများ ထားရှိခြင်း (၈) လူမှုရေးတာဝန်သိအစီအစဉ်ဖြင့် ဒေသခံများအတွက် ကျန်းမာရေးစောင့်ရှောက်မှု လုပ်ငန်းများ ဆောင်ရွက်ပေးခြင်း

၆	လုပ်သားကျန်းမာရေးနှင့် လုပ်ငန်းခွင်အန္တရာယ် ကျရောက်နိုင်မှု	(၁) ကုန်ကြမ်းကုန်ချော သယ်ယူပို့ဆောင်သည့်ယာဉ်များနှင့် လုပ်ငန်းခွင်သုံးယာဉ်များတွင် ယာဉ်နောက်ဆုတ်ချိန် သတိပေးသံ၊ သတိပေးမီး များ တပ်ဆင်ထားရှိခြင်း (၂) အလုပ်သမားများအတွက် အလုပ်ခွင်မဝင်မီနှင့် အလုပ်သိမ်းချိန်များတွင် ဆေးကြောသန့်စင်မှု ပြုလုပ်နိုင်မည့်နေရာ၊ အဝတ်လဲခန်း စသည်တို့ကို လုံလောက်စွာ စီမံထားရှိခြင်း (၃) သတ်မှတ်ထားသည့်နေရာမှအပ အခြားနေရာများတွင် အစားအစာများ စားသောက်ခြင်း၊ ဆေးလိပ်သောက်ခြင်း စသည်တို့ကို ကန့်သတ်တားမြစ်ခြင်း (၄) စက်ရုံသန့်ရှင်းရေးလုပ်ငန်းများကို စနစ်ကျနစွာဖြင့် ပုံမှန် ပြုလုပ်ခြင်း (၅) ကုန်ကြမ်းကုန်ချောများကို စနစ်တကျစုပုံခြင်း၊ ထပ်စီခြင်းဖြင့် အရာဝတ္ထုများ အမြင့်မှ ပြုတ်ကျမှုကို ကာကွယ်ခြင်း (၆) ကျန်းမာရေးနှင့် ညီညွတ်ပြီး လုံခြုံမှု အပြည့်အဝ ပေးနိုင်သည့် အလုပ်သမား တန်းလျားများ စီစဉ်ထားရှိခြင်း (၇) ဝတ်စုံ၊ လက်အိတ်၊ မျက်နှာဖုံး၊ နားကြပ်၊ ဦးထုပ် စသည်ဖြင့် လိုအပ်သည့် လုပ်ငန်းခွင်သုံး တစ်ကိုယ်ရေကာကွယ်ရေးပစ္စည်း (PPE) များ လုံလောက်စွာ စီစဉ်ထားရှိပြီး စနစ်တကျ ကိုင်တွယ် အသုံးပြုရေး ကြပ်မတ်ကွပ်ကဲခြင်း (၈) လုပ်ငန်းခွင် အန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာများကို လုပ်သားများအား ပညာပေးပြီး စနစ်တကျ လိုက်နာ ကျင့်သုံးစေရေး ကြပ်မတ်ကွပ်ကဲရန် (၉) လုပ်ငန်းခွင်အန္တရာယ်ကင်းရှင်းရေး အရာရှိ (Safety Officer) တစ်ဦးထားရှိပြီး လုပ်ငန်းခွင် အန္တရာယ် ကင်းရှင်းရေးလုပ်ငန်းများ စနစ်တကျ ဆောင်ရွက်ခြင်း

1. EXECUTIVE SUMMARY

1. INTRODUCTION

IHI Asia Pacific Pte. Ltd. of Singapore and the Department of Highways under Ministry of Construction of the Republic of the Union of Myanmar started a joint venture company namely I&H Engineering Co., Ltd. to carry out the business relating to the manufacturing and supply of concrete structures to meet the social development and economic demand in the Republic of the Union of Myanmar and neighboring countries.

Project location is Block No.3, Kalar Kone village, Myanundagar Industrial Zone, Hmawbi Township, Yangon Region, the Republic of the Union of Myanmar. Project area is 16 acres (65,272 square meter). The land is state-owned land managed by Department of Highways which is leased to I&H for a period of 15 years starting from 1 January 2016 to 31 December 2030.

Environmental and Social Impact Assessment (ESIA) study for the project was carried out by MYANMAR ENGINEERING SOCIETY from March 2016 to November 2016. The study was performed in accordance with the Environmental Conservation Law 2012, Environmental Conservation Rules (2014) and EIA Procedures.

2. OBJECTIVES OF THE STUDY

ESIA study for I&H PRECAST CONCRETE FACTORY is performed to investigate the legality of the project; to study the background environmental and socioeconomic profile of the area; to release project information for the general public, to study the environmental, social and socioeconomic issues likely to occur, and to devise mitigation and enhancement measures for key environmental and social impacts.

3. SCOPE OF THE STUDY

The ESIA study focusing the project area and its vicinity includes MOC staff quarter and Kalar Kone village. General study scope of ESIA team includes preliminary study, scoping, public participation, household survey, baseline environmental data survey, impact identification and assessment, EMP, SMP, report drafting, disclosure of draft report, and finalizing the report.

4. LEGAL FRAMEWORK

ESIA team carried out thorough reviews on a number of laws, rules, procedures and notifications to justify the compliance of the project and its activities with relevant Myanmar laws. Some of the relevant laws ESIA team focused are Foreign Investment Law, Ward and Village Tract Administration law, Factory Act 1951, Employment and Skill Development Law and others.

5. PROJECT DESCRIPTION

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Table A. Building to be Constructed

Sr.	Items	Unit	Area
1	Factory Building	m^2	5,864
2	Stock Yard	m^2	6,080
3	Batching Plant	m^2	800
4	Aggregate Storage	m^2	500
5	Office	m^2	768
6	Canteen	m^2	324
7	Accommodation	m^2	451
8	Car Parking	m^2	257
9	PC Girder Fab. Area	m^2	2,560
10	Total Footprint Area	m^2	17,604
11	Total Area	m^2	65,272

6. SURROUNDING ENVIRONMENT

6.1. WATER QUALITY

The baseline water quality status in the region is established by analyzing samples at four locations consisting of drainage channel from Kalar Kone village and three ground water samples from the project compound, the MOU staff quarter and the Chan Aye meditation center near the project. The criteria for the selection of sites was determined on the project location, agricultural land, slope of the land surface, topographical land upstream and downstream of the project, channels adjacent to irrigated fields, potential areas of polluted water and the location of the drainage and its discharge system. All water samples were analyzed for their physiochemical properties in ISO TECH laboratory.

6.2. GEOLOGY

As part of the ESIA study, specialist geological input is required in order to identify potential environmental impacts on the geological environment within the study area. The study area is located near the bank of Hlaing River and built-up area of Myaungdagar Industrial Zone. Therefore, the topography is quite flat, with no major differences in altitude. Based on the geological map of Myanmar, the regional geology of the proposed area and its surrounding is lied in Holocene Age of Younger Alluvium (Q2) and bounded by Upper Miocene to Pliocene Age of Irrawaddy Formation. The local geology of the project area is almost covering by alluvial soil.

6.3 AIR QUALITY

Surrounding air quality survey was carried out in two locations AQ-1, located near the factory, and AQ-2 was located near the village. Sampling and analysis of ambient air quality were conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S. EPA). According to the results of ambient air quality measured at AQ-1, and AQ-2, the concentrations of PM2.5 and PM10 are within the Myanmar Emission Guideline (MEG) value, WHO guideline value and National Ambient Air Quality Standard (NAAQS). For gases, comparing with the MEG value, WHO guideline value and NAAQS, the concentration of all gases were within the acceptable limit for industrial, residential, rural and other areas. Collected all data are less than the WHO Guidelines, NAAQS, MEG value. All these data are no significant effect on the environment.

6.4. BIODIVERSITY

The project area is located at Myaung Ta Gar Industrial Zone, Hmawbi Township, Yangon division. The project area comprises main factory shop, concrete blending factory, warehouse, canteen, main office, staffs'houses and car parking . The total area of project site including these building and dormitory may be 16 acre.

Flora, mammal and bird surveys were conducted at the development site. Species diversity of five groups, Insects (butterfly, dragonfly and damselfly, Fish, Amphibians (toads and frog), Reptiles (snake and lizard) and Birds examined. A total of 76 species representing butterfly (13 species), dragonfly and damselfly (15 species), Fish (10 species), Frog and Toad (8 species), Lizard and Skink (4 species), Snake (2 species) and birds (16 species), mammals (8 species) are recorded. In case of flora survey, there are 12 tree species, 28 small tree species, 30 shrubs, 42 herbs, 28 climbers, 10 grass, 2 ferns and 7 aquatics within the study area at preesent.

It will be considered to identify the biological impacts, existing biological condition, the biological impacts, and mitigation measure for environmental protection management.

7. IMPACT ASSESSMENT AND MITIGATIONS

To identify the potential environmental and social impacts of the project, project activities were correlated with environmental and social receptors and their interactions were identified for potential environmental and social impacts. ESIA team finds out following key environmental and social impacts of the project on its environment.

7.1. IMPACT ON OCCUPATIONAL SAFETY AND HEALTH

Personal injuries and illnesses arising out of work situations impose a substantial burden in terms of lost production, wage loss, medical expenses, and disability compensation payments. Proponent has to take effort to reduce the number of occupational safety and health hazards at the places of employment.

Occupational hazard such as falling from height, hit by fallen objects, injure by sharp objects, electric shock, and slipping etc., will be associated with the project construction works. In operation phase, the potential hazards for worker in precast manufacturing are eye, skin and respiratory tract irritation from exposure to cement dust, inadequate safety guards on equipment, inadequate lockout systems on machinery,

overexertion and awkward postures, slips, trips and falls and chemical burns from wet concrete.

7.2. IMPACT ON BIODIVERSITY

The project area lies within the government construction site compound which had been already cleaned up. For this reason, there is no natural vegetation in the direct impact zone. Only the cultivated species were collected in this zone. No endangered species were identified in the area. Direct mortality of wildlife could occur during construction activities and maintenance operations. Negative impacts include disturbance to the landscape, dust and noise and disruption to local biodiversity.

The site has a very low representation of fauna, due to the uncultivated area and limited range of habitats on site. The vegetated boundaries are of low species diversity and poor structure. There is an almost total lack of ponds, and there are no rivers or streams on the site. Admixtures are used in concrete mixtures in very small quantities and therefore have negligible environmental impact. Their use is important since they provide added benefits to the concrete and to the environment. There is no or little impact in the project area since the area lies within already cleaned up compound.

7.3. IMPACT ON COMMUNITY SAFETY AND HEALTH

Dust and particulate emissions, wastes generations, noise and vibrations could occur during the construction phase of the project. But the duration of the occurrence will be within the project construction phase. After finishing the construction, domestic solid wastes and domestic waste water will be generated upon project operations. Traffic hazard will also increase as public road ways will be used for the transportation of goods and personnel to and from the project. Negative impacts on CSH will be occurred due to the emissions from the project and the transportations but severity of impact will be low. The Master Plan should be prepared by a suitably qualified professional, and adequately cover fire prevention, detection and alarm system, fire suppression and control, emergency response plan, and operation and maintenance.

7.4. IMPACT ON WATER ENVIRONMENT

Soil, wood debris, concrete chunks and other construction wastes will be generated in the construction phase of the project which can cause drainage blockage if

they are handled improperly. If the solid wastes are managed improperly, they will scatter across the project area and finally end up in drainage causing blockage. In operational phase, including but not limited to excess concrete, concrete washout wastewater, concrete debris and aggregate by reusing the materials in concrete production would be potential impact on water environment.

In addition, the high content of total suspended solids (TSS) typically found in process water might be one of the negative impacts on water environment. Moreover, local community is worrying about depletion of groundwater by excessive use of the project. Local residences form MOC staff quarter discussed that the area around the project is poor in drainage capacity

7.5. IMPACT ON GEOLOGY AND SOIL

Concrete causes damage to the most fertile layer of the earth. Such impacts include excavation, displacement or importation of soil, stockpiling, mixing, wetting, compaction and pollution of soil, soil erosion and sedimentation. On operational phase, soil erosion and pollution of soil could occur because of transporting raw materials and products, particle emissions from batching, maintenance and alteration mold and abutment and stripping processes. The project needs to avoid discharging the waste water (e.g, wash water and process water) directly to the soil environment.

7.6. IMPACT ON AMBIENT AIR QUALITY

Emissions of air pollutants can occur from a wide variety of activities during the construction and operation. Dust will be generated from earth work such as leveling, digging, filling at the project site and transportation of soil resulted from the earth work in construction phase. Significant sources of odor emission from project construction phase will be operation of machinery, road asphalting and painting works.

In operational phase, every process from pre-production process to product finishing/delivery process will generate emissions of air pollutants and particles. In pre-production processes, precast material supply processes and stripping process many saws will be used and these processes could be generated particle emissions. Odor emission from concrete mixing, poring and casting processes might be occurred and these emissions will be significant impact.

7.7. IMPACT FROM NOISE AND VIBRATION

During construction and decommissioning activities, noise and vibration could occur by the operations of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. Various sources will create noise and vibration in the construction phase of the project. Piling and operation of other heavy machinery will produce significant noise.

In operation phase, the fabrication of hollow core slabs requires sawing the hardened concrete, producing noise levels that can exceed 85 dB. On operational phase, noise and vibration could be occurred by truck traffic, loading and unloading equipment (e.g. cranes, wheeled loaders), conveyance system and machines from every processes of the project.

7.8. JOB OPPORTUNITY

Local people will obtain job opportunities for the construction of I&H Precast Concrete Factory project. Moreover, there will be direct and indirect job opportunities for the local community at I&H precast concrete production works. About (151) vacancy for local community will be provided to maintain and operate the project. It is necessary to enhance the positive impact, job opportunity.

Table B. Summary of Impact Significance With/Without MEMs

Sr.	Impact	Without Mitigation		With Mitigation	
		Rating	Significance	Rating	Significance
1	Occupational Safety and Health	80	Medium-High	60	Low- Medium
2	Impact on Biodiversity	90	Medium-High	70	Low- Medium
3	Community Safety and Health	72	Low - Medium	49	Low
4	Impact on Water Environment	80	Medium - High	56	Low- Medium
5	Impact on Geology and Soil	90	Medium-High	70	Low- Medium

6	Impact on Ambient Air Quality	100	Medium-High	64	Low - Medium
7	Impact from Noise and Vibration	64	Low-Medium	42	Low
8	Job Opportunity	45	Low	63	Low-Medium

Table C. Summary of Mitigation /Enhancement Measures

Sr.	Impact	Mitigation/Enhancement Measures
1	Occupational Safety and Health	1. Eliminating some of the hazards by removing inessential activities from the work 2. Controlling the hazard at its source through use of engineering controls such as local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc… 3. Minimizing the hazard through design of safe work systems and administrative or institutional control measures such as job rotation, training safe work procedures, workplace monitoring, limiting exposure or work duration, etc... 4. Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE 5. Providing safe, secure and healthy camps for construction workers adequately 6. Providing necessary training on OSH for workers and supervise their implementation at work place 7. Implementing of OSH programmes systematically by appointing a safety officer 8. Following occupational safety and health section of this report completely 9. Must have flasher and warning alarm for going backward direction in every project vehicle 10. Provide hearing protection if needed to guard against excessive noise exposure 11. Prohibit smoking and taking meal in project area except allow area 12. Provide ablutions and loker-rooms for workers adequately 13. Practice cleaning process regularly and systematically
2	Impact on Biodiversity	1. To implement air pollution, water pollution, and soil pollution management programs delineated in EMP 2. Project implementation must conform to the existing environmental laws 3. To establish a plan to restore and replant the trees as landscaping scheme in the project area.

		4. To plant quick growing tree species as a wind-break behind the wall of the compound 5. To establish a plan to aid the socio-economic and livelihood of local people 6. Noise pollution of project construction should be minimized 7. Identify potential environmental impacts associated with construction and operation of the proposed Pre-cast concrete Project development 8. Regularly maintain production and wastewater treatment systems 9. Contribute to the removal of organic matters from polluted water 10. Replantation must be practiced in the indirect zone 11. Reduce dust and air pollution as far as possible 12. Wetting of roads to reduce traffic dust and reentrained particles 13. Solutions Limited as well as the implementation of appropriate mitigation 14. Many saws used in precast facilities are equipped with vacuum attachments to help reduce particulate emissions
3	Community Safety and Health	1. Providing adequate pavement with for the access road 2. Providing enough turning area at the junction point 3. Providing adequate unloading area for raw material transport 4. Providing adequate loading area for product precasts 5. Providing systematic vehicle management for incoming and outgoing vehicles 6. Using of enclosed/ covered areas for storage and handling of raw materials for precast concrete production, e.g. cements, sands, gravels, etc. 7. All the conveyors/vehicles for the transportation should be covered from all side, if possible 8. Conducting awareness program for traffic hazard in local community and drivers so that project related traffic incidents could be prevented or reduced on roads Avoiding high hazard routes and crowded periods in local communities so that traffic hazard could be minimized 9. Implementing systematic waste management system so that health hazard on local community could be prevented 10. The Master Plan should be prepared and adequately cover fire prevention, detection and alarm system, fire suppression and control, emergency response plan, and operation and maintenance. 11. Provide a connection between the representatives of project and local communities 12. Providing support for health sector of the local communities in CSR programme

4	Impact on Water Environment	1. Prevent leaking out fuel, lubricants and cement during construction period 2. Discharge only clear water from sedimentation tank, which is used to sendimentate waste water from construction 3. Providing necessary covering for drainages around the project 4. Providing adequate drainages around the project area 5. Conduct awareness program for effective utilization of water 6. Provide toilets and basins which need low capacity of water 7. Build raw materials receipt, processing and product storage places without running off and draining in water 8. The plant recycles as much of the treated water as possible when cleaning production equipment with a pressure washing 9. The discharge of process water should be treated to fulfill the limit for total suspended solids, pH and chemical composition. 10. The factory should investigate ways to minimize waste by recycling materials and ultimately strive for a zero-discharge manufacturing by completely recycling all process water. 11. Avoiding extraction of ground water as much as possible 12. Providing alternative water source to the project and local community e.g, from Hlaing river. 13. Providing plans for water distribution to MOC staff quarter in long term as a CSR programme. ➢ The plan must include distribution capacity for the staff quarter ➢ Time to start the construction of the infrastructure ➢ Estimated cost for construction ➢ Time to start the water distribution ➢ Estimated cost for distribution ➢ Anticipated cost sharing plan for distribution (if any) ➢ Dynamic discussion with MOC staff about the plan
5	Impact on Geology and Soil	1. Schedule excavation during low-rainfall periods, when possible 2. No sooner had excavated than construct immediately in order to mitigate soil erosion 3. Control concentrated flow and runoff to reduce the volume and velocity of water from work sites to prevent formation of rills and gullies 4. After the construction, land fill with appropriate fertile top soil and plant the flora to control the fecundity and richness of soil 5. Provide adequate storage for raw materials and products

		6. Install curbs to prevent runoff and install adequate covers to prevent windblown litter 7. Collect waste water with allocated channels and treat to meet applicable environmental standards to prevent soil pollution 8. Provide the closed room type enclosure for storage and handling if possible and necessary 9. Correct use of hazardous substances should be controlled in order to prevent soil pollution
6	Impact on Ambient Air Quality	1. Places of dust emission during earth works must be sprayed with water at least two times a day 2. A speed limit of 15 mph must be set for vehicles travelling within the project site 3. Unpaved road and tracks within the project area must be sprayed with water at least two times a day 4. Provide covering for dump trucks as necessary 5. Wheels of dump trucks must be washed with water jet in every outbound travel from the project site. 6. Need to enforce to cover to every truck for inbound and outbound transportation of the project 7. Need to be use any type of suppressant (e.g water) on yards and roadways 8. Bag houses and filters need to be installed adequately and properly maintained to ensure that only clean air is released to atmosphere. 9. Need to be equipped with vacuum attachments in saws used in project to help reduce particulate emissions. 10. A closed room type enclosure should be provided for storage and handling materials if necessary and possible 11. The adequate dust extraction must be provided from various points of dust generation starting from pre-production process to transportation process.
7	Job Opportunity	1. Liver advertisement for every recruitment at ward administration offices 2. Local people must be prioritized for employment
8	Impact from Noise and Vibration	1. Preventing unnecessary mechanical noise by carrying out regular maintenance work for vehicle and machinery 2. Avoiding high noise construction work in night time 3. Selecting equipment with lower sound power levels 4. Installing silencers for fans 5. Installing suitable mufflers on engine exhausts and compressor components

		6. Installing acoustic enclosures for equipment casing radiating noise 7. Improving the acoustic performance of constructed buildings, apply sound insulation 8. Installing vibration isolation for mechanical equipment 9. Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas 10. Re-locating noise sources to fewer sensitive areas to take advantage of distance and shielding 11. Reducing project traffic routing through community areas wherever possible 12. Developing a mechanism to record and respond to complaints

8. ENVIRONMENTAL MONITORING PROGRAMME

Environmental monitoring programmes must be carried out to justify the effectiveness of the EMP so that it can be reviewed and modified in due course of the project implementation.

Table D. Environmental Monitoring Programme

Domain	Parameter	Frequency	Location	Method	Phase	Respon-sibility
Air	Dust	Daily	Project Compound	Visual inspection	C	CC
	NO_2	Annually	Stack gas from standby engine exhaust	By accredited person	O	PM
	SO_2	Annually	Stack gas from standby engine exhaust	By accredited person	O	PM
Water	Ph	Bi-monthly	Waste water from the outlet of STP	By accredited person	O	PM
	TSS	Bi-monthly	Waste water from the outlet of STP	By accredited person	O	PM
	BOD	Bi-monthly	Waste water from the outlet of STP	By accredited person	O	PM
	COD	Bi-monthly	Waste water from the outlet of STP	By accredited person	O	PM
	Oil and Grease	Bi-monthly	Waste water from the outlet of STP	By accredited person	O	PM

Noise	Noise levels	Weekly	At 5 noise sites	By accredited person	C	CC
		Bi-monthly	At 5 noise sites	By accredited person	O	PM

O = Operation Phase C= Construction Phase

CC= Construction Contractor PM= Project Management

9. ENVIRONMENTAL MONITORING TEAM

An Environmental Monitoring Team must be established for successful implementation of the environmental management plan. The project proponent is responsible for complete implementation of the EMP. Proponent will carry out environmental monitoring programme which is part of the EMP and the monitoring report will be distributed to the participants of the monitoring team. Implementation of CSR programme will also be facilitated with the participation of the monitoring team. Local community could communicate with the project for environmental affairs through the monitoring team. The objectives of the Environmental Monitoring Team are as follows:

(a) To release information on the implementation of EMP for local community continuously

(b) To distribute information on environmental monitoring to local community

(c) To create a proper communication channel between the project and local community relating to environmental affairs

(d) To insert a check and balance action for the management of fund and aids provided by the CSR programme

The team mainly consists of representatives from government departments, the project and local communities. The representatives from local communities must be elected by respective local communities by themselves.

10. CORPORATE SOCIAL RESPONSIBILITY (CSR) PROGRAMME

The project will provide about two percent of its annual net profit for carrying out CSR programs in local community. Educational sector, health sector, social affairs, economic sector, infrastructural sector, disaster aid programmes for MOC staff quarter and Kalar Kone village will be included in CSR programmes. CSR programme will be executed in coordination with the local community and administrative bodies.

Programmes for employers such as social welfare, health care, educational aid, and professional development trainings must also be included in CSR programme.

11. PUBLIC CONSULTATIONS AND INFORMATION DISCLOSURES

First public meeting for releasing project information to general public requesting their comments and suggestions on the project was carried out on April 3rd, 2016 at No. (3) management office, Myaung Takar Industial park, Mhaw Bi Township. There were about 45 people from local community, employees from the project, representatives from the project and representative from MES attended the public meeting and participated in open discussion.

Discussions of the local people in the meeting could be summarized as follows.

(1) Expected not to treat the families from MOC staff quarter carelessly
(2) Satisfied for the transparent public consultation
(3) Asked to describe the detail of the project
(4) Discussed that the electricity cost including guest house are being paid self
(5) Discussed about the negotiation with construction company for electricity
(6) Discussed to a team to corporate with project and local stuff quarter
(7) Worried about depletion of groundwater by excessive use of the project. Local residences form MOC staff quarter had experience in depletion of ground water (about 20 ft) coz of the factories in past. Requested to provide the management program adequately if these affects are occurred
(8) Requested to study for the case of particles from the project carefully
(9) Requested to take care about traffic
(10) Requested to upgrade and widen the access road
(11) Requested to provide systematically the drainages because flood by storm water usually occurs around the area.
(12) Requested to be sure for safety in transportation, storage and using chemicals

Second public meeting for releasing ESIA study results to general public requesting their comments and suggestions was carried out on July 30th 2016, at the Ingyin Pin Dhama Thu Kha Dha Ma Yone Hall, Zina Man Aung Stupa, Myaung Takar Industial park, Mhaw Bi Township. There were about 63 people from local community, employees from the project, representatives from the project and representative from MES attended the public meeting and participated in open discussion.

Discussions in the second public meeting are:

(1) Discussed that the destruction of the main access road
(2) Requested to provide the lighting of the road adequately and discussed about the lack of security of the local people coz of absence of lighting along the road
(3) Discussed about the traffic hazard for the children due to transportation vehicles
(4) Requested to repair the access road quickly and the road is severely damage
(5) Requested to make correction as the fencing supposed to exceed the project boundary

The representative from Kyaw Ther company replied that there are two security officers for the traffic hazards of the children. The one is serving at the school to take care children and the other is at the entrance to warm vehicles.

The representative from the project replied that

(1) For the traffic hazard, discussion will be made with Penta Ocean company and Kyaw Ther company and necessary action will be taken immediately
(2) For the road severely damage, the permission will be claimed from the MOC and the repairing and upgrading road will be done quickly as permission

12. CONCLUSION

There is a total of eight significant impacts by the project where seven out of eight are negative impacts and only one left is positive impact. Without any MEMs, there are five impacts with significance level of medium-high, two impacts with low-medium and one with low significance. By applying the delineated MEMs, five negative medium-high impacts will be reduced to low-medium level, two negative low-medium impact will become low and one positive low-medium impact will be enhanced to medium-high significance level, two positive low impacts will be enhanced to low-medium.

ESIA team concludes that the project could be environmentally and socially sustainable if it complies with the delineated environmental management and monitoring plans in due course of the time.

2. INTRODUCTION

2.1 Project Background

IHI Asia Pacific Pte. Ltd. of Singapore and the Department of Highways under Ministry of Construction of the Republic of the Union of Myanmar started a joint venture company namely I&H Engineering Co., Ltd. to carry out the business relating to the manufacturing and supply of concrete structures to meet the social development and economic demand in the Republic of the Union of Myanmar and neighboring countries.

Project location is Block No.3, Kalar Kone village, Myanundagar Industrial Zone, Hmawbi Township, Yangon Region, the Republic of the Union of Myanmar. Project area is 16 acres (65,272 square meter). The land is state-owned land managed by Department of Highways which is leased to I&H for a period of 15 years starting from 1 January 2016 to 31 December 2030.

Total investment for the factory is US$ (12,240,500) and 60% of the investment for the project US$ (7,343,100) is provided by IHI Pacific Pte. Ltd. and the remaining 40% US$ (4,895,400) will be provided by Department of Highways, Ministry of Construction. Job opportunity created by the plant will be about 156 posts including the part time directors.

Environmental and Social Impact Assessment (ESIA) study for the project was carried out by MYANMAR ENGINEERING SOCIETY from March 2016 to November 2016. The study was performed in accordance with the Environmental Conservation Law 2012, Environmental Conservation Rules (2014) and EIA Procedures (8th Draft).

2.2 Objectives of the Study

The aim of Environmental and Social Impact Assessment (ESIA) for I&H Precast Concrete Factory project is to enable the approving authority and the developer to properly consider the potential environmental and social consequences of the project and to delineate an environmental management plan for the project.

Primary objective of the report is to provide sufficient, clear and objective information for the approving authority to make a decision on whether to approve the project and if so, under what conditions.

ESIA study for I&H Precast Concrete Factory project is performed by MES with the following specific objectives:

(a) to investigate the legality of the project;
(b) to study the background environmental and socioeconomic profile of the area;
(c) to release project information for the general public;
(d) to study the environmental, social and socioeconomic issues likely to occur; and
(e) to devise mitigation and enhancement measures for key environmental and social impacts.

2.3 Scope of the Study

The ESIA study focusing the project area and its vicinity includes MOC staff quarter and Kalar Kone village. General study scope of ESIA team includes:

- Preliminary study – collecting and analyzing preliminary information such as project information, project location, maps and technical background;
- Scoping – carrying out field trip, identification of potential environmental impacts, and determination of what has to be covered in the ESIA to which extent
- Public participation – acquiring public comments, suggestions and input for the project by means of public meetings and consultation works;
- Household survey – carrying out a systematic socioeconomic data survey;
- Baseline environmental data survey – collecting baseline data relating to existing physical and biological environment of the project;
- Impact identification and assessment – identification of anticipated impacts and assessing them by using a conventional rating matrix system;
- EMP – delineation of MEMs for the anticipated negative and positive impacts;
- Report drafting – preparation of a draft report and a translated non-technical executive summary;
- Disclosure of draft report – delivering the translated non-technical summary report to stakeholders; and

- Finalizing the report – finalization of the report putting together all the information obtained.

2.4 Presentation of the Project Proponent

2.4.1 Identification of the Project Proponent

Table 1. Information of I & H Engineering Co., Ltd

Sr.	Particular	Name/ Address
1	Company Name	I&H Engineering Co., Ltd
2	Location Project	Block No.3, Kalar Kone village, Myanundagar Industrial Zone, Hmawbi Township, Yangon Region
3	Company Address	Block No.3, Kalar Kone village, Myanundagar Industrial Zone, Hmawbi Township, Yangon Region
4	Total investment	US$ (12,240,500)
5	Project Owner	I&H Engineering

Table 2. Particulars of Directors, Managers and Managing Agents of I&H

Sr.	Participant	Sector	NRC	Address
1	Mr. Minoru	Managing Director	Japanese PP No.TK1381407	302,4-12-21, Maehara-cho, Kogamei-shf Tokyo Japan
2	U Win Tint	Director	Myanmar 7 / Ta Nga Na (Naing)014547	No. 30461, 3rd Street, Dakkinathiri Ward, Dakinathiri City, Nay Pyi Taw
3	U Ohn Lwin	Director	Myanmar 14/Pa Tha Na (Naing) 080493	Room-12, Building (31), Sable Housing, Thiri Thudhama Road, Zayatheidi Quarter, Zabuthiri Township, Nay Pyi Taw.
4	U Khin Maung Kyaw	Director	Myanmar 12/Da Ga Na (Naing) 016064	Room-11, Building (31), Sabal Housing, Thiri Thudhama Road,

				Zayarthedi Quarter, Zabuthiri Township, Nay Pyi Taw
5	Mr. Tomoyuki Kuwata	Director	Japanese PP No.TR5440523	No.211-1, Forest Suginami 4-5-1, Warita-nishi, Suginami-ku, Tokyo, Japan
6	Mr. Takashi Nose	Director	Japanese PP No.TH8610337	Sengoku 3-26-2, Bunkyo-ku, Tokyo, Japan

Table 3. Project Contact Person of I&H Engineering Company Lomited

Sr.	Name	Ph no.	Email Address	Website
1.	Mr. Minoru	09974847598	m-tonegawa@ihe-mm.com	www.iandheigineering.com

2.5 Presentation of the Environmental and Social Experts

Myanmar Engineering Society (MES) will be the third party for EIA study and reporting for I& H Precast Factory Project. MES EIA team consists of the following core team and sector-wise participants.

Table 4. MES EIA Workgroup Core Team

Team Manager	U LIN	Vice President	Policy and Legal Analysis
Team Leader	U SOE MYINT	CEC, JGS	Socio-Economy
Team Members	U HLA BAW	CEC	Water Resources
	U KHIN MAUNG HTAEY	Vice President	Water Pollution Control
	U KHIN MAUNG MAUNG	CEC	Urban Planning
	DR. MAUNG HLAING	CEC	Cultural Heritage
	DAW HTAY HTAY WIN	CEC	Geology and Soil
	DAW MU MU AYE	CEC, JGS	Process Analysis

	DR. AUNG LAY TIN	CC	Air and Noise
	U YAN NAING AUNG	Workgroup Member	Facilitation of Meeting and Reporting

Table 5. Sector-wise Participants of MES EIA Team

Sr.	Participant	Sector	E-mail/Phone
1	Dr. Lae Lae Win Daw Mu Mu Aye	Biodiversity	Mu.biotech@gmail.com (959)5028189
2	U SoeMyint U Yan Naing Aung U PhyoMaung Maung U Thet Paing Zaw U Lin Thura Aung	Social Impact Assessment	soemyint26@gmail.com (959)977110495
3	U Lin U Yan Naing Aung	Environmental Management Plan	yannaingaung123@gmail.com (959)797508797
4	Dr. Aung Lay Tin	Noise and Air Quality Study	aunglaytin@gmail.com (959)256036414
5	Daw Htay Htay Win U Kyaw Zin Latt	Geology and Soil	kyawzin.htp@gmail.com (959)420067497
6	U Hla Baw U Khin Maung Htaey	Water Resources and Water Pollution Control	hlabaw.irr@gmail.com (959)8601618
7	Dr. Maung Hlaing U Khin Maung Maung Dr. Yin Min Peik	Cultural Heritage and Urban Planning	khinmgmg12@gmail.com (959)5136531
8	Daw Mu Mu Aye	Process Analysis	mu.biotech@gmail.com (959)5028189
9	U Yan Naing Aung Dr. Htin Lin Dr. Yin Min Pike	Reporting	yannaingaung123@gmail.com (959)797508797

	U Myint Maung Maung Than U Phyo Maung Maung U Lin Thura Aung		

Table 6. Sector-wise Participants of MES EIA Team

Sr.	Particular	Name/ Address
1	Company Name	Myanmar Enginnering Society (MES)
2	Company Address	Hlaing University Campus, Hlaing Township, Yangon, Myanmar
3	Ph no	01-519673-6, Fax: 01519681
4	Email Address	Officemail.mes@gmail.com

Table 7. Project Contact Person of MES

Sr	Name	Contact number	Email Address
1	U Soe Myint	(959)977110495	soemyint26@gmail.com
2	U Yan Naing Aung	(959)797508797	yannaingaung123@gmail.com

Table 8. Project References of MES

Sr.	Project	From	To
1	ESIA for Myanmar Distillery Plant	July, 2013	December,2013
2	ESIA for Polo Club Residences	April,2014	January,2015
3	ESIA for Waste Discharge Pipe (IBTC)	October,2014	April,2015
4	ESIA for MEICO Port	October,2014	June,2015
5	ESIA for MAPCO Port	October,2014	June,2015
6	ESIA For MAGDPL Port	October,2014	June,2015
7	ESIA for INNO City Project	March,2015	September,2015
8	IEE For Yay Ni Garment Factory	May,2015	May,2016
9	IEE foe Naung Cho Bypass Road	November,2015	June,2016
10	IEE for Lashio Bypass Road	November,2015	August,2016
13	ESIA for MAPCO Rice Mill (NPT)	March,2016	July, 2017

3. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 MYANMAR ENVIRONMENTAL POLICY

The Constitution of the Republic of the Union of Myanmar stipulates the Government to protect and conserve the natural environment and implies every citizen of Myanmar to assist the Government in environmental conservation.

National Environmental Policy (1994) is the basis for the integration of environmental consideration into development in Myanmar which proclaims the Government's commitment to sustainable development. It highlights the integration of environmental considerations with development process for a better quality of life of all citizens. The State has the responsibility to preserve its natural resources in the interest of present and future generations and that environmental protection should always be the primary objective in seeking development.

The ***Myanmar Agenda 21*** was developed in 1997 for all-natural resource management and environmental conservation work in pursuit of activities pertaining to biodiversity conservation.

National Sustainable Development Strategy (NSDS) prepared in 2009 includes three goals: (i) sustainable management of natural resources; (ii) integrated economic development and (iii) sustainable social development. One of the Government's main priorities is to mainstream sustainable environmental considerations into the national development planning and to develop an effective safeguards system to prevent the social and environmental impacts associated with rapid economic growth.

3.2 LEGAL FRAMEWORK

Myanmar enacted the *Environmental Conservation Law* on 30th March, 2012 as Pyidaungsu Hluttaw Law No.9/2012. There are eight objectives of the law which stress on (i) implementation of Myanmar National Environmental Policy, (ii) integration of environmental conservation in sustainable development, (iii) emerging healthy and clean environment and conserving natural and cultural resources, (iv) reclaiming ecosystems, (v) sustainable and beneficial use of natural resources, (vi) promoting public awareness and cooperation, (vii) promoting international cooperation, (viii) and cooperation with government departments, INGOs, NGOs and individuals for the matters of environmental conservation.

There are 42 paragraphs in 14 sections of the law. Paragraph 14 of the law stipulates that "*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*".

Moreover, paragraph 15 of the law says that "*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*".

According to paragraph 39(b) of the law, if any terms and conditions of environmental conservation contained in the prior permission for a business is not complied with, the power to cancel the issued license, permit or register or suspend it for a limited period is granted for relevant government department, or government organization.

3.2.1 Environmental Conservation Rules

Environmental Conservation Rules were officially announced on 5 June 2014. Some of the highlights of the Environmental Conservation Rules are: (i) proposal for incentive mechanisms, terms and conditions for green initiatives for sustainable development to mainstream into the development sectors; (ii) establishment of the Integrated Environmental Monitoring System; (iii) conduct of Environmental and Social Impact Assessment; (iv) development of Environmental Quality Standards; (v) carrying out sustainable management and utilization of natural resources; (vi) waste management; and (vii) setting up of the Environmental Management Fund.

3.2.2 Environmental Impact Assessment Procedures

Former MOECAF developed the ***Environmental Impact Assessment Procedures*** which were approved in December 2015. MOECAF is already applying the main principles of EIA Procedures before their approval. Under the Foreign Investments Rules, the environmental impact assessment and social impact assessment reports are needed to be attached together with the investment proposal. Capital intensive investment projects and designated businesses need to be assessed by the MOECAF in terms of environmental impacts and compliance. Under the EIA

procedures, all projects undertaken in Myanmar that can cause significant adverse impacts are required to undertake an IEE or EIA and to obtain an Environmental Compliance Certificate (ECC).

ESIA team for this current I&H Precast Concrete Factory project carried out thorough reviews on a number of laws, rules, procedures and notifications to justify the compliance of the project and its activities with relevant Myanmar laws. Some of the relevant laws ESIA team focused are Foreign Investment Law, Ward and Village Tract Administration law, Factory Act 1951, Employment and Skill Development Law and others.

3.3 LAW AND RULES

The Laws, Rules and Procedures will be compliance from I&H Engineering Company Limited is as follows.

1. Environmental Conservation Law (2012)
2. Environmental Conservation Rules (2014)
3. EIA Procedures (2015)
4. National Standards and Guidelines (2015)
5. The Ethnic Rights Law (2015)
6. Myanmar Investment Law (2016)
7. Myanmar Investment Rules (2017)
8. Myanmar Insurance Business Law (1993)
9. The Private Industrial Enterprise Law (1990)
10. The Prevention and Control of Communicable Diseases Law (2013)
11. Myanmar Fire Bridgate Law (2015)
12. The Petroleum and Petroleum Product Law (2017)
13. The Automobile Law (2015)
14. The Law on Standardization (2014)
15. The Protection and Preservation of Cultural Heritage Regions Law (1998)
16. The Protection and Preservation of Antique Objects Law (2015)
17. The Protection and Preservation of Ancient Monuments Law (2015)
18. Myanmar Engineering Council Law (2013)
19. The Export and Import Law (2012)
20. The Labour Organization Law (2011)

21. The Labour Dispute Settlement Law (2012)
22. Employment and Skill Development Law (2013)
23. The Minimum Wage Law (2013)
24. The Payment of Wages Act (2016)
25. The Social Security Law (2012)
26. Workmen Compensation Act (1923)
27. The Factory Act (1951)
28. Leave and Holiday Act (1951)
29. The Public health Law (1972)
30. The Prevention and Control of Communicable Disease Law (1995)
31. The Control of Smoking and Consumption of Tobacco Product Law (2006)
32. City of Yangon Development Law (2018)
33. The Freshwater Fisheries Law (1991)
34. The Myanmar Marine Fisheries Law (1990)
35. The Conservation of Water Resources and River Law (2006)
36. Foreingn Investment Law (2012)
37. Ward or Village Tract Administration Law
38. The Electricity Law (2014)

3.3.1 Environmental Conservation Law

Myanmar enacted the Environmental Conservation Law on 30th March, 2012 as PyidaungsuHluttaw Law No. (9/2012). There are eight objectives of the law which stress on (i) implementation of Myanmar National Environmental Policy, (ii) integration of environmental conservation in sustainable development, (iii) emerging healthy and clean environment and conserving natural and cultural resources, (iv) reclaiming ecosystems, (v) sustainable and beneficial use of natural resources, (vi) promoting public awareness and cooperation, (vii) promoting international cooperation, and (viii) cooperation with government departments, INGOs, NGOs and individuals for the matters of environmental conservation.

There are (42) paragraphs in (14) sections of the law. Paragraph (14) of the law stipulates that “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”.

Moreover, paragraph (15) of the law says that "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 waste in accord with environmentally sound methods".

According to paragraph (39(b)) of the law, if any terms and conditions of environmental conservation contained in the prior permission for a business is not complied with, the power to cancel the issued license, permit or register or suspend it for a limited period is granted for relevant government department, or government organization.

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(c) conduct of Environmental Impact Assessment;
(d) development of Environmental Quality Standards
(e) carrying out sustainable management and utilization of natural resources;
(f) waste management; and
(g) setting up of the Environmental Management Fund.

3.3.3 EIA Procedure

Former MOECAF developed the Environmental Impact Assessment Procedures which were approved in December 2015. MOECAF is already applying the main principles of EIA Procedures before their approval. Under the Foreign Investments Rules, the environmental impact assessment and social impact assessment reports are needed to be attached together with the investment proposal. Capital intensive investment projects and designated businesses need to be assessed by the MOECAF in terms of environmental impacts and compliance. Under the EIA procedures, all projects undertaken in Myanmar that can cause significant adverse impacts are required to

undertake an IEE or EIA and to obtain an Environmental Compliance Certificate (ECC).

3.3.4 The Ethnic Right Protection Law

The Pyidaungsu Hluttaw enacted this law in 2015 for ethnic groups who have resided continuously within the Republic of the Union of Myanmar, stipulating as the original state. The objectives of this law are,

(a) To obtain equal citizen's right for all ethnic groups
(b) To live eternally together with amicable relations among ethnic groups on the basic of genuine Union Spirit
(c) To preserve and develop language, literature, fine art, culture, custom, national character, and historical heritage of ethnicmgroups
(d) To promote solidarity, mutual rarity and respect, and mutual assistance among ethnic groups
(e) To promote socioeconomic development including education, health, economy, transport and communication, so forth, of less-developed ethnic groups
(f) To fully obtain the rights prescribed in the constitution by ethnic groups

3.3.5 National Standards and Guidelines

National Environmental Quality (Emission) Guidelines (NEQG) for waste water and noise levels are referenced in this EIA report. Followings are the environmental standards and guidelines adopted by EIA team.

Table 9. Environmental Standards for Wastewater Discharge (NEQG)

Sr.	Parameter	Unit	Guideline Value
1	5-day BOD	mg/l	50
2	COD	mg/l	250
3	Oil and grease	mg/l	10
4	pH	Standard unit	6-9
5	Total coliform bacteria	100 ml	400
6	Total nitrogen	mg/l	10
7	Total phosphrouos	mg/l	2

8	Total suspended soils	mg/l	50

Table 10. Noise Level Standard (NEQG)

Receptor	**One Hour LAeq (dBA)**	
	Daytime (7:00-22:00) (10:00-22:00 for public holidays)	**Nighttime (22:00-7:00) (22:00-10:00 for public holidays)**
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Table 11. Air Quality Standard (NEQG)

Sr.	**Parameter**	**Averaging Period**	**Guide Value µg/ m^3**
1	Nitrogen dioxide	1-year 1-hour	40 200
2	Ozone	8-hour daily Maximum	100
3	PM_{10}	1-year 24 hour	20 50
4	$PM_{2.5}$	1-year 24 hour	10 25
5	Sulfur dioxide	24-hour 10-minute	20 500

3.3.6 Myanmar Investment Law

At the 2nd, Waxing of Thadingyut, 1378 M.E. (18, October, 2016), and the Pyidaungsu Hluttaw hereby enacts Myanmar Investment Law. This Law shall apply to all existing or new investments within the Union on the date of entry into force of this Law. The objectives of this Law are as follows:

(a) to develop responsible investment businesses which do not cause harm to the natural environment and the social environment for the interest of the Union and its citizens;
(b) to protect the investors and their investment businesses in accordance with the law;
(c) to create job opportunities for the people;
(d) to develop human resources;
(e) to develop high functioning production, service, and trading sectors;
(f) to develop technology, agriculture, livestock and industrial sectors;
(g) to develop various professional fields including infrastructure around the Union;
(h) to enable the citizens to be able to work alongside with the international community;
(i) to develop businesses and investment businesses that meet international standards

3.3.7 Myanmar Investment Rules

At the 3rd, Waxing of Tagu, 1378 M.E. (30, March, 2017), and the Pyidaungsu Hluttaw hereby enacts Myanmar Investment Rules. In this rule, the obligations of the investors are as follows;

(a) The Investor is acting, and the investment will be made, in accordance with the laws of the union
(b) The Proposal is in accordance with the laws;
(c) The Investor has demonstrated a commitment to carry out the investment in a responsible and sustainable manner, including by, as relevant, limiting any potentially adverse environmental and social impacts; In the commitment, it includes without limiting to environmental conservation actions, compliance with environmental conservation policies, human rights and application of effective technology for natural resources and practices of waste management;
(d) The Investment is compatible with national development, security, economic, social and cultural policies, taking into consideration development, security, economic, social and cultural policy objectives announced by the Government or the government of any State or Region affected by the Investment.

3.3.8 Myanmar Insurance Business Law

Myanmar insurances were officially announced on 23rd July, 1993. Some of the highlights of Myanmar insurance business laws are:

(i) Owners of motor vehicles shall effect compulsory Third Party Liability Insurance with the Myanmar Insurance.

(ii) An entrepreneur or an 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.

3.3.9 The Private Industrial Enterprise Law

The State Law and Order Restoration Council hereby enacts the private industrial enterprise law in the 10th waxing day of Nadaw, 1352 M.E (26, November, 1990). Private Industrial Enterprises shall be conducted in accordance with the following basic principles:

(a) To enhance the higher proportion of the manufacturing value added in the gross national product and value of services, and to increase the production of the respective economic enterprises which are related to the industrial enterprise;

(b) To acquire modem technical know-how for raising the efficiency of industrial enterprises and to establish the sale of finished goods produced by the industrial enterprise not only in the local market, but also in the foreign market;

(c) To cause utilization by relying mainly as local natural resources;

(d) To cause narrowing down of the gap between rural development and urban development by causing the development and improvement of industrial enterprises;

(e) To cause opening up of more employment opportunities;

(f) To cause avoidance of or reduction of the use of technical know-how which cause environmental pollution;

(g) To cause the use of energy in the most economical manner.

3.3.10 The Prevention of Hazard from Chemical and Related Substances Law

Pyidaungsu Hluttaw Law (No, 28) The 5th Waning of Wagaung 1375 M.E (26th August, 2013and the Pyidaungsu Hluttaw hereby enacts Law on Prevention of Hazard from Chemical and Related Substances Law. This Law shall apply to all existing or new standard within the Union on the date of entry into force of this Law. The highlight of this Law are as follows:

(a) To protect from being damaged the natural environment resources and being hazardous any living beings by chemical and related substances;

(b) To supervise systematically in performing the chemical and related substances business with permission for being safety;

(c) To perform the system of obtaining information and to perform widely educative and research for using the chemical and related substance systematically;

(d) To perform the sustainable development for the occupational safety, health and environmental conservation.

3.3.11 Myanmar Fire Bridgate Law

Myanmar Fire Bridgate Law was enacted in 13th waning of Taboung, 1376 M.E (17, March, 2015). The objectives of this law are as follows:

i. To prevent destruction of State-owned property, private property, cultural heritage and the lives and property of the public by fire and other natural disaster;

ii. To organize the fire brigate systematically and to train members of the fire brigate;

iii. To carry out extinguishing fire, prevention and search and rescue when fire, other natural disaster, epidemic disease or any kind of sudden disaster occurs;

iv. To educate, organize and incite extensively so as to achieve public coorperation when any disaster occurs;

v. To participate and help, if necessary, for the State safety, peace of the public and the rule of law.

3.3.12 The Petroleum and Petroleum Product Law

The Petroleum and Petroleum Product Law was enacted in 9th waxing day of Wagaung, 1379 M.E (1st, August, 2017). The objectives of this law are as follows:

(a) To carry out the petroleum and petroleum product businesses activities systematically in accordance with the provisions of the law, stipulated standards, procedures and conditions;

(b) To enable the petroleum and petroleum product business activities to carry out safely without environmental impact;

(c) To establish free and fair competition in carrying out petroleum and petroleum product business activities;

(d) To secure energy requirement and energy security of the Union;

(e) To obtain tax revenue of the Union.

3.3.13 Automobile Law

Automobile Law was enacted in 8th waxing day of Wagaung, 1377 M.E (7, September, 2015). An automobile is governed by state and federal laws, which vary by jurisdiction. An automobile is generally defined as a self-propelled vehicle that is operated on the highways and is propelled by the use of motor vehicle fuel. The automobile law is regarded with the sales and transfer of automobiles, repair work, safety standard, warrenties, and accidents.

3.3.14 The Law on Standardization

The Law on Standardization was enacted in 2014. The objectives of this Law are as follows:

(a) To enable to determine Myanmar Standards;

(b) To enable to support export promotion by enhancing quality of production organizations and their products, production processes and services;

(c) To enable to protect the consumers and users by guaranteeing imports and products are not lower than prescribed standard, and safe from health hazards;

(d) To enable to support protection of environment related to products, production processes and services from impact, and conservation of natural resources;

(e) To enable to protect manufacturing, distributing and importing the disqualified goods which do not meet the prescribed standard and those which are not safe and endangered to the environment;

(f) To support on establishing the ASEAN Free Trade Area and to enable to reduce technical barriers to trade.

(g) To facilitate technological transfer and innovation by using the standards for the development of national economic and social activities in accordance with the national development programme.

3.3.15 The Protection and Preservation of Cultural Heritage Regions Law

"Cultural Heritage" means ancient monument or ancient site which is required to be protected and preserved by reason of its historical, cultural artistic or anthropological value. The State Peace and Development Council hereby enacts this law in the 5th waning day of Tawthalin, 1360 M.E (10, September, 1998). The objectives of this Law are:

(a) To implement the protection and preservation policy with respect to perpetuation of cultural heritage that has existed for many years;

(b) To protect and preserve the cultural heritage regions and the cultural heritage therein so as not to deteriorate due to natural disaster or man-made destruction;

(c) To uplift hereditary pride and to cause dynamism of patriotic spirit of citizens by protecting and preserving the cultural heritage regions;

(d) To promote public awareness and will as to the high value of the protection and preservation of the cultural heritage regions;

(e) To protect the cultural heritage regions from destruction;

(f) To carry out protection and preservation of the cultural heritage regions in conformity with the International Convention approved by the State.

3.3.16 The Protection and Preservation of Antique Objects Law

Antique Object means objects which are used by human beings including fossils over one hundred years old in above or under the ground or in above or under the water. The Protection and Preservation of Antique Objects Law was enacted in 2015 and the objectives of this law are:

(a) To implement the policy of protection and preservation for the perpetuation of antique objects;
(b) To protect and preserve antique objects so as not to deteriorate due to natural disaster or man-made destruction;
(c) To uplift hereditary pride and to cause dynamism of patriotic spirit by protection and preservation of antique objects;
(d) To have public awareness of the high value of antique objects;
(e) To carry out in respect of protection and preservation of antique objects in conformity with the International Convention and Regional Agreement ratified by the State.

3.3.17 The Protection and Preservation of Ancient Monuments Law

Ancient Monument means building sites lived, made, used and built by human beings including geological environments where fossils of over one hundred years old are found above or under the ground or above or under the water. The Protection and Preservation of Ancient Monuments Law was enacted in 2015 and the objectives of this law are:

(a) To implement the policy of protection and preservation for the perpetuation of ancient monuments;
(b) To protect and preserve ancient monuments so as not to deteriorate due to natural disaster or man-made destruction;
(c) To uplift hereditary pride and to cause dynamism of patriotic spirit by protecting and preserving ancient monuments;
(d) To have public awareness of the high value of ancient monuments;
(e) To protect and preserve ancient monuments from destruction;
(f) To search and maintain ancient monuments;
(g) To carry out in respect of protection and preservation of ancient monuments in conformity with the International Convention and Regional Agreement ratified by the State.

3.3.18 Myanmar Engineering Council Law

Myanmar Engineering Council Law was enacted in 11th Waning of Tazaungmone, 1375 M.E (28, November, 2013). The objectives of the law are:

(a) To develop the dignity, ethical principles and ability of Myanmar citizen engineers, graduate technologists and technicians who are working in the engineering services sector;

(b) To explore beneficial, useful and good methods to research and develop the State's natural resources and human resources with the least environmental impact by a combination of engineering technology and information technology;

(c) To guide, control, maintain and take necessary action with regard to specified standards and norms relating to specified subjects, systematic methods, safety and ethical principles and duties in teaching engineering subjects and in technological research and services;

(d) To perform engineering and technological activities of the State and tasks assigned by the relevant ministry or organization from time to time.

3.3.19 The Export and Import Law

Pyidaungsu Hluttaw Law (No, 28) The 5th Waning of Wagaung 1375 M.E (26th August, 2013and the Pyidaungsu Hluttaw hereby enacts Law on Prevention of Hazard from Chemical and Related Substances Law. This Law shall apply to all existing or new standard within the Union on the date of entry into force of this Law. The highlight of this Law is follows: A person who obtained any license shall not violate the conditions contained in the license.

3.3.20 The Labour Organization Law

The Labour Organization Law replaced the Trade Union Act enacted in 1927 for protecting the rights of the workers, having good relations among the workers or between the employer and the worker, and for forming and carrying out the labour organizations systematically and independently. Under the law, the labour organization has the right to carry out freely in drawing up their constitution and rules. It has the right to negotiate and settle with the employer if the workers are unable to obtain the right of the workers contained in the labor laws. On the other hand, the employer shall recognize the labour organizations and assist as much as possible if the labour organizations request for help for the interest of his workers.

3.3.21 The Labour Dispute Settlement Law

This law was enacted for safeguarding the right of workers or having good relationship between employer and workers and making peaceful workplace or obtaining the rights fairly, rightfully and quickly by settling the dispute of employer and worker justly. It stipulates that employer in which more than 30 workers are employed shall form the workplace coordinating committee consisting of the representatives of workers and the representatives of employer.

3.3.22 Employment and Skill Development Law

With the objectives to facilitate employment which is appropriate to the age and ability of the job seeker, to help workers obtain employment and to provide stability of employment and skills development for employees, to help employers obtain appropriate employees, the Employment and Skill Development Law came into force in late 2013. The law stipulates the facts required to be included and specified in the employment agreement between the employer and employee.

The law stipulates that a company must enter into written employment contracts with Myanmar citizens and foreign staff within 30 days of employment. A Standard Employment Contract is issued which is applicable to all employees, public and private, and shall be deemed to apply in all cases where the employee's written contract is silent. The Standard Employment Contract is largely provided for convenience. It allows employers and employees to vary the terms of the Standard Employment Contract so long as the variation is not in contravention of Myanmar's labor and employment laws.

Furthermore, an employment agreement may address issues such as job description, place of employment, working hours, wages and benefits, probation period, termination, and duration of the contract. Employee performance and work standards may be inserted into the employment contract too.

3.3.23 The Minimum Wage Law

The minimum wage law, passed in March 2013, was replaced the 1949 Minimum Wage Act. The law provides a framework for minimum wage determination: the presidential office establishing a tripartite minimum wage committee shall decide

minimum wage with industrial variation based on a survey on living costs of workers possibly every two years. This also stipulates equal payment.

3.3.24 The Payment of Wages Act

The Payment of Wage Act defines the payment obligation to the workers employed in the factories or railway administration. It stipulates the method of payment stating that the payment should be made in cash on a regular payday, and allows legal action against delayed payment or un-agreeable deduction.

3.3.25 The Social Security Law

The Social Security Law, enacted in 2012, was amended the Social Security Act in 1954. It stipulates the formation and implementation of social security systems.

3.3.26 The Workmen Compensation Act

It stipulates that employer is required to make payments to employees who become injured or who die in any accidents arising during and in consequence of their employment. Such compensation also must be made for diseases which arise as a direct consequence of employment, such as carpal tunnel syndrome.

3.3.27 Factory Act

The act outlines provisions for working hours for a week, interval between continuous working hours, maximum working hours per day, and working days per week. It also stipulates maximum overtime working hours, overtime wage, worksite safety and health measures as well as welfare measures for workers. Welfare measures includes washing and cleaning facilities, seats first aid boxes, factory clinic, recreation center and canteen and child nursery center.

3.3.28 The Leave and Holiday Act

The objective of the law is to allow worker for leave and holiday allowances, religious or social activities with earn allowance, and benefits for health allowance for Daily wage workers/ temporary workers and permanent workers.

3.3.29 The Public Health Law

It is concerned with protection of people's health by controlling the quality and cleanliness of food, drugs, environmental sanitation, epidemic diseases and regulation of private clinics.

3.3.30 The Prevention and Control of Communicable Diseases Law

This law describes functions and responsibilities of health personnel and citizens in relation to prevention and control of communicable diseases. It also describes measures to be taken in relation to environmental sanitation, reporting and control of outbreaks of epidemics and penalties for those failing to comply. The law also authorizes the Ministry of Health to issue rules and procedures when necessary with approval of the government.

3.3.31 The Control of Smoking and Consumption of Tobacco Product Law

This Law wass enacted in 2006. The objectives of the Law are:

(a) To convince the public that health can be adversely affected due to smoking and consumption of tobacco product and to cause refraining from the use of the same;

(b) To protect from the danger which affects public health adversely by creating tobacco smoke- free environment;

(c) To obtain a healthy living style of the public including child and youth by preventing the habit of smoking and consumption of tobacco product;

(d) To uplift the health, economy and social standard of the public through control of smoking and consumption of tobacco product;

(e) To implement measures in conformity with the international convention ratified by Myanmar to control smoking and consumption of tobacco product.

3.3.32 City of Yangon Development Law

The Myanmar legislature voted for city of Yangon development law 14th May, 1990. In order to carry out the development works of the City of Yangon effectively; the Chairman of the State Law and Order Restoration Council shall form the City of Yangon Development Committee comprising a minimum of 7 members and a

maximum of 15 members. If necessary, the number of members may be increased. Such formation shall be made with suitable citizens.

Sr.	Paragraph	Stipulation
1	7(a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k), (l), (m), (n), (o), (p)	The Committee shall, in respect of the following duties and responsibilities, lay down the policy, give guidance, supervise or implement: - (a) preparation of civil projects and establishment of new towns within the limits of the City of Yangon Municipality; (b) administration of lands within the limits of the City of Yangon Municipality; (c) determining only the population which should be allowed to settle properly in the City of Yangon; (d) construction, repairing and demolition of buildings; (e) demolition and re-settlement of squatter huts, squatter buildings and squatter wards; (f) construction of roads, bridges and maintenance thereof; (g) stipulation of conditions for traffic and parking of vehicles and slow-moving vehicles; (h) construction of gardens, parks, playgrounds and recreation centres and maintenance thereof; (i) carrying out works for lighting of roads; (j) carrying out works for water supply; (k) construction of reservoirs and pipelines and maintenance thereof; (1) carrying out works for sanitation; (m) carrying out works for public health; (n) construction, maintenance and administration of markets; (o) stipulation of conditions in respect of roadside stalls; (p) carrying out precautionary measures against fire.
2	11	the Committee shall, in respect of the following duties and responsibilities, lay down the policy, give guidance, supervise or implement: -

		(i) environmental conservation and administration of garbage; (j) determinating, re-settlement, demolition, applying by another ways and administration of garbage can, temporary banked up(accumulated) area of garbage, the area where the transition system takes place, the final accumulated area of garbage; (k) giving guidance and implementation of emissions, waste water and solid wastes, ways of production, including the production standards for maintaining and developing the environmental quality of Yangon;
3	16(b)	It is needed to negotiate with the committee when Union of Government Department, Division of Government Department, the Organizations or private organizations establish the special economic zones and industrial zones.

3.3.33 The Freshwater Fisheries Law

The State Law and Order Restoration Council Law No. 1/91. The 5th Waning day of Tabaung, 1352 M.E (4 March, 1991) hereby enacts Law on Conservation of Water Resources and Rivers. Freshwater fishery shall be carried out in accordance with the following objectives:

(a) To further develop the fisheries;
(b) To prevent the extinction of fish;
(c) To safeguard and prevent the destruction of freshwater fisheries waters;
(d) To obtain duties and fees payable to the State;
(e) To manage the fisheries and to take action in accordance with the Law.

3.3.34 The Myanmar Marine Fisheries Law

The State Law and Order Restoration Council Law No. 9/94. The 2nd Waxing day of Kason, 1352 M.E(25th April, 1990) hereby enacts Law on Conservation of Water Resources and Rivers. This Law shall apply to all existing or new standard within the Union on the date of entry into force of this Law.

3.3.35 The Conservation of Water Resources and River Law

The State Peace and Development Council Law No. 8/2006) The 11th Waxing Day of Thadingyut, 1368 ME (2nd October, 2006) hereby enacts Law on Conservation of Water Resources and Rivers. This Law shall apply to all existing or new standard within the Union on the date of entry into force of this Law. The highlight of this Law is follows:

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

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

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

(d) No one shall dispose of any substance into the river-creek that may cause damage to waterway or change of watercourse from the bank or vessel which is plying, vessel which has berthed, anchored, stranded or sunk.

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

(f) No one shall, without the permission of the Directorate, pile sand, shingle and other heavy materials for business purposes in the bank area and waterfront area.

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

3.3.36 Foreign Investment Law

Foreign Investment Law was enacted in 2012. The objectives of the Law are:

- To produce the minerals of the state for the sufficient enjoyment of the public and to export the surplus,
- Job creation for the people inline with the progress and expansion of work.
- To develop human resources to develop the infra-structure such as banking and finance work, highway roads, cross-country highway, national electricity and energy works.
- To develop high-tech including modern data collection technology.

- To develop communication network international standard railway, maritime and airway transport in the whole country.
- To encourage the citizen to be able to do in competition with foreigners.
- To develop the investment work in line with the international standard.

Asia Golden Glory Development Company Limited (AGGD) is a joint venture company of Lat War Co., Ltd. and Huachu Investment Pte., Ltd of Singapore which imply its business conduct is to be in compliance with the Foreign Investment Law.

3.3.37 Ward or Village Tract Administration Law

The law is enacted in order to appoint and assign duty of Ward and Village Tract Administration in accord with law to any person who is respected by the society and has to implement and carry out the works relating to the Ward or Village Tract Administration as it is provided in section 289 of the constitution of the Republic of the Union of Myanmar. It stipulates the formation of wards or village tracts, basic principles of function of the ward or village tract administrator and their functions and duties, duties of the person residing in the ward or village tract together with their rights.

There are three villages around the project areas. The project has to establish a dynamic relationship with all the villages. In due course of the project implementation, the area will encounter general development including expansion of businesses and villages as well as its dwelling population.

3.3.38 The Electricity Law (2014)

In 2014, the Electricity Law of 1984 was replaced by the new Electricity Law, a comprehensive piece of legislation covering licensing, a new regulatory commission, standards, inspection, tariff, and restrictions. The Electricity Law divides projects into “small” (up to 10 MW), “medium” (between 10 MW to 30 MW) and large (upwards of 30 MW); the states and regions can issue permits for small and medium power plants. In case these plants are not connected to the national grid, the Union Government Ministry is not the primary authority involved. The authorities have a legal right to use land for the purpose of power plants under the Electricity Law, and have the right to expand and maintain their facilities. The law also provides that the authorities can build transmission lines in accordance with existing laws.

3.4 INSTITUTIONAL FRAMEWORK

The Environmental Conservation Department was originally established under the National Commission for Environmental Affairs (NCEA) in 1990. In 2005, NCEA was placed by the Ministry of Forestry. MOECAF was formerly established in September 2011 and the Environmental Conservation Department as a separate department under MOECAF in October 2012. The Environmental Conservation Department is specifically responsible for implementing the ECL 2012, National Environmental Policy, strategy, framework, planning and action plan for the integration of environmental consideration into the national sustainable development process. It is also responsible for the conservation and management of Myanmar's natural resources and sustainable utilization, pollution control on water, air and land.

3.5 ENVIRONMENTAL STANDARDS AND GUIDELINES

Internationally accepted environmental standards and guidelines for ambient air, waste water, noise levels and environmental monitoring parameters are referenced in this ESIA report. Following is the environmental standards and guidelines adopted by ESIA team.

Table 12. Environmental Standards and Guidelines Referenced in this Report

Sr.	Standards	Reference
1	Effluent Guidelines	NEQG (Myanmar)
2	Noise levels	NEQG (Myanmar)
3	Environmental monitoring programme	IFC

3.5.1 General EHS Guidelines (IFC)

The general Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general examples of Good International Industry Practice (GIIP). These General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines which provide guidance to users on EHS issues in specific industry sectors. Use of multiple industry-sector guidelines may be necessary for complex projects.

The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at

reasonable costs. The applicability of the EHS Guidelines are tailored for I&H Precast Concrete Factory Project by taking account the results of the environmental assessment.

3.5.2 Environmental Assessment Guidelines (ADB)

Environmental assessment is mandated for all ADB initiatives in order to arrest environmental degradation so that the growth rates necessary to reduce poverty will be sustained and the millennium development goals will be achieved.

The guidelines are to be used by ADB staff, its borrowers and consultants to provide guidance on how to fulfill ADB's environmental assessment requirements and to guide consultants who need to know ADB's policies and procedures in preparation of an EIA report. Guidance is also provided on more strategic tools such as country environmental analysis (CEA) and strategic environmental assessment (SEA). The guidelines may also be of use to NGOs and academic that are interested in ADB's environmental requirements and review processes.

3.5.3 Operational Procedures for Environmental Assessment (IFC OP 4.01)

IFC requires environmental assessment (EA) of projects proposed for IFC financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making.

IFC accord that the breadth, depth, and type of analysis of EA depend on the nature, scale, and potential environmental impact of the proposed project. The OP states that the EA must:

(i) Evaluate a project's potential environmental risks and impacts in its area of influence;

(ii) Examines project alternatives;

(iii) Identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts;

(iv) Includes the process of mitigating and managing adverse environmental impacts throughout project implementation.

IFC favors preventive measures over mitigatory or compensatory measures, whenever feasible.

3.5.4 National Environmental Quality (Emission) Guidelines

The guidelines are stipulated by former MOECAF by the provision of Paragraph (42), Sub-paragraph (b) of the Environmental Conservation Law 2012. The objective of the guidelines is to control noise and vibration, emissions and effluents in order to prevent the pollutions for the protection of human health and ecosystem. The guidelines are mainly based on EHS Guidelines of IFC.

3.6 INTERNATIONAL CONVENTION And RECOMMENDATION From ILO

1. Labor Inspection Convention, 1947 (No.81)
2. Employment Injury Benefits Convention, 1964 (No.121)
3. Working Environment (Air Pollution, Noise and Vibration) Convention, (No.148)
4. Occupation Safety and Health Convention, 1981 (No.155)
5. Occupation Safety and Health Services Convention, 1985 (No.161)
6. Safety and Health in Construction Convention, 1988 (No.161)
7. Prevention of Major Industrial Accidents Convention, 1993 (No.174)
8. Labor Inspection Recommendation, 1947 (No.81)
9. Protection of Workers' Health Recommendation, 1953 (No.97)
10. Welfare Facilities Recommendation, 1956 (No.202)
11. Employment Injury Benefits Recommendation, 1964 (No.121)
12. Working Environment (Air Pollution, Noise and Vibration) Recommendation, 1977 (No.156)
13. Safety and Health in Construction Recommendation, 1988 (No.175)
14. Prevention of Major Industrial Accidents Recommendation, 2001 (No.192)

The goal of this principles is to protect safety and health by prevention and controls of hazards. This principle can get not only to ensure the well-being of workers but also contribute positively to productivity. I&H Precast Concrete Factory will compliance with the conventation and recommendation during factory operation life.

4. PROJECT DESCRIPTION

4.1 PROJECT BACKGROUND

IHI Asia Pacific Pte. Ltd. of Singapore and the Department of Highways under Ministry of Construction of the Republic of the Union of Myanmar started a joint venture company namely I&H Engineering Co., Ltd. to carry out the business relating to the manufacturing and supply of concrete structures to meet the social development and economic demand in the Republic of the Union of Myanmar and neighboring countries.

Project location is Block No.3, Kalar Kone village, Myanundagar Industrial Zone, Hmawbi Township, Yangon Region, the Republic of the Union of Myanmar. Project area is 16 acres (65,272 square meter). The land is state-owned land managed by Department of Highways which is leased to I&H for a period of 15 years starting from 1 January 2016 to 31 December 2030.

Total investment for the factory is US$ (12,240,500) and 60% of the investment for the project US$ (7,343,100) is provided by IHI Pacific Pte. Ltd. and the remaining 40% US$ (4,895,400) will be provided by Department of Highways, Ministry of Construction. Job opportunity created by the plant will be about 156 posts including the part time directors.

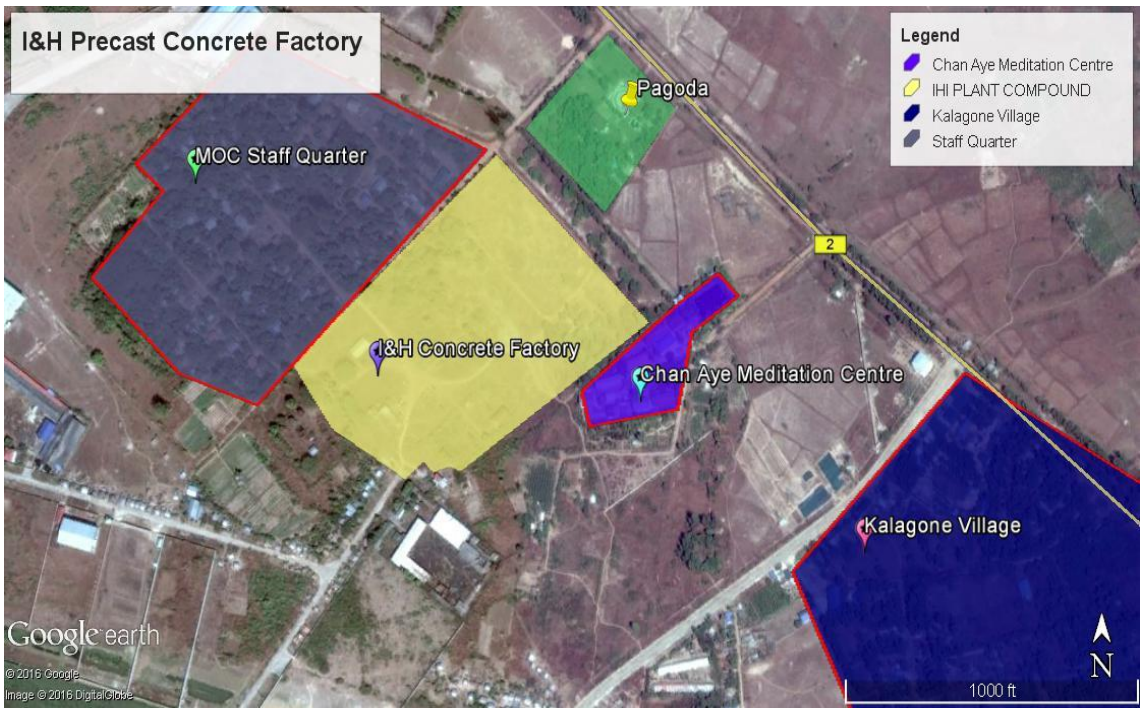


Figure 1. Illustration of the I&H Precast Concrete Factory

4.1.1 I&H Organization Chart

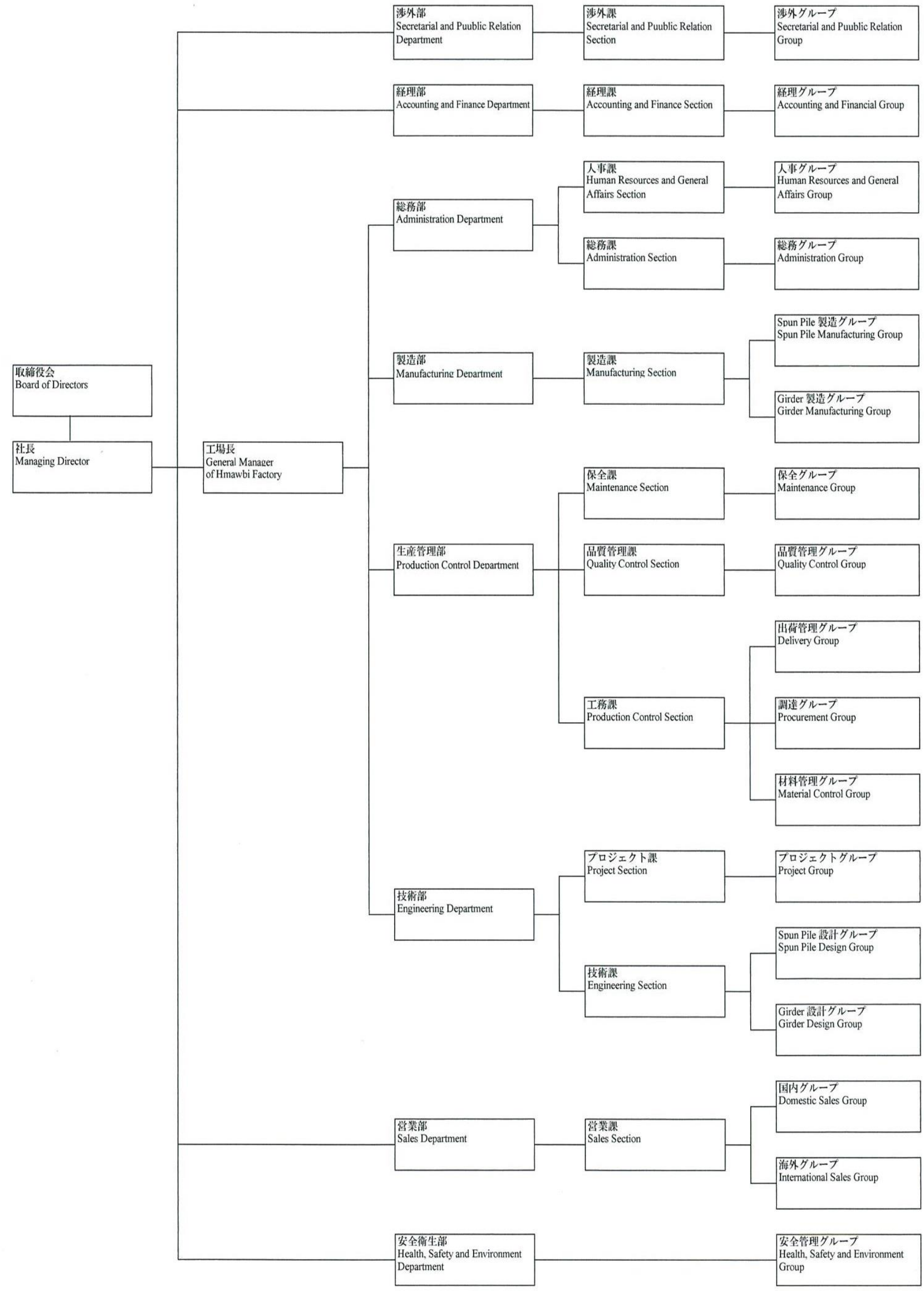


Figure 2. Organization Chart of I&H Engineering Company Limited

4.1.2 Project Schedule

Factory construction started from March 2016 and completed February 2017. Spun Pile Production was started form March 2017 and girder production was started form December 2018.

4.1.3 Description of Raw Materials

The basic raw materials used in I&H Precast Concrete Factory are crush stone, sand and cement. Crush stones are transported from Htone Bo Township, Mandalay Division, Sand are transported from Wah Ta Yar Townsip and cement from SCG cement factory. All of the raw materials were stored in the warehouse. The chemical used for drying was mighty 150 (Kao) and acid used for sedimentation and mixing was H_2SO_4 (Dilute).

4.1.4 Layout Plan

I & H Precast Factory is situated Block No.3, Kalar Kone village, Myanundagar Industrial Zone, Hmawbi Township, Yangon Region. GPS Coordinate point is Latitude 17°10'11.98" and Longitude 95°59'10.70'' and following the figures.

Figure 3. I & H Precast Factory Location Map

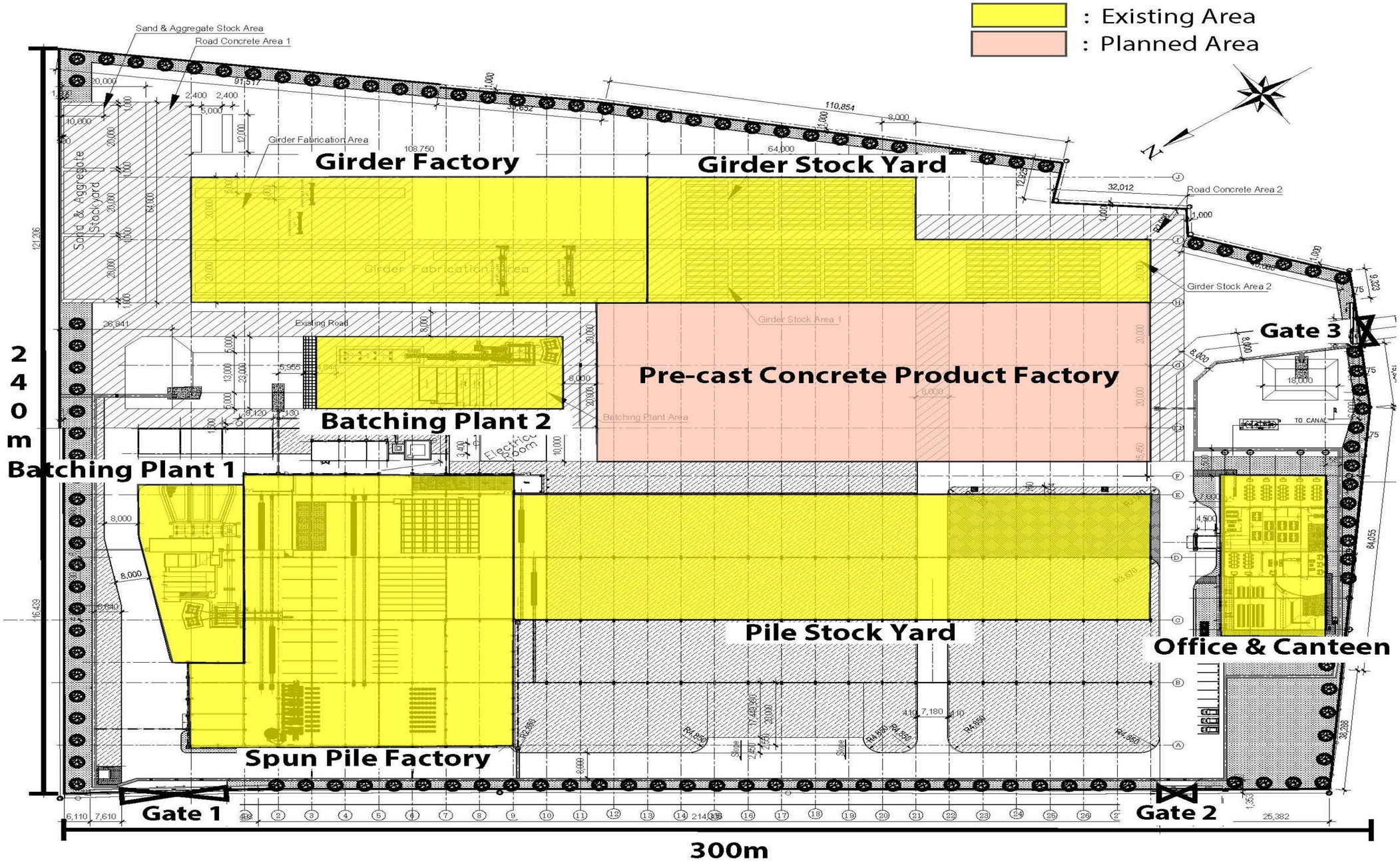


Figure 4. Layout Plan of I & H Precast Factory

4.1.5 Investment Amount

The Myanmar Investment Commission, at decision of the MIC for amendment of the total amount of capital of I&H Engineering Company Limited meeting 6/2018 held on 12th May 2018, approved the total amount of capital of I&H Engineering Company Limited be increased from US$ 15.688 million to US$ 18.283 million.

Hence, the total amount of capital is hearby amended to US$ 18.288 million (United States Dollar eighteen million, two hundred and eighty-eight thousand) on the permit No. 1080/2016 dated 4.2.2016.

It is notified that I&H Engineering Company Limited shall have to abide by all terms and conditions stated in the Commission's Letter No. DICA-3/FI-1265/2016 (210-D) dated 4.2.2016 and MIC-3/FI-1265/2018 (149-c) dated 22.3. 2018. Describe in Appendix (K).

4.1.6 Land Lease Aggrement

Describe Appendix (K).

Table 13. Building to be Constructed

Sr.	Items	Unit	Area
1	Factory Building	m^2	5,864
2	Stock Yard	m^2	6,080
3	Batching Plant	m^2	800
4	Aggregate Storage	m^2	500
5	Office	m^2	768
6	Canteen	m^2	324
7	Accommodation	m^2	451
8	Car Parking	m^2	257
9	PC Girder Fab. Area	m^2	2,560
10	Total Footprint Area	m^2	17,604
11	Total Area	m^2	65,272

4.2 PROJECT LOCATION

Project location is Block No.3, Kalar Kone village, Myanundagar Industrial Zone, Hmawbi Township, Yangon Region, the Republic of the Union of Myanmar. Project area is 16 acres (65,272 square meter). The land is state-owned land managed by Department of Highways which is leased to I&H for a period of 15 years starting from 1 January 2016 to 31 December 2030.

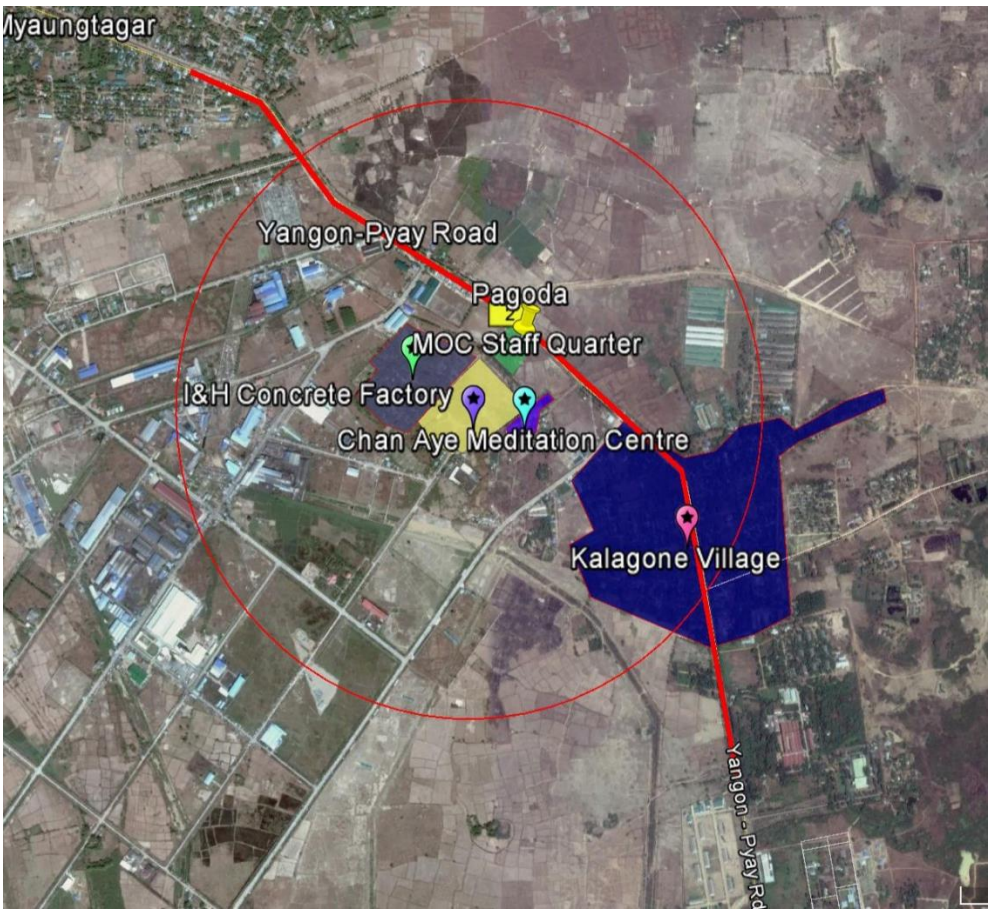


Figure 5. Location of I&H Precast Concrete Factory Project

The site is about 40 kilometers from Yangon city. It is accessible by land via car. The Yangon-Pyay Highway is passing near the project site. Settlements exist around 5 km radius of the project site consisting of 1 village and the staff quarter of the Ministry of Construction. The village, Kalar Kone, is located along the Yangon-Pyay highway and South-East of the project. The MOC stuff quarter is located face to face of the project.

4.3 PROJECT DESCRIPTION AND ALTERNATIVE METHODS

4.3.1 Description of Pre-Cast Plant Process

Concrete is a building material made by thoroughly mixing cement, sand, aggregate, such as gravel or crushed stone; and water in desired proportions. The mixture is poured into a cavity, an excavation in the ground, or a form designed for a specific purpose. After hardening, concrete has the appearance and structure of stone. In fact, it may be thought of as "moldable stone." When a concrete product or element is cast elsewhere (whether in a plant or on a field site) and then brought to its final position, it is termed precast concrete.

Pre-cast concrete is a construction product produced by casting concrete in a reusable mold or form which is then cured in a controlled environment, transported to the construction site and lifted into place. In contrast, cast-in-site concrete is poured into site-specific forms and cured on site. By producing precast concrete is a controlled environment which is called precast plant, the precast concrete is afforded the opportunity to properly cure and be closely monitored. Utilizing a precast concrete system offers many potential advantages over site casting of concrete, one of them the production process of precast concrete is performed on ground.

There is a greater control of the quality of materials and workmanship in a precast plant rather than on a construction site. Financially, the forms used in a precast plant may be reused hundreds of times before they have to be replaced, which allow cost of formwork per unit to be lower than for site-cast production. Concrete elements, cast and cured in a manufacturing plant, then transported to the construction site, plant casting allows increased efficiency and higher quality control. Durable, permanent steel forms are reused many times, reducing formwork compared to cast-in-place concrete.

The process of the pre-cast plant mainly can be divided into four processes and they are-

1. Pre-production process
2. Pre-cast materials supply process
3. Concrete material supply process
4. Pre-cast concrete production process and
5. Product finishing/delivery process.

4.3.1.1 Pre-production process

In pre-production process, design, preparation, installation and maintenance of form/mold are main processes. First of all production planning process and design process were needed to established for whole incoming process. Molds or forms used for the casting of precast concrete products usually are made of steel or wood. These molds needed to stable during casting and were able to withstand the abuse of preparation, installation of steel reinforcement, oiling, curing, stripping and reuse. Many types of mold, e.g holes, beams, notches, etc., are usually made to design specification by design process (department).

Steel molds are hammered, vibrated, modified and moved, creating dents, holes and misalignments that require periodic repair and maintenance. In maintenance process, welds and patches are occasionally required to fill in depressed spots, chipping and grinding operations are used to smooth rough areas. In the other way, the form surface against which the concrete will be cast must be clean and smooth usually. Molds are cleaned for reuse by chipping, wire brushing, scraping, scrubbing with water, sanding and air blowing. Mold assembly follows repair and cleaning. This is cleaning/alteration process.

In the production of large precast concrete elements, heavy anchorage abutments are needed and the length and character of such prestressing beds differs appreciably from those needed for hollow core slabs, lintels and floor beams that are generally produced by the sliding mould or slideformer method. Then inspection process needs to be carried out for the quality assureance of precast concrete. The pre-production process was illustrated in Figure 6.

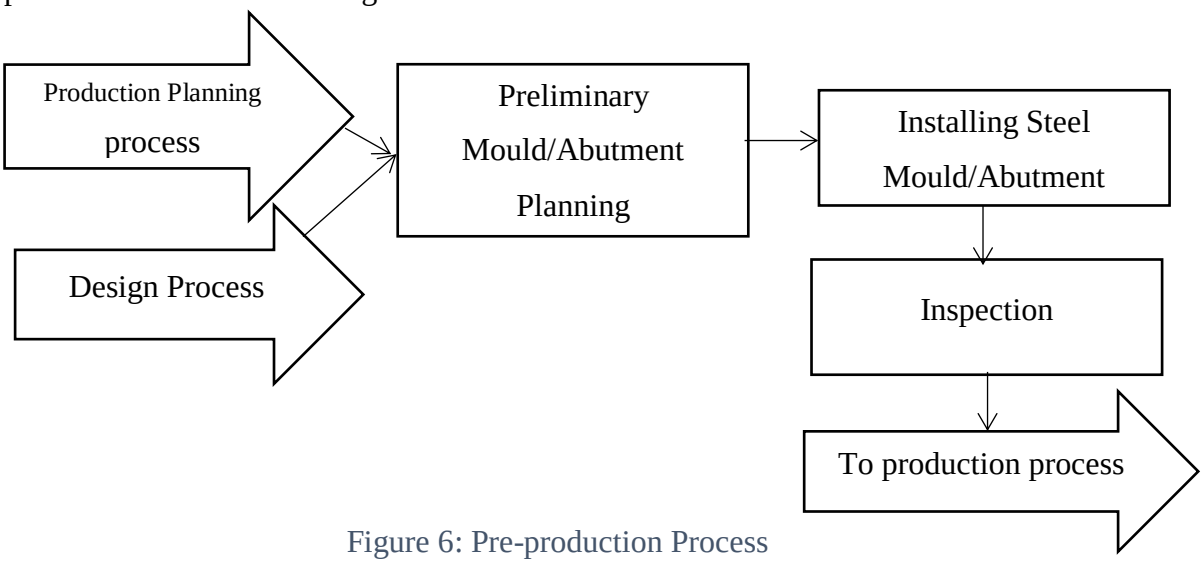


Figure 6: Pre-production Process

4.3.1.2 Pre-cast materials supply process

In pre-cast material supply process, normally consist of three processes, purchasing required materials from suppliers, incoming inspection and fabrication process. In fabrication process, cutting, bending, tying and welding of rebar, wire and wire mesh and string and stressing of steel strand operations are consisted of. In the production of pre-cast concrete process, these reinforcements, once sized and shaped, from fabrication process may be assembled in the mold or fabricated outside of the mold in a separate area or shop.

There are four basic types of steel reinforcement:

1) Plant fabricated cage and mats
2) Prefabricated wire, loops, bars, rods and welded wire mats
3) Steel plates and rolled sections and
4) Prestressing steel strand.

The figure of pre-cast material supply process was shown in below.

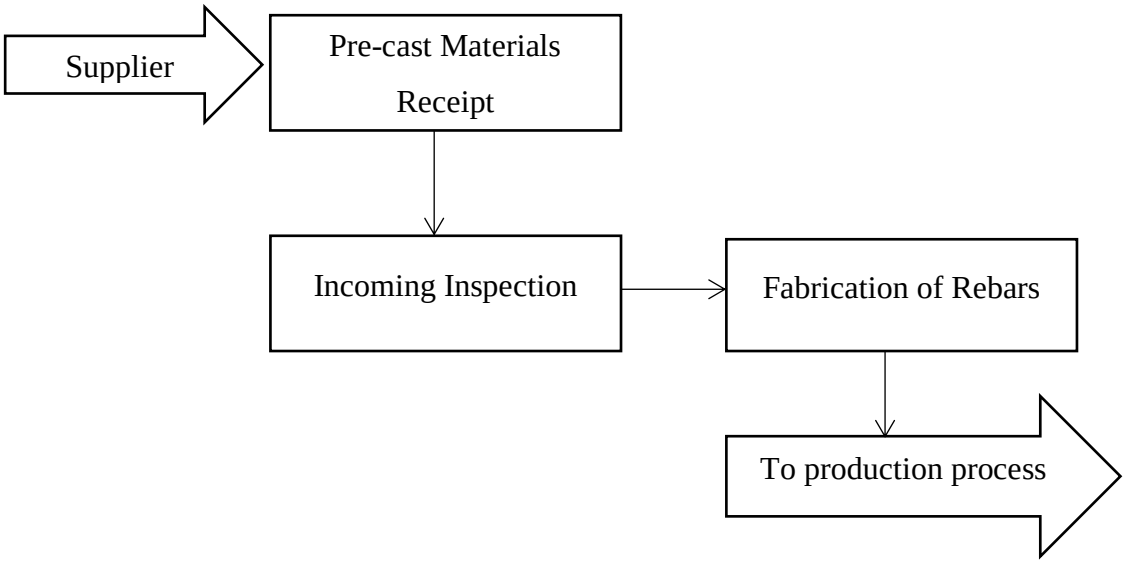


Figure 7: Pre-cast Material Supply Process

4.3.1.3 Concrete material supply process

In this process, especially purchasing concrete materials, concrete batching/mixing and inspection (need to be done) were consisted of. Cements, aggregates will be purchased from quality assured supplier in purchasing process.

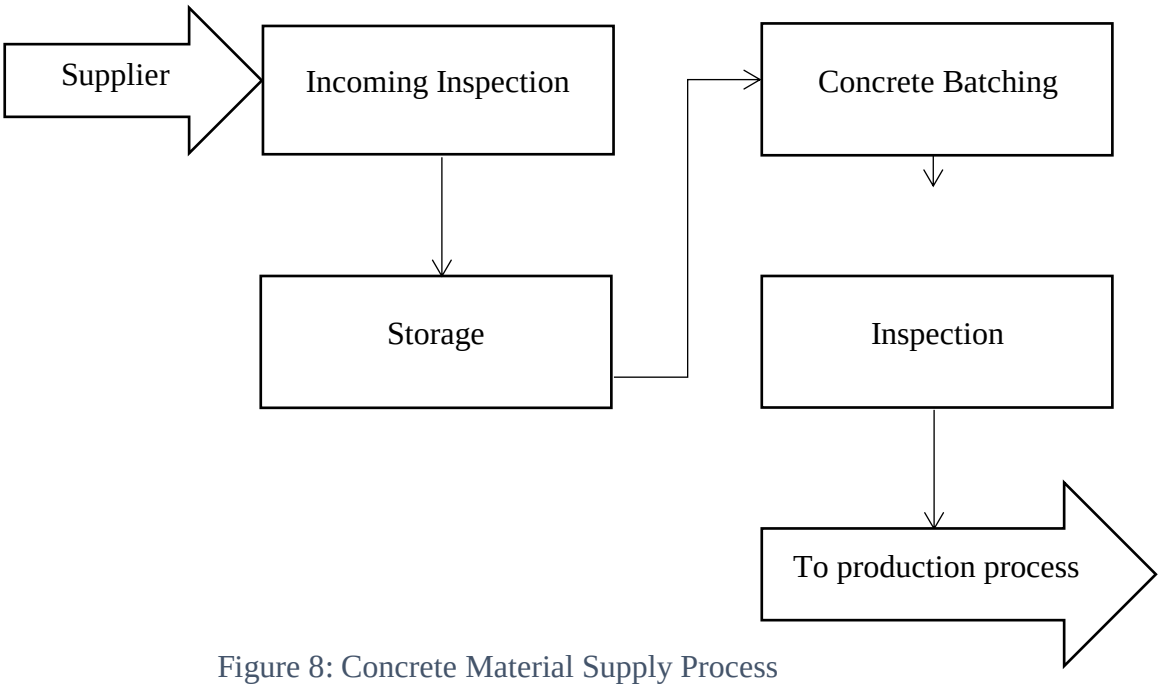


Figure 8: Concrete Material Supply Process

These materials will be store in storage and need to be inspection for the quality assurance of concrete mixing. Concrete will be batched and mixed at the project area. The correctly weighed proportions of cement, aggregates and water are charged into mixer. After completing mixing to get homogeneous mixture, the mixed concrete will be discharged into buckets, trucks or other means of conveyance to the casting area to operate for the production of pre-cast concrete. The concrete material supply process was illustrated in figure 7.

4.3.1.4 Pre-cast concrete production process

The precast production process is the finalizing process of the project. In this process, the materials from pre-production process (molds, abutment, etc.) would be prepared to oil and to assemble and reinforce the pre-cast materials from precast material supply processes. After this process, concrete pouring/casting process will be done. For the desire surface of concrete products, finishing process such as screeding, floating, troweling, patching, rubbing and cleaning surface need to be done before curing process. Pre-cast production process was shown in figure 9.

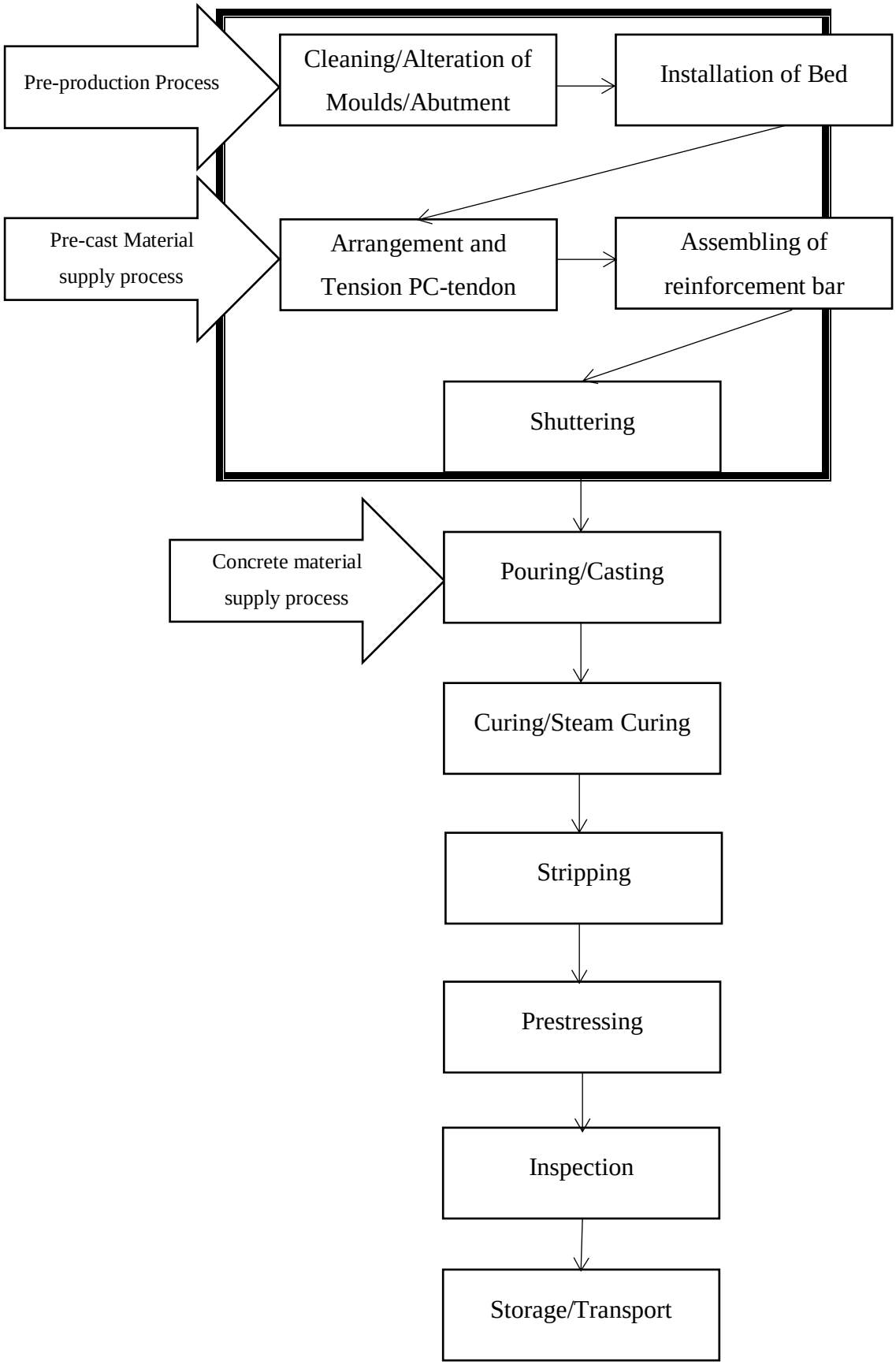


Figure 9: Pre-cast concrete production process

There are three fundamental factors in all methods of curing concrete and they are time, temperature and moisture. The time/ temperature relationship is not the same for all mixture, materials and conditions and is determined empirically. Steam and hot water for accelerated curing procedures are generated at the project by a low-pressure boiler and piped to designated location prior to release into the curing shed.

Once a concrete product has cured sufficiently to be handled, it is necessary to remove it mold it was cast in or, conversely to remove the molds from the product. The stripping process varies considerably with the nature of the product. Reusable metal molds are usually handled by overhead hoist. Flat products are removed from the mold by means of vacuum lifter. Some concrete products may require dismantling of the forms for removal either because the form material will not be used again or because this is the only pratical means of removing the completed product.

Prestressing steel is usually seven-wire strand that is manually or mechanically strung in the mold. Manual strand stringing is performed by a worker physically pulling the length of strand down the bed from a reel stationed at one end of the bed.

The strand is then cut by torch or strand saw, and the process is repeated. Mechanical stringers pull multiple lengths of strand from separate reels at the same time. Single or multiple strands may be threaded through cages of reinforcing steel and through bulkheads used to separate adjacent members.

After prestressing process, inspection process needs to be done to investigate the product possess or not desired quality. Then the product will be stored and transported. In storage, product storage methods vary considerably with the size and shape of the product. Discard products, broken pieces, meatal scrap from molds, reinforcement, tie-wire, wood scrap, nail, shamfer strip, reject hardware, concrete molds and the remainder of unused raw materials can be found in project area. So, it is need to be placed a “bone yard” in which discarded material is kept, pending burial or removal.

4.4 ALTERNATIVE METHODS

4.4.1 History of Spun Pile

In Japan, development of PC Spun Pile began in 1962, with the first large-scale use in bridge pier foundations for the Tokyo Metropolitan Expressway.Over the 54 years since, PC Spun Pile has been used for all types of structures such as buildings and highway structures, and it is a widely recognized preferred foundation material along

with cast-in-place pile and steel pipe pile. In this Seminar, a presentation will be made of the structure, advantages, and production method of PC Spun Pile. The first large-scale use in bridge pier foundations for the Tokyo Metropolitan Expressway in 1962; still in service today.

4.4.2 Project reference of PC Spun Pile in Japan (foundation)

Pile details are Size (m): Φ500, Length (m): 17~36m, Total sets 1,060 and Built: 1962.

Figure 10. East Shinagawa Pier (Tokyo Metropolitan Expressway)

Tokyo Metropolitan Expressway today with PC Spun Piles from 1962.

Figure 11. Tokyo Metropolitan Expressway

Pile details are Size (m) Φ500~800, Length (m): 17m, Total sets 188, Built: Sep 2013

Figure 12. Sapporo Municipal Junior High School public educational facility

4.4.3 Advantages of PC Spun Pile

4.4.3.1 Types of foundation piles

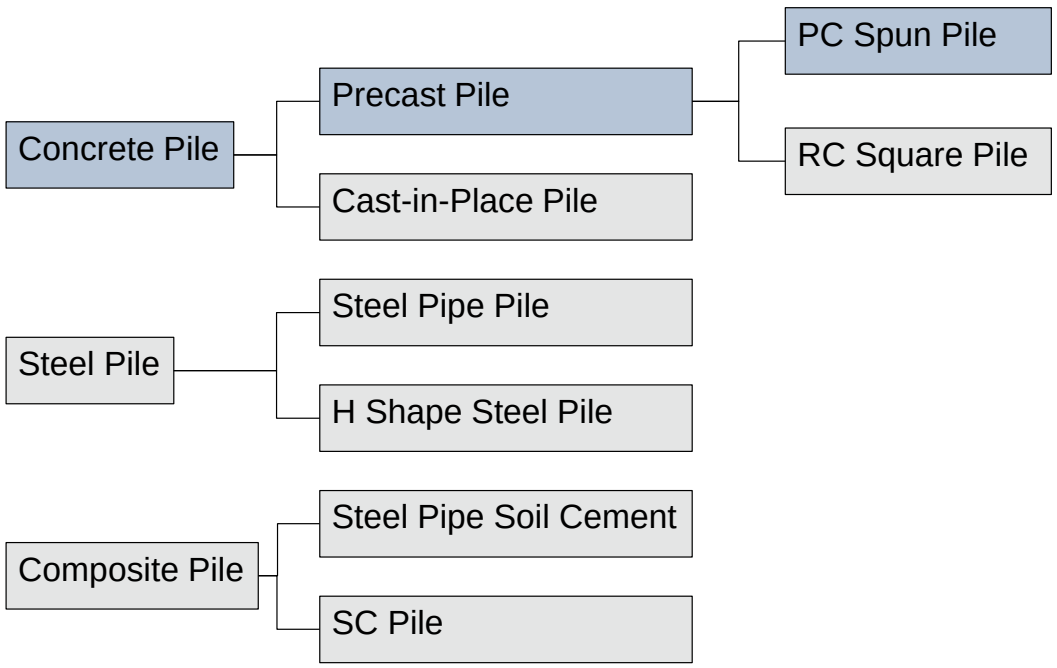


Figure 13. Types of foundation piles

4.4.3.2 Centrifugal method of production

(a) High strength concrete (high axial bearing capacity)

(b) Highly compacted concrete means high durability, high weather resistance, and high performance against wear (PC Spun Piles used in marine bridge piers for No. 1 Tokyo Metropolitan Expressway in 1962 are still in service)

(c) Cylindrical shape forming without inner form

(d) Higher bending strength compared to other shapes having same section area

(e) High round-section shape adaptability in bored precast piling method

(f) Easy production of long-length pile (standard maximum length is 15m)

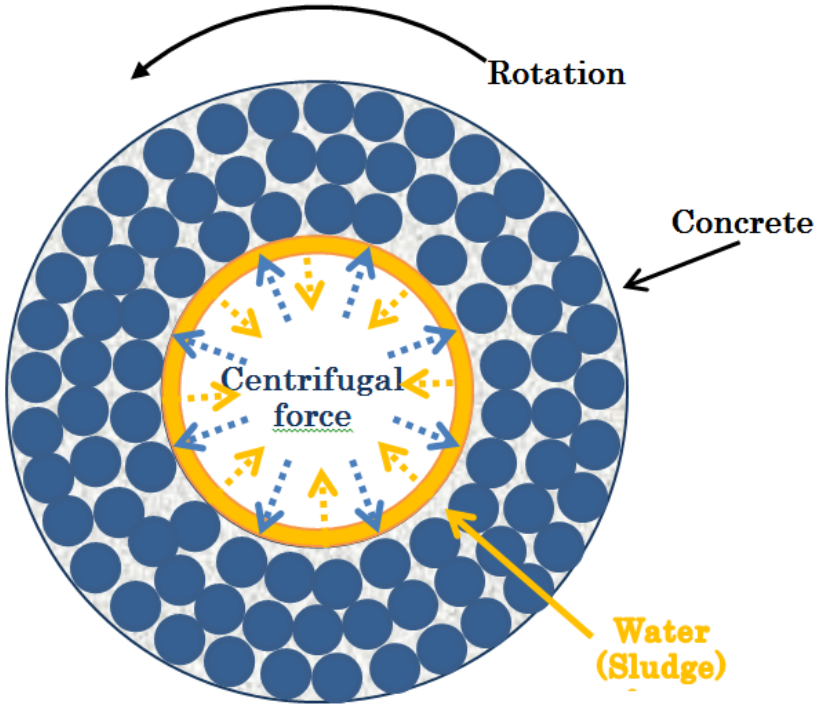


Figure 14. Centrifugal method of production

4.4.3.3 Prestress structure

(a) High tensile resistance

(b) High bending resistance

(c) High durability, high weather resistance (High cracking resistance, with self-sealing after occurrence of cracks)

(d) High non-cracking performance during transportation （long body possible)

4.4.3.3.1 High reliability of pile joint

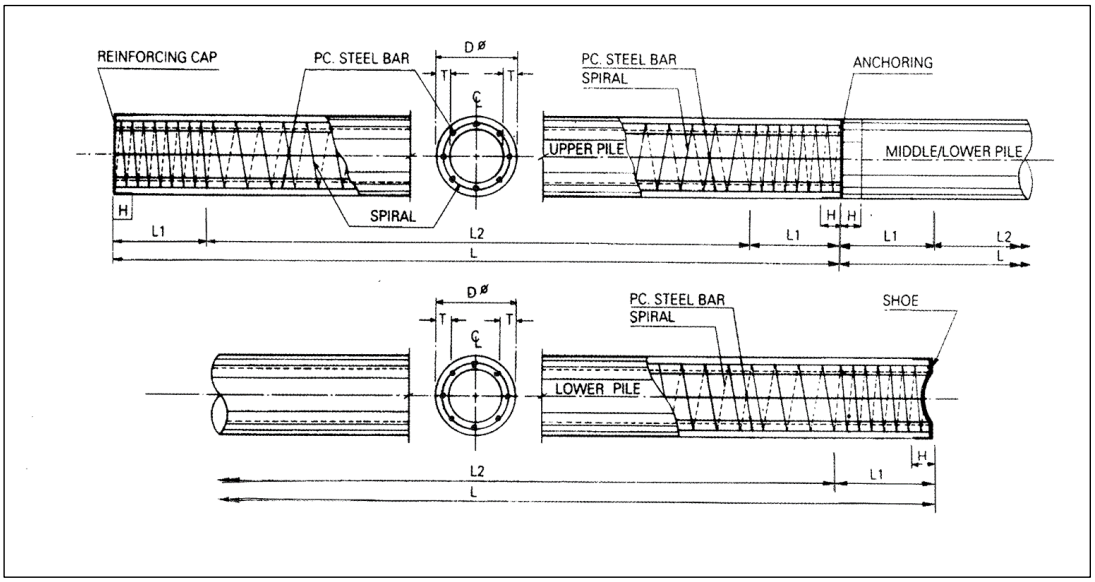
Joint strength is same as of the pile body.

4.4.3.3.2 Shipment at short material age possible

Shipment at 7 days possible by accelerated curing (steam curing)

4.4.4 Structure and Standard of IHE PC Spun Pile

4.4.4.1 Reinforcement Details



Dia 300~600mm, Class A 4N/mm^2, Class B 8N/mm^2, Class C 10N/mm^2

Table 14. Classification of PC Spun Pile

No.	Dimensions				Effective Prestress (N/mm^2)	Crack Bending Moment (kN-m)	Ultimate Bending Moment (kN-m)	Principle Use
	Dia (mm)	Class	Thickness (mm)	Length (m)				
1	300	A	60	7 to 13	4	24.5	37.3	• Factory • Warehouse • Building • Airport • Retaining Wall • Bridge • Power Plant • Petrochemical Plant • LNG Plant • Shopping Mall • Piled Slab
		B			8	34.3	61.8	
		C			10	39.2	78.5	
2	400	A	75	7 to 15	4	54.0	81.4	
		B			8	73.6	132.4	
		C			10	88.3	176.6	
3	500	A	90	7 to 15	4	103.0	155.0	
		B			8	147.2	264.9	
		C			10	166.8	333.5	
4	600	A	100	7 to 15	4	166.8	250.2	
		B			8	245.2	441.4	
		C			10	284.5	569.0	

Table 15. Size and Structural Capacity of PC Spun Pile

PC SPUN PILE - JIS A 5335 Equivalent										
Dimensions				Length		Classification		Moment		Allowable Bearing Capacity	
						Class	Effective Prestress				
D	T	d	A_c	Min	Max		σ_{ce}	M_{cr}	M_u	Permanent	Temporary
mm	mm	mm	cm^2	m	m		N/mm^2	kN-m	kN-m	ton	Ton
300	60	180	452	7	13	A	4	24.5	37.3	70.7	106.0
						B	8	34.3	61.8	64.5	96.8
						C	10	39.2	78.5	61.5	92.2
400	75	250	766	7	15	A	4	54.0	81.4	119.8	179.7
						B	8	73.6	132.4	109.4	164.0
						C	10	88.3	176.6	104.1	156.2
500	90	320	1159	7	15	A	4	103.0	155.0	181.2	271.8
						B	8	147.2	264.9	165.5	248.2
						C	10	166.8	333.5	157.6	236.4
600	100	400	1571	7	15	A	4	166.8	250.2	245.6	368.5
						B	8	245.2	441.4	224.3	336.4
						C	10	284.5	569.0	213.6	320.4

Calculation formula:

$\mathbf{M_{cr} = (I_e/y_e)(\sigma_{tu}+\sigma_{ce}+\sigma_N)}$

$\mathbf{Pa_p = (1/3)(\sigma_{cu}-\sigma_{ce})A_c}$

$\mathbf{Pa_t = (1/2)(\sigma_{cu}-\sigma_{ce})A_c}$

Where:

M_{cr} : Cracking moment

M_u : Ultimate moment

Class A: $M_u=1.5M_{cr}$, Class B: $M_u=1.8M_{cr}$, Class C: $M_u=2.0M_{cr}$

Pa_p : Permanent allowable bearing capacity of pile

Pa_t : Temporary allowable bearing capacity of pile

I_e : Moment of inertia

y_e : Length from centroid to tensile edge of concrete (D/2)

σ_{cu} : Compressive strength of concrete (σ_{cu} =50N/㎟)

σ_{tu} : Flexural tensile strength of concrete (σ_{tu} = 6N/㎟)

σ_{ce} : Effective prestress

σ_N : Axial compressive stress working on a pile (σ_N =0)

A_c : Section area of pile

4.4.4.3 Joint of PC spun pile

Joint shall have the same strength as the pile body. There are 2 types of joint;

(1) Welded joint (standard)

(2) Mechanical joint

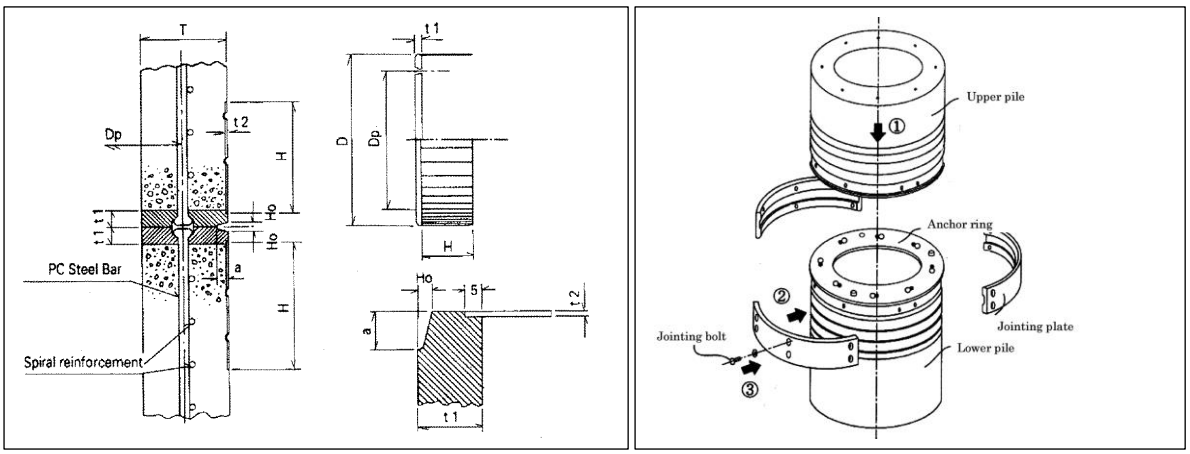


Figure 15. Welded joint (standard) and Mechanical joint (example)

4.4.4.4 Toe of PC Spun Pile

Open end type: for bored precast pile method

- No special end plate used
- Same specification as standard middle (top) pile

Closed end type: for direct driving

(1) Concave-section shoe (Mamira shoe)

- Good directivity during striking penetration

- End shoe portion same strength as pile body

(2) Pencil shoe

- Good striking penetration
- Poor directivity by striking penetration (easy to be deflected by obstruction)
- Toe shoe strength is lower than that of pile body

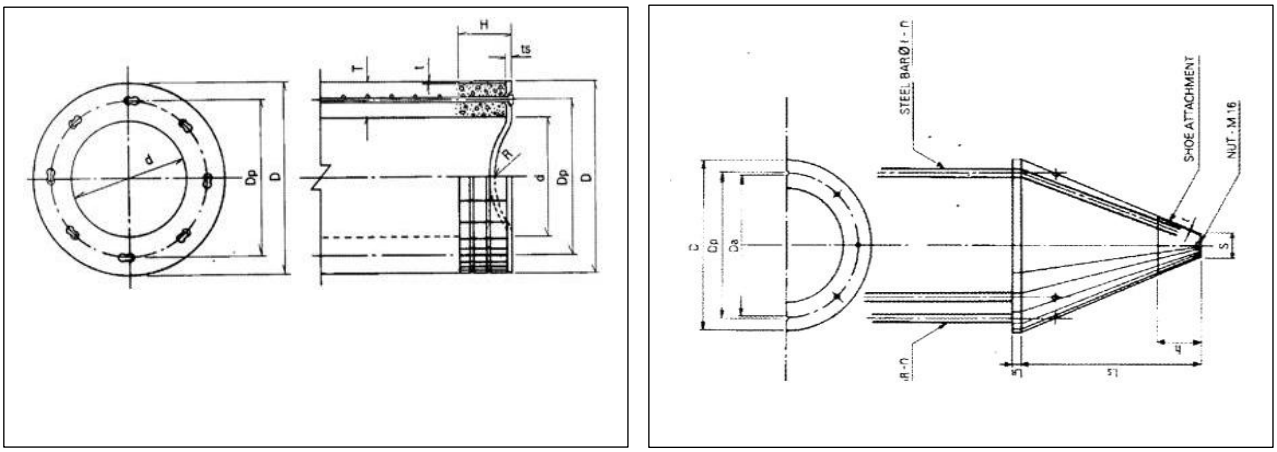


Figure 16. Concave-section shoe (Mamira shoe) Pencil Shoe

4.4.5 Foundation Design with PC Spun Pile

1) Allowable Capacity of pile (to be the minimum of :)

Allowable structural capacity

Allowable soil capacity

2) Bending moment and shear force from lateral load on pile to not exceed the pile's allowable bending moment and allowable shear force (include unit stress from vertical force). Unit stress induced in concrete to not exceed allowable unit stress

〔Example〕 Stress induced in concrete by bending moment and axial force

Where

N: Axial force acting on pile	σ_c	: Stress induced in concrete pile body
M: Bending moment acting on pile	σ_{ce}	: Effective prestress in pile body
A: Section area of pile	σ_{ca}	: Allowable stress of concrete
Z: Section modulus of pile		

3) Displacement of pile head to not exceed the allowable displacement of the structure Pile head displacement is determined by lateral force on pile, stiffness of pile body, and strength of the soil.

4.4.6 Production of PC Spun Pile

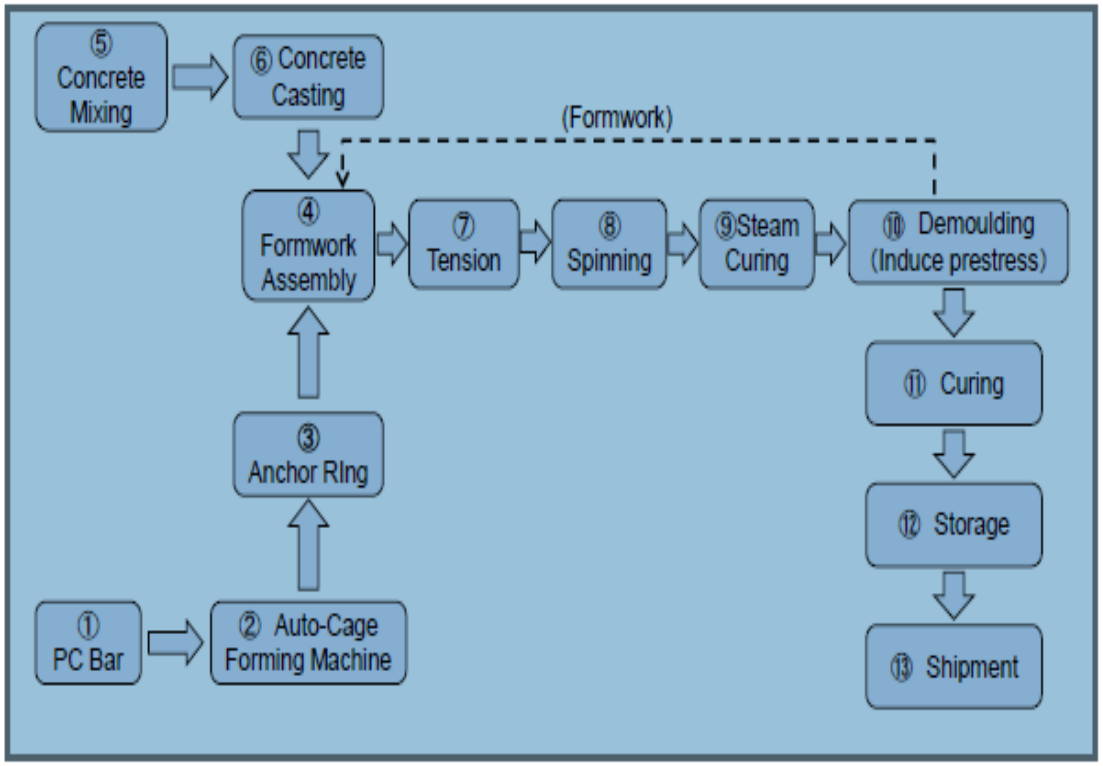


Figure 17. Flow Chart of Production

4.4.7 Comparison of PC Spun Pile with RC Square Pile

Table 16. Comparison of PC Spun Pile with RC Square Pile

Type of Pile	PC Spun Pile	RC Square Pile
Production method	Forming by centrifugal force	Forming by flow-in casting
Concrete compressive strength	50N/mm^2 (PC Pile) 80N/mm^2 (PHC Pile) [by cylindrical test piece]	Grade 40 or 45 [by cubic test piece]
Durability Weather resistance	High	Normal
Drying shrinkage	Small	Large
Density	High (2.45～2.55)	Normal (2.3～2.4)

Remarks	Centrifugal forming resulting in uniform and compact concrete	Flow-in casting leads to bleeding at the concrete surface, which may cause shrinkage cracks

Table 17. Comparison of PC Spun Pile with Cast-in-Place Pile

Type of Pile	**PC Spun Pile**		**Cast-in-Place Pile**
	Direct Driving Method	**Bored Precast Pile Method**	
Concrete compressive strength	High (50 N/mm^2)		Normal
Quality of pile body	Stable quality owing to factory production		Variable
Vibration, Noise	Large	Small	Small
Displaced soil	Nil	Less than CiP Pile	Large
Piling speed	◎	○	△
Pile diameter	300～800mm (Japan Case)	300～1,200mm (Japan Case)	Large dia. OK, Small dia. cannot
Remarks	Easy to confirm bearing capacity; Easy small-scale works	Stable piling quality	Comparatively more difficult quality management than precast pile

4.4.7.1 Comparison of PC Spun Pile with RC Square Pile Summary

PC Spun piles generally have the following advantages to Square Piles

1. Higher Bending Resistance

2. Higher Axial Capacity
3. Higher Tensile Capacity
4. Endure Higher Stress (Section Modulus is 1.45 to 1.64 times of Square Piles)
5. No directionality in the bending resistance against lateral forces
6. Better Manufacturing Quality（Spinning Compaction, Steam Curing)
7. In bored precast pile method, circular profile of both pile and excavated shaft is more geometrically appropriate

4.5 PROJECT ACTIVITIES AND ALTERNATIVES

4.5.1 Preconstruction

4.5.1.1 Site Preparation

The first step in site construction work will involve the grading of the site. Grading is defined as any operation consisting of excavation, filling, or a combination thereof. The grading process for the construction of I&H Precast Concrete Factory project could include some or all of the following alternatives:

1. Easements. The first step in the grading operation is to determine the location of any on-site utilities and easements. The on-site utilities and easements often need protection so that they are not damaged during the grading operation.
2. Clearing, Brushing, and Grubbing. Clearing, brushing, and grubbing are defined as the removal of vegetation (grass, brush, trees, and similar plant types) by mechanical means. It is important that this debris be removed from the site and not accidentally placed within the structural fill mass.
3. Cleanouts. This grading process deals with the removal of unsuitable bearing material at the site, such as loose or porous alluvium, colluvium, peat, muck, and uncompacted fill.
4. Scarifying and Recompaction. In flat areas that have not been benched, scarifying and recompaction of the ground surface is performed by compaction equipment in order to get a good bond between the in-place material and compacted fill.

4.5.2 Construction

4.5.2.1 Piling

There are several alternative methods for piling such pile driving, grip piling, auger cast piling, and bored pile. Pile driving method is the least favorable of all as it

generates a lot of noise and vibration. Grip piling where reinforced pile pole are driven by a grip and sink method is the best of all as it technically noiseless and vibrationless. But there will be limitation in this method such as pile depth.

4.5.2.2 Formwork

Formwork should be capable of supporting safely all vertical and lateral loads that might be applied to it until such loads can be supported by the ground, the concrete structure, or other construction with adequate strength and stability. Dead loads on formwork consist of the weight of the forms and the weight of and pressures from freshly placed concrete. Live loads include weights of workers, equipment, material storage, and runways, and accelerating and braking forces from buggies and other placement equipment. Impact from concrete placement also should be considered in formwork design. Wood and bamboo were used in traditional formworks. Current alternative for such formwork is using reusable and dismentalable metal formwork. Alternatives will be choices between material for formworks and technique for installation and dismantling of formworks. Environmentally friendly materials must be chosen. Moreover, installation and dismantling methods must be chosen on the basis of occupation safety point of view.

4.5.2.3 Reinforce Concrete Work

The term deformed steel bars for concrete reinforcement is commonly shortened to rebars. Standard rebars are produced in 11 sizes, designated on design drawings and in project specifications by a size number. Fabrication of rebars consists of cutting to length and required bending. Field placing drawings and bar lists are prepared, and the rebars are fabricated and set in place as required. Then, concrete will be placed. It will be conveyed from a mixer or from a truck to point of placement by any of a variety of methods and equipment, if properly transported to avoid segregation. In every step, choices must be made for environmentally friendly materials and sound occupational safety methods.

4.5.2.4 Installation Works

Necessary equipment and machinery for Precast Concrete Factory will be installed after finishing basic civil works.

4.5.2.5 Masonry Work

Masonry comprises assemblages of nonmetallic, incombustible materials, such as stone, brick, structural clay tile, concrete block, glass block, gypsum block, or adobe brick. Unit masonry consists of pieces of such materials, usually between 4 and 24 in in length and height and between 4 and 12 in in thickness. The units are bonded together with mortar or other cementitious materials. Walls and partitions are classified as load-bearing and non-load-bearing. Different design criteria are applied to the two types.

Like other structural materials, masonry may be designed by application of engineering principles. As an alternative, internationally accepted empirical rules and building codes may be used.

4.5.2.6 Carpentry work

Carpentry works will take place in doors, windows, and another frame works. Wood is the only renewable source for building materials. It comes from forests that can be continually being replanted as they are harvested. This practice ensures a plentiful supply of wood for construction and for a myriad of other uses. Compared to other building materials, wood has a very high ratio of strength to weight. This makes it very economical for use in all types of construction. Wood also has an aesthetic quality and natural warmth unequalled by other building materials. An alternative for wood structure carpentry work is using structural metal such aluminum and steel.

4.5.2.7 Mechanical and Electrical Work

The plumbing system should be designed and adjusted to use the minimum quantity of water consistent with proper performance and cleansing of fixtures and appurtenances. Plumbing fixtures, devices, and appurtenances should be supplied with water in sufficient volume and at pressures adequate to enable them to function properly. The pipes conveying the water should be of sufficient size to provide the required water without undue pressure reduction and without undue noise under all normal conditions of use.

An electrical system conforming adequate safety standards must be correctly designed and incorporated with the building. The electrical load in a building will be included the sum of all the loads for lighting, motors, and appliances.

There will be numerous alternatives on the choice of materials for all installation. Choosing a specific one is left to the design contractors, consultants and proponent. But IEE team recommends that every choice must be made for using environmentally friendly materials.

4.5.2.8 Finishing

Finishing operations include installation of the ceilings, tile, wallboard, wall paneling, air-conditioning equipment, cooling devices for rooms, floor coverings, window glass, movable partitions, finishing hardware, and other items called for in the drawings and specifications. Field offices, fences, bridges, and other temporary construction will be removed from the site. Utilities such as gas, electricity, and water are hooked up to the building. The site is landscaped and paved. Finally, the building interior is painted and cleaned.

4.6 Product Distribution

Production capacity of spun pile concrete was 70cum/day and grinder concrete was 10cum/day. The products are distributed to nationwide via major cities by mainly using road transport truck and barge. Transport trucks were used for downtown delivery and barges were used for long haul.

4.7 Electricity and Fuel Supply

I&H Precast Concrete Factory purchase electricity from government power source of Myaung Tagar Industrial Zone power substation. The plant was installed 1 nos of 450 kVA generator. The estimated electricity usage for the plant was 3029 unit/month. The diesel usage of I&H Precast Concrete Factory was 10000 litres/month.

4.8 Operational Workforce

The operational workforce for I&H Engineering Company Limited is 100 members including plant manager and general workers. The plant separates two shifts per day and the workers work 8 hrs per shift. The workers are working 26 days per month and 312 days per year. I&H Engineering Co., Ltd. was arranged the ferry for the staff and the transportation allowance for the workers from the other township except Hmawbi. The machines are operated 291 days/yr.

5. DESCRIPTION OF THE SURROUNDING ENVIRONMENT

5.1 SETTING THE STUDY LIMITS

The EIA study focusing the project area and its vicinity includes MOC Staff Quarter and Kalakone Village from Hmawbi Township, Yangon Region.

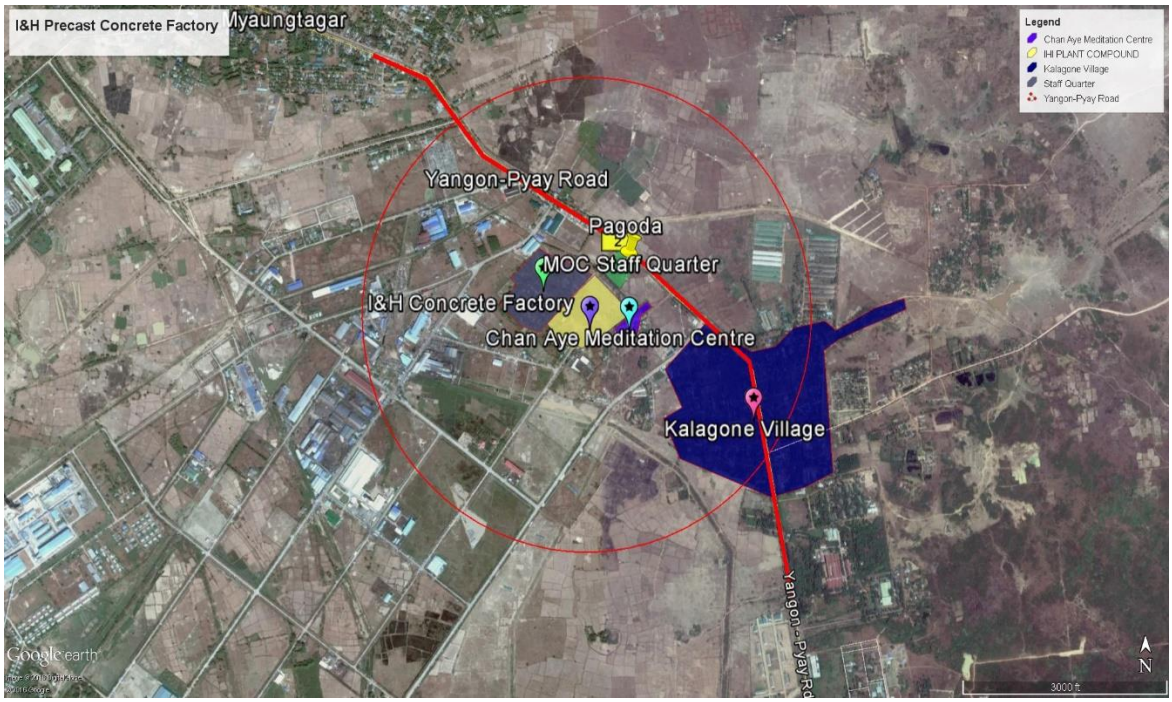


Figure 18. EIA Study Area for I&H Precast Concrete Factory Project

5.2 METHODOLOGY AND OBJECTIVES

The EIA study for the project includes analysis on baseline data from local, government organization, MIC proposal of the I&H Engineering Company Limited, and the master plan and other documents obtained from the project proponent.

Primary data collections include direct observation, interview, individual/target group consultation, public meeting, sampling and laboratory analysis on physicochemical parameters of water from the project area, listing biological resources such as flora and fauna, secondary data collection on demography, socioeconomics, occupation, education, and health.

5.3 STAKEHOLDER ANALYSIS

Stakeholders are categorized in four groups such as local people, government organizations, project proponent and other interested groups such as NGOs according to UNEP EIA MANUAL Guideline. Analysis was based on primary impact factors

such as vicinity to the project, common use of utilities such as water and infrastructures. Paragraph 49 (g) of the EIA procedures stipulates that the scoping shall identify potentially affected communities and other stakeholders with an interest in the Project. The following table shows level of interest by stakeholders on the project.

Table 18. Stakeholders of I&H Precast Concrete Factory Project

Sr.	Stakeholder Group	Stakeholder	Interest Level		Interest
			Level	Reason	
1	Local People	MOC Staff Quarter	High	Close Vicinity	- Local Development - Security - Air Pollution - Dust, Particles - CSH - Traffic Loading - Drainage Blockage
		Kalakone Village	Low	Vicinity	
2	Government Organization	General Administration Office Department	Low	-General administrative function	- Administration - Coordination - CSR
		Township Educational Office	Medium	- Relevant for CSR	
		Land Records Department	Low	- No land related issue	
		Township Health Department	Low	-General health function	
		Township Environmental Conservation Department	Not yet estd:		
		Township Firebrigate	Low	-	

		Yangon Electricity Supply Cooperation	High	Supply Electricity	Supply 15MVA Sub-Station from Bayli
		Yangon City Development Committee	High		-Solid Waste - Drainage System - Waste Water - Traffic - Water Usage
3	Proponent	Project management Project construction contractor	High	- Project Owner	- Operation and Management - Construction - EMP
4	Other Interested Party	None	-	-	-

5.4 PROJECT AFFECTED AREA

Project affected area is demarcated based on the results of stakeholder analysis. Affected human settlements, noise environment, biological environment, hydrological regime and land environment are shown in the following table.

Table 19. Project Affected Area of I&H Precast Concrete Factory Project

Sr.	Category	Location	Factor
1	Human Settlements	- MOC Staff Quarter - Kalakone Village	- Traffic Impact - Utilities, Amenities
2	Hydrological Regime	-Drainage	- Storm water
3	Land Environment	-Along the road -Project compound	- Solid Waste - Pollution - Soil
4	Biological Environment	-Around the project area	- Pollution

5	Air and Noise Environment	-Within project compound and nearby community	- Noise levels - Air quality levels
6	Water Environment	Within project compound and nearby community	- Water usages - Water quality - Waste water

Figure 19. Distance between I&H Precast Concrete Factory Project and Local Area

5.5 AIR QUALITY

Emission of air pollutants can occur from a wide variety of activities during the construction stage. These activities can be point sources, fugitive sources and mobile sources. As the visual decision, dust seems to be the main threat concerning with the quality of air. Because of the vehicles and the construction works, the clouds of dust are made and spread.

5.5.1 Air and Quality Monitoring

5.5.1.1 Survey Item

The parameters for air quality survey were SO_2, NO_2, CO_2, CO, CH_4, $H2_S$, O_3, PM2.5, and PM10, Solar Radiation, Temperature, Relative Humidity, Wind Speed and Wind Direction.

5.5.1.2 Survey Location

The air quality survey was carried out in two locations. AQ-1, and AQ-2 were located near the factory and near the village. The details of the location of air quality survey points are presented in figure below.

Table 20. Air Quality Survey Location

Survey Point	**Coordinates**	**Type of Survey Point**	**Detailed Description of Survey Point**
Latitude:		**Longitude:**	
AQ-1 (Location One)	17°10'20.66"N	95°59'5.17"E	Factory boundary	10 meters away from Factory boundary
AQ-2 (Location Two)	17°10'17.40"N	95°59'13.67"E	Near the village Infront of (Moekoke) Chan Aye Kyaungtaik	located beside 20 meters away from the factory

(a) Location One (AQ-1, factory center near transformar)

This station was set in a flat area, located beside the main building and about 10 meters away from the main building and about 7 meters away from the river. Construction works were operated near the air station during air quality monitoring period, the possible emission source is mostly from smoke and particulate matter from boats in the river or vehicular movements or bypassing motorbikes through the air station (EPAS).

Figure 20. Location One of Air Sampling Point in I & H Concrete Factory

(b) Location Two AQ-2 (Near the village)

This station was set in a flat area, located infront of Moe Koke Chan Aye Kyaung about 20 meters away from the factory and about 10 meters away from the village. The possible emission source is mostly from these residential houses or running vehicles.

Figure 21. Air Quality Survey at AQ-2 (Infront of Chanaye Kaungtaik)

(c) Duration for Air Quality Survey

Sampling and analysis of ambient air quality were collected within about one hour for each location because of the project is under construction, 8 hours and 24 hours measurement are needed during the operation of the factory.

Sampling point	Duration
AQ-1	17th July2016 (13:30 – 14:00)
AQ-2	17th July2016 (14:20 – 15:59)

5.5.1.3 Survey Item

Sampling and analysis of ambient air quality were conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S. EPA). The Haz-Scanner Environmental Perimeter Air Station (EPAS) was used to collect ambient air survey data. Sampling rate or air quality data were measured automatically every one minute and directly read and recorded onsite for measured parameters (SO_2, NO_2, CO_2, CO, H_2S, O_3, CH_4, PM_{10}, $PM_{2.5}$), as shown in Table. Sampling pump was

operated at 2 L/min. Different analysis methods are integrated in the instrument, such as Particulates 90° Infrared Light Scattering for particulate matters (PM10, PM2.5), electrochemical sensors for toxic gases (SO_2, NO_2, CO, H_2S), NDIR (optional sensor) for (CO_2, CH_4) and Gas Sensing Semiconductor- GSS technology (optional sensor) for O_3.

Table 21. Sampling and Analysis Method for Air Quality

No.	Parameter	Analysis Method
1.	Sulfur Dioxide (SO_2)	On site reading
2.	Nitrogen Dioxide (NO_2)	On site reading
3.	Carbon Dioxide (CO_2)	On site reading
4.	Carbon Monoxide (CO)	On site reading
5.	Hydrogen Sulfide (H_2S)	On site reading
6.	Particulate Matter 10 (PM_{10})	On site reading
7.	Particulate Matter 2.5 ($PM_{2.5}$)	On site reading
8.	Wind Direction	On site reading
9.	Wind Speed	On site reading
10.	Temperature	On site reading
11.	Relative Humidity	On site reading

5.5.1.4 Identifications of Air Pollutant and Its Impact

The proposed site of Yangon Inno City Development is in the constructing phase and a lot of construction works are operating by the time the air station is set on. Therefore, the site has to measure the surrounding air quality to know whether SO_2, NO_2, CO_2, CO, H_2S, $PM_{2.5}$ and PM_{10} are exceeding the limiting amount of National Environmental Quality Emission Guideline or not. The impacts of pollutants are defined below.

Carbon Monoxide (CO) is a toxic gas that cannot be seen or smelled. All people are at risk for CO poisoning. Unborn babies, infants, the elderly, and people with chronic heart disease, anemia, or respiratory problems are generally more at risk than others. Breathing CO can cause headache, dizziness and vomiting nausea. If CO levels are high enough, unconscious or death may be become. Exposure to moderate and high levels

of CO over long periods of time has also been linked with increased risk of heart disease.

Carbon Dioxide (CO_2) is the primary greenhouse gas pollutant, accounting for nearly three-quarters of global greenhouse gas emissions. Carbon pollution leads to long lasting changes in our climate, such as rising global temperatures, rising sea level, changes in weather and precipitation patterns and changes in ecosystems, habitats and species diversity. Children, older adults, people living in poverty may be at risk from the health impacts of climate change.

Nitrogen Dioxide (NO_2) is a nasty-smelling gas. The main effect of breathing in raised levels of nitrogen dioxide is the increased likelihood of respiratory problems. Nitrogen dioxide inflames the lining of the lungs, and it can reduce immunity to lung infections. This can cause problems such as wheezing, coughing, colds, flu and bronchitis. Increased levels of nitrogen dioxide can have significant impacts on people with asthma because it can cause more frequent and more intense attacks. Children with asthma and older people with heart disease are most at risk.

Sulfur Dioxide (SO_2) is an invisible gas and has a nasty, sharp smell. It reacts easily with other substances to form harmful compounds, such as sulfuric acid, sulfurous acid and sulfate particles. Sulfur dioxide affects human health when it is breathed in. It irritates the nose, throat and airways to cause coughing, wheezing, shortness of breath, or a tight feeling around the chest. The effects of sulfur dioxide are felt very quickly and most people would feel the worst symptoms in 10 or 15 minutes after breathing in. Those most at risk of developing problems if they are exposed to sulfur dioxide are people with asthma or similar conditions.

Particulate matter (PM) consists of microscopically small solid particles or liquid droplets suspended in the air. The smaller the particles, the deeper they can penetrate in to the respiratory system and the more hazardous they are to breathe. Long-term exposure to current ambient PM concentrations may lead to a marked reduction in life expectancy. The reduction in life expectancy is primarily due to increase cardio-pulmonary and lung cancer mortality. Increases are likely in lower respiratory symptoms and reduced lung function in children, and chronic obstructive pulmonary disease and reduced lung function in adults.

5.5.1.5 Survey Result

The air quality survey results obtained every minute at each survey site were combined to make daily average values (24 hours or 8 hours or 1 hour or 10 minutes) for further evaluation and comparison with corresponding standard values.

Results of ambient air quality measured at AQ-1, and AQ-2 are mentioned in Table below. The concentrations of $PM_{2.5}$ and PM_{10} are within the Myanmar Emission Guideline (MEG)value WHO guideline value and NAAQS. For gases, comparing with the MEG value, WHO guideline value and NAAQS, the concentration of all gases were within the acceptable limit for industrial, residential, rural and other areas. For Methane and Solar radiation for rice mill production factory, there have been mentioned in below guidelines. Collected all data are less than the WHO Guidelines, NAAQS, MEG value. All these data are no significant effect on the environment.

Table 22. Comparison with Guidelines Values

Pollutants	**1st 1hour**	**2nd 1hour**	**MEG Value**	**WHO Guideline Value**	**NAAQS**
CO_2 (uG/m^3)	0	0	-	-	-
CO (uG/m^3)	17.19233	0	-	-	10,000 for Industrial, 4,000 for residential, rural and other areas (1 hour)
H_2S (uG/m3)	4.993715	0	2 (30 min) for Agriculture, Livestock and Forestry Development	-	-
CH4 (uG/m^3)	3062245.42	3578566.786	-	-	-

NO_2 (uG/m^3)	84.99641	52.77736419	200 (1 hour)	200 (1 hour)	120 for Industrial, 80 for residential, rural and other areas (24 hour)
O^3 (uG/m^3)	207.6665	168.9615152	100 (8 hour)	100 (8 hour)	
PM_{10} (uG/m^3)	12.83333	18.24074	50 (24 hour)	50 (24 hour)	150 for Industrial, 100 for residential, rural and other areas
$PM_{2.5}$ (uG/m^3)	7.354167	11.31481	25 (24 hour)	25 (24 hour)	
SO_2 (uG/m^3)	3.037217	2.650662	500 (10 min)	500 (10 min)	120 µg/m3 (24 hour) for Industrial, 80 for residential, rural and other areas
Solar Radiation (W/m^2)	99999.9	99999.9	-	-	-

5.6 WATER QUALITY

I&H Precast Concrete Factory extracted water from the tubewell and the estimated water usage for the plant is 10000 litres/day. The baseline water quality status in the region is established by analyzing samples at four locations consisting of drainage channel from Kalar Kone village and three ground water samples from the project compound, the MOU staff quarter and the Chan Aye meditation center near the project. The criteria for the selection of sites was determined on the project location, agricultural land, slope of the land surface, topographical land upstream and downstream of the

project, channels adjacent to irrigated fields, potential areas of polluted water and the location of the drainage and its discharge system. All water samples were analyzed for their physiochemical properties in ISO TECH laboratory and the result are as shown in following table.

Table 23. Quality of Ground Water and Surface Water from Project Area

Test	Unit	WHO	Water Samples			
			Surface Water	Ground Water		
			Drainage Channel from Kalarkone Village	Project Compound	MOU Staff Quarter	Chan Aye Meditation Center3
pH	pH	6.5-8.5	7.3	5.8	5.3	5.6
Coulor	TCU	15	90	Nil	Nil	Nil
Turbidity	NTU	5	118	2	2	2
Total Hardness (as $CaCO_3$)	mg/l	500	22	16	10	16
Total Alkalinity	mg/l	-	26	24	18	24
Bicarbonate (HCO_3)	mg/l	-	26	24	18	24
Iron	mg/l	0.3	3.20	0.17	0.16	0.17
Chloride (as CL)	mg/l	250	2	4	5	4
Sulphate (as SO_4)	mg/l	200	Nil	Nil	Nil	Nil
Total Solids	mg/l	1500	107	27	24	27
Dissolved Solids	mg/l	1000	25	24	21	24
Salinity	ppt	-	-	-	-	-

By comparing the laboratory analysis results with WHO water quality guideline value, water from drainage channel has higher turbidity value and higher color value than that of WHO guideline value. Iron content of the drainage channel water (3.20) also is higher than WHO value. Other physiochemical properties of all samples are in accordance with WHO guideline values. The properties are baseline water quality of the existing environment before the implementation of the project. The project proponent is obliged to control the quality of sanitary water discharged from the project in accordance with WHO guideline value by applying necessary wastewater treatments. I&H Preccast Concrete Factory was installed waste water treatment plant and the quality of waste water from the plant was shown in the following table.

Figure 22. Collecting Water Samples from Drainage Channel of Kalar Kone Village

Table 24. Waste Water Quality Analysis Result

Sr.	Particular	Unit	NEQG	Waste Water Effluent
1	pH	-	6-9	8.2
2	BOD	mg/l	50	7.76
3	COD	mg/l	250	39.00
4	Oil & Grease	mg/l	10	11.00
5	Total Nitrogen	mg/l	10	3
6	Total Phosphorus	mg/l	2.0	<1

7	Total Suspended Solid (TSS)	mg/l	50	58
8	Total Coliform Bacteria	100ml	400	20

Figure 23. Waste Water Sampling Point of I&H Precast Concrete Factory

Figure 24. Sampling of Waste Water from I&H Precast Concrete Factory

5.7 SOIL Quality

One sample of soil was collected within I&H Precast Concrete Factory to record the current condition of soil. The sample was analyzed for their physiochemical properties in Soil Laboratory, Land Use Department of Ministry of Agriculture and Irrigation. Typical issues relating to soil pH could be seen in the Table 25.

Potential negative impacts by the project relating to soil degradation may have occurred in the early project construction works. Such impacts include excavation, displacement or importation of soil, stockpiling, mixing, wetting, compaction and pollution of soil, soil erosion and sedimentation. But the anticipated impacts on soil may have been occurred only to a limited area within the project compound.

Figure 25. Soil Sampling Photo

Figure 26. Location of Soil Sampling Point

According to test results, pH value of SS which was collected from the I&H Precast Concrete Tactory Compound is 7.86 which falls under classification of moderately alkaline conditions. Under this condition, following phenomena would occurs:

- Preferred pH range for most crops, lower end of range may be too acidic for some
- pH between the range of 6.0 and 7.0 hampers phosphorous fixation
- Neutral pH favors the fixation of molecular Nitrogen by free living soil microorganisms and by symbiotic microorganisms
- Above a pH value of 7.0 the availability of Iron, Manganese, Zinc, Cobalt, and Cupper declines

Table 25. Soil pH and Associated Impacts

pH value	**Soil classification**	**Impact interpretation**
≤ 5.5	Strongly acidic	• Possible Aluminum toxicity and excess availability of Cobalt, Cupper, Iron, Manganese, and Zinc • Deficient in Calcium, Potassium, Nitrogen, Magnesium, Phosphorous, and Sulphur • Boron deficiency below pH of 5 • Molybdenum becomes more available with decreasing pH • Bacterial and actinomycete activity is reduced along with a predominance of fungi • Mineralization of organic matter and nitrification are restricted • Below a pH of 3, functioning of cell membranes is impaired, resulting in leakage of elements

5.5 - 7.3	Moderately acidic, slightly acidic, and neutral soils	• Preferred pH range for most crops, lower end of range may be too acidic for some • pH between the range of 6.0 and 7.0 hampers phosphorous fixation • Neutral pH favors the fixation of molecular Nitrogen by free living soil microorganisms and by symbiotic microorganisms • Above a pH value of 7.0 the availability of Iron, Manganese, Zinc, Cobalt, and Cupper declines
7.3 - 8.5	Slightly alkaline and Moderately alkaline soils	• Above a pH of 7.0 there is an increase in the availability of Iron, Manganese, Zinc, Cobalt, and Copper • Increased risk of ammonia volatilization • First increasing availability of Phosphorus and Boron, but deficiencies may occur at higher pH values • Insoluble Calcium-Phosphates may be formed at higher pH • Electric conductivity is generally high at higher pH values
≥ 8.5	Strongly to very strongly alkaline	• Calcium and magnesium are liable to become unavailable to most crops • Often high sodium levels lead to toxicity and structural damage • Toxicity of bicarbonates and other anions • Possible Boron toxicity common in saline and or sodic soils • Availability of most micronutrients and of Iron, Manganese, Zinc, Copper, and Cobalt is reduced, except for Molybdenum • Decreased

Table 26. Results of Soil Quality Analysis

Sample	Moist-ure %	pH Soil: Water 1:2:5	Texture				Organic Carbon	Humus %	Total N %	Exchangeable cations			Available Nutrients	
			Sand %	Silt %	Clay %	Total %				Ca	Mg	K	P (ppm)	K_2O (mg/100 gm)
SS	4.59	7.86	62.4	11	26.6	100%	0.53	0.91	0.24	8.04	1.05	0.40	10.48	18.87

Table 27. Interpretation of Soil Quality Results

Sample	pH Soil: Water	Texture	Organic Carbon	Total N	Exchangeable cations			Available Nutrients	
					Ca	Mg	K	P	K_2O
SS	Moderately alkaline	Sandy clay loam	Very Low	Low	Low	Low	Medium	Medium	Medium

5.8 GEOLOGY

MES (Myanmar Engineering Society) has been appointed by the applicant to undertake the Environmental and Social Impact Assessment (ESIA) process for the proposed activity. As part of the Scoping Phase, specialist geological input is required in order to identify potential environmental impacts on the geology within the study area. MES has appointed the author to conduct a specialist geological report for the Scoping Phase. The following broad scope of work has been given:

- Carry out a desk study of available information pertaining to the geology, soil types and physical aspects of the study area;
- Prepare a brief report which describes the location, physical characteristics and geology of the study area and identifies potential environmental impacts on the geological environment that are likely to be associated with the proposed activity.

5.8.1 Limitations

Information provided in the specialist report has been based on information provided by the developer, published scientific literature and maps. The study area was visited to investigate physical aspects of the study area. There is no detailed geotechnical investigation (trial pits, soil testing) or verification of the existing geological mapping was conducted. This report is discussed the potential environmental impacts on geological environment in study area. The information provided in this report is deemed adequate for the Scoping Phase under Geology Section of the ESIA Report.

5.8.2 Topography and climate

The study area is located near the bank of Hlaing River and built-up area of Myaungdagar Industrial Zone. Therefore, the topography is quite flat, with no major differences in altitude.

5.8.3 Geology and soil type

Based on the geological map of Myanmar, the regional geology of the proposed area and its surrounding is lied in Holocene Age of Younger Alluvium (Q2) and

bounded by Upper Miocene to Pliocene Age of Irrawaddy Formation. The local geology of the project area is almost covering by alluvial soil.

There are two major geological faults around study area such as Strike Slip Sagaing Fault and Thrust West Bago Yoma Fault mapped on the 1:1,000,000 scales on tectonic map of Myanmar and its surrounding region. Besides, there are some active faults around the project area. The anticipated seismic intensity of the proposed area is located in moderate zone of deterministic seismic hazard map of Myanmar. The equivalent modified Mercalli Scale Classes are VII. The probable range of ground acceleration would be 0.1 to 0.15g.

5.8.4 GEOLOGICAL SCOPING ASSESSMENT

The proposed activity may have certain impacts on the geological environment, and this need to be assessed as an integral part of the broader EIA study. The geological environment includes the parent rock and the soil overburden. Important or prominent geological features (geosites) that contribute to the aesthetic scenery of geological interest in the area, such as fossil sites, prominent rock outcrops or features must also be considered in the impact study. Geological features, such as caves, addits, middens, worship rocks, etc. which are important from heritage standpoint are not covered in this report as they are covered in the Heritage Impact Assessment. Besides, geohydrological assessments also do not form part of this study.

5.8.4.1 Geosites

There are no fossil assemblages because the proposed area is fully covered by alluvial soil and there are no other known geo-sites within the study area.

5.8.4.2 Rock degradation

The bed rock is not distinct in study area. There would not be potential impact on rock degradation during construction activity.

5.8.4.3 Soil degradation

Soil degradation is the removal, alteration or damage to soil and soil-forming processes which can be due to natural processes, such as erosion, or human influence

during construction activity. The preservation of the natural soil is important to maintain environmental status.

Potential negative impacts relating to soil degradation are anticipated for the proposed activity. Such impacts include excavation, displacement or importation of soil, stockpiling, mixing, wetting, compaction and pollution of soil, soil erosion and sedimentation.

Soil erosion is the process of the lowering of the natural ground level by wind or water and may occur as a result of, inter alia, chemical process and/or physical transport on the land surface. Soil erodibility potential is the erosion when soils are exposed to water (and/or wind) during or as a result of land-disturbing activities. Erosion potential is determined by the erodibility of the soil (type and structure), vegetative cover, topography, climate (rainfall and wind), and the nature of land-clearing. Generally, soils with faster infiltration rates, higher levels of organic matter and improved soil structure have a greater resistance to erosion. Sand, sandy loam and loam textured soils tend to be less erodible than silt, very fine sand, and certain clay textured soils. Besides, erodibility potential is generally increased where low-plasticity, fine-grained, unconsolidated soils occur, such as Quaternary and Recent sediments. The soil type covered the study area is alluvium, i.e., loose, unconsolidated (not cemented together into a solid rock) soil or sediments, which has been eroded, reshaped by water in some form, and redeposited in a non-marine setting. Alluvium is typically made up of a variety of materials, including fine particles of silt and clay and larger particles of sand and gravel.

5.8.5 CONCLUSIONS

The geological scoping study has discussed geological features such as soil types, geologic structure and geosites. Besides, the potential impacts on geologic environment of proposed area has identified that degradation of the natural soil is the main geological impact associated with the proposed activity. The possible mitigation of impacts has discussed for Environmental Management and Planning. According to an overview of the discussed geological characteristics of the site, the main potential impacts that have been identified are considered to be low impacts to geologic environments if the possible mitigation of impacts will be carried out successfully.

5.9 BIODIVERSITY

5.9.1 Introduction

Biodiversity includes two portions, which are the study of vegetation (flora) and the study of living animals (fauna). Technical experts conducted the field survey for the construction site within sufficient time to get reliable data of impacts on existent biodiversity.

5.9.2 Purposes

The purpose of the Biodiversity is as follow,

(a) To know the existing biodiversity and ecosystem within the development project site and its surrounding.
(b) To record the tree species density and evaluate the present vegetation.
(c) To record and identify the fauna species in the projecy site.
(d) To identify the potential impacts.
(e) To recommend the mitigation measure.
(f) To recommend the management plan.

5.9.3 Materials and Methods

5.9.3.1 Materials

Materials used for recording are strings for sample plotting and transecting, digital camera for recording, GPS, maps, heavy duty plastic bags, newspapers, alcohol, spray jug (for fixing specimens), 10x lens, permanent marker, field note books, field press, drying press and dryers.

5.9.3.2 Methods (FLORA)

The floristic data and ecological data collection were conducted by the following methods in the study Area.

A. Sample Ploting

The Global Positioning System was used to navigate and mark the coordinates of the sample plots. In order to obtain essential data for predicting of tree species composition in the mangrove forest, 30x30 meter quadrants were set up and tree species in the plot were collected and population of each species were also counted. The species

identification was carried out by using key to families of flowering plants and appropriate literature and confirmed by matching with herbarium specimens of Department of Botany, University of Yangon.

B. Random Transecting

To get representative checklists of the plant species, collection was also carried out by random transect lines within the direct impact zone and indirect impact zone of the project site.

C. Maping

Location maps are set by the method based on the Google map and mark the GPS position of vegetation survey.

5.9.3.3 Data Analysis

After field survey, data entry was carried out in excel work sheet. Analysis of population per hectare percentage was conducted using excel work 2007.

5.9.4 Results and Finding

5.9.4.1 Flora

The project area is located at Myaung Ta Gar Industrial Zone, Hmawbi Township, Yangon division. The project area comprises main factory shop, concrete blending factory, warehouse, canteen, main office, staffs'houses and car parking . The total area of project site including these building and dormitory may be 16 acre. All most all vegetations in the area was cleaned up in the past. There are some trees which were cultivated for shade on road side and fruits trees.

At presnts there are 12 tree species, 28 small tree species, 30 shrubs, 42 herbs, 28 climbers, 10 grass, 2 ferns and 7 aquatics within the study area.

5.9.4.2 Floristic Composition

Total numbers of species collected in the studied area are altogether 7 aquatic and aqutic associate species. Table 4 show the species lists in direct impact zone. The dominant aquatic species in this area are:

(1) *Eichhornia crassipes* (Mart.) Solms

(2) *Ipomoea aquatica* Forssk.

(3) *Lemna minor* L.

(4) *Monochoria hastaefolia* Presl

(5) *Monochoria vaginalis* (Presl) Kunth

(6) *Nymphaea nouchali Byrn*. f.

(7) *Nymphaea pubescens Willd*.

Table 28. Species List in Direct Impact Zone

No.	Common Name	Scientific Name	Family Name
1	Aw-za	*Annona squamosa* L.	Annonaceae
2	Bama-kokko	*Albizia lebbek* (L.) Benth.	Mimosaceae
3	Ban-da	*Terminalia catappa* L.	Combretaceae
4	Bauk-thi-pin	*Physalis minima* L.	Solanaceae
5	Baw-di-nyaung	*Ficus religiosa* L.	Moraceae
6	Baw-za-gaing	*Leucaena leucocephala* (Lam.) De.Wit	Mimosaceae
7	Bi-zet	*Chromolaena odorata* (L.) R.M. King & H Robinson	Asteraceae
8	Bi-zet-new	*Mikania micrantha* H.B.K.	Asteraceae
9	Bi-zet-pho	*Synedrella nodiflora* (L.) Gaertn.	Asteraceae
10	Chin-paung-phyu	*Hibiscus surratensis* L.	Malvaceae
11	Chin-ya	*Flueggea leucopyrus* Willd	Euphorbiaceae
12	Dan-gywe	*Senna tora* (L.) Roxb	Caesalpiniaceae
13	Dan-na-thu-kha	*Scoparia dulcis* L.	Scrophulariaceae
14	Dan-tha-lun	*Moringa pterygosperma* Gaertn.	Moringaceae
15	Gaw-tha-zin	*Citharexylum suberratum* Sw.	Verbenaceae
16	Hti-ka-yon	*Mimosa pudica* L.	Mimosaceae
17	Japan-hti-ka-yon	*Mimosa diplotricha* C.	Mimosaceae
18	Japan-zi	*Muntingia calabura* L.	Tiliaceae
19	Ka-du-byan	*Cyanthillium cinereum* (L.) H. Robinson	Asteraceae
20	Kaing	*Saccharum spontaneum* L.	Poaceae
21	Kala-ma-gyi	*Pithecellobium dulce* (Roxb.) Benth.	Mimosaceae
22	Ka-na-phaw-yaing	*Alternanthera nodiflora* R.Br.	Amaranthaceae
23	Ka-zaw-poke	*Cassia occidentalis* L.	Caesalpiniaceae
24	Ket-si-nae-gyi	*Urea lobata* L.	Malvaceae
25	Ket-si-nae-thay	*Triumfetta bartramia* L.	Tiliaceae
26	Kha-aung	*Ficus hispida* L.	Moraceae
27	Kha-yan-chin	*Lycopersicon esculentum* Mill.	Solanaceae
28	Kha-yan-ka-zawt	*Solanum torvum* Swartz	Solanaceae
29	Khwe-lae-ya	*Canavalia cathartica*	Fabaceae

30	Khwe-thay-pan	*Ageratum conyzoides* L.	Asteraceae
31	Kin-pon	*Coccinia grandis* (L.) J. Voigh.	Cucurbitaceae
32	Ko-kko	*Samanea saman* (Jacq.) Merr.	Mimosaceae
33	Kon-ka-zun	*Ipomoea sagittata* Poir.	Convolvulaceae
34	Kon-tha-phan	*Ficus racemosa* L.	Moraceae
35	Kyan	*Saccharum officinarum* L.	Poaceae
36	Kyar-hin-nwee	*Operculina turpethum* (L.) Silva Mansa	Convolvulaceae
37	Kyauk-kwe	*Evolvulus nummularius* L.	Convolvulaceae
38	Kyaung-pan	*Vitex trifolia* L.	Verbenaceae
39	Kyaung-say-pin	*Acalypha indica* L.	Euphorbiaceae
40	Kyeik-hman	*Eclipta alba* (L.) Hassk.	Asteraceae
41	Kyet-gaung-chake	*Anisomeles ovata* R.Br.	Lamiaceae
42	Kyet-hin-kha	*Momordica charantia* L.	Cucurbitaceae
43	Kyet-mauk-sue-pyan	*Achyranthes aspera* L.	Amaranthaceae
44	Kyet-mauk-sue-pyan	*Achyranthes bidentata* Bl.	Amaranthaceae
45	Kyet-tha-hin	*Phyllanthus niruri* L.	Euphorbiaceae
46	Kyi-ah	*Trichosanthes cordata* Roxb.	Cucurbitaceae
47	Lay-gya-myet	*Chloris barbata* Sw.	Poaceae
48	Le-hmoe	*Ceiba pentandra* Gaertn.	Bombacaceae
49	Let-pan	*Bombax ceiba* L.	Bombacaceae
50	Ma-gyi	*Tamarindus indica* L.	Caesalpiniaceae
51	Ma-la-kar	*Psidium guajava* L.	Myrtaceae
52	Ma-lar	*Curcuma* sp.	Zingiberaceae
53	Myay-zi-phyu	*Phyllanthus urinaria* L.	Euphorbiaceae
54	Myay-zi-phyu	*Phyllanthus maderaspatensis* L.	Euphorbiaceae
55	Mye-na-ga	*Euphorbia thymifolia* L.	Euphorbiaceae
56	Myet-kyut	*Commelina nudiflora* L.	Commelinaceae
57	Nauk-poe-myet	*Chrysopogon acicularis* (Retz.) Trin	Poaceae
58	Not known	*Indigofera miniata* L.	Fabaceae
59	Not known	*Desmodium triflorium* DC.	Fabaceae
60	Not known	*Drynaria fortunei* (Kunze)J.Sm.	Polypodiaceae
61	Not known	*Paspalidium flavidum* Retz.	Poaceae
62	Not known	*Eragrostis papposa* Duf.	Poaceae
63	Not known	*Eragrostis tremula* Hochst. ex. Steud.	Poaceae
64	Not known	*Hedyotis diffusa* Willd.	Rubiaceae
65	Not known	*Lindernia crustacea*(L.) F.Muell.	Scrophulariaceae
66	Not known	*Cyperus exaltatus* Retz	Cyperaceae
67	Not known	*Fimbristylis ferruginea* Vahl.	Cyperaceae
68	Not known	*Alysicarpus ovalifolius* (Schum.) J. Leonard	Fabaceae

69	Not known	*Aeschynomene indica* L.	Fabaceae
70	Nwa-hta-min	*Smithia sensitiva* Ait.	Fabaceae
71	Ohn	*Cocos nucifera* L.	Arecaceae
72	Pa-de-gaw-gyi	*Alpinia conchigera* Griff.	Zingiberaceae
73	Pauk-pan-phyu	*Sesbania grandiflora* (L.) Poir.	Fabaceae
74	Pa-zun-sar-yaing	*Alternanthera sessilis* (L.) R.Br.	Amaranthaceae
75	Pein	*Colocasia antiquorum* Schott.	Araceae
76	Pein	*Colocasia esculnta* (L.)Schott	Araceae
77	Pein-kyar	*Caladium humboldtii*	Araceae
78	Pe-le-nyin	*Acmella calva* (DC.) R.K. Jansen	Asteraceae
79	Pe-yin	*Phaseolus calcaratus* Roxb.	Fabaceae
80	Phet-ya-gyi	*Urtica nivea* L.	Urticaceae
81	Phet-yar-lay	*Urtica dioca* L.	Urticaceae
82	Phi-gyan-nget-pyaw	*Musa malaccensis* Ridl.	Musaceae
83	Pilaw-yaing	*Corchorus olitorius* L.	Tiliaceae
84	Pin-sein-yaing	*Hyptis suaveolens* (L.) Poit.	Lamiaceae
85	Pyaung-phu-pin	*Zea mays* L.	Poaceae
86	Sa-be	*Jasminum* sp.	Oleaceae
87	Sa-byit-yaing	*Ampelocissus barbata* Planch.	Vitaceae
88	Sar-tha-kwar	*Gymnopetalum conchinchinense* Kurz	Cucurbitaceae
89	Seik-noe-ma-htwet	*Euphorbia hypericifolia* L.	Euphorbiaceae
90	Sin-hna-maung	*Heliotropium indicum* L.	Boraginaceae
91	Sin-ngo-myet	*Eleusine indica* Gaertn.	Poaceae
92	Su-la-na-pha	*Oldenlandia corymbosa* L.	Rubiaceae
93	Swe-daw	*Bauhinia acuminata* L.	Caesalpiniaceae
94	Ta-byet-si-ywet-gyi	*Sida mysorensis* Wight & Arn.	Malvaceae
95	Ta-byet-si-ywet-shae	*Sida acuta* Burm f	Malvaceae
96	Ta-byet-si-ywet-wine	*Sida rhombifolia* L.	Malvaceae
97	Taing-lon-chantha	*Portulaca grandiflora* Hook.	Portulacaceae
98	Ta-ma	*Azadirachta indica* A.Juss.	Meliaceae
99	Taw-hin-galar	*Cleome burmanii Wight &* Arn.	Capparaceae
100	Taw-lay-nyin	*Jussiaea suffruticosa* L.	Onagraceae
101	Taw-monla	*Elephantopus scaber* L.	Asteraceae
102	Taw-su-ka	*Passiflora foetida* L.	Passifloraceae
103	Tha-but-kha	*Luffa aegyptiaca* Mill.	Cucurbitaceae
104	Tha-bye	*Syzygium grande* (Wight) Walp	Myrtaceae
105	Tha-man	*Hibiscus similis* Blum.	Malvaceae
106	Tha-yet	*Mangifera indica* L.	Anacardiaceae
107	Thit-yay-gyi	*Peperomia pellucida* (L.) H.B.K.	Piperaceae

108	Thone-daunt-myet	*Kyllinga melanosperma* Nees.	Cyperaceae
109	Wet-kyut	*Commelina bengalensis* L.	Commelinaceae
110	Yakhaing-nget-pyaw	*Musa sapientum* L.	Musaceae
111	Ye-ka-zun	*Ipomoea aquatica* Forssk.	Convolvulaceae
112	Yon-padi	*Hibiscus esculentus* L.	Malvaceae
113	Zi	*Zizyphus jujuba* Lam.	Rhamnaceae

According to Table 4, the investigation in the list of IUCN, there were no endanger and endamic species in the direct impact zone. Table 5 shows the cultivated species in study area.

Table 29. Cultivated Species in Study Area

No.	Common Name	Scientific Name	Family Name
1	Aw-za	*Annona squamosa* L.	Annonaceae
2	Ban-da	*Terminalia catappa* L.	Combretaceae
3	Baw-za-gaing	*Leucaena leucocephala* (Lam.) De.Wit	Mimosaceae
4	Chan-si-yoe-kyet-su	*Jatropha curcas* L.	Euphorbiaceae
5	Chin-paung-ni	*Hibiscus sabdariffa* L.	Malvaceae
6	Chin-paung-phyu	*Hibiscus surratensis* L.	Malvaceae
7	Dan-gyi	*Lawsonia inermis* L.	Lythraceae
8	Dan-tha-lun	*Moringa pterygosperma* Gaertn.	Moringaceae
9	English-me-za-li	*Peltophorum pterocarpum* (DC.) Back.ex K	Caesalpiniaceae
10	Gaw-tha-zin	*Citharexylum suberratum* Sw.	Verbenaceae
11	Gwe-dauk	*Wattakaka volubilis* (L. f.) Stapf.	Asclepiadaceae
12	Ka-zun-gyi	*Ipomoea batatas* Lam.	Convolvulaceae
13	Kha-yae	*Mimusops elengi* L.	Sapotaceae
14	Kha-yan-chin	*Lycopersicon esculentum* Mill.	Solanaceae
15	Kha-yan-ka-zawt	*Solanum torvum* Swartz	Solanaceae
16	Ko-kko	*Samanea saman* (Jacq.) Merr.	Mimosaceae
17	Kyan	*Saccharum officinarum* L.	Poaceae
18	Kyaung-sha	*Oroxylum indicum* (L.) Kurz.	Bignoniaceae
19	Kyet-hin-kha	*Momordica charantia* L.	Cucurbitaceae
20	Le-hmoe	*Ceiba pentandra* Gaertn.	Bombacaceae
21	Ma-gyi	*Tamarindus indica* L.	Caesalpiniaceae
22	Ma-ho-gany	*Swetenia macrophylla* King	Meliaceae
23	Mai-daw-gyi-gamon	*Syngonium podophyllum* Schott	Araceae
24	Ma-la-kar	*Psidium guajava* L.	Myrtaceae
25	Me-za-li	*Senna siamea* (Lam.) Irwin & Barneby	Caesalpiniaceae
26	Nat-pan-nyo	*Justica oreophilia* Clarke.	Acanthaceae
27	Ngu	*Cassia fistula* L.	Caesalpiniaceae

28	Ohn	*Cocos nucifera* L.	Arecaceae
29	Pauk-pan-phyu	*Sesbania grandiflora* (L.) Poir.	Fabaceae
30	Pein-kyar	*Caladium bicolor* (L.)Vent.	Araceae
31	Pein-kyar	*Caladium humboldtii*	Araceae
32	Pein-ne	*Artocarpus heterophyllus* Lam.	Moraceae
33	Pe-zaung-yar	*Dolichos tetragonolobus* L.	Fabaceae
34	Phi-gyan-nget-pyaw	*Musa malaccensis* Ridl.	Musaceae
35	Pinle-ga-bwe	*Casuarina equisetifolia* Forst.	Casuarinaceae
36	Pin-ma-ywet-gyi	*Lagerstroemia macrocarpa* Kurz	Lythraceae
37	Pon-nyet	*Calophyllum inophyllum* L.	Hypericaceae
38	Pwe-say-mezali	*Senna alata* L.	Caesalpiniaceae
39	Pwint-tu-ywet-tu	*Mussaenda erythrophylla* Schum.&Thonn.	Rubiaceae
40	Pyaung-phu-pin	*Zea mays* L.	Poaceae
41	Pyin-ma-ywet-thay	*Lagerstroemia speciosa* (L.) Pers.	Lythraceae
42	Sa-be	*Jasminum* sp.	Oleaceae
43	Swe-daw	*Bauhinia acuminata* L.	Caesalpiniaceae
44	Taing-lon-chantha	*Portulaca grandiflora* Hook.	Portulacaceae
45	Taing-taung-pe	*Vigna peduncularis*(Kunth)Fawc.& Rendle	Fabaceae
46	Ta-ma	*Azadirachta indica* A.Juss.	Meliaceae
47	Taung-htan	*Livistona sp.*	Arecaceae
48	Tha-bye	*Syzygium grande* (Wight) Walp	Myrtaceae
49	Tha-yet	*Mangifera indica* L.	Anacardiaceae
50	Yakhaing-nget-pyaw	*Musa sapientum* L.	Musaceae
51	Ye-hmwe-pan	*Angelonia cornigera* Hook.	Scrophulariaceae
52	Ye-yo	*Morinda angustifolia* Roxb.	Rubiaceae
53	Yon-padi	*Hibiscus esculentus* L.	Malvaceae
54	Ywet-hla-pan	*Codiaeum variegatum* (L.)Blume	Euphorbiaceae
55	Zi-za-war	*Gardenia lucida* Roxb.	Rubiaceae

According to Table 30, the investigation in the list of IUCN, there were no endanger and endamic species in the study area. The Table 6 shows the species lists in indirect impact zone.

Table 30. Species Lists in Indirect Impact Zone

No.	Common Name	Scientific Name	Family Name
1	Alo-lay	*Capparis tenera* Dalzell	Capparaceae
2	Alo-lay	*Caesalpinia crista* L.	Caesalpiniaceae
3	Aw-za	*Annona squamosa* L.	Annonaceae
4	Bama-kokko	*Albizia lebbek* (L.) Benth.	Mimosaceae
5	Ban-da	*Terminalia catappa* L.	Combretaceae

6	Bauk-thi-pin	*Physalis minima* L.	Solanaceae
7	Baw-di-nyaung	*Ficus religiosa* L.	Moraceae
8	Baw-za-gaing	*Leucaena leucocephala* (Lam.) De.Wit	Mimosaceae
9	Be-da	*Eichhornia crassipes* (Mart.) Solms	Pontederiaceae
10	Bi-zet	*Chromolaena odorata* (L.) R.M. King & H Robinson	Asteraceae
11	Bi-zet-new	*Mikania micrantha* H.B.K.	Asteraceae
12	Bi-zet-pho	*Synedrella nodiflora* (L.) Gaertn.	Asteraceae
13	Chan-si-yoe-kyet-su	*Jatropha curcas* L.	Euphorbiaceae
14	Chin-paung-ni	*Hibiscus sabdariffa* L.	Malvaceae
15	Chin-paung-phyu	*Hibiscus surratensis* L.	Malvaceae
16	Chin-ya	*Flueggea leucopyrus* Willd	Euphorbiaceae
17	Dan-gyi	*Lawsonia inermis* L.	Lythraceae
18	Dan-gywe	*Senna tora* (L.*)* Roxb	Caesalpiniaceae
19	Da-ni	*Nypa fruticans* Wurmb	Arecaceae
20	Dan-na-thu-kha	*Scoparia dulcis* L.	Scrophulariaceae
21	Dan-tha-lun	*Moringa pterygosperma* Gaertn.	Moringaceae
22	Duck week	*Lemna minor* L.	Lemnaceae
23	English-me-za-li	*Peltophorum pterocarpum* (DC.) Back.ex K.	Caesalpiniaceae
24	Gwe-dauk	*Wattakaka volubilis* (L. f.) Stapf.	Asclepiadaceae
25	Hta-ma-soke	*Glochidion* sp.	Euphorbiaceae
26	Hti-ka-yon	*Mimosa pudica* L.	Mimosaceae
27	Japan-hti-ka-yon	*Mimosa diplotricha* C.	Mimosaceae
28	Ka-dauk-set	*Monochoria vaginalis* (Presl) Kunth	Pontederiaceae
29	Ka-det	*Crateva adansonii* DC.	Capparaceae
30	Ka-du-byan	*Cyanthillium cinereum* (L.) H. Robinson	Asteraceae
31	Kaing	*Saccharum spontaneum* L.	Poaceae
32	Kala-ma-gyi	*Pithecellobium dulce* (Roxb.) Benth.	Mimosaceae
33	Ka-na-phaw-yaing	*Alternanthera nodiflora* R.Br.	Amaranthaceae
34	Ka-thit	*Erythrina* sp.	Fabaceae
35	Kat-ma-lar	*Sonneratia apetala* Buch.-Ham	Sonneratiaceae
36	Ka-zaw-poke	*Cassia occidentalis* L.	Caesalpiniaceae
37	Ka-zun-gyi	*Ipomoea batatas* Lam.	Convolvulaceae
38	Ka-zun-nwee	*Ipomoea pilosa* Sweet	Convolvulaceae
39	Ket-si-nae-gyi	*Urea lobata* L.	Malvaceae
40	Ket-si-nae-thay	*Triumfetta bartramia* L.	Tiliaceae
41	Kha-aung	*Ficus hispida* L.	Moraceae
42	Kha-ru	*Pluchea indica* (L.)Less.	Asteraceae
43	Kha-yae	*Mimusops elengi* L.	Sapotaceae

44	Kha-yar	*Acanthus ilicifolius* L.	Acanthaceae
45	Khwe-lae-ya	*Canavalia cathartica*	Fabaceae
46	Khwe-sha	*Trema orientalis* (L.) Blume	Urticaceae
47	Khwe-thay-pan	*Ageratum conyzoides* L.	Asteraceae
48	Kin-pon	*Coccinia grandis* (L.) J. Voigh.	Cucurbitaceae
49	Ko-kko	*Samanea saman* (Jacq.) Merr.	Mimosaceae
50	Kon-ka-zun	*Ipomoea sagittata* Poir.	Convolvulaceae
51	Kon-tha-phan	*Ficus racemosa* L.	Moraceae
52	Kyar-hin-nwee	*Operculina turpethum* (L.) Silva Mansa	Convolvulaceae
53	Kyar-ni	*Nymphaea pubescens* Willd.	Nymphaeaceae
54	Kyar-phyu	*Nymphaea nouchali* Byrn. f.	Nymphaeaceae
55	Kyauk-kwe	*Evolvulus nummularius* L.	Convolvulaceae
56	Kyaung-say-pin	*Acalypha indica* L.	Euphorbiaceae
57	Kyaung-sha	*Oroxylum indicum* (L.) Kurz.	Bignoniaceae
58	Kyeik-hman	*Eclipta alba* (L.) Hassk.	Asteraceae
59	Kyet-gaung-chake	*Anisomeles ovata* R.Br.	Lamiaceae
60	Kyet-mauk-sue-pyan	*Achyranthes aspera* L.	Amaranthaceae
61	Kyet-mauk-sue-pyan	*Achyranthes bidentata* Bl.	Amaranthaceae
62	Kyet-tha-hin	*Phyllanthus niruri* L.	Euphorbiaceae
63	Kyet-thon-pin	*Ipomoea violacea* L.	Convolvulaceae
64	Kyi-ah	*Trichosanthes cordata* Roxb.	Cucurbitaceae
65	La-mu	*Sonneratia caseolaris* (L.)Engl.	Sonneratiaceae
66	La-tha-ka-zun	*Ipomoea fistulosa* Mart.ex Choisy	Convolvulaceae
67	Lay-gya-myet	*Chloris barbata* Sw.	Poaceae
68	Le-pa-dauk	*Monochoria hastaefolia* Presl	Pontederiaceae
69	Le-pa-du	*Sphenoclea zeylanica* Gaertn.	Sphenocleaceae
70	Let-pan	*Bombax ceiba* L.	Bombacaceae
71	Ma-gyi	*Tamarindus indica* L.	Caesalpiniaceae
72	Ma-ho-gany	*Swetenia macrophylla* King	Meliaceae
73	Mai-daw-gyi-gamon	*Syngonium podophyllum* Schott	Araceae
74	Ma-la-kar	*Psidium guajava* L.	Myrtaceae
75	Ma-lar	*Curcuma* sp.	Zingiberaceae
76	Me-za-li	*Senna siamea* (Lam.) Irwin & Barneby	Caesalpiniaceae
77	Mi-chaung-kun-phet	*Hygrophila phlomoides* Nees	Acanthaceae
78	Mi-chaung-pan	*Derris trifoliata* Lour.	Fabaceae
79	Myauk-kyein	*Flagellaria indica* L.	Flagellariaceae
80	Myauk-u	*Dioscorea sativa* L.	Dioscoreaceae

81	Myay-byit	*Portulaca oleracea* L.	Portulacaceae
82	Myay-zi-phyu	*Phyllanthus urinaria* L.	Euphorbiaceae
83	Myay-zi-phyu	*Phyllanthus maderaspatensis* L.	Euphorbiaceae
84	Myet-kyut	*Commelina nudiflora* L.	Commelinaceae
85	Nat-pan-nyo	*Justica oreophilia* Clarke.	Acanthaceae
86	Nauk-poe-myet	*Chrysopogon acicularis* (Retz.) Trin	Poaceae
87	Ngu	*Cassia fistula* L.	Caesalpiniaceae
88	Not known	*Alysicarpus ovalifolius* (Schum.) J. Leonard	Fabaceae
89	Not known	*Indigofera miniata* L.	Fabaceae
90	Not known	*Desmodium triflorium* DC.	Fabaceae
91	Not known	*Melanthera biflora* (L.) Wild	Asteraceae
92	Not known	*Drynaria fortunei* (Kunze)J.Sm.	Polypodiaceae
93	Not known	*Adiantum trapeziforme*	Adiantaceae
94	Not known	*Hedyotis diffusa* Willd.	Rubiaceae
95	Not known	*Tylophora flexuosa* R.Br.	Asclepiadaceae
96	Not known	*Utricularia* sp.	Lentibulariaceae
97	Not known	*Paspalidium flavidum* Retz.	Poaceae
98	Not known	*Aeschynomene indica* L.	Fabaceae
99	Not known	*Cayratia trifolia* (L.) Domin	Vitaceae
100	Not known	*Eragrostis papposa* Duf.	Poaceae
101	Not known	*Eragrostis tremula* Hochst. ex. Steud.	Poaceae
102	Not known	*Crinum* sp.	Amaryllidaceae
103	Not known	*Cyperus exaltatus* Retz	Cyperaceae
104	Not known	*Pontederia* sp.	Pontederiaceae
105	Not known	*Fimbristylis ferruginea* Vahl.	Cyperaceae
106	Not known	*Sarcolobus globosus* Wall.	Asclepiadaceae
107	Not known	*Lindernia ciliata* Colsm.) Pennell	Scrophulariaceae
108	Not known	*Lindernia crustacea*(L.) F.Muell.	Scrophulariaceae
109	Not known	*Lindernia antipoda* (L.) Alston	Scrophulariaceae
110	Not known	*Dactyloctenium aegyptium*	Poaceae
111	Nwa-hta-min	*Smithia sensitiva* Ait.	Fabaceae
112	Nyan	*Sesbania paludosa* Roxb.	Fabaceae
113	Ohn	*Cocos nucifera* L.	Arecaceae
114	Ohn-hne	*Streblus asper* Lour.	Moraceae
115	Pa-de-gaw-gyi	*Alpinia conchigera* Griff.	Zingiberaceae
116	Pa-zun-sar-yaing	*Alternanthera sessilis* (L.) R.Br.	Amaranthaceae
117	Pein	*Colocasia antiquorum* Schott.	Araceae
118	Pein	*Colocasia esculnta* (L.)Schott	Araceae
119	Pein	*Alocasia macrorrhizos* (L.)G.Don	Araceae
120	Pein-kyar	*Caladium bicolor* (L.)Vent.	Araceae
121	Pein-ne	*Artocarpus heterophyllus* Lam.	Moraceae

122	Pe-le-nyin	*Acmella calva* (DC.) R.K. Jansen	Asteraceae
123	Pe-yin	*Phaseolus calcaratus* Roxb.	Fabaceae
124	Pe-zaung-yar	*Dolichos tetragonolobus* L.	Fabaceae
125	Pha-lan-taung-hmwe	*Costus specious* Sm.	Costaceae
126	Phet-ya-gyi	*Urtica nivea* L.	Urticaceae
127	Phet-yar-lay	*Urtica dioca* L.	Urticaceae
128	Phi-gyan-nget-pyaw	*Musa malaccensis* Ridl.	Musaceae
129	Pilaw-yaing	*Corchorus olitorius* L.	Tiliaceae
130	Pinle-ga-bwe	*Casuarina equisetifolia* Forst.	Casuarinaceae
131	Pin-ma-ywet-gyi	*Lagerstroemia macrocarpa* Kurz	Lythraceae
132	Pin-sein-yaing	*Hyptis suaveolens* (L.) Poit.	Lamiaceae
133	Pon-nyet	*Calophyllum inophyllum* L.	Hypericaceae
134	Pwe-say-mezali	*Senna alata* L.	Caesalpiniaceae
135	Pwint-tu-ywet-tu	*Mussaenda erythrophylla* Schum.&Thonn.	Rubiaceae
136	Pyin-ma-ywet-thay	*Lagerstroemia speciosa* (L.) Pers.	Lythraceae
137	Sa-byit-yaing	*Ampelocissus barbata* Planch.	Vitaceae
138	Sar-tha-kwar	*Gymnopetalum conchinchinense* Kurz	Cucurbitaceae
139	Seik-noe-ma-htwet	*Euphorbia hypericifolia* L.	Euphorbiaceae
140	Sein-na-gyet	*Phyla nodiflora*	Verbenaceae
141	Shwe-nwee	*Cassytha filiformis* L.	Lauraceae
142	Sin-hna-maung	*Heliotropium indicum* L.	Boraginaceae
143	Sin-ma-hmwe-soke	*Malachra capitata* L.	Malvaceae
144	Sin-ngo-myet	*Eleusine indica* Gaertn.	Poaceae
145	Su-la-na-pha	*Oldenlandia corymbosa* L.	Rubiaceae
146	Swe-daw	*Bauhinia acuminata* L.	Caesalpiniaceae
147	Ta-byet-si-ywet-shae	*Sida acuta* Burm f	Malvaceae
148	Ta-byet-si-ywet-wine	*Sida rhombifolia* L.	Malvaceae
149	Taing-taung-pe	*Vigna peduncularis*(Kunth)Fawc.& Rendle	Fabaceae
150	Ta-ma	*Azadirachta indica* A.Juss.	Meliaceae
151	Taung-htan	*Livistona sp.*	Arecaceae
152	Taw-hin-galar	*Cleome burmanii Wight &* Arn.	Capparaceae
153	Taw-kyaung-pan	*Clerodendrum inerme* Gaertn.	Verbenaceae
154	Taw-lay-nyin	*Jussiaea suffruticosa* L.	Onagraceae
155	Taw-monla	*Elephantopus scaber* L.	Asteraceae
156	Taw-paik-san	*Crotalaria mucronata* L.	Fabaceae
157	Taw-pe-di-sein	*Atylosia crassa* Prain	Fabaceae
158	Taw-su-ka	*Passiflora foetida* L.	Passifloraceae

159	Tha-but-kha	*Luffa aegyptiaca* Mill.	Cucurbitaceae
160	Tha-khut	*Dolichandrone spathacea* (L. f.) K. Schum.	Bignoniaceae
161	Tha-man	*Hibiscus similis* Blum.	Malvaceae
162	Tha-me-ywet-leit	*Avicennia marina* (Forsk)Vierh.	Avicenniaceae
163	Tha-me-ywet-wine	*Avicennia officinalis* L.	Avicenniaceae
164	Tha-nat	*Cordia myxa* L.	Boraginaceae
165	Than-ma-naing-kyauk-ma-naing	*Alysicarpus vaginalis* (L.) Dc.	Fabaceae
166	Tha-yaw	*Excoecaria agallocha* L.	Euphorbiaceae
167	Tha-yet	*Mangifera indica* L.	Anacardiaceae
168	Thit-yay-gyi	*Peperomia pellucida* (L.) H.B.K.	Piperaceae
169	Thone-daunt-myet	*Kyllinga melanosperma* Nees.	Cyperaceae
170	Wet-kyut	*Commelina bengalensis* L.	Commelinaceae
171	win-u	*Millettia* sp.	Fabaceae
172	Yakhaing-nget-pyaw	*Musa sapientum* L.	Musaceae
173	Ye-hmwe-pan	*Angelonia cornigera* Hook.	Scrophulariaceae
174	Ye-ka-zun	*Ipomoea aquatica* Forssk.	Convolvulaceae
175	Ye-yo	*Morinda angustifolia* Roxb.	Rubiaceae
176	Ye-za-lat	*Pistia stratiotes* L.	Araceae
177	Yin-hnaung	*Vitis japonica* Thunb.	Vitaceae
178	Yon-padi	*Hibiscus esculentus* L.	Malvaceae
179	Ywet-hla-pan	*Codiaeum variegatum* (L.)Blume	Euphorbiaceae
180	Zi	*Zizyphus jujuba* Lam.	Rhamnaceae
181	Zi-za-war	*Gardenia lucida* Roxb.	Rubiaceae

According to the Table 6, the investigation in the list of IUCN, endanger and endemic species were not found.

5.9.5 Framework and Standards of Fauna Survey (Methods)

Biodiversity of fish, amphibians, reptiles, birds and mammals are assessed at the present study. The survey is carried out by specimen collections for the insects (dragonflies and butterflies), fish, frogs, toads, snakes (Herpetofauna), rodents (mice and rats) as voucher specimens. Butterflies, dragonflies, amphibians, mammals and reptiles were caught for the voucher specimens to identify down to species taxa level. Birds were studied by watching with the aid of field guide book and binoculars. Voucher specimens of all taxa were identified based on systematic taxonomic keys. References for the specific fauna for taxonomic for taxonomic keys are included.

5.9.6 Results and Findings

5.9.6.1 FAUNA

This is assessment of the EIA fauna survey. A total of **7**6 species representing butterfly (13 specie), dragonfly and damselfly (15 species), fish (10 species), frog and toad (8 species), lizard and skink (4 species) Snake (2 Species) birds (16 species) and mammals (8 species) are recorded. There is not included the any endangered and endemic species under IUCN Red list category. The significance of biodiversity in an ecosystem and complex interrelations with other components determines the structure and productivity of ecosystems, as well as contributing to their functionality.

Mammals and birds' surveys were conducted at the development site. No designated habitats of international or national value were recorded on or adjacent to the site. All the habitats recorded on site are widespread within the landscape and of moderate to low species-richness.

Table 31. Species Diversity

	Order	**Family**	**Species**
Butterfly	1	5	13
Dragonfly and Damselfly	1	2	15
Fish	3	3	10
Frog and Toad		4	8
Lizard and skink		3	4
Snake		2	2
Bird	5	10	16
Mammal	4	4	8
			76

Flora, mammal and bird surveys were conducted at the development site. No designated habitats of international or national value were recorded on or adjacent to the site. All the habitats recorded on site are widespread within the landscape and of moderate to low species-richness. There are very limited areas of scrub or other habitat types. No active endanger species were recorded in site. A few places looked like a small jungle in indirect impact zone.

Species diversity of five groups, Insects (butterfly, dragonfly and damselfly, Fish, Amphibians (toads and frog), Reptiles (snake and lizard) and Birds examined. A total of 76 species representing butterfly (13 species), dragonfly and damselfly (15 species), Fish (10 species), Frog and Toad (8 species), Lizard and Skink (4 species), Snake (2 species) and birds (16 species), mammals (8 species) are recorded.

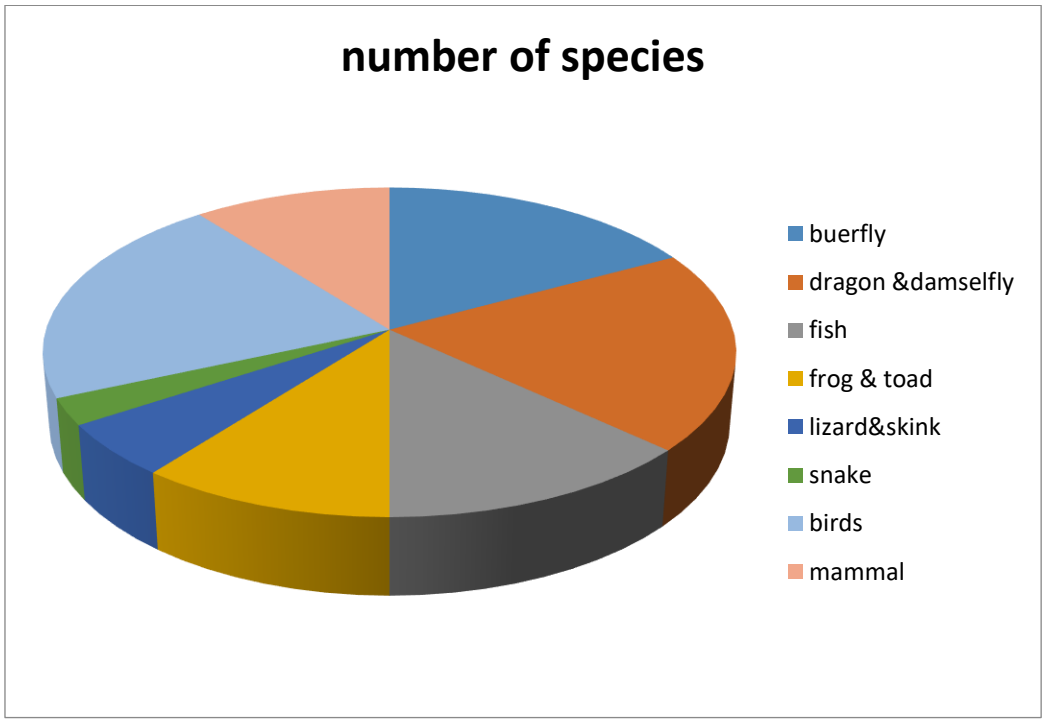


Figure 27. Species Richness of Fauna in Study Area of Project

5.9.6.2 Insect Fauna

Twenty-three insect species under order Odonata (5 families,13 species) and order Lepidoptera (2 families, 15 species) are recorded. Since the collected numbers of each species are not many, population size is relatively small and all species are rear species, hence they are vulnerable and easy to disappear. No endemic or endangered species is recorded

Table 32. Butterfly Species Collected from Survey Area of Project

No.	Family Name	Scientific Name
1	Danaidae	*Danaus genutia genutia* *Danaus limniace limniace*
2	Pieridae	*Eurema hecabe contubernalis*

		Leptosia nina nina *Appias lalassis lalassis* *Euremalaeta pseudolaeta* *Atrophaneura latreillei kabrua*
3	Satyridae	*Lethe philemon*
4	Nymphalidae	*Junonia atlites* *Junonia almana almanac* *Hypolimnas bolina jacintha* *Neptis hylas kamarupa*
5	Papilionidae	*Papilio cresphontes*

Table 33. Dragonfly & Damselfly Collected from Survey Area of Project

Order/ Suborder	**Family**	**Scientific Name**
Order-Odonata Sub-order Zygoptera	Coenagriidae	*Ceriagrion coromandelinum* *Ceriagrion praetermissum* *Ceriagrion nigroflavum* *Ischnura senegalensis* *Agriocnemis dabreui*
Sub- order Anisoptera	Libebellulidae	*Orthetrum Sabina* *Acisoma panorpoides* *Diplacodestrivalis* *Bradinopyga geminate* *Neurothemis tullia* *Brachythemis contaminate* *Rhodothemis rufa* *Trithemis Kirby* *Rhyothemis Phyllis* *Pantala flavesscens*

5.9.6.3 Fish Fauna

A total of 10 fish species representing 3 families under 3 fish orders, Cypriformes, Perciformes and Anguilliformes are recorded. The order Perciformes and Cypriformes are the member of common species. Then, recorded number is only 7 species as specimen vouchers and remaining 3 species is observed from interview survey, meaning that all species are very small population size in the nature before implementation (Table 10). No endangered species is recorded.

Table 34. Fish Fauna Collected from Indirect Survey Area of Project

No.	Order/Family	Scientific Name	Common name	Local name
1.	**Cypriniformes** **Cyprinidae**	*Ctenopharyngodon idellus* *Barillius barila* *Barillius dogarsinghi* *Catla catla* *Chela laubuca* *Crossocheilus burmanicus* *Cyprinus intha* *Danio albolineatus*	Grass carp Carplet Nga thaing Grass barb Glass fish Common carp Pearl danio-	
2	**Perciformes** **Channidae**	*Channa harcourtbuleri*	Snake head	Nga- yant
3	**Anguilliformes** **Anguillidae**	*Anguilla bengalensis*		Nga-shint

5.9.6.4 Herpetofauna

A total of 14 species of 9 families of Class Amphiabia (4 families & 8 species) and Reptilia (5 families & 6 species) of Herpetofauna are recorded from this survey area. All species are very few numbers of collected specimens (Table.11). It could be assumed that species number and population size is locally disappeared due to

discharge of waste from factory and human impacts. No endemic or endangered species is recorded.

Table 35. Recorded Herpetofauna Collected from Survey Area of Project

Family	Scientific Name	Common Name	Habit
Bufonidae	*Bufo melanostictus* *Bufo macrotis*	Common toad Large ear toad	Near pond On the ground
Microhylidae	*Kaloula pulchra* *Microhyla ornate*	Common bull frog Ber narrow mouthed frog	On the ground Near pond
Ranidae	*Rana limnocharis* *Rana tigerina* *Ocidozyga sp.*	Paddy frog Khaing land frog Swamp floating frog	In the pond Mud pond
Rhacophoridae	*Polypedates leucomystax*	Common tree frog	Crevices of roof
Geckkonidae	*Hemidactylus frenatus*	Common house gecko	House
Agamidae	*Calotes versicolor* *Calotes mystaceus*	Garden fence lizard Blue crested lizard	On the trunk On the trunk
Scincidae	*Mabuya multifasciata*	Common sun skink	Storage house
Colubridae	*Xenochrophis piscstor*	Chequered keel back	In the water
Pythonnidae	*Ptyas mucosus*	Lin- myae	In land

5.9.6.5 Bird Fauna

Total of 16 species under 10 families 5 orders were collected in study area. According to their nature and behavior of birds, the survey area is not their original roosting and nesting sites, they come from another place for foraging to here. In bird activity pattern, flying pattern is the most common than the others. There is not many

tall trees for the bird's nesting in that area that means no good habitat is present (Table 12). No endemic or endangered species was recorded.

Table 36. Recorded Avifauna Collected from Survey Area of Project

Order/Family	Scientific Name	Common Name	Vernacular Name
I.Piciformes 1.**Picidae**	*Dendrocopos macei*	Fulvous-breasted woodpecker	Thit-tauk-nghet
II.Falconiformes 2.**Accipiridae**	*Milvus migrans*	Black kite	Son
III.Columbiformes 3.**Columbidae**	*Columba livia*	Rock pigeon	Kho
IV.Ciconiiformes 4.**Ardeidae**	*Ardeola grayii*	Indian pond heron	Byine-ouk
VI.Passeriformes 6.**Corvidae** 7.**Muscicapidae** 8.**Sturnidae** 9.**Hirundinidae** 10.**Sylviidae** 11.**Passeridae**	*Corvus splendens* *Corvus macrorhynchos* *Copsychus saularis* *Acridotheres tristis* *Acridotheres fuscus* *Hirundo striolata* *Orthotomus sutorius* *Passer domesticus* *Passer montanus* *Ploceus philippinus* *Lonchura striata* *Lonchura punctulata*	House crow Large –billed crow Oriental magpie robin Common myna Jungle myna Red-rumped swallow Common tailor bird House sparrow Eurasian tree sparrow Baya weaver White-rumped-munia Scaly-breasted munia	Kyi-kan Taw-kyi-kan Tha-paik-lwe Myo-za-yet Taw-za-yet Pyan-hlwar Hnan-pyi-soak Eain-sar Thit-pin-sar Sar-wa-tee Sar-pa-tee Sar-pa-tee

5.9.6.6 Mammals

The mammalian community was made up of diverse organisms. A total of (8) mammals; mouse and rat were recorded as information and could not identified because of interview survey during limited study period. The murids (rats and mice) were the most common types. Apart from these mammals that were identified, a few other species of insectivorous bats (micro-chiroptera) and shrews were frequently observed, but these evaded captures and hence could not be identified.

Table 37. Systematic Position of Class Mammal Fauna Collected from Indirect Impact Zone of Project

Order/Family	Scientific Name	Common Name	Vernacular Name
I. Cetartiodactyla 1.**Bovidae**	*Bos taurus*	Bovine	Cow
II. Artiodactyla 1.**Bovidae**	*B. bubalis* *B. bubalis. arnee*	Bovine	Water Bufflo
III. Rodentia **1. Sciuridae** **2. Muridae**	*Funambulus palmarum* *Bandicota bengalensis* *Mus mucclus* *Rattus rattus*	squirrel rat rat rat	Palm squirrel bandicoot rat
IV. Soricomorpha **1. Soricidae**	*Suncus murinus*	rat	rat

5.9.6.7 Soil fauna

Life in the soil is diverse ranging from microscopic single celled organisms to large burrowing animals. Hence there are well-defined food chain/energy flows within the soil ecosystem. The soil macro-fauna encountered within the study area include various arthropods (insects, millipedes, mites), molluscs (snails), annelids (earthworms) and nematodes (Table.14). These organisms are primary consumers; decomposers, mixers and utilizers of energy stored in plants and plant residues, and contribute to the re-cycling of nutrients. Others were secondary consumers such as centipedes, scorpions and spiders. These animals consume smaller sized animals and they may also serve as food for organisms occupying higher levels of the food chain.

The soil fauna of special interest within the savanna ecosystem under study were termites and earthworms. The importance of earthworms to soil includes aeration, improvement of texture, mixing (materials from the surface taken to lower depths and *vice versa*) and nutrient re-cycling.

Table 38. Soil Fauna Encountered in Soils of the Study Area

Group	General	Common Name	Trophic Level
Arthropod	Trinervitermes	Termite	Primary Consumers
	Ancistrotermes	Termites	Primary Consumers
	Amitermes	Termites	Decomposers
	Macrotermes	Termites	Decomposers
	Odontotermes	Termites	Decomposers
	Cubitermes	Termites	Decomposers
	Collembola	Beetle	Decomposers
	Oryetes	Dung beetle	Decomposers
Myriapoda	Lithobius	Centipedes	Secondary Consumers
	Spirotreplus	Milipedes	Primary Consumers
Aranchnida	Gastrocantha	Spiders	Secondary Consumers
	Pandinus	Scorpion	Secondary Consumers
Annelids	Ephyridrilus	Earthworm	Decomposers
	Edudrilus	Earthworm	Decomposers
	Hyperidrilus	Earthworm	Decomposers
Molluscs	Limicolaria	Garden snail	Primary Consumers

5.9.6.8 Soil Microorganisms

The microorganisms and macro-fauna work together as a team in organic matter decomposition. The microorganisms of concern in this study were fungi and bacteria and these play important roles in the transformation of soil nutrients. The pre-dominant heterotrophic bacterial isolates were *Serratia* sp, *Bacillus* sp, *Escherichia* sp, *Pseudomonas* sp, *Vibro* sp, *Flavobacterium* sp and *Alkalegenes* sp.

5.9.7 Discussion and Conclusions for Biodiversity Environment

All living existing organisms inhabiting in the direct zones definite will disappear after this project. The main environmental impacts are the (indirect) land usage for resource production, the destruction of natural habitats and ecosystems, pollution through the Pre-cast concrete Project. However, solid waste from precast plants is very low. Made of natural raw materials (stones, gravels, sand, cement), locally available almost everywhere and in an enormous quantity, precast concrete minimizes the whole life cycle impact on the environment when compared with other construction materials.

It is noted that no significant disturbance of birds arose as part of construction or operational activities associated with this major development. A diverse range of small mammals and herpeto-fauna is extant on site. These species are not relevant to the implicated Natura 2000 sites and are not considered here. The site has a very low representation of fauna, due to the uncultivated area and limited range of habitats on site. The vegetated boundaries are of low species diversity and poor structure. There is an almost total lack of ponds, and there are no rivers or streams on the site. Admixtures are used in concrete mixtures in very small quantities and therefore have negligible environmental impact. Their use is important since they provide added benefits to the concrete and to the environment.

Precast concrete units can entirely be re-used or recycled. On-site construction using precast concrete is not only faster, but also safer as secure working platforms are quickly established. There are no adverse fauna and flora impacts predicted in the vicinity of the site as a result of these developments.

Figure 28. I & H Pre-Cast Concrete Factory's Direct & Indirect Impact Zone

Ischnura senegalensis *Ceriagrion praetermissum*

Figure 29. Lepidoptera Species Collected from Survey Area of the Project

Danaus limniace limniace *Danaus genutia genutia*

Atrophaneura latreillei kabrua *Eurema hecabe contubernalis*

Figure 30. Some Butterfly Species Collected from Survey Area of the Project

Neurothemis tulia *Rhyothemis Phyllis*

Brachythemis contaminate *Orthetrum Sabina*

Figure 31. Dragonfly Species Collected from Survey Area of the Project

Channa harcourtbutleri *Catla catla*

Figure 32. Some Fish Fauna collected from Drainage Channel

Kaloula pulchra *Bufo melanostictus*

Mabuya multifasciata *Calotes mystaceus*

Figure 33. Some Herpeto Fauna Collected from Project Area

Corvus splendens *Acridotheres tristis*

Orthotomus sutorius *Lonchura striata*

Figure 34. Some Avi Fauna Species Collected from Project Area

Rattus rattus

Bandicota bengalensis

Bos taurus (Cow)

Figure 35. Some mammals collected from from Project Area

Eudrilus earthworm

Millipedes

Limicolaria garden snail

Odontotermes termite

Figure 36. Soil Fauna Encountered in the Study Area of the Project

5.10 NOISE STUDY

5.10.1 Purpose of the Noise Study

The purpose of this noise study is to evaluate noise impacts and abatement under the requirements of Myanmar Environmental Conservation Law (2012) and Rules (2014). The Protocol outlines the requirements for preparing noise study reports. Noise impacts associated with this project are evaluated in the project's environmental document.

5.10.2 Noise Level Guidelines

Myanmar National Environmental Quality Guidelines are used for reference. The guidelines show the impacts should not exceed the levels presented in the following table, or result in a maximum increase in background level of 3 dB at the nearest receptor location off-site.

Table 39. NEQG (Myanmar) Noise Level Guidelines

Receptor	One Hour L_{Aeq} (dBA)	
	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

5.10.3 Study Methods

5.10.3.1 Measurement Time

The noise under investigation is measured for sufficient time to establish that the measured value adequately represents the subject source noise. The source noise is measured over a time interval of at least 15 minutes or, if the noise continues for less than 15 minutes, the duration of the source noise.

Typical monitoring periods should be sufficient for statistical analysis and may last 48 hours with the use of noise monitors that should be capable of logging data continuously over this time period, or hourly, or more frequently, as appropriate (or else cover differing time periods within several days, including weekday and weekend

workdays). The type of acoustic indices recorded depends on the type of noise being monitored, as established by a noise expert.

5.10.3.2 Measurement Location

Normally, when undertaking a noise assessment, it is essential to make note of the following on a site map:

- location of noise source
- background noise measurement location
- source noise measurement location
- topography between noise source and sensitive receivers.

5.10.3.3 Measurement Method

(a) Handheld quick assessment

The handheld assessment method is used to get noise levels; a tripod is used for a compliance inspection or to take enforcement action. To obtain the most accurate data using this method, the sound level meter is held out at arm's length and held out to the side with the microphone pointed towards the source of the noise, to minimize sound reflecting off the body.

(b) Affected height of the receptor

A noise reading should always be taken at the height of the receptor. If the receptor is at the ground level, measurement is taken at the ground level (1.2–1.5m off the ground) and no closer than 3 m to any reflecting surface (e.g., wall).

5.10.4 Existing Noise Environment

The proposed project is located near the settlement and do not far from the Yangon-Pyay Highway, and has existing human noise from workers and road traffic related noise sources. The noise environment at the project is dominated by human activities, with most activities during daytime hours. The noise monitoring results are summarized in the following table to demonstrate baseline noise levels around the site.

Table 40. Noise Measurement Results

No	Sample Name	Coordinates		Noise Level In (dB)(A)	NEQG Guideline
		Latitude(N)	Longitude(E)		
1	NS-1	17°10'20.66"N	95°59'5.17"E	60	70

2	NS-2	17°10'17.40"N	95°59'13.67"E	50	70
3	NS-3	17°10'17.20"N	95°59'13.47"E	45	70
4	NS-4	17°10'17.10"N	95°59'13.30"E	60	70
5	NS-5	17°10'16.65"N	95°59'16.05"E	63	70
6	NS-6	17°10'15.95"N	95°59'19.39"E	90.8	70

Figure 37. Location of Noise Sampling Point

Figure 38. Surveying Noise Levels

5.10.5 Future Trend

Based on the project information, construction and operation of the project including vehicular movements and pre-cast cement production operations are potential noise sources that may affect NSRs. Future increase in the population may result in more human activity and potentially a higher noise background.

During construction and decommissioning activities, noise and vibration could occur by the operations of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. Various sources will create noise and vibration in the construction phase of the project. Piling and operation of other heavy machinery will produce significant noise. Stand by generator set in the time of emergency power supply will also contribute to significant noise in operation phase. But surrounding villages and workers quarter are not adjacent to the project area.

5.10.6 Potential Construction Noise

It is anticipated that the use of Powered Mechanical Equipment (PME) during the construction phase will generate potential noise upon the existing NSRs. Following table presents the likely equipment that shall be used to construct the project corresponding sound power levels.

Table 41. Powered Mechanical Equipment to be used for Construction

Sr.	Description	Sound Power Level dB (A)
1	Air compressor	104
2	Bar bender (electric)	90
3	Concrete mixer (electric)	96
4	Crane, mobile (diesel)	112
5	Derrick barge/ Split barge	104
6	Dredger, grab	112
7	Dump truck	117
8	Excavator/ Backhoe	117
9	Generator, Standard	112
10	Poker, vibratory, hand-held	113
11	Roller, vibratory	108

5.11 Topography

Based on the data obtained from the topography survey, the site is relatively flat, with a gentle downward slope from the northeast boundary (RL+10.97 m) to the southwest (RL+7.75 m).

5.12 Temperature.

The hottest period is between February and May, with little or no rain. At the end of this season, generally from March to April, the average monthly temperature reaches the upper 30℃. The average temperatures in Yangon range from 24℃ to 36℃ in April during the hot season and it ranges from 18℃ to 32℃ in January during the cooler season.

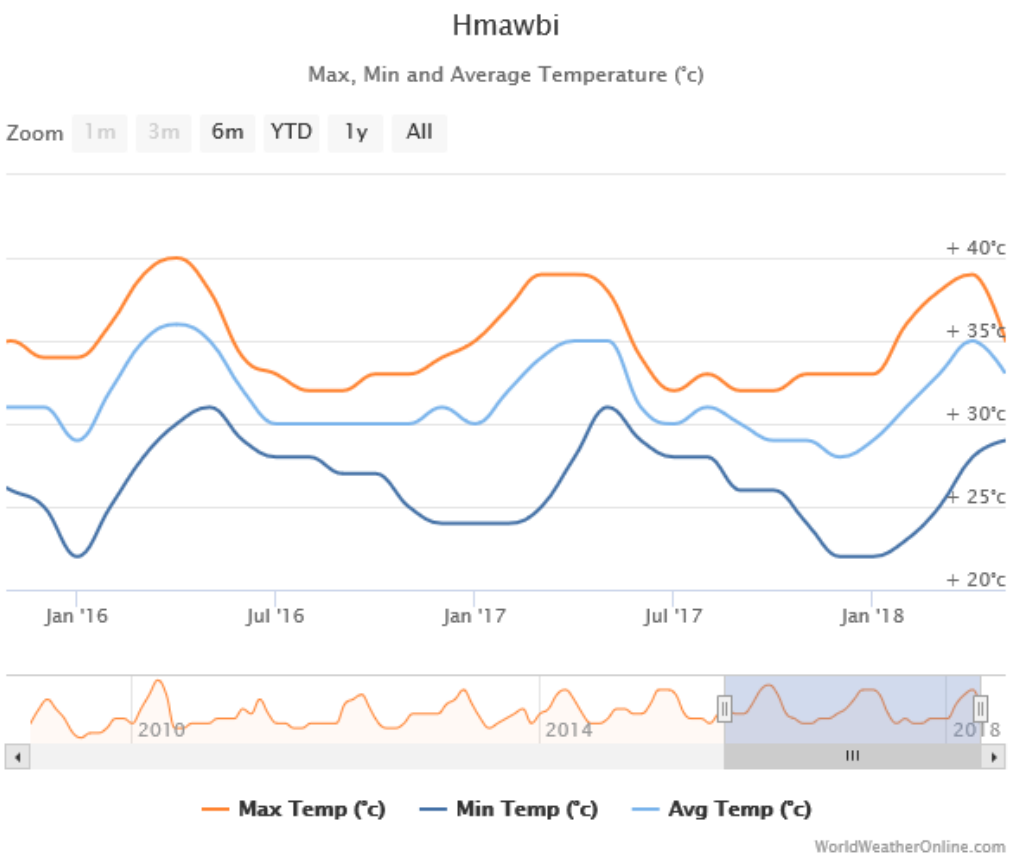


Figure 39. Temperature Graph of Hmawbi

5.13 Rainfall and Relative Humidity

The climate of Myanmar follows a typical monsoon pattern. Historically, the average annual mean rainfall for Yangon is 2,681 mm with the annual average rainy

days of 129.3 days. During the course of 2016, the Department of Meteorology and Hydrology (Myanmar) reported an annual precipitation of approximately 2700 mm. The month with the most precipitation was in July. The relative humidity was generally higher from May to October 2016. The dry season occurs from November to April. Based on the historical weather for the last twelve months in Yangon, no precipitation was observed in December 2015, February 2016 and March 2016. The least humid month of the last 12 months was February 2016 with an average daily low humidity of 34%, and the most humid month was September with an average daily high humidity of 80%. 58. Wind Speed and Direction. Based on 2016 data, it was reported that the month with the highest wind speed was April 2016 with an average wind speed of 3 m/s while the least windy month was December 2015 with an average wind speed of 1m/s. The highest sustained wind speed was 54 m/s, occurring on September 19, 2016 and the highest daily mean wind speed was 4 m/s, occurred on May 14, 2016.

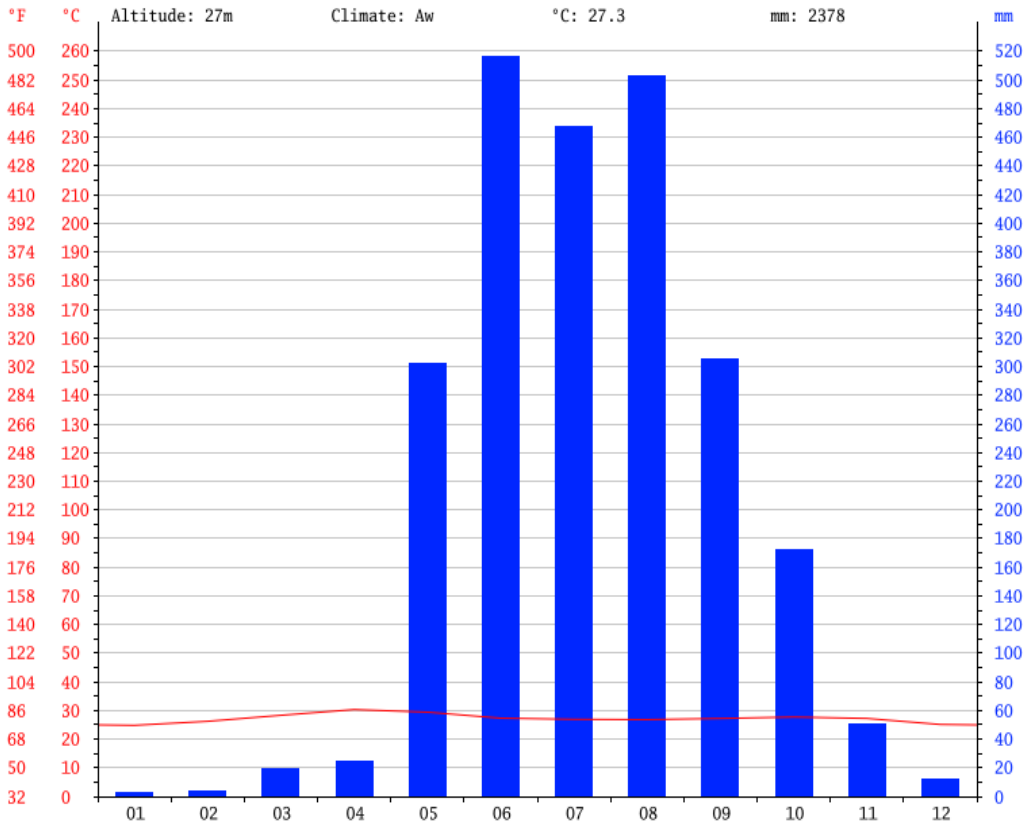


Figure 40. Climate Graph of Yangon

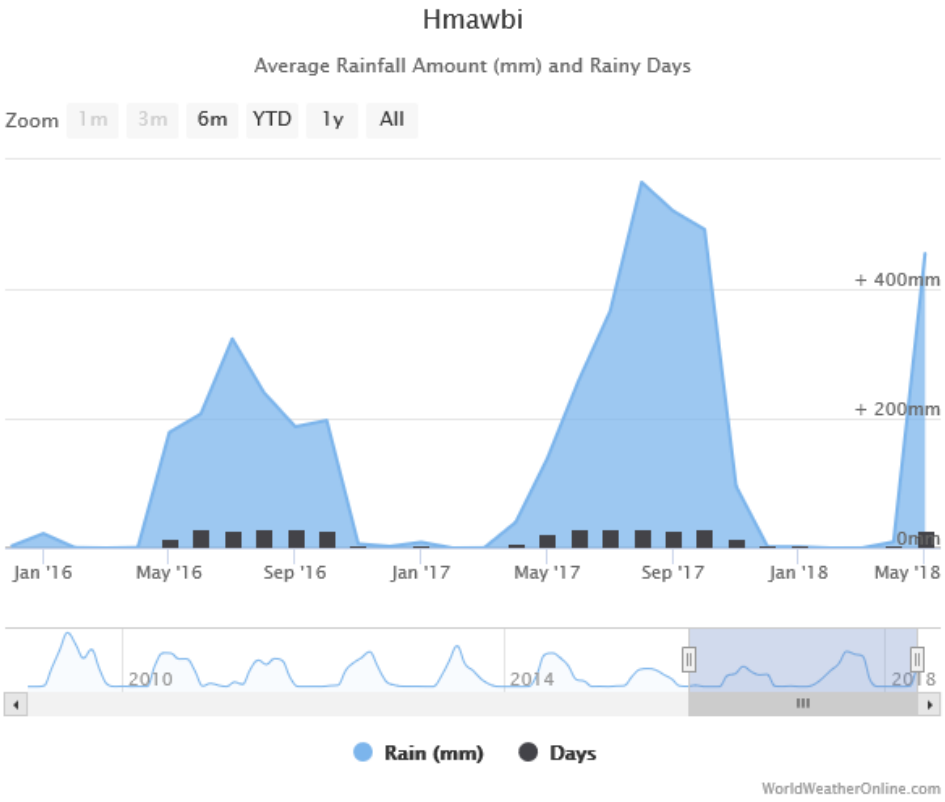


Figure 41. Average Rainfall Amount of Hmawbi

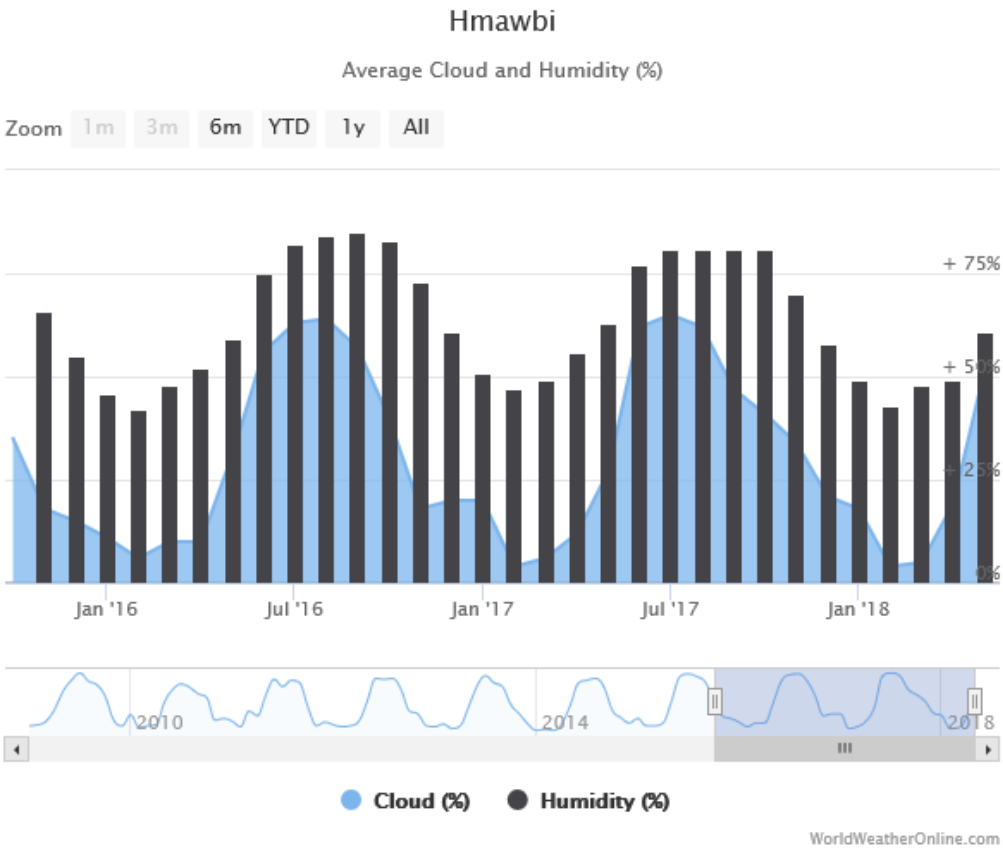


Figure 42. Aveage Cloud and Humidity of Hmawbi

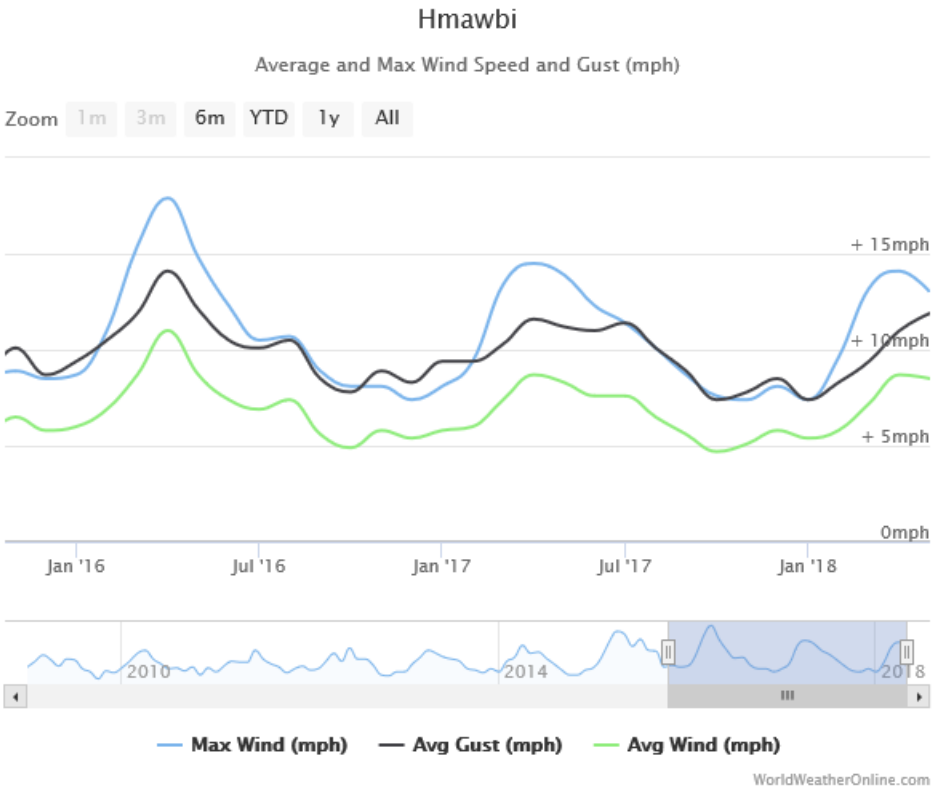


Figure 43. Average and Max Wind Speed for Hmawbi

5.14 Socio-Economic Components

Socio-economic factors are lifestyle components and measurements of both financial viability and social standing. They directly influence social privilege and levels of financial independence. Factors such as health status, income, environment and education are studied by sociologists in terms of how they each affect human behaviors and circumstances income and livelihoods.

5.14.1 Living Conditions

Living conditions refers to the circumstances of a person's life, especially with regard to their well-being. Standard of living is the level of wealth, comfort, material goods and necessities available to a certain socioeconomic class in a certain geographic area, usually a country. The standard of living includes factors such income, quality and availability of employment, class disparity, poverty rate, quality and healthcare, quality and availability of education, life expectancy, incidence of disease, cost of goods and services, infrastructure, national economic growth, economic and political stability,

political and religious freedom, environmental quality, climate and safety. The standard of living is closely related to quality of life.

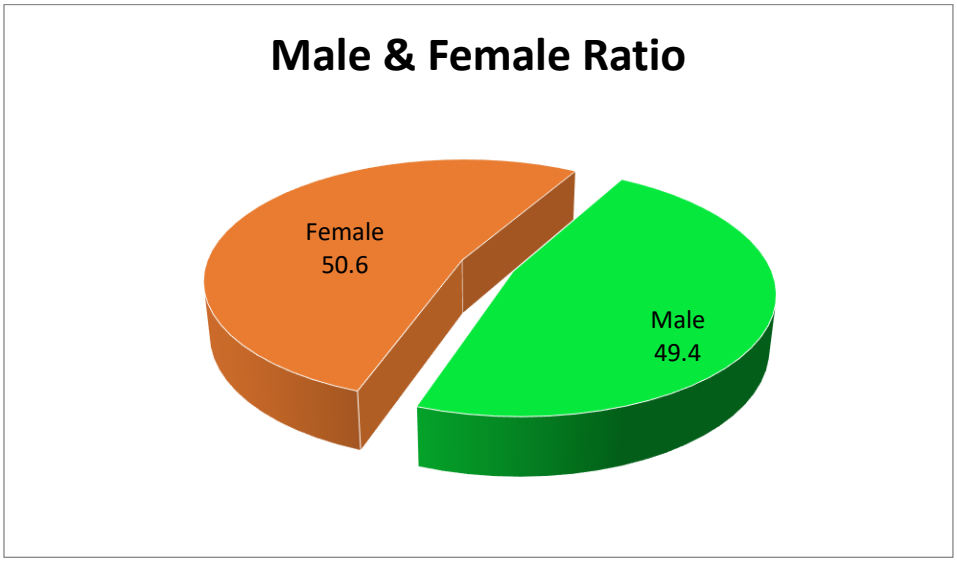


Figure 44. Gender Ratio in Hmawbi

The above pie chart shows the male and female ratio for Mhawbi Township. There are 120931 males in 123676 female populations as the gender ratio of male to female goes 49.4: 50.6.

5.14.2 Demographic Characteristics

The surrounding area of I&H Concrete factory includes the villages namely MOC Staff Quarter and Kular Kone Village. Total number of house holds for each village is represented in the following table and pie chart. With a total of 84 house hold in MOC Staff Quarter.In Hmawby Township, there are more females than males with 98 males per 100 females. The majority of the people in the Township live in rural areas with only (10.6%) living in urban areas. The population density of Hmawby Township is 514 persons per square kilometre. There are 4.1 persons living in each household in Hmawby Township. This is lower than the Union average.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	162	48.4	48.4	48.4
	Female	173	51.6	51.6	100.0
	Total	335	100.0	100.0	

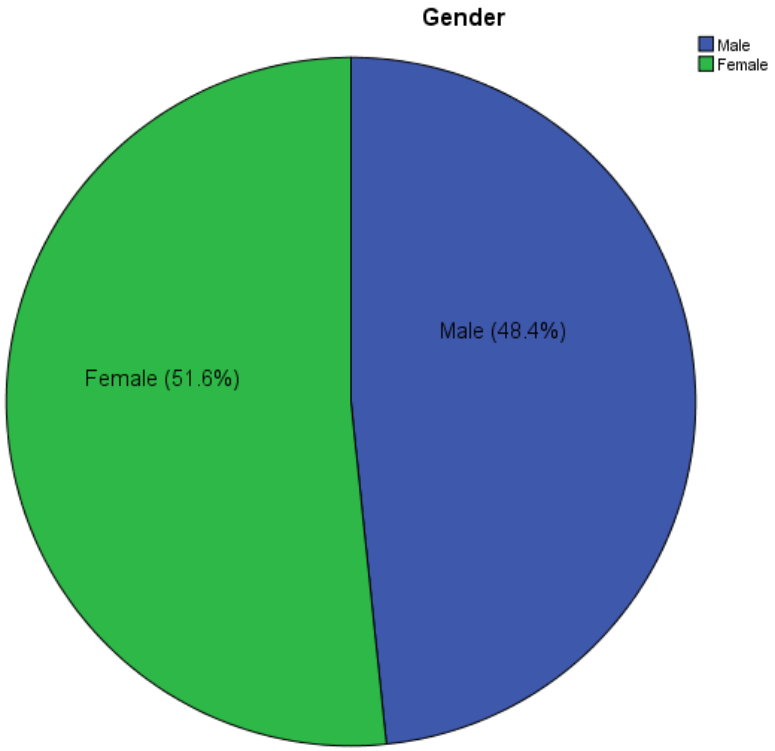


Figure 45. Gender Ratio from MOC Quarter

5.14.3 Educational Attainment

Around 38.65% the people in local community attained only primary level education. Only 7.81% of the local people are graduated. About 44.85% remaining are middle and high school levels. It could be noted that more than half (55.8%) of local population attained more than primary education. Current educational attainment levels show the local community's past education condition. Hospitality and tourism business need a fair to high level of educational attainment. Background educational attainment of local community shows that the project needs to concentrate capacity building of local community so that they could participate in the development process. Figure (26) show the educational attainment of local community.

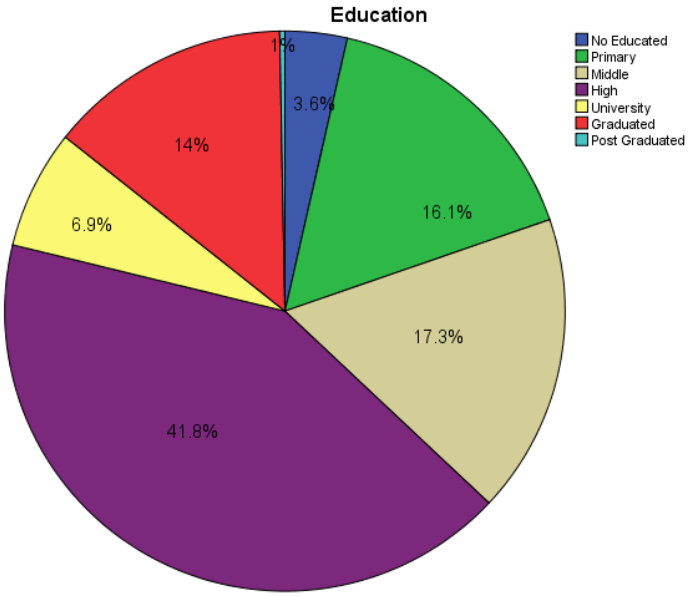


Figure 46. Educational Attainment

5.14.4 Employment

The most conspicuous living is employee. Second most dominant type is own account worker. Approximately 1% of the people in the resident area is ill or. Figure 26 show the population 10 years and over by usual activity status and sex.

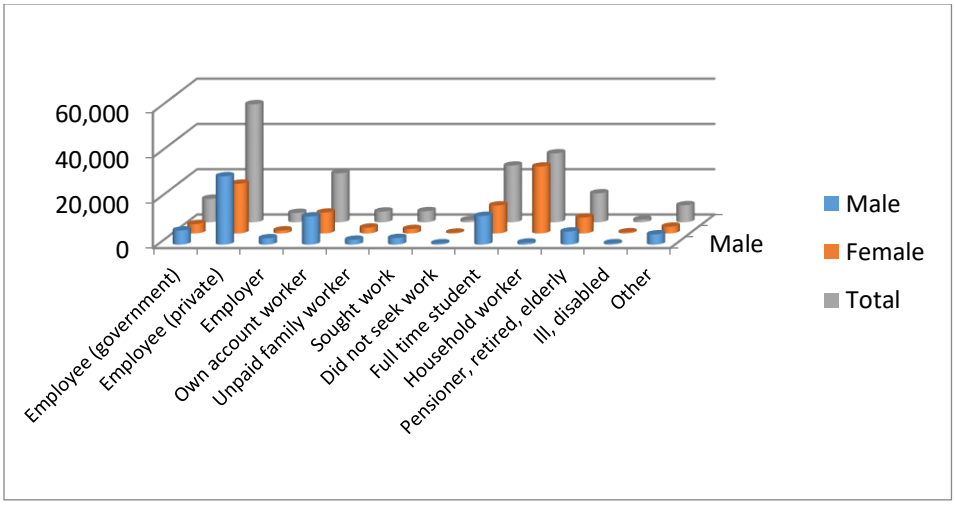


Figure 47. Population 10 years and over by usual activity status and sex

5.15 Health Information

The surrounding area of I&H Concrete factory includes the villages namely MOC Staff Quarter and Kular Kone Village.Mhawbi Township in Kular Kone village, from rural health project in the village area near the affected area had access to health information. Health information describe in Appendix- L.

5.16 Cultural Factors

In the study area, the proposed project is closed with Zinamanaung Aung Pagado, Shwe Phone Taw Pagado and Shwe Pyi Aye Pagado. The location map is the following figure.

Figure 48. Location Map of near project site Pagoda

Zinamanaung Aung Pagoda built since 1992.It was situated with a compound with Ingyin Pin Damathukha Chapel.The entire pagado was built with brick and concrete and have the four entrances. It is located Yangon-Pyay Road, Lattitude 17°10’19.87’’ and Londitude 95°59’21.79’’ and is closed from proposed project area. This is the local call of the Inngyin Pin Maung Na Ma Pagoda, usually every year. Since 2012 years, it is no longer available. In the surrounding environment, there have any buildings which was 100 years old.

Figure 49. Zinamanaung Aung Pagoda

Shwe Phone Taw Pagoda and Yazarmuni Pagoda were built by 2005 and 2016 and are situated within a compound of Myaung Takar Village.It was constructed with brick and concrete. It is also 1.44km far from the proposed project area. It describes following the figure.

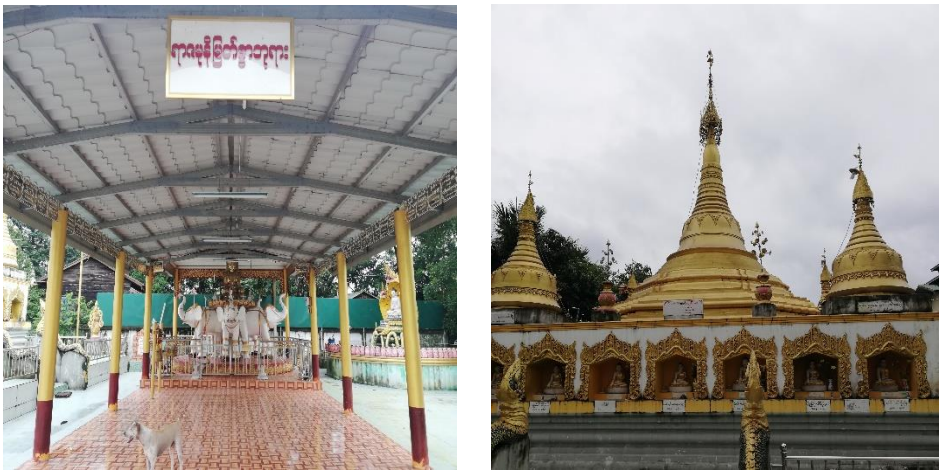


Figure 50. Yazarmuni Pagoda and Shwe Phone Taw Pagoda

Shwe Pyi Aye Pagoda are situated within a compound of Kalar Kone Village.It was constructed with brick and concrete. It is also 1.7km far from the proposed project area. It describes following the figure.

Figure 51. Shwe Pyi Aye Pagoda

6. IMPACT ASSESSMENT AND MITIGATION

To identify the potential environmental and social impacts of the project, project activities were correlated with environmental and social receptors and their interactions were identified for potential environmental and social impacts. ESIA team finds out eleven key environmental and social impacts of the project on its environment. These impacts are described in this section of the report.

6.1 ASSESSMENT METHODOLOGY

A conventional rating matrix method is used to assess the significance level of the identified environmental and social impacts of the TTMTS project on its environment. There are five parameters considered for the activities of the projects and the consequences resulted from the said activities. System of rating is described in detailed as follows.

Table 42. Activity 1

Frequency of Activity	Rating
Annual or less	1
Bi-annual	2
Monthly	3
Weekly	4
Daily	5

Table 43. Activity 2

Probability of Activity	Rating
Almost impossible	1
Highly unlikely	2
Unlikely	3
Possible	4
Definitely	5

Table 44. Consequence 1

Severity of Impact	Rating
Insignificant/non-harmful	1
Small/potentially harmful	2
Significant/slightly harmful	3
Great/ harmful	4
Disastrous/ deadly harmful	5

Table 45. Consequence 2

Spatial Scope of Impact	Rating
Activity specific	1
Within right of way	2
Local area	3
Regional	4
National	5

Table 46. Consequence 3

Duration of Impact	Rating
One day to one month	1
One month to one year	2
One year to ten year	3
Life of operation	4
Permanent	5

Table 47. Significance Rating Matrix

Activity (Frequency + Probability)	Consequence (Severity + Spatial Scope + Duration)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table 48. Significance Levels

Sr.	Color Code	Value	Rating
1		1-25	Very Low
2		26-50	Low
3		51-75	Low-Medium
4		76-100	Medium-High
5		101-125	High
6		126-150	Very High

6.2 IMPACT ON OCCUPATIONAL SAFETY AND HEALTH

Personal injuries and illnesses arising out of work situations impose a substantial burden in terms of lost production, wage loss, medical expenses, and disability compensation payments. Proponent has to take effort to reduce the number of occupational safety and health hazards at the places of employment.

As the project is large, there are a number of workers for the project construction works. Variety of workers for site clearing, earth work, steel work, masonry work, general work, material storage and management body stay together during the construction phase. Poor temporary camp conditions could deteriorate workers' health. Occupational hazard such as injuries from machine and equipment use, accidental explosions, falling from height, hit by fallen objects, injure by sharp objects, electric shock, and slipping etc., will be associated with the project construction works. OSH issues relating to construction and operation of the project are addressed in depth in a separate chapter.

In operation phase, health problems and diseases may occur due to occupational works for long time. Workers' health is adversely affected due to dusts, carrying of excessive weight (varicose vein syndrome), noise from machines and odor from chemical and concrete. The potential hazards for worker in precast manufacturing are eye, skin and respiratory tract irritation from exposure to cement dust, inadequate safety guards on equipment, inadequate lockout systems on machinery, overexertion and awkward postures, slips, trips and falls and chemical burns from wet concrete. On operational phase, the main risks of accidents at the plant are falls from great height (into the pit or down from the footbridges), collisions with trucks transporting raw materials and products, accidents at rotating equipment, scalding by hot water or steam, equipment failure, explosions, and fire. During the operation, chemical hazards can occur in the activities of concrete mixing, casting, transport and curing work.

Table 49. Identification of Impact on OSH

Project Activity	Impact Factor
Site Preparation	
Site clearing	Noise, Physical hazards
Earth filling/cutting	Noise, Physical hazards
Digging	Noise, Physical hazards

Soil loading/unloading	Noise, Physical hazards
Soil transportation	Noise, Physical hazards
Soil compaction	Noise, Physical hazards
Road Work	
Surveying	Physical hazards
Site clearing	Noise, Physical hazards
Earth filling/cutting	Noise, Physical hazards
Soil loading/unloading	Noise, Physical hazards
Soil and materials transportation	Noise, Physical hazards
Soil compaction	Noise, Physical hazards
Paving (Concrete and Asphalt)	Noise, Physical hazards, Chemical Hazard
Finishing (painting, signage, signal…)	Physical hazards, Chemical Hazard
Electricity Work	
Construction of transformer station	Noise, Physical hazards, Chemical Hazard
Survey	Physical hazards
Transportation of materials	Noise, Physical hazards
Digging and foundation	Physical hazards
Pole erection and installation	Noise, Physical hazards
Cable installation	Physical hazards
Construction Works	
Piling	Noise, Physical hazards
Reinforced Concrete Work	Noise, Physical hazards
Masonry Work	Physical hazards
Carpentry Work	Noise, Physical hazards, Chemical Hazard
M&E Work	Noise, Physical hazards, Chemical Hazard
Finishing	Physical hazards, Chemical Hazard
Furnishing	Noise, Physical hazards
Precast Concrete Production Works	
Materials Handling	Noise, Physical Hazards
Worker Proximity to Operation	Noise, Physical Hazards
Chemical Handling	Odor, Chemical Hazard
Form Work	Noise, Physical Hazards

Reinforcing	Noise, Physical Hazards
Concrete Mixing, Casting and Transport	Noise, Odor, Physical Hazards, Chemical Hazards
Curing	Noise, Odor, Physical Hazards, Chemical Hazards
Product Handling and Transport	Noise, Physical Hazards

Table 50. Impact Assessment for Occupational Safety and Health

OCCUPATIONAL SAFETY AND HEALTH			
Type of Impact	Negative		
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Possible	4	Activities that can cause OSH issues are possible
Frequency of Activity	Daily intermittent	4	Activities will occur every day routinely
Spatial Scope of Impact	Activity specific	1	Most of the OSH impacts occur at the site of specific activity
Duration of Impact	Life of operation	4	Most of the impacts occur along the project life
Severity of Impact	Deadly Harmful	5	Severe incidents can be deadly harmful
Significance level	Medium-High	80	Rating value fall in 76-100 range

6.2.1 Impact Mitigation

(1) Eliminating some of the hazards by removing inessential activities from the work

(2) Controlling the hazard at its source through use of engineering controls such as local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc…

(3) Minimizing the hazard through design of safe work systems and administrative or institutional control measures such as job rotation, training

safe work procedures, workplace monitoring, limiting exposure or work duration, etc...

(4) Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE

(5) Providing safe, secure and healthy camps for construction workers adequately

(6) Providing necessary training on OSH for workers and supervise their implementation at work place

(7) Implementing of OSH programmes systematically by appointing a safety officer

(8) Following occupational safety and health section of this report completely

(9) Must have flasher and warning alarm for going backward direction in every project vehicle

(10) Provide hearing protection if needed to guard against excessive noise exposure

(11) Prohibit smoking and taking meal in project area except allow area

(12) Provide ablutions and loker-rooms for workers adequately

(13) Practice cleaning process regularly and systematically

(14) Use of proper drill benches or wagon drills, avoiding the use of portable and hand-hell drill equipment

(15) Use of properly protected wire cutting machines

(16) Providing specific warning devices

(17) Providing training on explosives handling and safety management

Table 51. Impact Rating for Occupational Safety and Health with Mitigation

OCCUPATIONAL SAFETY AND HEALTH			
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	**Highly unlikely**	**2**	Possibility of the activities that can cause incidents are highly unlikely with systematic application of appropriate mitigation measures
Frequency of Activity	Daily intermittent	4	Project activities will remain the same

Spatial Scope of Impact	Activity specific	1	Most of the OSH impacts occur at the site of specific activity
Duration of Impact	Life of operation	4	When occurred, maximum possibility of the effect of the impact will be permanent for severe incidents
Severity of Impact	Deadly Harmful	5	Severity will be the same
Significance level	Low-Medium	60	Rating value fall in 51-75 range

6.3 IMPACT ON BIODIVERSITY

The project area lies within the government construction site compound which had been already cleaned up. For this reason, there is no natural vegetation in the direct impact zone. Only the cultivated species were collected in this zone. No endangered species were identified in the area.

Concrete production can create pollution mainly in the form of dust and noise. Terrestrial fauna would be impacted directly and indirectly by various phases of the project on both short-term and long-term bases. Direct mortality of wildlife could occur during construction activities and maintenance operations. Wildlife could be killed by construction vehicles traveling to and from the Project. Wildlife would be disappeared from habitats by clearing vegeation and from areas adjacentto construction sites due to increased noise and human presence. Nesting migraorybirds and wildlifewould be affectedby habitat removal. Negative impacts include disturbance to the landscape, dust and noise and disruption to local biodiversity.

It is noted that no significant disturbance of birds arose as part of construction or operational activities associated with this major development. A diverse range of small mammals and herpeto-fauna is extant on site. These species are not relevant to the implicated Natura 2000 sites and are not considered here. The site has a very low representation of fauna, due to the uncultivated area and limited range of habitats on site. The vegetated boundaries are of low species diversity and poor structure. There is an almost total lack of ponds, and there are no rivers or streams on the site. Admixtures are used in concrete mixtures in very small quantities and therefore have negligible environmental impact. Their use is important since they provide added benefits to the

concrete and to the environment. There is no or little impact in the project area since the area lies within already cleaned up compound.

6.3.1 Mitigation of Impacts on Flora

1. To establish a plan to restore and replant the trees as landscaping scheme in the project area.
2. To plant quick growing tree species as a wind-break behind the wall of the compound. (Suggested wind-break tree species list- Table 5.4)
3. To establish a plan to aid the socio-economic and livelihood of local people.

Table 52. Wind-Brake Species

No.	Vernacular Name	Scientific Name	Family Name
1.	Ban-da	*Terminalia catappa* L.	Combretaceae
2.	Eu-ca-lit	*Eucalyptus ovate* Labill.	Myrtaceae
3.	Kha-yae	*Mimusops elengi* L.	Sapotaceae
4.	Korea-ban-da	*Bucida* sp.	Combretaceae
5.	Lan-ta-ma	*Polyalthia longifolia* (Lam.) Benth. & Hook.f.	Annonaceae
6.	Ma-lay-sha-padauk	*Acacia auriculiformis A.* Cunn	Mimosaceae

6.3.2 Mitigation of Impacts on Fauna

1. Noise pollution of project construction should be minimized.
2. Identify potential environmental impacts associated with construction and operation of the proposed Pre-cast concrete Project development.
3. Regularly maintain production and wastewater treatment systems.
4. Contribute to the removal of organic matters from polluted water.
5. Replantation must be practiced in the indirect zone.
6. Reduce dust and air pollution as far as possible.
7. Wetting of roads to reduce traffic dust and reentrained particles.
8. Solutions Limited as well as the implementation of appropriate mitigation
9. Many saws used in precast facilities are equipped with vacuum attachments to help reduce particulate emissions.

Table 53. Impact Rating for Biodiversity

BIODIVERSITY			
Type of Impact	Negative		
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Possible	4	Activities that can cause impact on biodiversity are possible
Frequency of Activity	Daily continuous	5	Activities will occur daily
Spatial Scope of Impact	Local area	3	Impacts are estimated to spread in local area
Duration of Impact	Project life	4	Impacts will occur the whole project life
Severity of Impact	Significant	3	Significant impacts on existing ecosystem can occur without implementing appropriate mitigation measures
Significance level	Medium-High	90	Rating value fall in 76 - 100 range

Table 54. Impact Rating for Biodiversity with Mitigation

BIODIVERSITY			
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Unlikely	3	Impacts on ecology will be lowered with appropriate mitigation
Frequency of Activity	Daily intermittent	4	Activities will remain the same
Spatial Scope of Impact	Local area	3	Impacts can spread in local area, but not in national
Duration of Impact	Project life	4	Impacts will remain the whole project life
Severity of Impact	Significant	3	Impacts are estimated to be significant by implementing delineated mitigation measures
Significance level	Low-Medium	70	Rating value fall in 51 – 75 range

6.4 IMPACT ON COMMUNITY SAFETY AND HEALTH

Many community health and safety impacts during the construction of precast concrete plant are common to those of most nonhazardous industrial and commercial activities. These impacts include dust, noise, and vibration from construction vehicle and communicable disease and adverse impacts associated with the influx of temporary construction labor.

Dust and particulate emissions, wastes generations, noise and vibrations could occur during the construction phase of the project. But the duration of the occurrence will be within the project construction phase. After finishing the construction, emission of dust, ash and bran, waste water (soak water and discharge water from waste water treatment process) and odor will be generated upon project operations.

The project boundary is about (660) ft away from Yangon-Pyay Highway. Existing access road is mainly used by MOC staff quarter where the project will be sharing it with the local community. The section of highway at the point of junction with the access road is about 22 ft wide and the product precast components sometimes will be large. The traffic hazard could be critical.

Negative impacts on CSH will be occurred due to the emissions from the project and the transportations but severity of impact will be low. In spite of noise and odor being generated from the project, these pollutions will be occurred within right of way. The Master Plan should be prepared by a suitably qualified professional, and adequately cover fire prevention, detection and alarm system, fire suppression and control, emergency response plan, and operation and maintenance.

Table 55. Identification of Impact on Community Safety and Health

Project Activity	**Impact Factor**
Site Preparation	
Earth filling/cutting	Dust and particulate
Digging	Dust and particulate
Soil loading/unloading	Dust and particulate
Soil transportation	Dust and particulate, Traffic hazard
Road Work	
Earth filling/cutting	Dust and particulate
Soil loading/unloading	Dust and particulate

Soil and materials transportation	Dust and particulate, Traffic Hazard
Paving (Concrete)	Dust and particulate, Traffic hazard
Paving (Asphalt)	Odour, Traffic hazard
Finishing (painting, signage, signal, etc.)	Odour
Electricity Work	
Construction of transformer station	Dust and particulate
Transportation of materials	Dust and particulate, Traffic hazard
Construction Works	
Piling	Waste
Reinforced Concrete Work	Waste
Masonry Work	Waste
Carpentry Work	Waste
Finishing	Odour
Precast Concrete Production Works	
Chemical Handling and Transport	Odor, Dust and particulate
Form Work	Noise, Dust and particulate, Waste
Reinforcing	Noise, Dust and particulate, Waste
Concrete Mixing, Casting and Transport	Noise, Odor, Dust and particulate, Waste
Curing	Noise, Dust and particulate, Waste
Product Handling and Transport	Noise, Dust and particulate, Waste and Traffic Hazard

Table 56. Impact Rating for Impact on Community Safety and Health

COMMUNITY SAFETY AND HEALTH			
Type of Impact	Negative		
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Possible	4	Occurrence of activities that can impact community safety and health are possible

Frequency of Activity	Daily intermittent	4	Activities will occur daily in operation and construction phases
Spatial Scope of Impact	Within right of way	2	Impacts can spread within right of way
Duration of Impact	Project Life	4	Hazards from the project could exist since the project construction throughout the operation of the project
Severity of Impact	Significant	3	Consequence of impacts are significant
Significance level	Low-Medium	72	Rating value fall in 51-75 range

6.4.1 Impact Mitigation

(1) Providing adequate pavement with for the access road

(2) Providing enough turning area at the junction point

(3) Providing adequate unloading area for raw material transport

(4) Providing adequate loading area for product precasts

(5) Providing systematic vehicle management for incoming and outgoing vehicles

(6) Using of enclosed/ covered areas for storage and handling of raw materials for precast concrete production, e.g. cements, sands, gravels, etc.

(7) All the conveyors/vehicles for the transportation should be covered from all side, if possible

(8) Conducting awareness program for traffic hazard in local community and drivers so that project related traffic incidents could be prevented or reduced on roads Avoiding high hazard routes and crowded periods in local communities so that traffic hazard could be minimized

(9) Implementing systematic waste management system so that health hazard on local community could be prevented

(10) The Master Plan should be prepared and adequately cover fire prevention, detection and alarm system, fire suppression and control, emergency response plan, and operation and maintenance.

(11) Provide a connection between the representatives of project and local communities

(12) Providing support for health sector of the local communities in CSR programme

Table 57. Impact on Community Safety and Health with Mitigation

COMMUNITY SAFETY AND HEALTH			
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Unlikely	3	Occurrence of activities will be reduced by mitigation measures
Frequency of Activity	Daily intermittent	4	Activities will occur in daily basis
Spatial Scope of Impact	Activity Specific	1	Impacts can be restricted to limit its effected area
Duration of Impact	Project Life	4	Hazards from the project could exist since the project construction throughout the operation of the project
Severity of Impact	Small	2	Consequence of impacts will be small with careful implementation of mitigation measures
Significance level	Low	49	Rating value fall in 26-50 range

6.5 Impact on Water Environment

Soil, wood debris, concrete chunks and other construction wastes will be generated in the construction phase of the project which can cause drainage blockage if they are handled improperly. If the solid wastes are managed improperly, they will scatter across the project area and finally end up in drainage causing blockage. Negative impacts on water environment for downgradient places could be occurred by draining the waste water from the plant with rain water and wafting the dust and particles with air. Waste water combining with clay and cement from excavation, stockpiling, mixing and wetting could occur water pollution, erosion and potential negative impacts.

In operational phase, including but not limited to excess concrete, concrete washout wastewater, concrete debris and aggregate by reusing the materials in concrete production would be potential impact on water environment. The concrete process

water is caustic and typically has a high pH value ranging between 11 and 12. It contains dissolved solids including sulfates and hydroxides from cement, oil and grease from equipment and derivatives from chemical admixtures.

In addition, the high content of total suspended solids (TSS) typically found in process water might be one of the negative impacts on water environment. The project requires to optimize the recycling of all by products and/or waste material generated during the manufacturing of concrete products, including but not limited to excess concrete, concrete washout waste water, concrete debris and aggregate by reusing materials on concrete production. As a whole, the plant should investigate ways to minimize waste by recycling materials and ultimately strive for a zero-discharge manufacturing process.

According to survey results, nearby MOC staff quarter has about (150) numbers of households with estimated water usages of 35 m^3 per day and the estimation of water usage will be 12775 m^3 per year. The project will use 6025 m^3 water per year for the overall processes. Local community is worrying about depletion of groundwater by excessive use of the project. Local residences form MOC staff quarter discussed that the area around the project is poor in drainage capacity. Flood by storm water usually occurs around the area.

Table 58. Identification of Impact on Water Environment

Project Activity	Impact Factor
Site Preparation	
Site clearing	Debris
Earth filling/cutting	Loose soil, Destruction of natural drainages
Digging	Loose soil, Destruction of natural drainages
Soil loading/unloading	Loose soil
Soil transportation	Loose soil
Road Work	
Site clearing	Debris
Earth filling/cutting	Loose soil, Destruction of natural drainages
Soil loading/unloading	Loose soil, Destruction of natural drainages

Soil and materials transportation		Loose soil
Paving (Concrete)		Solid waste
Paving (Asphalt)		Solid waste
Construction Works		
Piling		Mud water, Loose soil
Reinforced Concrete Work		Solid waste
Masonry Work		Solid waste
Carpentry Work		Solid waste
M&E Work		Solid waste
Finishing		Solid waste
Furnishing		Solid waste
Precast Concrete Production Works		
Pre-production Process	Installing Steel Mould/ Abutment	Waste water, drainage
Pre-cast Material Supply Process	Fabrication of Rebars	Waste water, drainage
Concrete Material Supply Process	Inbound Transportation	Waste water, drainage
	Handling & Storage	
	Concrete Batching	
Pre-Cast Concrete Production	Cleaning/Alteration of Moulds/Abutment	Waste water , drainage, Chemicals
	Arrangement and Tension PC-tendon	
	Shuttering	
	Pouring/Casting	
	Stripping	
	Storage/Transport	

Table 59. Impact Rating for Impacts on Water Environment

WATER ENVIRONMENT			
Type of Impact	Negative		
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Possible	4	Activities that will that will create impacts on water environment are possible

Frequency of Activity	Daily intermittent	4	Activities will occur daily in operation and construction phases
Spatial Scope of Impact	Local area	3	Impact can spread the local area
Duration of Impact	Project life	4	Impact factors will exist for the whole project life
Severity of Impact	Significant	3	Significant impacts will occur if the factors that can cause impacts on water environment are not managed systematically
Significance level	Medium-High	80	Rating value fall in 76-100 range

6.5.1 Impact Mitigation

(1) Prevent leaking out fuel, lubricants and cement during construction period

(2) Discharge only clear water from sedimentation tank, which is used to sendimentate waste water from construction

(3) Providing necessary covering for drainages around the project

(4) Providing adequate drainages around the project area

(5) Conduct awareness program for effective utilization of water

(6) Provide toilets and basins which need low capacity of water

(7) Build raw materials receipt, processing and product storage places without running off and draining in water

(8) The plant recycles as much of the treated water as possible when cleaning production equipment with a pressure washing

(9) The discharge of process water should be treated to fulfill the limit for total suspended solids, pH and chemical composition.

(10) The factory should investigate ways to minimize waste by recycling materials and ultimately strive for a zero-discharge manufacturing by completely recycling all process water.

(11) Avoiding extraction of ground water as much as possible

(12) Providing alternative water source to the project and local community e.g, from Hlaing river.

(13) Providing plans for water distribution to MOC staff quarter in long term as a CSR programme.

- The plan must include distribution capacity for the staff quarter
- Time to start the construction of the infrastructure
- Estimated cost for construction
- Time to start the water distribution
- Estimated cost for distribution
- Anticipated cost sharing plan for distribution (if any)
- Dynamic discussion with MOC staff about the plan

Table 60. Impact Rating for Impacts on Water Environment with Mitigation

WATER ENVIRONMENT			
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	**Unlikely**	**3**	Possibility of impact on water environment will become unlikely
Frequency of Activity	Daily intermittent	4	Frequency of the activities will remain the same
Spatial Scope of Impact	**ROW**	**2**	Careful implementation of mitigation measures will reduce impact area
Duration of Impact	Project life	4	Impact duration will remain the same
Severity of Impact	**Small**	**2**	Impact significance will be small by systematic implementation of delineated mitigation measures
Significance level	Low-Medium	56	Rating value fall in 51-75 range

6.6 IMPACT ON GEOLOGY AND SOIL

Concrete causes damage to the most fertile layer of the earth. It is almost impossible to be removed. Potential negative impacts relating to soil degradation are anticipated for the proposed activity. Such impacts include excavation, displacement or importation of soil, stockpiling, mixing, wetting, compaction and pollution of soil, soil erosion and sedimentation.

On operational phase, soil erosion and pollution of soil could occur because of transporting raw materials and products, particle emissions from batching, maintenance and alteration mold and abutment and stripping processes. Moreover, waste water from maintenance and alteration mold and abutment could occur upper soil erosion and pollution of soil. The project needs to avoid discharging the waste water (e.g, wash water and process water) directly to the soil environment.

Table 61. Identification of Impact on Geology and Soil

Project Activity	Impact Factor
Site Preparation	
Site clearing	Soil erosion
Earth filling/cutting	Soil removal, Soil alteration
Digging	Soil removal
Soil loading/unloading	Soil removal, Soil alteration
Soil transportation	Soil alteration
Soil compaction	Soil alteration
Road Work	
Site clearing	Soil erosion
Earth filling/cutting	Soil removal, Soil alteration
Soil loading/unloading	Soil removal, Soil alteration
Soil and materials transportation	Soil removal, Soil alteration
Soil compaction	Soil alteration
Paving (Concrete)	Soil pollution
Paving (Asphalt)	Soil pollution
Construction Works	
Piling	Soil removal, Soil alteration, Soil pollution, Soil erosion
Reinforced Concrete Work	Soil pollution
Masonry Work	Soil pollution

The proposed activity will conduct earthworks for foundations for structures and access road. The most important issues are the direct impacts of soil degradation which includes soil removal, soil alteration, soil pollution and specifically, soil erosion

from the area of activity. The main direct potential impacts are mentioned in Table 38 below;

Table 62. Nature and Extent of Potential Impact

Potential Impact	Nature	Extent
Soil Removal	Removal of soil due to excavations for foundations and assess internal roads	Local only
Soil Alteration	Alteration of soil texture, density, structure and chemistry due to soil mixing, wetting, stockpiling and compaction	Local Only
Soil Pollution	Pollution of in situ soil due to spillage of hazardous substances such as fuel, oil and cement	Local Only
Soil Erosion	Loss of soil by water or wind erosion	Local Only

Table 63. Impact Rating for Impacts on Geology and Soil

GEOLOGY AND SOIL			
Type of Impact	Negative		
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Possible	4	Impacts on geology and soil are possible without any mitigation measures
Frequency of Activity	Daily continuous	5	Activities will occur daily continuous
Spatial Scope of Impact	Local area	3	Impacts can spread in local area
Duration of Impact	Life of operation	4	Impact duration will be life of operation
Severity of Impact	Significant	3	Significant impacts will occur
Significance level	Medium-High	90	Rating value fall in 76- 100 range

6.6.1 Impact Mitigation

1. Schedule excavation during low-rainfall periods, when possible

2. No sooner had excavated than construct immediately In order to mitigate soil erosion
3. Control concentrated flow and runoff to reduce the volume and velocity of water from work sites to prevent formation of rills and gullies
4. After the construction, land fill with appropriate fertile top soil and plant the flora to control the fecundity and richness of soil
5. Provide adequate storage for raw materials and products
6. Install curbs to prevent runoff and install adequate covers to prevent windblown litter
7. Collect waste water with allocated channels and treat to meet applicable environmental standards to prevent soil pollution
8. Provide the closed room type enclosure for storage and handling if possible and necessary
9. Correct use of hazardous substances should be controlled in order to prevent soil pollution

Table 64. Impact Rating for Geology and Soil with Mitigation

GEOLOGY AND SOIL			
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Highly Unlikely	2	Possibility of the incidents are highly unlikely with appropriate mitigation measures
Frequency of Activity	Daily continuous	5	Project activities will remain the same
Spatial Scope of Impact	Local Area	3	Impact will also spread in local area
Duration of Impact	Life of operation	4	Impact duration will remain the same
Severity of Impact	significant	3	Severity could be reduced to small with appropriate mitigation measures
Significance level	**Low-Medium**	**70**	Rating value fall in 51- 75 range

6.7 IMPACT ON AMBIENT AIR QUALITY

Emissions of air pollutants can occur from a wide variety of activities during the construction and operation. So, the project will avoid, minimize, and control adverse impacts to human health, safety, and the environment from emissions of air pollutants. Dust will be generated from earth work such as leveling, digging, filling at the project site and transportation of soil resulted from the earth work. Trucks transporting the waste soil generated from earth work will spray particulate of soil along its route if they are not covered appropriately. Road to project area will also generate dust emission by transporting of not only soil but also building materials. Dust emission would be eminent if the construction period falls in hot season and windy weather. Significant sources of odor emission from project construction phase will be operation of machinery, road asphalting and painting works.

In operational phase, every process from pre-production process to product finishing/delivery process will generate emissions of air pollutants and particles. Roadways at the facility will also generate dust emission and also need to be kept in a condition to eliminate dust and proper speed need to be enforced for safety and reduce dust. Batching plant will generate dust emissions. Unloading of aggregate will also produce dust. In pre-production processes, precast material supply processes and stripping process many saws will be used and these processes could be generated particle emissions. Odor emission from concrete mixing, poring and casting processes might be occurred and these emissions will be significant impact. Other work practices such as establishing work stations that allow product to be brought to a specific area where proper ventilation is provided can be used to eliminate emissions and exposure.

Table 65. Identification of Impact on Ambient Air Quality

Project Activity	**Impact Factor**
Road Work	
Soil and materials transportation	Dust and particulate, Vehicle emissions
Paving (Concrete)	Dust and particulate
Paving (Asphalt)	Dust and particulate, Odor
Finishing (painting, signage, signal, etc.)	Odor
Construction Works	
Piling	Mud water, Loose soil

Reinforced Concrete Work		Solid waste
Masonry Work		Solid waste
Carpentry Work		Solid waste
M&E Work		Solid waste
Finishing		Solid waste
Furnishing		Solid waste
Operational Phase		
Pre-production Process	Installing Steel Mould/ Abutment	Particulates, emission of air pollution
Pre-cast Material Supply Process	Fabrication of Rebars	Particulates, emission of air pollution
Concrete Material Supply Process	Inbound Transportation	Dust, Particulates, emission of air pollution
	Handling & Storage	
	Concrete Batching	
Pre-Cast Concrete Production	Cleaning/Alteration of Moulds/Abutment	Dust, Particulates, emission of air pollution, Odor, Vehicle emissions
	Arrangement and Tension PC-tendon	
	Shuttering	
	Pouring/Casting	
	Stripping	
	Storage/Transport	

Table 66. Impact Rating on Ambient Air Quality

AMBIENT AIR QUALITY			
Type of Impact	Negative		
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Definitely	5	Impacts on are possible without any mitigation measures

Frequency of Activity	Daily Continuous	5	Activities will occur daily in operation and construction phases
Spatial Scope of Impact	Local area	3	Impacts can spread in local area
Duration of Impact	Project life	4	Major impact from dust and particulate will occur at construction and operation phase.
Severity of Impact	Slightly harmful	3	The severity of impact will be slightly harmful.
Significance level	Medium-High	100	Rating value fall in 76-100 range

6.7.1 Impact Mitigation

(1) Places of dust emission during earth works must be sprayed with water at least two times a day

(2) A speed limit of 15 mph must be set for vehicles travelling within the project site

(3) Unpaved road and tracks within the project area must be sprayed with water at least two times a day

(4) Provide covering for dump trucks as necessary

(5) Wheels of dump trucks must be washed with water jet in every outbound travel from the project site.

(6) Need to enforce to cover to every truck for inbound and outbound transportation of the project

(7) Need to be use any type of suppressant (e.g water) on yards and roadways

(8) Bag houses and filters need to be installed adequately and properly maintained to ensure that only clean air is released to atmosphere.

(9) Need to be equipped with vacuum attachments in saws used in project to help reduce particulate emissions.

(10) A closed room type enclosure should be provided for storage and handling materials if necessary and possible

(11) The adequate dust extraction must be provided from various points of dust generation starting from pre-production process to transportation process.

Table 67. Impact Rating on Ambient Air Quality with Mitigation

AMBIENT AIR QUALITY			
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	**Unlikely**	**3**	Possibility of the incidents are unlikely with appropriate mitigation measures
Frequency of Activity	Daily continuous	5	Project activities will remain the same
Spatial Scope of Impact	Activity specific	2	Most of the impacts occur at the site of specific activity
Duration of Impact	Life operation	4	Minor impact in operation phases are negligible
Severity of Impact	**Small**	**2**	Severity could be reduced to small with appropriate mitigation measures
Significance level	**Low-Medium**	**64**	Rating value fall in 51-75 range

6.8 IMPACT FROM NOISE AND VIBRATION

During construction and decommissioning activities, noise and vibration could occur by the operations of pile drivers, earth moving and excavation equipment, concrete mixers, cranes and the transportation of equipment, materials and people. Various sources will create noise and vibration in the construction phase of the project. Piling and operation of other heavy machinery will produce significant noise.

Concrete production can create pollution mainly in the form of noise. The fabrication of hollow core slabs requires sawing the hardened concrete, producing noise levels that can exceed 85 dB. On operational phase, noise and vibration could be occurred by truck traffic, loading and unloading equipment (e.g. cranes, wheeled loaders), conveyance system and machines from every processes of the project. However, impact from noise and vibration from plant could not be adverse because the plant is located away from sensitive receptors. Open-air production facilities are typically located away from populated areas to provide a noise and dust pollution buffer zone.

Table 68. Impact Rating for Noise and Vibration

NOISE AND VIBRATION			
Type of Impact	Negative		
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Possible	4	Impacts are possible without any mitigation measures
Frequency of Activity	Daily intermittent	4	Activities will occur intermittently in construction phase but not continuously
Spatial Scope of Impact	Activity specific	1	Noise impact could not occur the whole area but specific site of construction and garment manufacturing
Duration of Impact	Project life	4	Human noise will remain throughout project life
Severity of Impact	Significant	3	Significant impacts will occur
Significance level	Low-Medium	64	Rating value fall in 51-75 range

6.8.1 Impact Mitigation

(1) Preventing unnecessary mechanical noise by carrying out regular maintenance work for vehicle and machinery

(2) Avoiding high noise construction work in night time

(3) Selecting equipment with lower sound power levels

(4) Installing silencers for fans

(5) Installing suitable mufflers on engine exhausts and compressor components

(6) Installing acoustic enclosures for equipment casing radiating noise

(7) Improving the acoustic performance of constructed buildings, apply sound insulation

(8) Installing vibration isolation for mechanical equipment

(9) Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas

(10) Re-locating noise sources to less sensitive areas to take advantage of distance and shielding

(11) Reducing project traffic routing through community areas wherever possible

(12) Developing a mechanism to record and respond to complaints

Table 69. Impact Rating for Noise and Vibration with Mitigation

NOISE AND VIBRATION			
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Highly Unlikely	2	Impacts are highly unlikely as delineated mitigation measures apply
Frequency of Activity	Daily intermittent	4	Frequency of activities will occur intermittently
Spatial Scope of Impact	Activity specific	1	Project area scope is large but noise impact could not occur the whole area but specific site of construction
Duration of Impact	Project Life	4	Impact duration will remain the same
Severity of Impact	Small	2	Severity of the impact will become small
Significance level	Low	42	Rating value is between 26-50

6.9 JOB OPPORTUNITY

Local people will obtain job opportunities for the construction of I&H Precast Concrete Factory project. Moreover, there will be direct and indirect job opportunities for the local community at I&H precast concrete production works. About (151) vacancy for local community will be provided to maintain and operate the project. It is necessary to enhance the positive impact, job opportunity.

Table 70. Rating for Job Opportunity

Job Opportunity			
Type of Impact	Negative		
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Unlikely	3	Impacts will be occurred unlikely.

Frequency of Activity	Bi-annual	2	Activities will occur Bi-annual in operation phases
Spatial Scope of Impact	Local area	3	Impacts can spread in local area
Duration of Impact	Project life	4	Job opportunities will be occurred at construction and operation phase.
Severity of Impact	Small	2	The severity of impact will be small.
Significance level	Low	45	Rating value fall in 26-50 range

6.9.1 Impact Enhancement

(1) Deliver advertisement for every recruitment at ward administration offices

(2) Local people must be prioritized for employment

Table 71. Rating for Job Opportunity with Enhancement

Job Opportunity			
Type of Impact	Negative		
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Definitely	5	Impacts will be occurred definitely.
Frequency of Activity	Bi-annual	2	Activities will occur Bi-annual in operation phases
Spatial Scope of Impact	Local area	3	Impacts can spread in local area
Duration of Impact	Project life	4	Job opportunities will be occurred at construction and operation phase.
Severity of Impact	Small	2	The severity of impact will be small.
Significance level	Low - Medium	63	Rating value fall in 51-75 range

6.10 IMPACT ON SOLID WASTE AND CHEMICAL HAZARDS

Concrete is a mixture of rock, sand, Portland cement and water. It may also be contained the chemical admixtures / fly ash/ granulated slag or silica fume, which have no effect on the hazards associated with the use of the product. The chemical admixtures are present in quantities comprising less than 1% of the material. The hazardous ingredients in wet concrete become airbone. However, water added to the materials rect with some of the ingredients to form calcium hydroxide, a corrosive chemical that will irriate the eyes and skin upon contact. Concrete may also contain hazardous ingrients in sufficient concentrations to cause skin, eye or respiratory.

Table 72. Impact Rating for Solid Waste and Chemical Hazards

SOLID WASTE AND CHEMICAL HAZARDS			
Type of Impact	Negative		
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Possible	4	Impacts are possible without any mitigation measures
Frequency of Activity	Daily intermittent	4	Activities will occur intermittently in operation phase but not continuously
Spatial Scope of Impact	Activity specific	1	Hazards will occur at the project area of activity
Duration of Impact	Life of Operation	4	Hazards will occur in project operation life
Severity of Impact	Significant	3	Significant impacts will occur
Significance level	Low-Medium	64	Rating value fall in 51-75 range

6.10.1 Impact Mitigation

(1) Hazards and non-hazardous waste management plan should be developed

(2) Carrying out preventive measures for hazard from chemicals and related materials

(3) Concrete waste should be used by recycling

Table 73. Impact Rating for Solid Waste and Chemical Hazard

SOLID WASTE AND CHEMICAL HAZARD			
Parameter	**Rating**	**Value**	**Reasoning**
Probability of Activity	Highly Unlikely	2	Impacts are highly unlikely as delineated mitigation measures apply
Frequency of Activity	Daily intermittent	4	Frequency of activities will occur intermittently
Spatial Scope of Impact	Activity specific	1	Project area scope is large but Hazards will occur at the project area of activity
Duration of Impact	Project Life	4	Impact duration will remain the same
Severity of Impact	Small	2	Severity of the impact will become small
Significance level	Low	42	Rating value is between 26-50

7. ENVIRONMENTAL MANAGEMENT PLAN

7.1 BRIEF DESCRIPTION OF THE PROJECT

I&H ENGINEERING COMPANY LIMITED is trying to implement I&H PRECAST CONCRETE FACTORY. Project location is Block No.3, Kalar Kone village, Myanundagar Industrial Zone, Hmawbi Township, Yangon Region, the Republic of the Union of Myanmar. Project area is 16 acres (65,272 square meter). The land is state-owned land managed by Department of Highways which is leased to I&H for a period of 15 years starting from 1 January 2016 to 31 December 2030.

7.2 SUMMARY OF IMPACT SIGNIFICANCE

There is a total of eight significant impacts by the project where seven out of eight are negative impacts and only one left is positive impact. Without any MEMs, there are five impacts with significance level of medium-high, two impacts with low-medium and one with low significance as shown in the following table.

Table 74. Summary of Impact Ratings without MEMs

Sr.	Impact	Severity	Duration	Spatial Scope	Frequency	Probability	Total Rating	Significance Level
1	Occupational Safety and Health	5	4	1	4	4	80	Medium-High
2	Impact on Biodiversity	3	4	3	5	4	90	Medium-High
3	Community Safety and Health	3	4	2	4	4	72	Low - Medium
4	Impact on Water Environment	3	4	3	4	4	80	Medium - High
5	Impact on Geology and Soil	3	4	3	5	4	90	Medium-High
6	Impact on Ambient Air Quality	3	4	3	5	5	100	Medium-High

7	Impact from Noise and Vibration	3	4	1	4	4	64	Low-Medium
8	Job Opportunity	2	4	3	2	3	45	Low
9	Solid Waste and Chemical Hazard	3	4	1	4	4	64	Low-Medium

MEMs for the anticipated impacts are delineated. By applying the delineated MEMs, five negative medium-high impacts will be reduced to low-medium level, three negative low-medium impact will become low and one positive low-medium impact will be enhanced to medium-high significance level, two positive low impacts will be enhanced to low-medium.

Table 75. Summary Impact Ratings with MEMs

Sr.	Impact	Severity	Duration	Spatial Scope	Frequency	Probability	Total Rating	Significance Level
1	Occupational Safety and Health	5	4	1	4	2	60	Low-Medium
2	Impact on Biodiversity	3	4	3	4	3	70	Low-Medium
3	Community Safety and Health	2	4	1	4	3	49	Low
4	Impact on Water Environment	2	4	2	4	3	56	Low-Medium
5	Impact on Geology and Soil	3	4	3	5	2	70	Low-Medium
6	Impact on Ambient Air Quality	2	4	2	5	3	64	Low - Medium
7	Impact from Noise and Vibration	2	4	1	4	2	35	Low

8	Job Opportunity	2	4	3	2	5	63	Low-Medium
9	Solid Waste and Chemical Hazard	2	4	1	4	4	42	Low

All the significance levels of anticipated impacts with and without MEMs could be summarized as in the following table.

Table 76. Summary of Impact Significance With/Without MEMs

Sr.	Impact	Without Mitigation		With Mitigation	
		Rating	Significance	Rating	Significance
1	Occupational Safety and Health	80	Medium-High	60	Low-Medium
2	Impact on Biodiversity	90	Medium-High	70	Low-Medium
3	Community Safety and Health	72	Low - Medium	49	Low
4	Impact on Water Environment	80	Medium - High	56	Low-Medium
5	Impact on Geology and Soil	90	Medium-High	70	Low-Medium
6	Impact on Ambient Air Quality	100	Medium-High	64	Low - Medium
7	Impact from Noise and Vibration	64	Low-Medium	42	Low
8	Job Opportunity	45	Low	63	Low-Medium
9	Solid Waste and Chemical hazard	64	Low-Medium	42	Low

7.3 SUMMARY OF MITIGATION/ENHANCEMENT MEASURES

Detailed impact assessments and mitigations are described in previous section of the report. Summary of delineated MEMs could be found in the following table.

Table 77. Summary of Mitigation /Enhancement Measures

Sr.	Impact	Mitigation/Enhancement Measures
1	Occupational Safety and Health	(1) Eliminating some of the hazards by removing inessential activities from the work (2) Controlling the hazard at its source through use of engineering controls such as local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc… (3) Minimizing the hazard through desig``n of safe work systems and administrative or institutional control measures such as job rotation, training safe work procedures, workplace monitoring, limiting exposure or work duration, etc... (4) Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE (5) Providing safe, secure and healthy camps for construction workers adequately (6) Providing necessary training on OSH for workers and supervise their implementation at work place (7) Implementing of OSH programmes systematically by appointing a safety officer (8) Following occupational safety and health section of this report completely (9) Must have flasher and warning alarm for going backward direction in every project vehicles (10) Provide hearing protection if needed to guard against excessive noise exposure (11) Prohibit smoking and taking meal in project area except allow area (12) Provide ablutions and loker-rooms for workers adequately (13) Practice cleaning process regularly and systematically (14) Use of proper drill benches or wragon drills, avoiding the use of portable and hand-hell drill equipment (15) Use of properly protected wire cutting machines (16) Providing specific warning devices

		(17) Providing training on explosives handling and safety management
2	Impact on Biodiversity	(1) To implement air pollution, water pollution, and soil pollution management programs delineated in EMP (2) Project implementation must conform to the existing environmental laws (3) To establish a plan to restore and replant the trees as landscaping scheme in the project area. (4) To plant quick growing tree species as a wind-break behind the wall of the compound (5) To establish a plan to aid the socio-economic and livelihood of local people (6) Noise pollution of project construction should be minimized (7) Identify potential environmental impacts associated with construction and operation of the proposed Pre-cast concrete Project development (8) Regularly maintain production and wastewater treatment systems (9) Contribute to the removal of organic matters from polluted water (10) Replantation must be practiced in the indirect zone (11) Reduce dust and air pollution as far as possible (12) Wetting of roads to reduce traffic dust and reentrained particles (13) Solutions Limited as well as the implementation of appropriate mitigation (14) Many saws used in precast facilities are equipped with vacuum attachments to help reduce particulate emissions
3	Community Safety and Health	(1) Providing adequate pavement with for the access road (2) Providing enough turning area at the junction point (3) Providing adequate unloading area for raw material transport (4) Providing adequate loading area for product precasts (5) Providing systematic vehicle management for incoming and outgoing vehicles

		(6) Using of enclosed/ covered areas for storage and handling of raw materials for precast concrete production, e.g. cements, sands, gravels, etc. (7) All the conveyors/vehicles for the transportation should be covered from all side, if possible (8) Conducting awareness program for traffic hazard in local community and drivers so that project related traffic incidents could be prevented or reduced on roads Avoiding high hazard routes and crowded periods in local communities so that traffic hazard could be minimized (9) Implementing systematic waste management system so that health hazard on local community could be prevented (10) The Master Plan should be prepared and adequately cover fire prevention, detection and alarm system, fire suppression and control, emergency response plan, and operation and maintenance. (11) Provide a connection between the representatives of project and local communities (12) Providing support for health sector of the local communities in CSR programme
4	Impact on Water Environment	(1) Prevent leaking out fuel, lubricants and cement during construction period (2) Discharge only clear water from sedimentation tank, which is used to sendimentate waste water from construction (3) Providing necessary covering for drainages around the project (4) Providing adequate drainages around the project area (5) Conduct awareness program for effective utilization of water (6) Provide toilets and basins which need low capacity of water (7) Build raw materials receipt, processing and product storage places without running off and draining in water (8) The plant recycles as much of the treated water as possible when cleaning production equipment with a pressure washing (9) The discharge of process water should be treated to fulfill the limit for total suspended solids, pH and chemical composition.

		(10) The factory should investigate ways to minimize waste by recycling materials and ultimately strive for a zero-discharge manufacturing by completely recycling all process water. (11) Avoiding extraction of ground water as much as possible (12) Providing alternative water source to the project and local community e.g, from Hlaing river. (13) Providing plans for water distribution to MOC staff quarter in long term as a CSR programme. ➢ The plan must include distribution capacity for the staff quarter ➢ Time to start the construction of the infrastructure ➢ Estimated cost for construction ➢ Time to start the water distribution ➢ Estimated cost for distribution ➢ Anticipated cost sharing plan for distribution (if any) ➢ Dynamic discussion with MOC staff about the plan
5	Impact on Geology and Soil	(1) Schedule excavation during low-rainfall periods, when possible (2) No sooner had excavated than construct immediately In order to mitigate soil erosion (3) Control concentrated flow and runoff to reduce the volume and velocity of water from work sites to prevent formation of rills and gullies (4) After the construction, land fill with appropriate fertile top soil and plant the flora to control the fecundity and richness of soil (5) Provide adequate storage for raw materials and products (6) Install curbs to prevent runoff and install adequate covers to prevent windblown litter (7) Collect waste water with allocated channels and treat to meet applicable environmental standards to prevent soil pollution

		(8) Provide the closed room type enclosure for storage and handling if possible and necessary (9) Correct use of hazardous substances should be controlled in order to prevent soil pollution
6	Impact on Ambient Air Quality	(1) Places of dust emission during earth works must be sprayed with water at least two times a day (2) A speed limit of 15 mph must be set for vehicles travelling within the project site (3) Unpaved road and tracks within the project area must be sprayed with water at least two times a day (4) Provide covering for dump trucks as necessary (5) Wheels of dump trucks must be washed with water jet in every outbound travel from the project site. (6) Need to enforce to cover to every truck for inbound and outbound transportation of the project (7) Need to be use any type of suppressant (e.g water) on yards and roadways (8) Bag houses and filters need to be installed adequately and properly maintained to ensure that only clean air is released to atmosphere. (9) Need to be equipped with vacuum attachments in saws used in project to help reduce particulate emissions. (10) A closed room type enclosure should be provided for storage and handling materials if necessary and possible (11) The adequate dust extraction must be provided from various points of dust generation starting from pre-production process to transportation process.
7	Impact from Noise and Vibration	(1) Preventing unnecessary mechanical noise by carrying out regular maintenance work for vehicle and machinery (2) Avoiding high noise construction work in night time (3) Selecting equipment with lower sound power levels (4) Installing silencers for fans (5) Installing suitable mufflers on engine exhausts and compressor components (6) Installing acoustic enclosures for equipment casing radiating noise (7) Improving the acoustic performance of constructed buildings, apply sound insulation

		(8) Installing vibration isolation for mechanical equipment (9) Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas (10) Re-locating noise sources to less sensitive areas to take advantage of distance and shielding (11) Reducing project traffic routing through community areas wherever possible (12) Developing a mechanism to record and respond to complaints
8	Job Opportunity	(1) Liver advertisement for every recruitment at ward administration offices (2) Local people must be prioritized for employment
9	Impact on Solid waste and Chemical and	(1) Hazards and non-hazardous waste management plan should be developed (2) Carrying out preventive measures for hazard from chemicals and related materials (3) Concrete waste should be used by recycling

7.4 Management Actions

Table 78. Management Actions for Impact Mitigation

Sr.	IMPACT	MITIGATIONS	Management Actions
		PRE-CONSTRUCTION	
1	Air Quality Impact by Site Clearing Dust and Particulate	1.Places of dust emission during earth works must be sprayed with water at least two times a day	1. Checking workplace daily
2	Soild Waste from Site Clearing	1. Dispose the solid waste systematically at designated waste disposal site provided by YCDC	1. Negotiation of waste disposal site with township development committee
		CONSTRUCTION	
1	Impact on Air Quality by Dust and Particulates	1.Places of dust emission during earth works must be sprayed with water at least two times a day	1. Checking workplace daily
		2. A speed limit of 15 mph must be set for vehicles travelling within the project site	1. Checking workplace daily
		3. Unpaved road and tracks within the project area must be sprayed with water at least two times a day	1. Checking workplace daily
		4. Provide covering for dump trucks as necessary	1. Checking workplace daily
		5. Wheels of dump trucks must be washed with water jet in every outbound travel from the project site	1. Checking workplace daily
		6. Covering trucks and transport vehicles travelling within the project site	1. Checking workplace daily

2	Imapact from Noise and Vibration	1. Carry out regular maintenance work so that unnecessary mechanical noise could be prevented	1. Carrying out annual overall maintenance work 2. Checking workplace daily
		2. Incoporating silencer/ Muffler with engines and generator sets	1. Checking workplace daily for physical conditions of silencers
		3. Delivering information of a contant person with contact number site and in local community so that issues from noise disturbance could be communicated and informed with the project	1. Appointing person with contact phone number for noise issue 2. Distributing contact person name and phone number to nearby quarters
		4. Piling system with less noise and vibration must be used instead of a noisy and vibrating one	1. Piling system with less noise and vibration must be used instead of a noisy and vibrating one
		5. High noise construction work must be avoided in night time	1. Checking workplace daily
		6. Carrying out noise level to NEQG	1. Monitoring and control of noise level
		7. Providing necessary PPE for workers at high noise area	1. Providing necessary PPE for workers at high noise area
3	Impact on Land by Solid Wastes	1. Construction activity should be done in restricted areas and activities kept to a minimum as far as possible	1. Construction activity should be done in restricted areas and activities kept to a minimum as far as possible.
		2. Excavation process should be monitored to prevent over-excavation.	1. Checking workplace daily
		3. In order to mitigate soil erosion, the basic principle of construction erosion control measures should be followed where necessary.	1. Checking workplace daily

		4. Schedule excavation during low-rainfall periods, when possible.	1. Checking workplace daily
		5. Excavate immediately before construction instead of leaving soils exposed for months or years.	1. Excavate immediately before construction instead of leaving soils exposed for months or years.
		6. Where wind erosion is a concern, plan and install windbreaks	1. Where wind erosion is a concern, plan and install windbreaks
		7. Divert water from disturbed areas.	1. Checking workplace daily
		8. Avoid soil compaction by restricting the use of trucks and heavy equipment to limited area	1. Avoid soil compaction by restricting the use of trucks and heavy equipment to limited area
		9. Control concentrated flow and runoff to reduce the volume and velocity of water from work sites to prevent formation of drainages	1. Checking workplace daily
		10. The wetting of soil and the discharge of construction grey water across natural soil should be controlled.	1. Checking workplace daily
		11. The handling of natural construction materials, such as filling soil and gravels will require dust management.	1. Checking workplace daily
4	Waste Water Generation	1. Construction waste water must be settled in settling ponds and only clear water must be allowed to disposed to roadsite drain	1. To construct the settling pond
			2. After constructing the settling pond, must be allowed to disposed to roadsite drain

		2. Mud water from bore pile work must be prevent from direct run off or direct or direct discharge rodeside drainage	1. Discharge only clear water from sedimentation tank, which is used to sendimentate waste water from construction
		3. Prevent leaking out fuel, lubricants and cement during construction period	1. Checking workplace daily
6	OSH	1. Appointing a safety officer	1. Appointing a safety officer
		2. Provide safe, secure and health camps for workers adequately	1. Provide safe, secure and health camps for workers adequately
		3. Construction activity should be done in restricted areas and activities kept to a minimum as far as possible.	1. Providing the restricted area sign boards at project area
		4.Providing necessary PPE adequately and supervise their proper use in work place	1. Providing necessary PPE for workers 2. Checking workplace daily for systematic usage of PPE
		5. Use of proper drill benckes or wagon drills	1. Use of proper drill benckes or wagon drills, avoiding the use of portable and hand-hell equipment
		6. Use of protected wire cutting machines	1. Use of properly wire cutting machines
7	CSH	1. To conduct awareness program for traffic hazard in local community and drivers	1. To conduct awareness program for traffic hazard in local community and drivers
		2. To avoid high hazard routes and crowded periods so that traffic hazard could be minimized	1. Checking workplace daily

		3. Provide security system and fire safety system adequately	1. Provide security system and fire safety system adequately
		4. Provide support for health sector in CSR programme	1. Provide support for health sector in CSR programme
OPERATION			
1	Waste Water Generation	1. The discharge of process water should be treated to fulfill the limit for NEQG	1. To construct waste water treatment plant and to discharge waste water by compliance with NEQG guidelines
		2. To prevent or minimize the suspended sediment in discharge water	1. Recycling of processing/ wire cutting waters 2. Construction a dedicated drainage network
		3. To consider proper process for reducing of water use so that domestic water consumption could be minimized	1. Recycling treated domestic waste water will reuse
		4. Fixtures that can minimized water consumption must be used	1. Fixtures that can minimized water consumption must be used
		5. To conduct awareness program for effective utilization of water	1. To conduct awareness program for effective utilization of water
		6. To consider other source of water apart from groundwater for future expansion of project	1. To consider other source of water apart from groundwater for future expansion of project
		7. To practice rainwater harvesting for saving of water	1. To practice rainwater harvesting for saving of water

		8. Providing necessary covering for drainages around the project and providing adequate drainages around the project area	1. To provide necessary drainages and covering for drainages
		9. Build raw materials receipt, processing and product storage places without running off and draining in water	1. Build raw materials receipt, processing and product storage places without running off and draining in water
		10. The plant recycles as much of the treated water as possible when cleaning production equipment with a pressure washing	1. To use the recycle water
		11. Avoiding extraction of ground water as much as possible	1. To plan the future, which will be used to store rain water
		12. Providing plans for water distribution to MOC staff quarter in long term as a CSR programme.	1. Providing the distribution of water for MOC staff quarter as CSR programme
2	Impact from Solid Waste	1. Provide adequate skips and waste bins	1. Providing 4 nos. of 1100 liter waste bins 2. Providing 12 nos of 100-liter waste bins
		2. Dispose the solid waste systematically at designated waste disposal site provided by YCDC	1. Weekly disposal of solid waste to designated site
4	Incresed Residential Amenity	1. Sufficient security personnel and systematic security system must be provided	1. Providing the security personnel and systematic security system
		2. Adequate lighting for night time security must be installed in readily accessible area	1. Adequate lighting for night time security must be installed in readily accessible area
		3. Project area must be landscaped systematically when construction works are finished	1. Project area must be landscaped systematically when construction works are finished

		4. Provide security system and fire safety system adequately	1. Provide the fire management system
5	Job Opportunity	1. Deliver advertisement for every recruitment at ward administration offices	1. Preparing a notification letter for recruitment 2. Printing and posting notification letter in village administrator office
		2. Local people must be prioritized for employment	1. Adding in the notification letter that local people will be prioritized for employment
		3. Singing employment contract in 175mployment with employment and skill development law	1. Preparing employment contract according to employment and skill development law chapter (3) paragraph (5) 2. Singing employment contract for every employment
		4.Carrying out recrument and plant operation in accordance with labour and employment bylaws	1. Carrying out monthly management review on overall project operation
6	OSH	3.Providing necessary PPE adequately and supervise their proper use in work place	1. Providing 40 suites of PPE annually 2. Checking workplace daily for systematic usage of PPE
		4. Use of proper drill benckes or wagon drills	1. Use of proper drill benckes or wagon drills, avoiding the use of portable and hand-hell equipment
		5. Use of protected wire cutting machines	1. Use of properly wire cutting machines

		6. Providing specific warning devices	1. Providing specific warning devices for hazardous and explosives materials
		7. Providing training on explosives handling and safety management	1. Providing training on explosives handling and safety management for workers
7	Impcat on Soild Waste and Chemical Hazard	1. Hazards and non-hazardous waste management plan should be developed	1. Hazard and non-hazardous waste management plan shoul be adopted
		2. Carrying out preventive measures for hazard from chemicals and related materials	1. Sending appropriate employers to prevention of hazards from chemicals and related materials training provided by relevant government departments 2. Providing necessary PPE for workers handling chemicals 3. Providing training for systematic use of PPE 4. Regular inspection and supervision of the use of PPE
		3. Concrete waste should be recycled	1. Concrete waste should be reused by recycling
DECOMMISSIONING			
1	Impact on Air Quality by Dust and Particulates	1. When the earth work must be sprayed after decommissing	1. Checking workplace daily

2	Noise and Vibration from Demolisions	1. High noise decommission work must be avoided the night time	1. Checking workplace daily
		2. Carrying out noise to NEQG	1. Carrying out noise to NEQG
		3. Providing necessary PPE for workers at high noise area	1.Checking workplace daily for systematic usage of PPE
3	Drainage Blockage	1. Sewage waste water appear from the decommission dispose the negotiation by YCDC	1. Negotiation of a waste disposal site with township development committee 2. Disposal of decommissioning solid waste to designated site
4	Soild Waste Generation	1. Disposing the decommissioning solid waste systematically at waste disposal site provided by respective YCDC	1. Negotiation of a waste disposal site with township development committee 2. Disposal of decommissioning solid waste to designated site
		2. Disposing the decommissioning solid waste must be seprated reuse materials and non-reuse materials.	1. Disposing the decommissioning solid waste must be seprated reuse materials and non-reuse materials.
5	OSH	1. Providing necessary PPE adequatedly while the decommissioning	1. Providing necessary PPE adequatedly while the decommissioning
		2. Planning work site layout to minimize the need for manual transfer of heavy loads	1. Planning work site layout to minimize the need for manual transfer of heavy loads

7.5 Implementation Plan for EMP

Table 79. Implementation Plan for EMP

Sr.	Management Actions	Frequency	Cost	Responsibility
1	Providing the restricted area sign boards at project area	Construction project Life	15000	AD
2	Appointing a safety officer	Once		HR
3	Provide safe, secure and health camps for workers adequately	Once		HR
4	Providing suites of PPE annually	Construction project Life		AD
5	Checking workplace daily for systematic usage of PPE	Daily		SO
6	Providing necessary training on OSH for workers and supervise their implementation at work place	Two time in One Year	5,000,000	HR
7	Checking work place daily for use of proper drill benckes or wagon drills	Daily		PM
8	Checking work place daily for use of protected wire cutting machines	Daily		PM
9	Providing specific warning devices	Once	150,000	AD
10	Providing training on explosives handling and safety management	Once	5,000,000	HR
7	Providing adequate pavement with for the access road	Once		AD
8	Avoiding high hazard routes and crowded periods in local communities so that traffic hazard could be minimized	Daily		AD

9	The Master Plan should be prepared and adequately cover fire prevention, detection and alarm system, fire suppression and control, emergency response plan, and operation and maintenance.	Once		ED
10	Provide a connection between the representatives of project and local communities	Once		HR
11	Providing support for health sector of the local communities in CSR programme	Yearly		HR
12	Prevent leaking out fuel, lubricants and cement during construction period	Daily		ED
13	Providing necessary covering for drainages around the project	Once		ED
14	The discharge of process water should be treated to fulfill the limit for total suspended solids, pH and chemical composition.	Once		ED
15	After the construction, land fill with appropriate fertile top soil and plant the flora to control the fecundity and richness of soil	Once		HR
16	Correct use of hazardous substances should be controlled in order to prevent soil pollution	Daily		ED
17	A speed limit of 15 mph must be set for vehicles travelling within the project site	Construction project Life	15000	AD

18	Bag houses and filters need to be installed adequately and properly maintained to ensure that only clean air is released to atmosphere.	Project life		AD
19	Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas	Project Life		ED, AD
20	Developing a mechanism to record and respond to complaints	Project Life		AD
21	Deliver advertisement for every recruitment at ward administration offices	Once	15000	HR
22	Local people must be prioritized for employment	Once		
23	Carrying out necessary action if the channel is disturbed to maintain it to its nomal flowing condition	Daily		ED
24	Carrying out annual overall maintenance work	Weekly		ED
25	Checking workplace daily for physical conditions of silencers	Daily		SO
26	Appointing person with contact phone number for noise issue	Once		HR
27	Distributing contact person name and phone number to nearby quarters	Once		HR
28	Piling system with less noise and vibration must be used instead of a noisy and vibrating one	Daily		ED

29	Monitoring and control of noise level	Daily		SO
30	Providing necessary PPE for workers at high noise area	Daily		SO
31	Excavate immediately before construction instead of leaving soils exposed for months or years.	Daily		ED
32	To construct the settling pond	Once		ED
33	After constructing the settling pond, must be allowed to disposed to roadsite drain	Daily		ED
34	Mud water from bore pile work must be prevent from direct run off or direct or direct discharge rodeside drainage	Daily		ED
35	Checking the condition of the channel weekly	Daily		ED
36	Providing an alternative drainage when the area for drainage is needed for future development	Once		ED and AD
37	To conduct awareness program for effective utilization of water	Once		AD
38	To consider other source of water apart from groundwater for future expansion of project	Once		AD
39	Providing 4 nos. of 1100 liter waste bins and 12 nos of 100-liter waste bins	Once per five year	1540,000	AD
40	Weekly disposal of solid waste to designated site	Daily		AD
41	Preparing a notification letter for recruitment	Once		HR

42	Printing and posting notification letter in village administrator office	Once	15000	HR
43	Adding in the notification letter that local people will be prioritized for employment	Once		HR
44	Preparing emplyment contract according to emplyment and skill development law chapter (3) paragraph (5)	Once		HR
45	Singing employment contract for every employment	Once		HR
46	Carrying out monthly management review on overall project operation	Monthly		PM
47	Checking workplace daily for systematic usage of PPE	Daily (for decommissio ning)		SO
48	Disposal of decommissioning solid waste to designated site	Daily (for decommissio ning)		AD
49	Providing necessary PPE adequatedly while the decommissioning	Once		AD
50	Planning work site layout to minimize the need for manual transfer of heavy loads	Daily (for decommissio ning)		SO
51	Hazard and non-hazardous waste management plan shoul be adopted	Once		SD
52	Sending appropriate employers to prevention of hazards from chemicals and related materials	Once	300,000	PM

	training provided by relevant government departments			
53	Providing necessary PPE for workers handling chemicals	Biannually	300,000	HR
54	Providing training for systematic use of PPE	Once		SD
55	Regular inspection and supervision of the use of PPE	Daily		SD

ED = Engineering Department PM = Project Manager

AD = Administration Department SD = Safety Department

HR = Human Resources Department SO = Safety Officer

7.6 PERFORMANCE INDICATORS AND MONITORING

7.6.1 Emissions and Effluent Guidelines

The project must control emission and effluent from the project so that they are in compliance with international guidelines. WHO ambient air quality guideline is referenced for air emissions and IFC treatment sanitary waste water quality guideline is taken reference for effluent guideline. Effluent guidelines are applicable for direct discharges of treated effluents to surface waters for general use. Emissions guidelines are applicable to process emissions.

Table 80. WHO Ambient Air Quality Guidelines

	Averaging Period	Guideline value in µg/m3
Sulfur dioxide (SO2)	24-hour	125
		50
		20
	10 minute	500
Nitrogen dioxide (NO2)	1-year	40
	1-hour	200

Particulate Matter PM10	1-year	70 50 30 20
	24-hour	150 100
Particulate Matter PM2.5	1-year	35 25 15 10
	24-hour	75 50 37.5 25
Ozone	8-hour daily maximum	160 100

Table 81. IFC Effluent Levels

Pollutants	Units	Guideline Value
pH	pH	6 – 9
BOD	mg/l	30
COD	mg/l	125
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Oil and grease	mg/l	10
Total suspended solids	mg/l	50
Total coliform bacteria	MPN[a] / 100 ml	400
Notes: [a] MPN = Most Probable Number		

7.7 Monitoring Plan

Environmental monitoring programs for this project will be implemented to address all activities that have been identified to have potentially significant impacts on the environment, during normal operations and upset conditions. Environmental monitoring activities will be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the project.

Monitoring frequency are set to be sufficient to provide representative data for the parameter being monitored. Monitoring will be conducted by trained individuals following monitoring and record-keeping procedures and using properly calibrated and maintained equipment. Monitoring data will be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken.

7.7.1.1 Air and Noise Level Monitoring

Myanmar National Environmental Quality Guidelines are used for reference. The guidelines show the impacts should not exceed the levels presented in the following tables,

Table 82. NEQG (Myanmar) Air Quality Guidelines

Parameter	**Average 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

Table 83. NEQG (Myanmar) Noise Level Guidelines

Receptor	One Hour L_{Aeq} (dBA)	
	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

7.7.1.2 Waste Water Quality Monitoring

Parameter	Unit	Guideline Value
Biochemical Oxygen Demand (BOD)	mg/l	30
Chemical Oxygen Demand (COD)	mg/l	125
Oil and grease	mg/l	10
pH	S.U. [a]	6-9
Total coliform bacteria	100ml	400
Total Nitrogen	mg/l	10
Total phosphorus	mg/l	2
Total Suspended Solid	mg/l	50

7.7.2 Environmental Monitoring Programme

Environmental monitoring programs should be implemented to address all activities that have been identified to have potentially significant impacts on the environment, during normal operations and upset conditions. Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the particular project.

Monitoring frequency should be sufficient to provide representative data for the parameter being monitored. Monitoring should be conducted by trained individuals following monitoring and record-keeping procedures and using properly calibrated and maintained equipment. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken.

Table 84. Environmental Monitoring Programme

Domain	Parameter	Frequency	Location	Method	Phase	Respon-sibility
Air	Dust	Daily	Project Compound	Visual inspection	C	CC
	Nitrogen Dioxide	Annually	Stack gas from standby engine exhaust	By accredited person	O	PM
	Sulphur Dioxide	Annually	Stack gas from standby engine exhaust	By accredited person	O	PM
Water	pH	Bi-monthly	Waste water from the outlet of drainage	By accredited person	O	PM
	TSS	Bi-monthly	Waste water from the outlet of drainage	By accredited person	O	PM
	BOD	Bi-monthly	Waste water from the outlet of drainage	By accredited person	O	PM
	COD	Bi-monthly	Waste water from the outlet of drainage	By accredited person	O	PM
	Oil and Grease	Bi-monthly	Waste water from the outlet of drainage	By accredited person	O	PM
Noise	Noise levels	Weekly	At 7 noise sites	By accredited person	C	CC
		Bi-monthly	At 7 noise sites	By accredited person	O	PM

O = Operation Phase C= Construction Phase

CC= Construction Contractor PM= Project Management

7.8 Project Budgets

Projected budget for implementation of EMP management actions and monitoring requirements could be summarized from detailed particulars described in previous section of the report. I&H Precast Concrete Factory will allocate 550,000 kyats total of one-time cost and 16,638,000 kyat of annual recurring cost for successful implementation and monitoring of the EMP. If the estimated budget isn't enough, I&H Precast Concrete Factory will be used by filling the enough budgets.

Table 85. Project Budgets for Implementation and Monitoring of EMP

Sr.	Management Actions	Budget
1	Providing 5 distinct speed limit sign boards and 5 distinct engine idling reduction sign boards	15,000/yr
2	Installing landscape watering system with treated waste water	500,000
3	Providing 4 nos. of 1100 liter waste bins and Providing 12 nos of 100-liter waste bins	1,540,000/ 5 years (308,000/yr)
4	Providing OSH training	5,000,000
5	Fire Safety Training	5,000,000/yr
6	Providing annual medical check-up for all employee	3,100,000/ yr
7	Printing and posting notification letter	15,000/ yr
8	Monitoring and control of wastewater at External Lab	1,600,000/ yr
9	Monitoring Air quality	4,000,000/ yr
10	Monitoring Noise level	2,000,000/ yr
11	Sending appropriate employers to prevention of hazards from chemicals and related materials training	300,000/yr
12	Providing necessary PPE for workers handling chemicals	300,000/yr
Total One Time Cost		5,500,000
Total Recurring Cost		16,638,000/yr

7.9 Environmental Monitoring Team

An Environmental Monitoring Team shall be established for successful implementation of the environmental management plan. The project proponent is responsible for complete implementation of the EMP. Proponent shall carry out environmental monitoring programme which is part of the EMP and the monitoring report will be distributed to the participants of the monitoring team. Implementation of CSR programme will also be facilitated with the participation of the monitoring team. Local community could communicate with the project for environmental affairs

through the monitoring team. The objectives of the Environmental Monitoring Team are as follows:

(a) To release information on the implementation of EMP for local community continuously

(b) To distribute information on environmental monitoring to local community

(c) To create a proper communication channel between the project and local community relating to environmental affairs

(d) To insert a check and balance action for the management of fund and aids provided by the CSR programme

The team mainly consists of representatives from the project and local communities. The representatives from local communities must be elected by respective local communities by themselves.

Table 86. Environmental Monitoring Team

Sr.	Representative	Number
Project Management		
1	CEO	1
2	General Manager	1
3	Deputy General Manager 1	1
4	Deputy General Manager 2	1
Local Community		
1	Village Administrator (MOC Staff Quarter Kalakone Village)	1
2	Elected person ((MOC Staff Quarter Kalakone Village)	2
3	Village Administrator (Kalakone Village)	1
4	Elected person (Kalakone Village)	2

7.9.1.1 Roles and Responsibilities

(a) Local representatives must connect the project and local communities for environmental affairs

(b) Fund and aids provided by the project as CSR programme will be submitted to local communities through local representatives

(c) Environmental monitoring reports must be distributed to representatives from government departments and local communities so that the information will be widely spread to local communities
(d) Recruitment by the project will be informed the local community thoroughly with the help of local representatives
(e) Local representatives must coordinate with the project so that the project could participate in the social, religious and cultural events
(f) The project is responsible for establishing the environmental monitoring team prior to the commencement of the project construction works
(g) The environmental monitoring team must be informed about the starting-up of the project construction works within 7 days of such action by a report including the schedule and plan of construction works
(h) The environmental monitoring team will become active upon receiving the said report on the starting-up of the project
(i) The monitoring team must be informed about the commercial scale commencement of the project within 7 days of such action
(j) Project must communicate with the monitoring team to contribute fund for CSR programme within 7 days of apportioning the annual net profit
(k) The monitoring team must be assembled at least once in a year so that objectives, roles and responsibilities of the team should be reviewed and revised

7.9.1.2 Task of General Manager

General Manager is responsible for overall achievement of environmental management objectives. He has to report to president for regular process, compliance, non-compliance and corrective actions for the course of implementation of EMP. He has to lead the regular EMP review process together with the environmental management team so that effectiveness of EMP is assured.

7.9.1.3 Task of Deputy General Manager 1

Deputy General Manager1 is responsible for overseeing day to day activities of the EMP. He has to direct Deputy General Manager 2 to the right path of implementation of EMP and report back to General Manager for progress, compliance, non-compliance and corrective actions for the course of implementation of EMP.

7.9.1.4 Task of Deputy General Managr 2

Deputy General Manager 2 is responsible for carrying out day to day activities of EMP. He has to direct employees and villager or carrying out inspection works of the implementation of EMP and report back to general manager and deputy general manager 2 for progress, compliance, non-compliance and corrective actions for the course of implementation EMP.

7.10 Training, Awareness and Competence

This plan describes the provisions of training to ensure that any people working for or on behalf of I&H Precast Concrete Factory involved in the activities covered by the scope of the EMP are properly trained to carry out their assigned duties in a manner that will not cause deviation from company environmental policy.

This procedure applies to EMP related training for staff and any persons working for or on behalf of I&H Precast Concrete Factory involved in the activities covered by the scope of the EMP. I&H Precast Concrete Factory will ensure that all people performing tasks for or on behalf of the organization have had an appropriate assessment for their potential to cause a significant environmental impact and the associated competence required.

The HODs shall ensure that people working for or on behalf of the company within the scope of EMP are competent on the basis of appropriate education, training or experience. The General Manager shall identify training needs for people working for or on behalf of the company to ensure individual competence to implement the EMP effectively.

Table 87. Training Requirement

Sr.	Training Topics	Trainee	Duration
1	OSH Training	Supervisors, Operators, Workers and Security	40 hours
2	EMP Training	Environmental management team	40 hours
3	Emergency Response Training	All employee	16 hours
4	First Aid Training	All employee	20 hours
5	Fire Fighting Training	All employee	40 hours

7.11 Communication

This plan ensures a consistent and efficient approach to internal communication and external complaints relating to the environment. The procedure applies to all documents established under the EMP of I&H Precast Concrete Factory. The documents under the EMP include but are not limited to:

- *EMP Report*
- *Mitigation Measures and Management Actions*
- *Environmental Monitoring Programme*
- *Registers of Legal and Other Requirements*
- *External documents including legislation, professional guides and code of practices, etc.*

7.11.1 Responsibility

- *The General manager is responsible for dealing with complaints.*
- *The communication from cooperate affairs is responsible for ensuring that all communications relating to the environment are processed correctly.*
- *All staffs are responsible for putting forward suggestions on environmental matters.*

7.11.2 External Communications

Communications to be handled according to this procedure include correspondence, conservations and meeting with relevant interested parties.

The person receiving the communication shall be noted the time and date, relevant address/telephone number and details of communication. Details shall be passed to the general manager who will determine the response and whether the corrective action is required upon consultation with Corporate Affairs Department. If

the communication is significant, the general manager shall inform the supply chain director as soon as possible.

General manager shall be responsible for maintaining records, responses and corrective action in a separate file designated for that purpose. In order to have more understanding the environment management practices by the Concrete Factory/ EMP team and to have more transparent, Local authorities and Communities leaders shall be invited to the factory once in a year to share update environment management procedures.

7.11.3 Internal Communications

The primary means of communication is through team briefings, supported as appropriate by use of notice boards and memos. Suggestions for environmental improvements are made through the company suggestion scheme.

7.12 Document Management

This procedure describes the control system for preparing, approving, distributing, revising and updating documents that are required under the Environmental Management Plan (EMP). I&H Engineering company Limited will be established the EMP report to Environmental Conservation Department at sixth monthly start from plant operation day.

This procedure applies to all documents established under the EMP of I&H Precast Concrete Factory. The documents under the EMP include but are not limited to:

- *Impact Mitigation*
- *Management Actions*
- *Environmental Monitoring Programme*
- *EMP Forms, Checklists and Guidelines*
- *Registers of Legal and Other Requirements*

- *External documents including legislation, professional guides and code of practices, etc.*

7.12.1 Responsibility

7.12.1.1 CEO

The CEO shall approve and sign all EMP documents, include the Environmental Policy, EMP report and Other Requirements. In the absence of CEO, General Manager shall approve and sign the EMP documents.

7.12.1.2 General Manager

The General Manager is responsible for the EMP document control system. The general manager shall ensure that only controlled and current copies of documents are used and distribute the controlled EMP documents to relevant personnel. The general manager shall also maintain and update the Master List of Documents.

7.12.1.3 Heads of Departments (HODs)

HODs shall review relevant EMP documents and procedures, ensure that their subordinates are familiar with the EMP documents related to them, and report any proposed changes to the EMP documents and forms to the Environmental Management Team.

7.13 Emergency Response Plan

Describe Appendix (G).

8. OCCUPATIONAL SAFETY AND HEALTH

8.1 INTRODUCTION

The safe work practices recommended in this chapter are presented as ways to reduce and control injuries resulting from precasting operations. The solutions offered in the following safety recommendations may not be entirely suitable for the entire project. In some instances, management may even view the recommendations as counterproductive to their operations. In these instances, the responsible persons (plant managers, safety managers, and/or plant owners) should interpret and modify the recommendations to make them applicable to their specific needs. It is essential that, in any modification of the recommended safe work practices, a similar quality of worker protection be provided.

The safety recommendations presented are not meant to be all-inclusive adequate regulatory guidelines for many of the tasks, tools, and equipment used in the precast concrete products industry. Emphasis has been placed on recommendations for safe work practices which address tasks, activities, and tools commonly associated with injuries.

The safety recommendations are organized and presented in two major categories:

A. General Safety Recommendations
B. Safe Work Practices for Precasting Processes.

8.2 General Safety Recommendations

This preliminary section presents safe work practices for the tasks, activities, and tools that are commonly used throughout precasting operations. Included in this section are the recommendations for manual and mechanical materials handling, handtools, worker proximity to operations, welding and cutting, chemical handling, ladders and scaffolding, and chipping/cleaning.

8.2.1 Manual Materials Handling

A wide range of manual materials handling activities are inherent to the precast concrete products industry. Workers may be required to lift, carry, push and pull raw materials and/or finished products during loading/unloading, processing, storage and cleanup operations. The handling and manipulation of loads can markedly increase the

stresses imposed on workers' musculoskeletal systems and increase the likelihood of injuries to certain body areas (e.g. back, extremities). The application of proper handling techniques can minimize these stresses and help reduce the incidence of musculoskeletal injuries. These are:

i. Using safe handling techniques which emphasize proper body mechanics in performing materials handling activities, e.g workers should assess the size, shape and weight of the objects to be lifted or carried,
ii. Selecting and using assistive devices, e.g hooks and handles, prybars or crowbars,
iii. Providing adequate work space, e.g a clear, unobstructed path if transportation of objects is required, and
iv. Training workers and reinforcing their activities, e.g providing workers with criteria for assessing the stress of handling various objects.

8.2.2 Mechanical Materials Handling

8.2.2.1 Powered Hoists and Cranes

Safety in hoisting operations is a function of the interaction of four major areas:

i. Selection, inspection, and integrity of the equipment
ii. Competent operation
iii. Rigging of the load
iv. Handling of the load.

8.2.2.2 Straddle Carriers

i. Straddle carrier operators must be thoroughly trained.
ii. The rated load of the straddle crane should be posted in a conspicuous location on the equipment and in the operator's cab.
iii. Visible and audible alarms should be in operation during any moving task.
iv. No one should ride on the carrier unless such a procedure is approved by the plant manager. Where approval is granted, a seat or cage, located so that it will not interfere with operator vision or in itself be a hazard, should be provided. The rider should be in the seat or cage before the carrier is moved and should not move around on the carrier until it is stopped.

8.2.2.3 Forklifts

i. Only workers authorized by the employer and trained in the safe operation of industrial trucks, forklifts, or industrial tow tractors should be permitted to operate these types of vehicles.
ii. Forklifts and industrial vehicles should be equipped with audible backup alarms.
iii. Industrial vehicles must be inspected and tested to ensure that:
    1.Brakes are in working order
    2.Hydraulic systems are working properly
    3.Horns and lights are in working order.
iv. Vehicle loads must not exceed rated capacities. A loaded industrial vehicle should not be moved until the load is secure.

8.2.2.4 Chain Hoists

i. Chain hoists or "come-a-longs" should be inspected and maintained as part of a preventative maintenance program.
ii. Employees lifting material with mechanical hoists should:
    1.Use proper and accepted rigging methods
    2.Use safety latch hooks
    3.Chock or block loads before working under them
    4.Not use "cheaters" on the hoist handles.

8.2.2.5 Conveyors

i. Conveyors should be adequately guarded to prevent workers from being caught on moving parts or being injured by falling materials.
ii. Conveyors should have delay startup warning devices with controls for emergency stops. All chain drives, gears, nip or shear points, and revolving shafts should be guarded.
iii. Personnel working near conveyors should wear close-fitting clothing that cannot be caught in moving parts.
iv. Employees should be instructed in safe practices for freeing "jammed" conveyors, including use of special tools. A lockout system should be mandatory.

8.2.3 Handtools

8.2.3.1 Powered

Handtools (powered) should be used according to the following safety recommendations:

i. Hand-held powered circular saws, chain saws, and percussion tools without a positive accessory holding means must be equipped with a constant pressure switch.
ii. Portable, power-driven circular saws must have guards above and below the base plate or shoe.
iii. Abrasive wheels and stones must have a safety guard covering the spindle end, nut, and flange projections.
iv. Hand-held powered drills; tappers; fastener drivers; horizontal, vertical, and angle grinders; disk and belt sanders; reciprocating, saber, scroll, and jig saws; and similar tools must be equipped with constant pressure switches. Other handheld powered tools, such as platen sanders; grinders; disk sanders; routers; planers; and saber, scroll, and jig saws, should be equipped with either a positive on-off control or a constant pressure switch.

8.2.3.2 Unpowered

The following safe practices should be observed when unpowered hand tools are being used:

i. Train employees to select the correct tool for the job, and ensure that the tools are available.
ii. Keep all hand tools in a safe condition. Handles of tools shall be kept tight in the tool. Wooden handles shall be free of splinters or cracks. Wedges, chisels, and other struck tools should be dressed as soon as the struck surfaces begin to mushroom. Discard wrenches which are sprung to the extent that slippage occurs.
iii. Instruct employees in the correct use of tools.

8.2.4 Worker Proximity to Operations

8.2.4.1 Walking Through Work Areas

Work areas should be kept free of litter, trash, gravel, excess concrete spills, welding rod stubs and other junk. All scrap, salvageable material, unused forming or reinforcing materials and equipment should be removed. Protruding nails in wood

forming material should either be removed or bent over. Aisles around work areas should be kept clear of such items as reinforcement, welding hoses or leads, lumber, power cords, and concrete working tools.

8.2.4.2 Working near Operations

Of particular interest in this category is the need to protect workers in the vicinity of welding operations from flash burns. Whenever possible, resistance welding operations should be isolated to protect workers in the vicinity of the welding operations from exposure to the direct or reflected light rays. This can be
accomplished either by use of booths for regular welding production operations or by portable welding screens for welding being performed intermittently throughout the plant.

8.2.5 Welding, Cutting, Burning

Welding, cutting, and burning necessary for making precast concrete products should be done in accordance with the following safe work practices:

i. Workers performing welding and cutting tasks should be trained.
ii. Before starting welding or cutting operations, the work area should be inspected to ensure that there are no potential fire hazards
iii. Welding and cutting should be done in an area having a nonflammable floor, such as concrete, but not on the concrete floor, because of the possibility of explosive spalling of the concrete.
iv. Personal protective equipment should be worn by all welders and helpers as needed
v. Avoid burning while wearing ragged or oily clothes. Sparks may lodge in rolled-up sleeves or pockets of clothing, or in cuffs of overalls or trousers.

8.2.6 Chemical Handling

Persons working with chemicals such as fresh (moist) concrete, form release agents, or epoxies should:

i. Avoid direct contact between skin surfaces and chemicals or clothing saturated by chemicals

ii. Soon after contact between skin surface areas and chemicals or clothing saturated by chemicals, skin areas involved should be washed thoroughly and saturated clothing areas rinsed out with clean water
iii. Use barrier creams
iv. Wear full length trousers, long sleeve shirts, waterproof gloves, boots, and hand pads
v. Wear eye protection
vi. Periodically be updated on recommendations for safe usage contained on the appropriate chemical's material safety data sheet.

8.2.7 Ladders and Scaffolds

Portable ladders should be:

i. Equipped with safety feet
ii. Chocked and/or tied off to prevent accidental displacement (if necessary, a coworker should be used to hold the ladder)
iii. Of sufficient length to ensure that the vertical to horizontal placement maintains a 1 to 4 ratio (for each 10 feet in height, the ladder feet should be 2-1/2 feet out).

Scaffolding should be:

i. Free from holes and tripping hazards on the platforms
ii. Provided with adequate guardrails on all exposed sides, including the one next to the form if a floor gap exists
iii. Provided with a safe means of access.

8.2.8 Chipping/Cleaning

The most common type of accident that occurs during chipping/cleaning tasks involves fragments flying into workers' eyes. The following recommendations are made to alleviate this problem:

i. Persons involved in grinding, chipping, wire brushing, and/or scraping should wear goggles or safety glasses with side shields under a face shield,
ii. Since the chipping/cleaning tasks which utilize power tools can cause particles to be airborne for considerable distance (10-30 feet), the operations should be isolated from other workers. If this is not practical, then workers in the vicinity of these operations should also wear adequate eye and face protection.

8.3 Safe Work Practices for Precasting Processes

Safe work practices for procedures used in the manufacture of precast concrete products are presented in this section. Included are safety recommendations that address the hazards of processes used in the precasting industry as well as the application of tools or equipment used in a specific process.

8.3.1 Form Work

8.3.1.1 Forms and Forming

i. Forms and beds for casting should be:
    1. Arranged or laid out to provide a working space, aisleway, or working platform clear of obstructions and sufficiently wide to provide ample room for the safe movement of materials and vehicles
    2. Provided with access steps or ramps at convenient intervals along the bed or form
    3. Equipped with standard guardrails, if over 4 feet high.

ii. Forms should be structurally sound so that they do not present a hazard to employees as they are built, repaired, cleaned, modified, or moved.

iii. During form assembly, components should be chocked and/or braced to prevent displacement.

iv. Safe access during vertical pipe form assembly should be provided for workers during assembly, aligning of hoisted parts, and attaching of hoist hooks.

v. The floor, yard, platform, or other surface on which a form is placed, built, or erected should be free of litter, debris, and other loose materials that can cause tripping hazards. Also, these surfaces should be well drained and free of potholes, cracks, unevenness, or standing water that may contribute to slips and falls.

8.3.1.2 Form Stripping

i. Employees should be instructed that form bulkheads, etc., may temporarily adhere to the concrete product. The bulkheads may release suddenly.

ii. During form stripping and product removal tasks, it is important that form bulkheads and components be cribbed, braced, or suspended by hoist to prevent their falling unexpectedly.

iii. Prying tasks should only be performed with the proper tool (crowbar or prybar). Shovels should not be used as substitutes.

iv. As forms are stripped, all excess material, wood, nails, and bits of wire should be removed so that the area is clean and safe. After forms are stripped, all nails should be bent or pulled immediately.

8.3.2 Reinforcing

8.3.2.1 Reinforcing Materials/Assemblies

i. Reinforcing assemblies should be fabricated with a working level jig to avoid constant bending over to tie or weld.

ii. In the handling of reinforcing steel and fabricated assemblies, the following precautions should be taken:

1. Employees must be instructed and required to use correct lifting techniques,
2. Finished cages for pipes, columns, and beams should be moved to their final locations in the forms with consideration of their weight and the physical capabilities of the employees assigned,
3. Mechanical lift assistance should be provided to safely lift pieces too bulky or heavy to be handled manually,
4. Bundles of reinforcing steel moved by crane or other means should be securely tied and wedged together to prevent slipping.
5. Rebar bundles lifted by hoist should be rigged by 2-pointsuspension chokers and moved in a balanced horizontal position. They should not be moved in the vertical plane,
6. When bars carried by hand are long, bulky, or heavy, more than one worker should be utilized,
7. Rebar materials used in cutting and bending operations should be located such as to minimize or eliminate the need for the worker to lift the bar from ground level to the cutting or bending height,
8. Gloves should be worn during strand stringing, vise placing, rebar tying or handling, mesh placement, and cage handling tasks

8.3.2.2 Metalworking Equipment

Metalworking equipment should meet the following requirements:

1. Cage rollers should be equipped with deadman switches and positive braking mechanisms that immediately stop the movement of the rollers,
2. Cage or wire rollers should be equipped with trip wire mechanisms at the in-rolling nip points, that automatically shut down the rollers when inadvertent contact is made.
3. Shearing machines should be equipped with physical guards and/or proximity detectors.

8.3.2.3 Stressing

General safety recommendations for stressing include the following:

i. Strand should be inspected as it is placed in the bed to detect defects that could cause failure, such as:
    1. Nicks
    2. Kinks
    3. Broken wires
    4. Excess corrosion.
ii. Welding or cutting should not be allowed in any stressing bed where strand has been strung or tensioned, or in any other location where strand is stored.
iii. Strand vises used to secure strand at the anchor abutments should be placed away from a burned end to avoid the area of altered strand strength.
iv. Strand previously gripped by vises, and therefore nicked, must not be reused. Strand vises should be cleaned and inspected between each use and lubricated as necessary. Grips that become visibly worn or distorted, or allow excessive slippage should be discarded.
v. Audible and visible alarm signals should be turned on and remain on during tensioning.
ix. Personnel in the stressing crew must not stand behind the jack or in line with the tensioned steel, since ruptured strand tends to retract along the line of tension.
x. Elongation should be measured by means of a template, jig, or scale attached to the stressing jack that can be viewed from a safe distance.

xi. Workers involved in tensioning should be protected by bed end protection, a pumphouse, or a portable booth to shield them from flying strands or bulkheads resulting from strand breakage.

8.3.2.4 Bed End Protection

Bed end protection should be provided at the jacking abutment end of each stressing bed and should consist of a main shield at or near the bed end and a secondary barrier downstream of the jacking area. Shields must be designed to withstand the forces applied against them by recoiling strand, flying bulkheads, and other material that may be launched as a result of strand failures during stressing. The purpose of bed end protection is to shield those workers who are involved in the tensioning or detensioning operation from flying chucks, strand, or bulkheads resulting from chuck or strand breakage.

In addition to bed end protection, a secondary barrier should be provided to block the path of strand retracting through the abutment or pulling head as a result of tensioned strand failure. Without such protection, the retracting strand may continue along its path for several hundred feet. The secondary barrier should be constructed of concrete, steel, or other material able to withstand the force of a chuck and strand retracting through the pulling head.

8.3.2.5 Harping

Before harping, the operator should be knowledgeable of the recommended depressing sequence and mark the required distance on the harping dowel large enough to be visible from a safe location during the harping sequence. During harping the following safety recommendations should be followed:

1. All unnecessary employees should be cleared from the immediate area,
2. Audible and visible alarms should alert personnel that harping operations are taking place,
3. Entangled or misaligned strand should be restored to its original position and then correctly harped. Workers must not attempt to shift strand while it is depressed.

8.3.2.6 Dejacking

Dejacking, used to release a strand that is misplaced or fouled, requires extreme care. The following precautions should be taken:

1. Hands and fingers must not be placed between the chuck face and the jackhead.
2. Jaws should be removed with a hook tool or other device recommended by the manufacturer,
3. Tension on strand should be released slowly.

8.3.2.7 Detensioning

Detensioning of cured product by cutting torch should be performed as follows:

1. a specific order for strands to be cut should be determined. Strands should then be cut at both ends of the bed simultaneously in the predetermined sequence.
2. The method of cutting should minimize shock loading. Each strand should be preheated to partially relieve tension prior to cutting.
3. A strand should be cut with the torch cutter working from the side, not the rear, of the strand.

8.3.3 Oiling

i. Form release agents should be stored neatly in cabinets or areas specially set aside for that purpose.
ii. Material Safety Data Sheets for all form release agents should be requested, and all applicable safety and health precautions should be followed.
iii. Eye and face protection, such as a face shield, should be mandatory during spray application of form release agents.
iv. A minimum of safety glasses should be used during hand applications (swabbing, rolling) and during all transfers of form release agents.

8.3.4 Concrete Mixing and Transport

8.3.4.1 Concrete Mixing

i. Mixer energy sources should be locked out and tagged before cleaning, maintenance, or repair procedures.
ii. Employees should be adequately instructed in preventive measures to avoid skin burns that can occur from prolonged, direct contact between skin surfaces and fresh (moist) concrete or clothing saturated by it.

iii. NIOSH/MSHA-approved respirators should be worn in areas where dust levels are excessive.
iv. In high-noise areas, the employees must be provided with hearing protection devices if feasible engineering controls are inadequate in reducing noise to levels below 85 dB(A) for an 8-hour time-weighted average (TWA).

8.3.4.2 Concrete Transport

i. A signalman should be available at times of entry, movement, and exit to ensure safe passage of concrete delivery trucks to casting areas.
ii. Movement of personnel and job equipment should be routed to avoid crossing truck lanes, tracks, aisleways, or transfer areas.
iii. Concrete delivery transporters should be equipped with audible and visible alarms, including backup alarms to warn of their approach, and mirrors to eliminate blindspots.

8.3.5 Casting Concrete

During the casting of concrete product, the following safety recommendations should be followed:

i. Concrete buckets should not be transported over workers. Workers should not step under overhead buckets.
ii. Buckets should have a positive locking gate.
iii. Electric cords should be placed or protected so that they will not be run over and damaged or be allowed to rest in water.
iv. Safe access to the points of concrete placement and consolidation should be provided by stairs, ramps, or ladders.
v. Safe work platforms should be provided for elevated casting operations such as vertical wet casting of pipe.
vi. Rolling stair scaffolds must be equipped with adequate guardrails on all exposed sides, particularly the ends of the scaffold and the interface between the form and the scaffold if a floor or wall opening exists.
vii. Electric vibrators should be inspected for electrical continuity and should be properly grounded.

viii. Housekeeping and cleanup of discharged aggregate and/or water should not be performed while spin casting machines are in motion.

8.3.6 Finishing

i. Finishers should neither stand on nor work under suspended loads.
ii. Adequate and safe work platforms should be provided for all elevated finishing activities.
iii. Grinders (abrasive stone) should be equipped with properly adjusted guards.
iv. The exposed blades of concrete saws should be guarded. A retractable lower-blade guard should be used.
v. Where caustic or acidic materials are used, the following protective measures should be provided and used in case of spills on employees' skin or clothing:
    1. Employees should be kept informed of the irritant materials which they use and instructed in appropriate emergency procedures in case of accidental contamination of skin or clothing.
    2. Eye wash facilities and showers must be readily accessible to finishers.
    3. Gloves and safety goggles should be worn when workers are using or chipping epoxy.
    4. Contaminated clothing should be removed immediately and the affected skin area flushed with water for a minimum of 15 minutes.

8.3.7 Curing

(a) Employees should be protected against contact with steam and hot water lines used for accelerated curing of concrete products by insulation, location, or guarding.
(b) Curing compounds should be stored in cabinets designated for them.
(c) Aisles, passageways, and walkways should be maintained in a neat and uncluttered condition during curing operations.

8.3.8 Product Handling and Transport

i. Only drivers and equipment operators authorized by the employer should use product handling equipment such as automatic unloaders, vault trucks, flatbed

carriers, or tractors. Operators should be trained in the safe operation of, and be licensed to operate, a specific piece of product handling or moving equipment.

ii. Product handling equipment should be checked at the beginning of each shift and deficiencies reported, including: brake systems, steering, lights, backup alarms, and other warning and safety devices.

iii. Concrete products should be unloaded in accordance with the following safety recommendations:

1. The safe lifting capacity of the equipment should not be exceeded.
2. Loads that are long, oddly shaped, or difficult to rig should be raised only a short distance until it is apparent they will not spring, slip, or tip.
3. Pipe or circular products should be off-loaded with skids, ropes, or automatic unloaders,
4. The job site unloading area should be examined for access, stability, and temporary storage capability,
5. Before unattended vehicles are unloaded, all wheels should be chocked and the parking brakes set.
6. Trailers should be loaded and unloaded evenly so as not to tip the load or the trailer.

8.4 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal Protective Equipment (PPE) provides additional protection to workers exposed to workplace hazards in conjunction with other facility controls and safety systems.

PPE is considered to be a last resort that is above and beyond the other facility controls and provides the worker with an extra level of personal protection. Following table presents general examples of occupational hazards and types of PPE available for different purposes. Recommended measures for use of PPE in the workplace include:

(1) Active use of PPE if alternative technologies, work plans or procedures cannot eliminate, or sufficiently reduce, a hazard or exposure

(2) Identification and provision of appropriate PPE that offers adequate protection to the worker, co-workers, and occasional visitors, without incurring unnecessary inconvenience to the individual

(3) Proper maintenance of PPE, including cleaning when dirty and replacement when damaged or worn out.

(4) Proper use of PPE should be part of the recurrent training programs for employees.

Requirement for PPE are covered in the OSHA standards.

Table 88. Recommended Personal Protective Equipment

Type	Type of	Protection Provides	Comments
Foot	Safety boots	Falling or dropped objects	Safety boots should be worn by all employees. Boots should have rubber or synthetic composition,
	Knee-high safety boots	Caustics and slipping	Knee-high safety boots should be worn by employees performing casting operations. Boots should be rubber, steel-toed, and non-slip worn over heavy socks, with trousers tucked in or bloused.
Head	Hardhats	Falling objects, strike-against hazard, low beams and other head level obstacles	Hardhats should be worn by all employees. Hats should be resistant to impact, fire, and moisture, and if necessary, be made of nonelectrical conductor materials.
Face	Face shields	Particles thrown off by such operations as spraying or grinding	Shields should be worn by all employees performing spraying or grinding tasks. Shields should be replaced when plastic is cracked, brittle, or badly scratched.
Skin	Clothes suitable for work performed	Caustic materials, entanglement in machinery	Loose sleeves or torn, ragged clothing should not be worn. Buttoned, long-sleeved shirts and trousers without cuffs should be worn when casting, finishing, welding, or burning.

	Gloves	Abrasions, caustics, minor cuts, and scratches resulting from handling rough material	Gloves should be worn when handling materials or products, or rebar bending, except when operating machinery with revolving parts or when they interfere with the safe operation of controls.
Skin (Cont.)	Rubber gloves	Abrasions and caustics resulting from handling wet material	Rubber gloves should be worn, as needed, during some mixing and finishing tasks.
	Leather, wool, or fire-retardant cotton	Flame, heat and sparks	These materials are recommended where flame, heat, or sparks are present.
	Protective creams Barrier creams	Irritating effect of cement or chemicals	Should be used by workers handling cement or finishing or mixing concrete, as needed.
Eye	Goggles	Grinding, chipping, or burning, or working in areas where the possibility of flying objects exists	Goggles offer good protection in general yard and plant work against dusts and particles and are recommended for all employees
	Safety eyeglasses with side shields	Small-sized particles thrown off by such operations as metal sawing, sanding, and chipping of concrete	Welders must also wear safety glasses in addition to a welding helmet.
	Welder's helmet	Molten metal splashes; ultraviolet and visible radiation depending upon the correct type of filter	Helmets must be worn by all welders. Helmets protect the face, forehead, neck, and ears from direct exposure to radiation from the arc

Hearing	Earplugs	Noise levels between 90 and 130 dB(A) depending on the type and quality of earplug	All employees exposed to an 8-hour time-weighted average of 85 decibels or greater must be provided with hearing protection.
	Ear muffs	Noise levels between 90 and 135 dB(A)depending on the quality and type of earplug used with	Employers must administer effective hearing conservation programs to all employees exposed to noise levels equal to or exceeding an 8-hour time-weighted sound
Respira-tory	Respirators, dust masks	Harmful dusts, fumes, vapors	Respirators or facemasks with appropriate filter must be worn by employees exposed to toxic agents. Respirators may be required when spraying, sand blasting, mixing, or working in storage silos.
Fall	Lifelines, safety belts and lanyards	Falls from elevations	Should be worn by employees working from elevated work surfaces which are not adequately guarded against fall hazards.

9. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

9.1 OBJECTIVES

In order to acquire public opinion on the implementation of I&H Precast Concrete Factory project, public consultation works were done firstly disclosing related project information in local community. Public consultation and information disclosure work for I&H Precast Concrete Factory project were carried out with the following objectives:

(a) To disseminate the project information, benefits and disadvantages of the project to general public so that they could understand the trade-offs;

(b) To be able to gain meaningful contribution of informed public; and

(c) To achieve greater trust of general public with the project proponent by disseminating relevant information.

9.2 METHODOLOGY AND APPROACH

9.2.1 Public Consultation

(a) Personal Interview

Personal interviews with local authorities from the MOC staff quarters and Kalar Kone village within 5 km of project area were exercised to collect their opinion and suggestions. Then, interested persons from local community were consulted firstly disseminating project information to them and then acquiring their comments and suggestions.

(b) Open Discussion

An agenda was provided for open discussion with local people and representatives from ESIA team and project proponent in both public meetings which were collectively held for I&H Precast Concrete Factory project at No(3) management office, Myaung Takar Industial park, Mhaw Bi Township and Religious building of Kalar Kone village, Mhaw Bi Township respectivelly. Results from the open discussion sessions of the two public meetings are shown in later section.

9.2.2 Information Disclosure

(a) Presentation

Representatives from project proponent and ESIA teams gave presentations about their respective scope of works before general public in both public meetings.

10. CONCLUSION

There is a total of eight significant impacts by the project where seven out of eight are negative impacts and only one left is positive impact. Without any MEMs, there are five impacts with significance level of medium-high, two impacts with low-medium and one with low significance.

MEMs for the anticipated impacts are delineated. By applying the delineated MEMs, five negative medium-high impacts will be reduced to low-medium level, two negative low-medium impact will become low and one positive low-medium impact will be enhanced to medium-high significance level, two positive low impacts will be enhanced to low-medium.

ESIA team concludes that the project could be environmentally and socially sustainable if it complies with the delineated environmental management and monitoring plans in due course of the time.

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APPENDIX /

Health Statistic for Surrounding Environment of I&H Pecast Concrete Factory

3. 1. 2018.

SR No.	Name.	Address.	old/NEW	Age (yr)	M/F	RBS	DISEASE				CVA RISK.	STRIP	LANCET								B.P	Wt:
							CVA	H/T	D/M	OTHER	<10% <10%-20% <20%-30% 30%			AMLONG	BECOSPIRIN	ATCHAS	METFORM	GLICLA	MULTI	B1		
1	ဒေါ်မြင့်ဖို	တလာကုန်း	O	48	F	161	- T/N	Lasix ✓	10 mg ✓		T/m Decla, T/M 3,6,12.	1	1	7	7	7	28		7		190/120	61 Kg.
2	" စန်းဖို	"	O	51	F			✓	✓					7	7	7	42		7		110/90	55 "
3	" ဒေါမွန်	"	O	57	F			✓						14	7	7			7		140/90	90 "
4	" ဝင်းဝင်းမာ	ကန်သာယာ	O	36	F			✓	✓					7	7	7	42		7		-	-
5	" ကောင်ဖွန်	ဆေးရုံ. ကုန်ကြမ်း	O	58	F	209		✓	✓			1	1	7	7	7	21		7		150/80	60 "
6	" စန်းဖြူ	တလာကုန်း	O	51	F			✓	✓					7	7	7	21		7	7	120/90	35 "
7	" ဒင်္ဂီ	ကန်သာယာ	O	71	F			✓						7	7	7			7			
8	ဦး သန်းထွန်း	တလာကုန်း	O	59	M			✓						7	7	7			7		120/80	45 "
9	ဒေါ်တင်ကြည်	ကန်သာယာ	O	85	F			-	-										7	7	130/90	30 "
10	ဦး ခိုင်မြင့်	သ. လ. ဂု.	O	68	M			✓						7	7	7			7		120/90	58 "
11	ဒေါ်သန်းဖို	တလာကုန်း	O	45	F			✓	✓					7		7	21		7	7	100/70	60 "
12	" မေဝင်းဖို	သ လ ဂု.	O	62	F			✓	✓					21	7	7	14		7		160/100	76 "
13	ဦး မောင်လေး	တလာကုန်း	O	62	M			✓	✓					14	14	14	56		14		(1) ပတ်စာ.	
14	ဒေါ်သန်းမြင့်	သ. လ. ဂု	O	47	F			✓						7	7	7			7		120/80	56 "
15	" ဘွဲ့ဖို	"	O	65	F			✓						7					7		-	-
16	" မောင်	တလာကုန်း	O	41	F			✓						7					7	7	100/60	60 "
17	" ဘွဲ့ကြိုင်	"	O	63	F	128		✓	✓			1	1	7			4		7	7	110/90	51 "
18	" သန်းမော်ဖို	"	O	50	F	378		✓	✓			1	1	7	7	7	21	14	7	7	130/80	58 "
19	ဦး ရွှေဝ	"	O	71	M			✓						14	7	7			7	7	120/90	72 "
20	ဒေါ်ပေါ်ပေါ	တံတားဦး	O	70	F			✓	✓					7	7	7	14		7		160/100	50 "
21	" စန်းဝင်း	တလာကုန်း	O	50	F			✓	✓					7	7	7	21		7	7	120/80	70 "
22	ဦး မင်းဘဲဦး	"	O	50	M			✓	✓					7	7	7	7		7	7	-	-
23	ဒေါ်နန်းဆွေကြည်	ဘဏ်းတာကာ	O	54	F			✓	✓					7	7	7	21		7	7	130/80	63 "
24	" စန်းမြင့်	တလာကုန်း	O	62	F			✓						7	7	7			7	7	120/90	60 "
25	" မို့ဖို	"	O	50	F			✓						7	7	7			7	7	130/90	66 "
26	" မြကြွယ်	"	O	63	F			✓								7			7	7	100/60	38 "
27	ဦး သန်းဝင်း	"	O	58	M	265		✓	✓			1	1	21	7	7	21	28	7	7	140/90	84 "
28	ဦး ဒင်္ဂီ	ဓာတ်သုံးဆိုင်	O	58	M			✓	✓					7	7	7	42	28			-	-
29	ဒေါ်သန်းဝင်း	"	O	56	F			✓						7	7	7			7	7	110/90	71 "
30	ဒေါ်လှမြင့်	တလာကုန်း	O	58	F			✓	✓					7	7	7	21	14	7	7	110/90	56 "
31	" မြင့်မာ	"	O	55	F			✓	✓					7	7	7	42	28	7		130/80	52 "
32	" လှိုက်ဦး	"	O	60	F			✓	✓					7	7	7	28	7	7	7	-	-
33	" လှမြင့်	"	O	58	F			✓	✓							7	7		7	7		
34	" မာဝိတာဒေဝီ	"	O	34	F			✓	✓					7	7	7	28	28	7		120/80	61 "

SR NO.	NAME	ADDRESS	OLD/NEW	AGE (yr)	M/F	RBS	DISEASE: CVA	H/T	D/M	OTHER	CVA RISK: <10%	(10-20%)	(20-30%)	30%	STRIP LANCET: AMIONG	ECOTRIN	ATOVAS	METFORM	GLICLA	MULTI	B.	B.P.	Bwt (Kg)
35	ဦးကျော်ဇော	ကုန်းကလေး	O	41	M			✓							7	7	7			7		-	-
36	ဒေါ်ခင်မိုးခိုင်	"	O	41	F			✓	✓						7	7	7	28	28	7		-	-
37	ဦးအန္တိုနီယ	ကွင်းပေါင်း	O	50	M			✓	✓						7	7	7	28	28	7		-	-
38	ဦးခင်	"	O	70	M			✓							7		7			7		-	-
39	ဒေါ်ဖောသွန်	ကုလားကုန်း	O	70	F			✓	✓						7	7	7	28	28	7		-	-
40	" ကြည်တင်	"	O	65	F			✓	✓						7	7	7	28	28	7		-	-
41	ဦးဘင်လတ်	"	O	53	M			✓	✓						7	7	7	28	28	7		140/90	78
42	ဒေါ်အိုဘိန်း	"	O	38	F			✓							7	7	7			7	7	100/20	65
															5	5	308	237	243	237	315	280	126

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1	ဦးဘန်ဌေး	ကုလားကုန်း	O	59	M			✓							7	7	7			7		100/70	49
2	ဒေါ်နုစန်	ဘဝါကုန်း(ဂ)	O	53	F			✓	✓						7	7	7	28		7		130/80	60.
3	" ဘွဲ့ဌေ	ကန်သာယာ	O	71	F			✓	✓						7			21		7		150/90	41
4	" ဝင်းဦး	ကုလားကုန်း	O	69	F			✓							7	7	7			7		130/80	50.
5	" ခင်ဦး	"	O	51	F			✓	✓						7	7	7	42		7		110/70	55
6	" ဝင်းမြ	"	O	48	F			✓							21	7	7			7		170/110	61
7	" ခင်ဖြူ	"	O	62	F			✓							7	7	7			7		140/90	60.
8	" ဘာဒီ	ကကဏ္ဍိုကုန်း	O	63	F			✓							7					7	7	140/80	43.
9	" ဖြဴးဖြဴးထွဋ်	ကုလား ကုန်း	O	63	F			✓									✓			7	7	100/80	37.
10	ဦးဘဦးဦး	"	O	58	M			✓	✓						21	7	7	21	14	7	7	-	-
11	ဦးဘဦးဦး	"	O	50	M			✓	✓						7	7	7	7		7	7	110/70	85.
12	ဒေါ်ခင်ဆွေ	"	O	50	F			✓	✓						7	7	7	21	7	7	7	130/90	70.
13	" ဘဦး	"	O	45	F			✓	✓						7		7	21		7	7	120/80	61
14	" ဖွဲ့ဦး	"	O	51	F			✓	✓						7	7	7	2	14	7		140/80	51.
15	ဒေါ်ဘဝဖြူ	ကကဏ္ဍိုကုန်း	O	36	F			✓	✓						7	7	7	42	28	7		140/90	72
16	" ဝင်းဖြူ	ကုလားကုန်း	O	57	F			✓							14	7	7			7	7		
17	" ဝေဝေဦး	"	O	70	F	395		✓	✓			1	1		7	7	7	28	7	7		120/80	54.
18	" ဖြူဖြူဝေ	"	O	55	F			✓	✓						7	7	7	42	28	7		140/90	52
19	" ခိုခို	"	O	50	F			✓							7	7	7					150/100	57.
20	" ဝေဝေဦး	ဓာတ်ခဲတောင်ကုန်း	O	45	F			✓	✓						7	7	7	21					
21	" ဖြူဖြူဦး	ကုလားကုန်း	O	54	F			✓	✓						7	7	7	21				150/90	60.

SR NO	NAME	ADDRESS	OLD/NEW	AGE (yr)	M/F	RBS	DISEASE				CVA	RISK	STRIP	LANCET								B.P.	Body (KG)
							CVA	H/T	DM	OTHER	<10% >10%	(20-40% 30%			Analgin	Ecosprin	Atrovas	Metrix	Glucla	Multi	B1		
22	ဦး ကြည်	ရွာအနောက်ပိုင်း		71	M			✓							14	7	7				7	120/80	73
23	ဒေါ်ကြည်ဆင်	"		65	F	364		✓	✓				1	1	7	7	7	28	28	7	7	110/60	64
24	"ဖားဘိုကဆောင်	"		34	F	261		✓	✓				1	1	7	7	7	28	28	7		120/80	61
25	"သုခြင်း	"		58	F			✓									7	7		7		-	-
26	"ဒေါ်ဦး	"		47	F	249		✓	✓				1	1	7	7	7	42		7		120/80	61
27	"ဒေါ်ကြည်ဆွေ	"		47	F			✓	✓						7	7	7	14	7	7		-	-
28	"သုမို	ဘ.လ.ဂ.		65	F			✓							7						7	-	-
29	ဦး စိန်ဦး	"		68	M			✓							7	7	7			7	7	120/90	60
30	ဦး ဝင်းတင်	ရေကန်ကုန်း		53	M			✓	✓						7	7	7	28	28			140/90	78
31	ဦး ကြော်ဘွဲ့	ကုန်း ကလေး		41	M			✓							7	7	7			7	7	120/80	72
32	ဒေါ်နွဲ့ဦး	"		41	F			✓	✓						7	7	7	28	28	7	7	-	-
33	ဦး ကနဲ့ဂြိုဟ်	ကွင်းကြောင်		50	M			✓	✓						7	7	7	28	28	7	7	-	-
34	ဒေါ်ဖေကူး	ရေကန်ကုန်း		60	F			✓	✓						7	7	7	28	28	7	7	-	-
35	"ဘဉ်မြဲ	"		50	F			✓	✓						7	7	7	28	28			-	-
36	ဦး ဖောင်းမောင်	ပြောက်		-	M			✓							20	20	20					-	-
37	ဒေါ်နဲ့	"		-	F			✓							20	20	20					-	-
38	"ဖေဖေ	ကုလားကုန်း		45	F			✓	✓						7		7	14		7	7	120/80	65
39	"ဘဉ်ဦး	ဘ.လ.ဂ.		47	F			✓							7	7	7			7	7	120/90	56
40	"ဖေဖေဦး	"		62	F			✓	✓						21	7	7	14		7	7	-	-
41	ဦး ကြည်ဇင်မှူး	ကုန်းဘကော		72	M			-	-											7	7	-	-
42	ဒေါ်လှမြိုင်	ရေကန်ကုန်း		63	F				✓								7	14		7	7	-	-
43	"ဖေဘု	"		41	F										7					7	7	-	-
													4	4	348	257	295	787	301	245	52		

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1	မစိုးစိုး	ကုလားကုန်း		49	F			✓									7	28	28	7		100/60	64
2	ဦး ဖေဖေ	"		71	M			✓								7	7			7	7	130/90	72
3	ဒေါ်ဆင်မိုး	ကန်းကလေး		71	F			✓												7	7	120/90	75
4	"ဖေကား	ဖေ့ဘွတ် ကြည့်ပြောင်		58	F			✓								7	7	7		7	7	150/90	61
5	"ခင်မင်းခိုင်	ကုလားကုန်း		38	F			✓									7	7		7	7	100/90	54
6	"ပြည့်ဖေကား	"		45	F			✓									7	14		7	7	120/80	66
7	"ခင်ဦး	"		51	F			✓	✓							7	7	42	14	7		120/80	50

SR NO.	NAME	ADDRESS.	OLD/ NEW	AGE	M/F	RBS	DISEASE				CVA. RISK. (10%-20%/20%-30%/30%)	STRIP LANCET							B.P.	B.wt. (KG)
							CVA.	H/T	D/M	OTHER (10%)		AMLONG	ECOSPRIN	ATORVAS	METFOR	GLICLA	MULTI	BI.		
8	[illegible]	[illegible]		64	F			✓	✓				14.	14.		14	14.		130/70	45 Kg
9	[illegible]	[illegible]		59	M			✓					7	7		7			-	-
10	[illegible]	"		47	F			✓	✓				7	7	14.	7	7	7.	-	-
11.	" [illegible]	"		57	F			✓					7	7			7	7	120/80	89.
12	" [illegible]	[illegible]		31	F			✓	✓				7	7	42		7		-	-
13	[illegible]	"		72	M.				-								7	7.	-	-
14	[illegible]	[illegible]		48	F.			✓	✓				7	7	28		7		140/90	61
15	[illegible]	"		53	M.			✓	✓				7	7	28	28	7	7	140/90	80.
16	[illegible]	"		65	F			✓	✓				7	7	28	28	7	7	-	-
17	" [illegible]	"		70	F			✓	✓				7	7	28	28	7	7	-	-
18	" [illegible]	"		66	F			✓	✓				7	7	28	28	7	7	-	-
19	" [illegible]	"		63	F				✓					7			7	7	Cheriaf 110/70	36.
20	[illegible]	"		58	M.			✓	✓				7	7	21	28.	7	7	-	-
21	[illegible]	"		50	F.			✓	✓				7	7	28	28		7.	140/80	56.
22.	" [illegible]	[illegible]		54	F.			✓					7	7	21.		7	7.	120/80	57.
23	" [illegible]	[illegible]		50.	F.			✓					7	7			7.		140/90	56.
24	" [illegible]	"		62	F.			✓					7	7			7	7.	120/70	58.
25	" [illegible]	[illegible]		53	F.			✓	✓				7.	7	28.	14.	7	7.	120/60	58
26. (1)	" [illegible]	[illegible]	(N.)	47	F.			✓	✓				7	7	42	7	7	7.	110/70	58.
27	" [illegible]	[illegible]		51	F.			✓	✓				7	7	21.	28.	7		-	-
28	" [illegible]	"		55	F.			✓	✓				7	7	42	28.	7		130/80	52
29	" [illegible]	"		45	F				✓					7	21		7	7.	100/70	58
30	" [illegible]	"		65	F.				✓					7			7.		130/70	55.
31	" [illegible]	"		56	F			✓					7	7			7	7.	110/70	61.
32	" [illegible]	[illegible]		47	F.			✓					7	7			7	7	130/90	55.
33	" [illegible]	"		62	F			✓					7	7	14.		7	7	130/80	76
34	" [illegible]	[illegible]		56	F			✓	✓				7	7			7	7	-	-
35	[illegible]	"		58	M			✓					7	7	42	28	7		-	-
36	[illegible]	[illegible]		63	F			✓	✓					7	4.		7	7	100/70	51.
37.	" [illegible]	"		58	F.			✓	✓				7	7	21	14.	7	7	100/90	57.
38	" [illegible]	"		41	F			✓									7	7	110/80	58.
39	" [illegible]	[illegible]		41	F			✓	✓				14	14	56	56	14	14.	120/80	61.
40	[illegible]	"		41	M			✓					14.	14			14	14.	120/70	72
41.	[illegible]	[illegible]		65	F			✓					7	7	4		7		110/70	50

		AGE (Y.)	M/F	RBS.	DISEASE CVA.	H/T	D/M	OTHER	CVA RISK. (10%-20% <20% 30% 30)	STRIP JANCET AMLONG	ECOSPRIN	ATOVAS	METTOR	GLICLA	MULTI T	B1	B.P.	B.W.T (KG)
			M			✓	✓			-	7	7	30	30.	7	7	-	-
			M			✓						10.			10.		-	-
											231	304	713	492	318	238		
				24.1.2018														
	ဆေးဝါးကုန်ကြမ်း		58.	F		✓	✓				7	7	21		7	.	140/80	61
	ကုမ္ပဏီအလုပ်		71.	F		-	✓						21.		7		120/80	41
	"		71	F		-	-								7	7.	120/80	76
	ဆင်ခြေဖုံး	တပ်ကုတ်(ရှေ့)	58.	F		✓	✓				7	7	28.	14.			120/60	53
	ဘုရားပြင်	ကုမ္ပဏီအလုပ်	53	F		✓	✓					7	28		7	7.		50
	ကြေးဘီတာဆောက်လုပ်ရေး	"	34	F							7	7	28	7	7	7	-	-
	ဖြေးကျော်ဦး	"	65.	F							7	7	14		7		110/70	50
	အိုးဝင်းဦး	"	38.	F							7	7			7	7	110/90	66
	ပြည်ကြီး	"	48.	F							7	7	28.		7.		140/100	60.
	စန်းဦး	"	51	F							7	7	42		7		-	-
	ဆန်းဝေ	"	62.	F							7	7			7.	7.	120/70	60.
	ဖြေးသင်	ကုမ္ပဏီအလုပ်	40.	F							7	7	21.		7		120/80	55.
	ကိုကောင်းမွန်ဆုံး	"	45.	M								7	28	28.	7	7	120/80	55
	ကိုသိန်းဝင်း	ကုမ္ပဏီအလုပ်	58.	M							7	7	21	28.	7	7	-	-
	ခေါ်ပြည့်ကြယ်	"	63.	F								7			7	7	100/70	38
	ကို ခိုင်ကိုင်	ဘ.လ.ဝ.	68.	M							7	7.			7.		120/60	60
	ခြေဆန့်ကြိုး	"	65.	F											7		-	-
	" စန်းဝင်း	ကုမ္ပဏီအလုပ်	50	F							7	7	28	28.	7		-	-
	ကိုသန်းဝင်းဦး	"	50.	M							7	7	7		7.		120/60	85
	ခြေသာဝင်းဦး	ဘ.လ.ဝ	47	F							7	7	21		7		-	-
	ဖြေဝင်းကိုကို	"	62	F							7	7			7		120/80	56
	ဘဝသိမ်းဆည်း	ပြောကားဆိုင်	56	F							7	7	14		7		140/100	77
	ကိုသန်းဝင်း	"	58.	M							7	7	42	28	7		-	-
	ခြေသာဝင်းကြည်	ကုမ္ပဏီအလုပ်	50.	F							7	7	28.		7.		-	-
	" ခိုင် ဖြေ ခြေဝင်း	ပြည်ပင်ငွေ	54	F							14	14	42		14.	(1)ပတ်စာ	120/80	58
	ဘဝသိမ်းဆည်း	အင်္ဂလိပ်	47	F							7	7	42		7		-	-
	ကို ခြေဝင်း	ကုမ္ပဏီအလုပ်	71	M							7	7			7		-	-
	ခြေသာဝင်းဖြစ်	ကုမ္ပဏီအလုပ်	36	F							7	7	42		7		-	-

SR NO	NAME	ADDRESS	OLD/ NEW	AGE (Y.)	M/F	RBS.	DISEASE CVA.	H/T	D/M	OTHER	<10%	CVA RISK. <10% 10%-20% <20% 30% 30%	STRIP LANCET MILONG	ECOSHAPE	ACTIVES	METTCO	GLUCLA	MULTI	BI	B.P.	BMI (KG)
42	ဦးကဆွေဝိုဟ	ဘုန်းတောင်း		50.	M			✓	✓				-	7	7	30	28.	7	7	-	-
43	ဦးဆင်းတေဇဝန္တ	"		70	M			✓							10.			10.		-	-
														231	304	713	532	378	238		
				24.1.2018																	
1	ဒေါ်ခေမာဘုန်း	ဆေးတိုက်နှစ်ကြိမ်		58.	F			✓	✓					7	7	21		7		140/80	61
2	" ဘွဲ့နုံ့ဖြူ	ကရင်အာမေ		71.	F			-	✓							21		7		120/80	41
3	" ဒင်မို့	"		71	F			-	-									7	7.	120/80	76
4	" ဒင်ဆုံး	တပ်ကွင်း (၅)		58.	F			✓	✓					7	7	28.	14.			120/80	53
5	" မွန်မြင်	ကညာ:ကုန်း		53	F			✓	✓						7	28		7	7.		50
6	" ဖေခေ:သိဂာအောင်	"		34	F									7	7	28	7	7	7	-	-
7	" ဖေခေ:ဘန်း	"		65.	F									7	7	14		7		110/70	50
8	" ဆုံ့ဘဒိန်	"		38.	F									7	7			7	7.	110/70	66
9	" မြင့်ဂို	"		48.	F									7	7	28.		7.		140/100	60.
10	" ဝန်းဂို	"		51	F									7	7	42		7		-	-
11	" ဝန်းဖြူ	"		62	F									7	7			7.	7.	120/70	60.
12	" ဖေခေ:ဘင်	ကဲကလေး		40.	F									7	7	21.		7		120/80	55.
13	ဦးဆာကွမ်းဝန်း	"		45.	M										7	28	28.	7	7	120/80	55
14	ဦးဘဒိန်ဝင်း	တူလာ:ကုန်း		58.	M									7	7	21	28.	7	7	-	-
15	ဒေါ်ဖြူဖြူမေ	"		63.	F										7			7	7	100/70	38
16	ဦးစိန်ဘွဲ့	ဘ.လ.ဂ.		68.	M									7	7			7.		120/80	60.
17	ဒေါ်ဖြူဖြူ	"		65.	F													7		-	-
18	" ဝန်းဝင်	တူလာ:ကုန်း		50	F									7	7	28	28.	7		-	-
19	ဦးဘင်ဒိန်	"		50.	M									7	7	7		7.		120/80	85
20	ဒေါ်ဘဝဲဆုံ	ဘ.လ.ဂ		47	F									7	7	21		7		-	-
21	" ဖြဖြဝင်းဖြူ	"		62	F									7	7			7		120/80	56.
22	" ဘဝဲမွန်ဝင်း	ဖြစ်ကောင်းဘုန်း		56	F									7	7	14		7		140/100	77
23	ဦးဘဒိန်ဆို	"		58.	M									7	7	42	28	7		-	-
24	ဒေါ်ဘဝဲဖြူဆွတ်ဆို	ကူလာ:ကုန်း		50.	F									7	7	28.		7.		-	-
25	" ဆုံ့ ဖြူ ဝင်းဆုံ	ဖြူဝင်း:အကော		54	F									14	14	42		14.	(1)ဝေဒနာ.	120/80	58
26	" ဘဝဲဒိန်	အမဲ/ဖြူး:		47	F									7	7	42		7		-	-
27	ဦး ဖြူဝ	အကောကုန်း		71	M									7	7			7.		-	-
28	ဒေါ်ဘဝဲဒိန်	ကရင်အာမေ		36	F									7	7	42		7		-	-

SR NO	NAME	ADDRESS	OLD / NEW	AGE (yr)	M / F	RBS	DISEASE CVA	H/T	D/M	OTHER	CVA RISK 10%	<10%-20%	<20%-30%	30%	AMLONG	ECOSPRIN	ATOMAS	METFOR	GLICLA	MULTI	BI	CARDIVAS 6.25	B.P	B.WT (Kg)
29	ဒေါ်ဇေမွဲ	ကုလားတဲ့		57	F											7	7			7				
30	" ဆုံးဂျိုး	ဖောက်ဆော်		46	F											7	7	42		7				
31	" ဆုံးမြ	ကုလားတဲ့		51	F											7	7	21		7				
32	" ဘဘိုင်	"		63	F												7	4		7			100/70	58
34	" ဘဘိုးမိုင်	"		45	F												7	21		7			100/70	58
35	" ဖြုတ်ဝင်	"		60	F											7	7	28	28	7				62
36	ဦးအောင်မင်း	"		53	M											7	7	28	28	7				
37	" ဘဘိုင်	ကွင်းကောင်း		50	M											7	7	28	28	7				
38	ဒေါ်ဒေါ်ကြည်	ကုလားတဲ့		60	F											7	7	28	28	7				
39	" ဂျိုးဂို	"		50	F											7	7						120/80	57
40	ဦးဆောင်ဝေ	ဘ.ဂ.ဒ		56	M											7	7	7					140/80	54
41	" ဘင်ဦး	"		76	M											7	7	42					-	-
42	ဒေါ်ဝင်းဝေမြင့်	ကုလားတဲ့		47	F											7	7	14					120/80	54
43	" မြင့်ဖေ	"		45	F												7	14					140/90	61

SR NO	NAME	ADDRESS	OLD / NEW	AGE (yr)	M / F	RBS	DISEASE CVA	H/T	D/M	OTHER
				7-2-2018						
A/1	ဒေါ်ဘွဲ့ထော်	ကုလားတဲ့	A/	80	F	109	✓	✓		
A/2	ဒေါ်သိုဝေဘွဲ့	ဖောက်ဆော်	A/	45	F	117	✓	✓		
A/3	ဒေါ်ခင်ဝေဝင့်	ပတေ	A/	32	F	387		✓	✓	
O	ဒေါ်မိုးမင်း	ကွင်းတွင်းတွဲ	O	57		285		✓	✓	
A/4	ဒေါ်ဖဲဖဲ	ဥယျာဉ်တွဲ	A	59		159				✓
O	ဒေါ်ပြည့်ဖွံ့	ခံတွေတော	O	63		219		✓	✓	
O	ဒေါ်တင်ပြ	ကုလား	O	68		283		✓	✓	
O	ဒေါ်ဖွားဝွဲ	"	O	65		196		✓	✓	
O	ဆွေးဆွေးမူ	ကန်ဘားကား	O	49	F					
O	ဦးတွဲ	ကုလားကုန်း	O	71	M					
O	ဒေါ်ဆန်ဦး	ကန်ဘားကား	O	71	F					
O	ဦးသင်းထွန်း	ကုလားကုန်း	O	59	M					
O	ဒေါ်ဝိတွဲ	"	O	60	F					
O	ဗလျှင်	"	O	63	F					
O	ဆန်ဝေ	ကဲကလေး	O	55	F					
O	သန်းဦး	ကုလားတွဲ	O	46	M					

SR NO	AMLONG	ECOSPRIN	ATOMAS	METFOR	GLICLA	MULTI	BI	CARDIVAS 6.25	B.P	B.WT (Kg)
		231	293	865	245	259	112			
"		10	10	10					200/100	29
"		10	10	10					110/100	
"		7	7	7	14	14			140/100	
"		14	14	14	14	14			140/90	
"									100/70	
		14	14	14	28	14			140/90	
		14	14	14	28	14			140/90	
		14	14	14	28	14			160/90	45
							7		120/80	74
		14	7	7			7		100/70	35
									120/80	49
		7	7	7					-	-
		7	7	7	28				-	-
				7	4				130/100	59kg
		7	7	7	42				110/70	60kg
				7	21					

SR NO	Name	Adress.	OLD/ NEW	AGE (yr)	M/F	RBS	DISEASES. CVA	H/T	D/M	OTHERS
	ဒေါ်ရေး:ဘုန်	ဆေးတက္ကသိုလ်		58.						
	ဒေါ်ပြောင်မာ	ကုလားကျင်း		63.						
	ဦး:ဇင်မြင့်:ဝင်း	"		58.						
	ဒေါ်:မြင့်	"		58.						
	" ခေး:သိမ်းကောင်	"		34						
	" ရွှေဥ	"		69.						
	ဦး:သက်ဝင်း:ဇိုင်	တပ်ကျင်း ရွာ?		41						
	ဒေါ်သစ်ဝ	"		53.						
	" ဗုဒ္ဓ	အင်းစိန်		65.						
	ဦး:စိန်:ဇိုင်	"		68.						
	ဒေါ်ဝင်း:မြ	ကုလားကျင်း		51.						
	" ဦး:ဦး	"		52						
	" မြင့်:ဗို	"		48.						
	" စန်း:ဦး	"		51						
	" ဦး:ဆွေ:လွန်	ဖြောင်းတကာ		54						
	" ဝင်း:မြင့်	ကုလားကျင်း		62						
	" ခေါ်ယုဂ်	"		57						
	" ထိပ်:ဖြ	"		36						
	" ဆိုး:ဝင်း	"		50.						
	ဦး:သာဓိန်	"		56						
	ဒေါ်ခင်:ဆုပြ	အေ.ဂျီ:ကွင်းတပ်		58.						
	ဦး:သင်း	အောက်ဖိုင်		58.						
	ဒေါ်:သန်း:ဝင်း	"		56						
	" မေခင်:ဂျိ	ဘ.ဇ.ဂ.		62.						
	" ဖုန်း:ဦးဇင်	"		47						
	" ဖြဴ:ဘူ	ကုလားကျင်း		41						
	"ကြည်ဝင်း	"		63						
	ဦး:ဝင်းမာန	"		53						
	ဒေါ်ခေါ်ယွင်:ဆေ	"		34						
	ဦး:ဘဏ္ဍိဝ	ဘုဦး:ကျောင်း		-						
	" ကျော်ဝင်း	"		-						
	ကိုကိုဌေး:ကြည်									

CVA RISK. <10%	10%-20%	16%-30%	>30%	Smoking	Alcohol	Metf.	GLIC.	Insul	Gli	BP	Wt.
					7.					100/70	
					7.					100/70	37
				21.	7	7	21.			-	-
						7	28.			110/70	50
				7	7	7	28.			130/90	62.
				7	7	7				130/80	50
						7.	28.			120/80	70
				7	7	7	28.			120/80	58.
				7.						-	-
				7	7	7				130/90	60
				7	7	7	21.			120/80	65.
				7	7	7	28.			130/90	55.
				21.	7	7.				130/90	67
				7	7	7.	42.			120/80	56.
				7	7	7	21.			150/90	57
				7	7	7.				120/80	60.
				14.	7	7.				-	-
				7	7	7	42.			-	-
				7	7	7	21.			-	-
				7	7	7	7			120/80	55.
				7	7	7	21			-	-
				7	7	7	42.			-	-
				7	7	7				-	-
				21	7	7	14			150/100	77.
				7	7	7				140/90	57.
				7						160/100	62
				7	7	7	28.			110/70	65.
				7	7	7	28.				80
				7	7	7	7.			140/70	75.
				7	7	7	28.			-	-
				7	7	7				-	-
				7	7	7	14			-	-
				363	273	335	704				

SR NO	Name	Adress.	OLD/ NEW	AGE (yr)	M/ F	RBS	DISEASES. CVA	H/T	D/M	OTHER	CVA RISK. <10%	<10%-20%	<20%-30%	>30%	Amlodip	Losartan	Atenolol	Methyl.	Clic.	Multi	Bi.	BP	Bmt:
	ဒေါ်စောဝင်းမြင့်	ဝဲလင်းကုန်တိုက်		58.													7.					100/70	
	ဒေါ်မြင့်မြင့်ဝေ	ကုလားကုန်...		63.													7.					100/70	37
	ဦးအိန်ဒင်း	"		58.											21.	7	7	21.				—	—
	ဒေါ်ရယ်မြင့်	"		58.													7.	28.				110/70	50
	ဒေါ်အေးသိမ်းဝေဆင်	"		34											7	7	7	28.				130/70	63.
	" မြဝင်း	"		69.											7	7	7					130/80	50
	ဦးသတ်ထင်ကိုင်	တပ်ကုန်း (ရှေ့)		41													7.	28.				120/80	70
	ဒေါ်ဘုန်ဝင်း	"		53.											7	7	7	28.				120/80	58.
	" ဖွဲ့	ဘ.စ.ဂ		65.											7.							—	—
	ဦးစိန်လှိုင်	"		68.											7	7	7					130/90	50
	ဒေါ်စန်းမြ.	ကုလားကုန်.		51.											7	7	7	21.				120/80	65.
	" ဦးဦး	"		52											7	7	7	28.				130/90	55.
	" မြင့်ဦ	"		48.											21.	7	7.					130/90	67
	" ဖွဲ့ဦ	"		51											7	7	7.	42.				120/80	56.
	" ဘုန်ဝေ့ကြွယ်	ဝဲလင်းတကာ		54											7	7	7.	21.				150/90	59
	" ဝင်းမြင့်	ကုလားကုန်း.		62											7	7	7.					120/80	60.
	" ရယ်ဖွဲ့	"		57											14.	7	7.					—	—
	" ဇော်ဝင်းဦ	"		36											7	7	7	42.				—	—
	" ဘုန်းဝင်း	"		50.											7	7	7.	21.				120/80	75.
	ဦးသန်းမြင့်	"		58											7	7	7	7.				—	—
	ဒေါ်ဝင်းဝင်းဆွေ	ကောဇာကုန်းတပ်		58.											7	7	7	21				—	—
	ဦးသန်းဦ	ဖောကသိုက်		58.											7	7	7	42.				—	—
	ဒေါ်ဝင်းမြင့်ဆင်	"		56											7	7	7					150/100	77.
	" ရေဝင်းမြ	ဘ.စ.ဂ		62											21	7	7	14				110/80	57.
	" သန်းဦဝင်း	"		47											7	7	7					160/100	62
	" ဖြဲ့ဝင်း	ကုလားကုန်း		41											7							110/70	65.
	" ကြည်ဇော	"		63											7	7	7	28.					80
	ဦးဇော်ဝင်း	"		53.											7	7	7	28.				110/70	75.
	ဒေါ်ခင်မြင့်မြဲ	"		34											7	7	7	7.				—	—
	ဦးမန္တစိုး	သူဦးကောင်း		—											7	7	7	28.				—	—
	" ကျော်ဝင်း	"		—											7	7	7					—	—
	ကိုကြည်ဇော														7	7	7	14				—	—
															363	293	335	704					

14.2.2018

SR NO	Name	Address	OLD / NEW	AGE (Yr)	M / F	RBS	DISEASES CVA	H/T	DM	OTHER	CVD	CVA Risk 25% / 75%	Cholesterol	Analog	Exogen	Amlys	Multip	Glicl	Multi	B.	Gabapl	EMI	B.P	B.Cr
1			O	71	F	145		✓	✓		✓			7	7	7	21	4			5		140/80	46
2			O	69	F	-		✓			✓			7	7	7					5		120/70	50
3			O	53	F	104		✓	✓		✓		(1)	7	7	7							140/90	57
4			O	71	F	-								7	7	7	28		7				110/70	36
5			O	69	M	-		✓					(1)					2	-	7	5		130/70	46
6			O	71	M	-		✓					(1)	7	7	7			7	7			130/90	52
7			O	40	F	230		✓	✓		✓			7	7	7	14	-	7	7			140/100	40
8			O	47	F	41		✓	✓					7	7	7	42		7	7			140/90	58
9			O	54	F	97		✓	✓		✓			7	7	7	14		7	7			140/90	67
10			O	48	F	-		✓	✓		✓			7	7	7	42	7	7	7			110/70	58
11		"	O	51	F	72		✓	✓		✓			7	7	7	42	7	7	7			140/90	55
12			O	47	F			✓			✓			7	7	7			7	7			130/90	57
13			O	50	F	456		✓	✓		✓			7	7	7	28	28	7	7			165/90	56
14			O	55	F	295		✓	✓		✓			14	7	7							130/80	30
15			O	90	F	-	✓	✓			✓			21	7	7				7	5	-	110/70	61
16		"	O	34	F				✓		✓					7	28	28	7	7			105/70	50
17		"	O	58	F						✓					7	28	28	7	7	5		110/70	73
18			O	45	M			✓	✓		✓			7	7	7			7	7			120/80	63
19			O	45	F	258		✓	✓		✓			7	7	7	42	28	7	7	5		100/70	33
20			O	63	F			✓	✓		✓		(1)	-					7	7	5		90/60	-
21		"	O	55	M			✓	✓		✓			7	7	7			7	7	5		120/80	51
22		"	O	57	F						✓			7	7	7	21	-	7	7			135/80	57
23			O	68	M	-		✓			✓			7	7	7			7	7	5		150/80	-
24		"	O	65	F			✓			✓								7	7	5		120/80	-
25			O	42	M			✓	✓		✓			7	7	7	21		7	7	8		135/80	85
26		"	O	50	M			✓	✓		✓			7	7	7	7		7	7			150/100	52
27			O	55	F	525		✓	✓		✓			21	7	7	42		7	7			120/80	68
28			O	45	F	143		✓	✓		✓			7	7	7	14		7	7			120/80	65
29		ZN	O	95	F	-		✓			✓			14	7	7	-		7	7			120/80	63
30			O	95	F	-		✓			✓			7	7	7			7	7			125/80	55
31		"	O	59	F	-		✓			✓			7	7	7			7	7			110/70	54
32		"	O	43	F	-					✓			7	7	7			7	7			110/70	51
33		"	O	55	F	84		✓			✓			7	7	7	7		7	7			110/70	57
34		"	O	63	F	140		✓	✓		✓													

SR No	Name	Address	OLD / NEW	AGE (Yrs)	M / F	RBS	CVA	HCT	DM	OTHER. Cl
35	[illegible]	[illegible]	O	45	F	-		✓	✓	
36	[illegible]	"	O	41	F			✓		
37	[illegible]	[illegible]	O	57	F			✓		
38	[illegible]	"	O	58	M			✓	✓	
39	[illegible]	[illegible]	O	78	P			✓		
40	[illegible]	"	O	57	F			✓	✓	
41	[illegible]	"	O	36	P	182		✓	✓	
42	[illegible]	[illegible]	O	58	P			✓	✓	
43	[illegible]	[illegible]	O	72	M			—	—	
44	[illegible]	[illegible]	O	70	P	302		✓	✓	
45	[illegible]	"	O	62	M	-		✓	✓	
46	[illegible]	"	O	50	M			✓	✓	
47	[illegible]	"	O	69	M			✓		
48	[illegible]	"	O	53	F	183		✓	✓	
49	[illegible]	"	O	43	F			✓	✓	
50	[illegible]	"	O	41	P			✓	✓	
51	[illegible]	[illegible]	O	69	F			✓	✓	
52	[illegible]	"	O	65	F			✓	✓	
53	[illegible]	[illegible]	O	65	F			✓	✓	

"21.2.2018"

1	[illegible]	[illegible]	O	58.	F.	
2	" [illegible]	[illegible]	O	57	F.	
3	" [illegible]	[illegible]	O	36.	F.	
4	[illegible]	"	O	72	M	
5	[illegible]	"	O	70	F.	
6	" [illegible]	[illegible]	O	54	F.	
7	" [illegible]	[illegible]	O	53	F.	
8.	[illegible]	[illegible]	O	59.	M.	
9	[illegible]	"	O	50	P.	
10.	[illegible]	"	O	50.	M	

10-20/20-40	75 or Above	25 Gluc	Amlodip	Ecosprin	Amaryl	Metsprin	Glicizid	Multi.	B1	Groxi	BMI	B.P	B.Suger
			7			21		7	7			100/70	58
			7					7	7			120/80	60
			7					7	7			110/70	71
			7	7	7			7	7			120/80	74
			7	7	7	42	28	7	7			110/80	63
			7	7	7				7.			135/80	90
			14	7	7			7	7			140/90	72
			14	7	7	42		7	7			120/80	61
			7	7	7	21	-	7	7			140/80	52
			-	-				7	7			160/90	64
			7	7	7	21	14	7	7			130/80	84
			7	7	7	28	28	7	7			-	-
			7	7	7	21	21	7	7				
			7	7	7			7	7			130/80	55
			7	7	7	14	-	7	7			160/100	88
			7	7	7	14		7	7			170/100	82
			7	7	7	14		7	7			120/80	68
			7	7	7	21		7	7			130/80	67
			7	7	7	14		7	7			140/80	68
			7	7	7	21		7	7				
			378	301	315	728	217	322	385				
				7	7	21						120/70	60
				7	7							-	
				7	7	42						-	
							7					-	
								7		4.		110/60	36.
				7	7							130/80.	59.
				7	7	28.						140/70	58.
				7	7							100/70.	45.
				7	7	28.						120/80	56
												120/80	84.

SR NO	Name	Address	O/N	AGE (YRS)	M/F	RBS	CVA	H/T	D/M	OTHER	LOC
11	[illegible]	[illegible]	O	50	F	188					
12	" [illegible]	"	O	69	F						
13	" [illegible]	"	O	47	F						
14	" [illegible]	"	O	50	F						
15	" [illegible]	"	O	54	F						
16	" [illegible]	"	O	62	F						
17	" [illegible]	[illegible]	O	55	F						
18	" [illegible]	[illegible]	O	60	F						
19	" [illegible]	[illegible]	N	65	F			H			
20	[illegible]	"	O	71	M						
21	[illegible]	[illegible]	O	46	F						
22	[illegible]	[illegible]	O	62	M	304					
23	[illegible]	[illegible]	O	56	F						
24	" [illegible]	[illegible]	O	65	F						
25	" [illegible]	"	O	60	F						
26	" [illegible]	"	O	58	F						
27	" [illegible]	"	O	34	F						
28	[illegible]	[illegible]	O	68	M						
29	[illegible]	"	O	65	F						
30	" [illegible]	"	O	62	F						
31	" [illegible]	"	O	47	F						
32	" [illegible]	[illegible]	O	45	F						
33	" [illegible]	"	O	65	F	Hi					
34	" [illegible]	"	O	45	F	92					
35	" [illegible]	"	O	58	F	204					
36	[illegible]	[illegible]	O	41	M						
37	[illegible]	"	O	41	F	231					
38	[illegible]	[illegible]	O	62	F						
N39	[illegible]	[illegible]	N	58			✓				
N40	[illegible]	[illegible]	N	32	F	210			✓		
N41	[illegible]		N	49		285			✓		
N42	[illegible]	[illegible]	N	80		199		✓			
N43	[illegible]	[illegible]	N	45		117		✓			
N44	[illegible]	[illegible]	N	76		102		-	-		

0-20%	20-70%	70%↑	28% Gluco	Analog	Ecotrin	Monovin	Metfor	Glicla	Multi	B.			B.P.	Bwt
					7	7	21						-	-
					7	7							120/70	50.
					7	7							110/70	60.
					7	7							120/80	58.
					7	7							130/80	45.
						7.	28.						140/80	60
					7	7			7.				150/90	59.
					7.	7	42						140/90	68.
					7	7			7.				150/100	45 Kg
													120/80	74
					7	7			7.				-	-
						7.	21.		7					
					7	7	28.		7.				120/80	60.
					14.	14	28.		14	(Jvafan.)			110/60	50.
					14	14	28.		14	(").			150/90	76
					7	7	42		7.	7.			100/70	56.
						7	28.		7	7			-	-
						7	28.		7				120/90	60.
					7	7			7	7.			-	-
									7.	7			160/100	74.
					7	7	14		7				140/90	56
					7	7			7.				120/80	65.
						7	14.		7	7			90/60	55.
					7	7	28		7				120/80	58.
						7	21		7				130/90	60.
					7	7	21		7.				120/80	73.
					14	14			14.	14	(Jvafan)		120/80	64.
					14	14	56.		14	14.	(Jvafan)		120/70	51.
						14	8.		14.		(Jvafan)		150/100	[illegible]
					14	14							120/80	
													130/90	
													180/80	
													160/100	
													130/90	

SR No	Name	Address	O/N	Age (yrs)	M/F	RBS	CNA	H/T	D/M	OTHER	10%
N 45	[illegible]	[illegible]	N	68	M	103		-	-		
N 46	[illegible]	[illegible]	N	70	F	98		-	-		
N 47	[illegible]	[illegible]	N	42	M	140		✓			
N 48	[illegible]	[illegible]	N	45	F	118		✓			✓
N 49	[illegible]	[illegible]	N	70	F	137		✓			✓
N 50	[illegible]	[illegible]	N	43	M	197		✓			
N 51	[illegible]	[illegible]	N	45	M	101		-	-		
N 52	[illegible]	[illegible]	N	40	F	150		-	-		
N 53	[illegible]	[illegible]	N	45	F	119		-	-		
N 54	[illegible]	[illegible]	N	58	F	228		✓	✓		
N 55	[illegible]	"	N	43	F	416		✓	✓		
N 56	[illegible]	[illegible]	N	66	F	124		✓			✓
N 57	[illegible]	[illegible]	N	56	M	102		✓			
N 58	[illegible]	[illegible]	N	52	F	122		✓			✓
N 59	[illegible]	"	N	71	M	127		✓			
N 60	[illegible]	[illegible]	N	57	F	448		✓	✓		✓
N 61	[illegible]	[illegible]	N	63	M	311		✓			
N 62	[illegible]	[illegible]	O	61	F	261		✓	✓		
N 63	[illegible]	[illegible]	N	57	F	150		✓			
N 64	[illegible]	[illegible]	N	62	F	89		✓			
N 65	[illegible]	[illegible]	N	70	F	128		✓			
N 66	[illegible]	[illegible]	N	53	M	187		✓			
N 67	[illegible]	[illegible]	N	63	F	411		✓			
N 68	[illegible]	[illegible]	N	72	M	136		✓			

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1	[illegible]	[illegible]	O	71.	M.			✓		
2	[illegible]	[illegible]	O	71	F.			-	-	
3	[illegible]	[illegible]	O	68.	M.			✓		
4	[illegible]	"	O	65.	F.			✓		
5	[illegible]	[illegible]	O	51	F.			✓	✓	
6	[illegible]	"	O	48	F.			✓	✓	
N 7	[illegible]	[illegible]	N	35.	F.	430.		✓	✓	

10-20%	20-30%	30% >	Gluco	Amlo 5	Ecosprin	Atorva	Metfor	Glucla	Multi	S.	B.P	Sug:
					-						120/80	72
											130/80	56
											150/100	89
				14	14	14					160/100	58
				14	14	14					170/100	88
	✓			14	14	14					180/100	
				14	14	14					190/100	
✓											130/80	
											140/90	
✓				14	14	14					160/100	
✓				14	14	14					150/90	
✓				14	14	14					150/100	
✓				14	14	14					140/90	
	✓			14	14	14					160/100	
	✓			14	14	14	28				150/100	
✓				14	14	14					160/110	
	✓			14	14	14					180/120	
	✓			14	14	14					160/110	
	✓			14	14	14	42	28			200/130	
	✓			14	14	14					180/110	
				266	196	546	681	63	189	63	170/	

			14.	7	7		0	7			
								10.	10.		
			7	7	7			10	10		120/80 59kg
			7					7			
			7	7	7	42		7			100/60 55kg
			7	7	7	28		7			140/100 60kg
			7		7	42		7			110/80 [illegible]

SR NO	Name	Address	O/N	Age (Yrs)	M/F	R.B.S	DISEASE CVA	H/T	D/M.	OTHER	<10%
N/8	ဒေါ်ဟဘ	ကုန်းကတ်	N.	76	F			✓			
9	ဒေါ်ပြည့်မြေ	ကုန်းကတ်	O.	63	F			-	-		
10	ဦး သန်း ထွန်း	"	O	59	M.			✓			
11	ဒေါ်ဝေးသန်း / ဖိုး	"	O	65	F			✓	✓		
12	ဟဘွဲ့	"	O	69.	F			✓			
13	ဦး အိုး ဝင်း	"	O	58.	M.			✓	✓		
14	ဟ သင်း	ဝါကတ်ကြီး	O	58	M.			✓	✓		
15	ဒေါ်သန်း ဝင်း	"	O	56	F.			✓			
16	" အေး ဇင်	ဘ. ဘ. ရ	O	62.	F.			✓	✓		
17	" ခေ သွဲ	ကုန်းကတ်	O	60.	F.			✓	✓		
18	" သန်း ဦး	ဘ. ဘ. ရ	O	47	F			✓			
19	" ဆွဲ ဖြိုး	NM	O	56	F			✓			
20	" ဦး ဦး	ကုန်းကတ်	O	41	F			✓	✓		
21	ဦး ဇော်ဝေ	"	O	41	M			✓			
22	ဒေါ်သော် သန်း	ကုန်းကတ်	O	65	F			✓			
23	ဒေါ်ဝေ	"	O	56	F			✓			
24	ဖြိုး ဝင်း	"	O	55	F.			✓	✓		
25	ဦး ဝဏ္ဏ ဝိဿ	ကုန်းကတ်	O	50	M.			✓	✓		
26	" ဝင်းမြင့်	ကုန်းကတ်	O	53	M			✓			
27	ဦး ဇော် ဝင်းမြင့်	ကုန်းကတ်	O	-	M			✓			
28	ဒေါ်သောင်းဆက်	ကုန်းကတ်	O	65	F			✓	✓		
29	" ခင်မိုး	"	O	45	F			✓			
30	" ခင်မာ	"	O	57	F			✓			
31	ကဗျာ ဝင်း	"	O	63	F			-	✓		
32	" ခင်မိုး	"	O	58	F			✓	✓		
33	" ခင်မိုး	"	O	76	F			✓	✓		
34	" ခေ ခင်မိုး	ခေ ကုန်းကတ်	O	58	F			✓	✓		
35	ဦး ကျော်ဇော	ကုန်းကတ်	O	72	M			.			
36	ဒေါ်သင်း ဖြိုး	ကုန်းကတ်	O	70	F			✓	✓		

IVA RISK <10-20	20-30	30% >	Strip Lancet	Analog	Exacp	Actrapid	Mixtard	Glicla	Multi	B1		B.P.	Body Wt. Kg.
				7.							7.	170/80	30 Kg
			Brominex (14) Cobin (14) Metrohol (14)			7	P-cefcer (14)		7.	7.		90/60	36 Kg.
				7	7	7						120/80.	46 Kg
				7	7	7	14		7	7		120/80	
				7	7	7			7	7		140/100	50Kg
				7	7	7			7.			+2.	5.
				21	7	7	21.		7			-	-
				7	7	7	42					-	-
				7	7	7			7.			160/120.	76.
				42.	14	14	28.					160/100	76.
				14	14	14	84		14	14		140/110.	55
				14	14	14.			14			150/110	
				14.	7	7			7	7.			
				7	7	7	28.		7	7.		120/100	
				7	7	7			7	7		40/40	55 Kg
				7		7			7			110/80	62 Kg
				7	7	7			7	7		140/80	54 Kg
				21	7	7	42.		7			-	-
				7	7	7	28.		7	7.		-	80.
				14	14	14	56.		14	14.		-	-
				7		7	-					-	-
				7	7	7	28		7	7		-	57 Kg
				7		7	21		7	7.			
				14	7	7			7				54 Kg
						7	4.		7				59 Kg
				7	7	7	21.		7.				
				7	7	7	42						
				7	7	7	21						
									14	14			
				7	7	7	28.						
				329	210	252	550		241	189			

SR No	Name	Address	OLD / NEW	AGE (YR)	M / F	RBS	CVA	BCT	DRM	OTHER < 10
35	[illegible]	[illegible]	O	45	F	-		✓	✓	
36	[illegible]	"	O	41	F			✓		
37	[illegible]	[illegible]	O	57	F			✓		
38	[illegible]	"	O	58	M			✓	✓	
39	[illegible]	[illegible]	O	78	F			✓		
40	[illegible]	"	O	57	F			✓	✓	
41	[illegible]	"	O	36	F	182		✓	✓	
42	[illegible]	[illegible]	O	38	F			✓	✓	
43	[illegible]	[illegible]	O	72	M			-	-	
44	[illegible]	[illegible]	O	70	F	302		✓	✓	
45	[illegible]	"	O	52	M	-		✓	✓	
46	[illegible]	"	O	50	M			✓	✓	
47	[illegible]	"	O	69	M			✓		
48	[illegible]	"	O	53	F	183		✓	✓	
49	[illegible]	"	O	43	F			✓	✓	
50	[illegible]	"	O	41	F			✓	✓	
51	[illegible]	[illegible]	O	69	F			✓	✓	
52	[illegible]	"	O	65	F			✓	✓	
53	[illegible]	[illegible]	O	68	F			✓	✓	

"21.2.2018"

1	[illegible]	[illegible]	O	58	F	
2	" [illegible]	[illegible]	O	57	F	
3	" [illegible]	[illegible]	O	36	F	
4	[illegible]	"	O	72	M	
5	[illegible]	"	O	70	F	
6	" [illegible]	[illegible]	O	54	F	
7	" [illegible]	[illegible]	O	53	F	
8	[illegible]	[illegible]	O	59	M	
9	[illegible]	"	O	50	F	
10	[illegible]	"	O	50	M	

10-20/20-40	75 or Glucose	25 Amylase	Eosinophil	Amylase	Multiplasm	Glucosed	Malt	B1	Growth	BMI	B.P	B.Sugar
		7			21		7	7			100/70	52
		7					7	7			120/80	60
		7					7	7			110/70	71
		7	7	7			7	7			120/80	74
		7	7	7	42	28	7	7			110/80	63
		7	7	7				7			135/90	96
		14	7	7			7	7			130/80	72
		14	7	7	42		7	7			100/60	61
		7	7	7	21	-	7	7			140/80	52
		-	-				7	7			100/70	64
		7	7	7	21	14	7	7			130/80	84
		7	7	7	28	28	7	7			-	-
		7	7	7	21	21	7	7			-	-
		7	7	7			7	7			130/80	55
		7	7	7	14	-	7	7			120/80	88
		7	7	7	14		7	7			100/70	82
		7	7	7	14		7	7			120/80	68
		7	7	7	21		7	7			130/80	67
		7	7	7	21		7	7			140/90	68
		378	301	315	728	217	322	336				
			7	7	21						120/70	60
			7	7							-	
			7	7	42						-	
						7					-	
							7		4.		110/60	36.
			7	7							130/80.	59.
			7	7	28.						140/70	58.
			7	7							100/70.	45.
			7	7	28.						120/80.	56
											120/80	84.

SR NO	Name	Address	O/N	AGE (YRS)	M/F	RBS	CVA	H/T	D/M	OTHER	<10%	10-20%	20-30%	30% >	Ethico	Analog	Exogrp	Mixtard	Mettpr	Glucla	Mulki	B1			B.P.	Bwt
11	[illegible]	[illegible]	O	58	F	188											7	7	21						-	-
12	- [illegible]	"	O	69	F.												7	7							120/70	50.
13	- [illegible]	"	O	47	F												7	7							110/70	60.
14	- [illegible]	"	O	50	F												7	7							130/80	58.
15	- [illegible]	"	O	54	F.													7.	28.						130/80	45.
16	- [illegible]	"	O	62	F.												7	7.			7.				140/80	10
17	- [illegible]	[illegible]	O.	55	F.												7.	7	42.						150/90	59.
18	- [illegible]	[illegible]	O.	60	F												7.	7			7.				140/80	48.
(19)	- [illegible]	[illegible]	N.	65	F			N									7	7							150/100	45Kg
20	[illegible]	"	O	71	M													7.	21.		7				120/80	74
21	[illegible]	[illegible]	O	46	F.												7	7	28.		7				-	-
22	[illegible]	[illegible]	O	62	M	304											14.	14	28.		14	(Jodan.			120/80	60.
23	[illegible]	[illegible]	O	54	F												14	14	28.		14	("	).		110/60	50.
24	- [illegible]	[illegible]	O	65	F												7	7	42		7.	7.			150/90	76
25	- [illegible]	"	O	60	F													7	28.		7	7			100/70	56.
26	- [illegible]	"	O	58.	F.													7.	28.		7				-	-
27	- [illegible]	"	O	34	F												7	7				7.	7.		120/90	60.
28	[illegible]	[illegible]	O	68	M																7.	7			-	-
29	[illegible]	"	O	65	F												7	7	14		7				160/100	74.
30	- [illegible]	"	O	62	F												7	7			7.				140/90	56
31	- [illegible]	"	O	47	F													7	14.		7	7			120/80	65.
32	- [illegible]	[illegible]	O	45	F												7	7	28		7				90/60	35.
33	- [illegible]	"	O	65	F	Hi												7	21		7				120/80	58.
34	- [illegible]	"	O	45	F	92											7	7	21		7.				130/90	60.
35	- [illegible]	"	O	58.	F.	204.											14	14			14.	14	(Jodan)		120/80	73.
36	[illegible]	[illegible]	O	41	M												14	14	56.		14	14.	(Jodan)		120/80	64.
37	[illegible]	"	O	41	F	231												14	8.		14.		(Jodan)		120/70	51.
38	[illegible]	[illegible]	O.	62	F.												*	14	14						150/100	71
N39	[illegible]	[illegible]	N	68				✓																	120/80	
N40	[illegible]	[illegible]	N	32	F	210			✓																130/90	
N41	[illegible]		N	49		285			✓																180/80	
N42	[illegible]	[illegible]	N	80		199		✓																	160/100	
N43	[illegible]	[illegible]	N	45		317		✓																	130/80	
N44	[illegible]	[illegible]	N	76		102		-	-																	

SR No	Name	Address	OIN	Age	M/F	RBS.	DISEASES			
							CVA	HCT	OLM	OTHER
			0	75.	F	124		✓		
			0	55	F.	158.		✓	✓	
			0	62	F	127.		✓	✓	
			0	47	F	-		✓		
			0	65	F.	-		✓	✓	
			0	60	F.	220		✓	✓	
			0	59.	F.	223		✓	✓	
			0	45	F	82				
			0	42	F.	88.				
			0	55.	F.	284				
			0	52	F.	364				
			0	68.	M.	-				
			0	65	F.	-				
			0	53	F.	-				
			0	41	F	175.				
			0	41	M	-				
			0	34	F.	200.				
			0	63	F.					
			0	58	F.	240				
			0	70.	F.	195.				
			0	58	M.	94.				
			0	63	F.					
			0	51	F.	294.				
			0	48.	F.	330.				
			0	45.	F.	100				
			0	56	F.					
			0	58	F.					
			0	75	F.					
			0	57	F.					
			0	36	F.					
			0	58	F.					
			0	72	M.					

CLVP.	10-20/20-30	30/.	ESR	Lenad Steps	Amlo	ECO	Atno	Metx	Gluc	Mint	B1	B6	B.P.	Bwt.
				1/1	7.	7		21.		7.			140/80.	69.
				1/1	14	7	7	42	28.	7.			160/90.	66
				1/1	42	14	14.	28		7			150/100.	75.
				-	14.	14.	14.			14.			130/90.	56
				-	14	14	14	28.		7.			100/70.	48
				1/1	7	7	7	42	14.	7.			160/00	75.
				1/1	7	7	7	21.	14	7.			120/80.	50.
				1/1	7	7		14		7.			100/70.	88.
				1/1									120/80.	65.
				1/1	21.	7	7	42	28.	7.			120/80	63.
				1/1		7	7.	35	14	7			120/80	-
				1/1	14	14	14			14			-	-
					14					14			150/90.	55.
					7	7	7	14	56	7			110/80	63
				1/1	14	14	14			14			120/80	74.
				-	14	14	14.			14.			110/80	62
				1/1	.		7.	28.	28.					
							7	4.		7.			100/70	60
					7	7	7	21	14	7			140/80.	50.
					7	7	7.	28.	28	7			160/90	89
				Betamed (10)	7	7	7	21.	28.	7.			90/60	37.
					Bromine (7). Betamed (10). MOM (7).								100/80.	54.
					7	7	7.	.	42.	7			140/80	10.
					7	7	7	28.	28.	7.			40/70.	67
							7	14					120/80	72.
					14	4	14		4					
					14	14	14.	84	56.					
					14	7	7						160/60	-
					14	7	7							
					7	7	7	42						
					7	7	7	21.						
										7	7			
					539	406	420	809	497	189	I	I		

SR No	Name	Address	OIN	Age	M/F	RBS.	DISEASES			
							CVA	HCT	OLM	OTHER
			0	75.	F	124		✓		
			0	55	F.	158.		✓	✓	
			0	62	F	127.		✓	✓	
			0	47	F	-		✓		
			0	65	F.	-		✓	✓	
			0	60	F.	220		✓	✓	
			0	59.	F.	223		✓	✓	
			0	45	F	82				
			0	42	F.	88.				
			0	55.	F.	284				
			0	52	F.	364				
			0	68.	M.	-				
			0	65	F.	-				
			0	53	F.	-				
			0	41	F	175.				
			0	41	M	-				
			0	34	F.	200.				
			0	63	F.					
			0	58	F.	240				
			0	70.	F.	195.				
			0	58	M.	94.				
			0	63	F.					
			0	51	F.	294.				
			0	48.	F.	330.				
			0	45.	F.	100				
			0	56	F.					
			0	58	F.					
			0	75	F.					
			0	57	F.					
			0	36	F.					
			0	58	F.					
			0	72	M.					

CLVP.	10-20/20-30	30/.	ESR	Lenad Steps	Amlo	ECO	Atno	Metx	Gluc	Mint	B1	B6	B.P.	Bwt.
				1/1	7.	7		21.		7.			140/80.	69.
				1/1	14	7	7	42	28.	7.			160/90.	66
				1/1	42	14	14.	28		7			150/100.	75.
				-	14.	14.	14.			14.			130/90.	56
				-	14	14	14	28.		7.			100/70.	48
				1/1	7	7	7	42	14.	7.			160/00	75.
				1/1	7	7	7	21.	14	7.			120/80.	50.
				1/1	7	7		14		7.			100/70.	88.
				1/1									120/80.	65.
				1/1	21.	7	7	42	28.	7.			120/80	63.
				1/1		7	7.	35	14	7			120/80	-
				1/1	14	14	14			14			-	-
					14					14			150/90.	55.
					7	7	7	14	56	7			110/80	63
				1/1	14	14	14			14			120/80	74.
				-	14	14	14.			14.			110/80	62
				1/1	.		7.	28.	28.					
							7	4.		7.			100/70	60
					7	7	7	21	14	7			140/80.	50.
					7	7	7.	28.	28	7			160/90	89
				Betamed (10)	7	7	7	21.	28.	7.			90/60	37.
					Bromine (7). Betamed (10). MOM (7).								100/80.	54.
					7	7	7.	.	42.	7			140/80	10.
					7	7	7	28.	28.	7.			40/70.	67
							7	14					120/80	72.
					14	4	14		4					
					14	14	14.	84	56.					
					14	7	7						160/60	-
					14	7	7							
					7	7	7	42						
					7	7	7	21.						
										7	7			
					539	406	420	809	497	189	I	I		

4.4.2018

SR No	Name	Address	O/N.	Age.	M/F	RBS.	DISEASES	<10%	10%-20	20%-30	30%	Amlodip	Ecosp	Atorv	Metf	Glicla	Multi	Bi.	Bc.	MOM.	B.P	Wt.
	ဒေါ်မေမြင့်	ဘောဂိတ်ကုန်း	O	58	F	112						7	7	7	21		7.				140/90	60Kg.
	" စိန်ဝင်း	ကရင်အာဏာ	O	71	F							7		7	21		7	Bcomplex ⑦.			120/80	40Kg.
	" နွဲ့ဝင်း	ရွာ/ကြီး	O	47	F							7		7	21		7				—	—
	" မြစိုးမိုး	ကုန်းကွင်း	O	48	F							7	7	7	28	14	7				140/90	57Kg
	" စန်းဦး	"	O	51	F							7	7	7	28	28	7				140/80	55Kg
	" ဘုန်းမိုး	ကရင်အာဏာ	O	71	F							7	7	7	42	28	7				110/70	35Kg
	" ဒေါ်ဝင်း	ကုန်းကွင်း	O	69	F												7	7	7	7	150/100	50Kg
	" ထွေးဦး	ကုန်းကွင်း	O	58	F							7	7	7			7	Bcomplex ⑦.			—	—
	" မမြဝင်း	"	O	34	F							7		7	28		7				120/90	61
	" ဒေါ်အိမ်ဆောက်ဦး	"	O	34	F									7	28	28	7				120/90	61
	" ဒေါ်ဦးဝင်း	ကံကလေး	O	35	F	180						7	7		21		7				130/80	55
	" ဒေါ်သင်း	"	O	40	F	227						7	7	7	14		7	Gelmi 7.			140/90	55
	" ဦးကြည်	ကုန်းကွင်း	O	58	I							7	7	7			7				140/80	59
	" စန်းမြ	"	O	62	I							7	7	7			7	Bcomplex ⑦.			—	—
	ဦးအိုင်းဝင်း	"	O	58	M							14	7	7	21	28	7				100/70	35.
	ဒေါ်ပြည့်ဖြိုး	"	O	63	F									7			7	?	Bcomplex ⑦		130/80	52
	" စန်းမြ	"	O	51	F	292						7	7	7	21.	28.	7				110/70	55
	" ဆန်းဦးမိုး	ဘ.ဘ.ရ	O	47	F							7	7	7			7				—	—
	" ခင်ဝင်းမြ	"	O	62	F							21	7	7	14		7				120/80	53
	" သန်းမေမိုး	ကုန်းကွင်း	O	50	F								7	7	28.	28.	7	7.			110/70	46
	ဦးသန်းဆွေ	"	O	59	M							7.	7	7			7				—	—
	ဦးဆောင်းဝေ	"	O	62	M							7	7	7	28	28.	7				150/100	78.
	ဒေါ်ခင်မိုးမေ	ကရိအာဏာ	O	76	F	278						7	7	7	42	14	7				—	—
	" ခေမာမွန်	ကုန်းကွင်း	O	57	F							14	7	7			7				—	—
	ဦးကောင်းခိုင်	ကရိအာဏာ	O	72	M												7	7.	Bcomplex ⑦.		—	—
	ဦးဘန်ဦး	ဝေကောင်ကြီး	O	58	M							14	14	14	84.	56	14		(Juafen)		—	—
	ဒေါ်သန်းဝင်း	"	O	56	F							14	14	14	56	28	14				—	—
	" နုမာဘုန်	ဘယ်ကျိုင်း	O	52	F							14		7			14				—	—
	ဦးဖိုးကြိုင်	ဘ.ဘ.ရ.	O	68	M							7		7	21		7		Z		120/80	57
	ဒေါ်မွန်မြ	"	O	65	F							7	7	7			7		Bcomplex ⑦		120/8	69.
	" ခိုင်ခိုင်	ကုန်းကွင်း	O	41	F							7		7			7		Bcomplex ⑦.			
N.	" ဒင်္ဂါခိုးကဝေ	ဘယ်ကျိုင်	N	46	F	116						7	7	7	28.	28.	7		Bcomplex ⑦.		110/100	57
	ဦးကောဆွေ	ကုန်းကွင်း	G	41	M							14	7	7			7				160/100	57.
	ဦးတွင်း	ကုန်းကွင်း	O	71	M							7	7	7			7		Bcomplex ⑦			
	ဒေါ်သန်းခိုင်	"	O	46	F							14	7	7			7					
												7		7	14		7				140/70	56

| ဝင်ငွေခွန် | အသားတင်ငွေ | အသားတင်ငွေ | ကုန်ကျစရိတ် | ကုန်ကျစရိတ် | အကြွေးရောင်းရငွေ | ငွေသားရောင်းရငွေ | ရောင်းရငွေစုစုပေါင်း | ရောင်းရငွေစုစုပေါင်း | ရောင်းရငွေစုစုပေါင်း

25.4.2018

Sr No	Name	Address	OLD / New	AGE	M / F	RBS	DISEASES CVA	HT	DM	other	<10
1			N	69	F	112		✓			
2			O	58	M			✓			
3			O	51	F	211		✓	✓		
4			O	57	F	172		✓	✓		
5			O	56	F	212		✓	✓		
6			O	72	F	254		✓	✓		✓
7			O.	60.	M.	236		✓	✓		✓
8			O	50	F	309.		✓			✓
9			O		F	-		✓			
10			N	52	F	185.		✓			
11			O.	51	F.	230.		✓	✓		✓
12			O.	50	F.	274.		✓	✓		
13			O	73	F						
14			O	55	F.						
15			O	66	M.	265.		✓	✓		
16			O	65.	F.	92					
17			O.	53	F	78.					✓
18			O.	58	F.	345.					
19			O	71	M						✓
20			O	56.	F.						✓
21			O	65	F.						✓
22			N	60.	F.	94.					✓
23			O	62	F.	285.					✓
24			O.	56.	F.						✓
25			N	59.	F.	119.					✓
26			O	45	F	116					✓
27			O	47	F.	248.				✓	✓
28			O	45.	F.	107					✓
29			O	50.	F.	157					✓
30			O	50	M	303					✓
31			O	47	F	107					✓
32			O	54	F.	394					✓
33			O	65	F.						✓
34			O	68	M						✓

8105-A-78

CVA Risk 10-20	20-30	<10	strip	lancet	Ankle	Finger	Arm	Neck	Chest	Multi.	Ht.	Pulse	BMI	B.P	B wt 1k
	✓		✓	✓	14	7	7					7	22	120/90	40
	✓		✓	✓	7	7	7					7	18	160/90	108
		✓	✓	✓	7	7	7	21				7	25	170/80	158
		✓	✓	✓	14	7	7	42	28			7	26	140/70	126
		✓	✓	✓	7	7	7	21	14	7		7	25	170/100	120
		✓	✓	✓	14	7	7	14	-	-		7	30	-	184.
		✓	✓	✓	14	14	14.	56	60.		5.6	14.		110/70.	129.
		✓	✓	✓	7	7	7	28.	28.			7	25	120/70.	130
		✓	✓	✓	7	7	7	(I/V 25% + B6)				7	30	160/100.	144.
		✓	✓	✓	28	14	14			14	5.		28.	110/70.	124.
✓		✓	✓	✓	7	7	7	42	28	7	4.10"		26.	160/100.	132
		✓	✓	✓	7	7	7.	28.			4.11"		28	-	-
	✓				one	inj	tab.	Gel	10	Vidapet	10	-		150/90.	120.
✓					7	7	7			7	4.9"		25.	160/90	194.
	>40%	✓	✓		21	7	7.	21	28.		5.2	7.	31.	90/60	82
		✓	✓	I/V	25%	Glucose	+B1	+Gel.	7	tab.	4.8"	7		120/80	122.
		✓	✓		17	7	7	14	7	7	4.11"			110/70.	130
		✓	✓		14	14	14	42.		14.	4.11"		27.	140/80	152
✓						14	7	7		7.	5.5"		28.	120/70	142
						7	7	7		7.	5'		24.	110/60	124
				I/V	25%	Gluco	+ B1	+ B12					32.	130/80	152
				ATT.	①	stat.	Amplox	+ Dexa	+ Dicla	+ cvit.	4.11"		22	110/70.	110.
		✓	✓		7		7	28.	7	7	5.		29.	130/80.	148.
					14	7	7			7	5.4			110/60.	130
				I/V	25%	Glucose	+ B1	+ B12	Para - 10;	B1 - 10	Cetri.	14	4.11"	100/70	144
		✓	✓			7	7	28		7	5.1"			130/90.	112
		✓	✓		14	14	14	56	28.		4.11"		23	100/70	128.
					7		7	14.			4.11"		27.	120/80.	154.
					7	7	7	21		7.	5.		30	130/90	184
					7	7	7	28.		7	5.5"		30.	120/80	140.
					14	14	14.			14.	5.4"		24.	130/90	140.
					14	14	14.	56.	56.	4.	5.2"		26.	120/80.	135
					14					4.	5.		26.	140/80	126
					14	14	14			14.	5.3"		28		

25.4.2018

SR No	Name	Address	OLD/ NEW	AGE (YR)	M/ F	RBS	DISEASES CVA	HT	DM	OTHERS	CVD <10%	CVA RISK 10-20%	20-30%	>30%	Asthma	Bronch	Arm	Mouth	Cheek	Mouth	B:	Ht.	BMI	BP	B.wt
35	ေဒၚ[illegible]	[illegible]	O	70.	F						✓						14.	7	7			7.		5'. 2		130/80	106
36.	" [illegible]	"	O	65.	F.	296																		5'.1"	32	170/100	170
37	" [illegible]	[illegible]	O	62	F	99												14	14	84.	28	14.		5'.8"		140/100	168
38	" [illegible]	"	O	47	F.	87											42		14	28.				4'.11"		130/80	128.
39	" [illegible]	[illegible]	O	34	F.	282					✓						14.	14	14.			14.		5'.1"	27.	120/80	134
40	" [illegible]	[illegible]	N.	35.	F	85.					✓								7	28.	28.	7.		5'.2"	27	100/60	148.
41	" [illegible]	[illegible]	O	52	F	218					✓						Para (10) I/V 25% Glucose + B6 + B12					28.	B6.28.	5'.	25.	120/80	128.
42	[illegible]	[illegible]	N	74.	M.	127					✓						Gelnay (10) 14			14	42	14.					
43	[illegible]	"	O	51	F.						✓						I/V 25% Glucose + B6 + B12			B6 - 14 tab.		28		4'.11"	22	120/80	107
43	[illegible]	"	O	54	F	154.					✓							7	7	7	21	28.		-	-	-	-
44	" [illegible]	[illegible]	O	57	F.						✓						✓	✓	14	14	14.	42			5'	26.	140/80	130
45	" [illegible]	[illegible]	O	36	F.	269					✓								14	7	7		7	5'.4"	33	130/80	192
46	" [illegible]	"	O	72	M						✓	✓					✓	✓	7	7	7	42	28.	7		4'.11"	32	150/100	156
47	[illegible]	"	O	50	M						✓										B6	10 tab.		7		-	-	-	-
48	" [illegible]	[illegible]	O	51	M	218					✓								7	7	7	28	28	7		-	-	-	-
49	" [illegible]	[illegible]	O	60	F						✓						✓	✓	7	7	7	28	28	7		-	-	-	-
50	[illegible]	"	O	63	F.						✓								7	7	7	28	28	7		-	-	-	-
51	" [illegible]	"	O	70	M						✓										7	4		7		-	-	-	-
52	[illegible]	[illegible]																	7					7		-	-	-	-

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																	504	336	385	998	487	343.					
1	[illegible]	[illegible]	O	71	F						✓						Gelmax. 14 - B6 - 14. Gelavit. 14 - I/V 25% Glucose +								.21	110/70	81
2.	[illegible]	[illegible]	O	58	F												✓		14.	7	7	42	28.	7			27	160/90	130
3	[illegible]	[illegible]	O	59	M.														7	7	7			7.		5'.6"	19.	130/80.	106.
4.	[illegible]	[illegible]	O	47	F.														7	7	7.	28.	14.	7.		4'.11"	23.	130/80	114.
5	" [illegible]	[illegible]	O	50	F			✓											7	7	7			7.		4'.5"	25.	130/90	128.
6	" [illegible]	"	O	64	F.			✓											7	7	7			7.			30.	130/70	132
7	" [illegible]	"	O	51	F.						✓								7	7	7.	42.	28.	7.			26.	100/70	124.
8	" [illegible]	"	O	50	F.												✓		7	7	7.	28.	28	7			28.	160/100	182.
9	" [illegible]	"	O	65	F.														7	7	7	14		7				110/60	104.
10	" [illegible]	"	O	69	F						✓								7	7	7			7.				100/60	110.
11	[illegible]	"	O	60	M														21	7	7	21	28	7.			31.	160/90	194.
12	[illegible]	"	O	55	F												Tab. B6 (7) Calmag. (7).								7			90/60.	82
13	" [illegible]	"	O	50	F.	155.													7	7	7	21		7	7.		30.	140/90	154.
14	[illegible]	"	O	50	M														7	7	7	28.		7			30	130/90	184

SR	Name	Address	OLD/NEW	AGE	M/F	RBS	DISEASES CVA	H/T	D/M	OTHER	≤10%
15	[illegible]	[illegible]	O	71	M						
16	[illegible]	"	O	55	F	287					✓
17	[illegible]	[illegible]	O	50	M						✓
18	[illegible]	[illegible]	O	41	M						✓
19	[illegible]	"	O	41	F	221					✓
20	[illegible]	[illegible]	O	51	F	347					✓
21	[illegible]	[illegible]	O	56	F						✓
22	[illegible]	"	O	58	M						✓
23	[illegible]	[illegible]	O	56	M	135					✓
24	[illegible]	"	O	46	F						✓
25	[illegible]	"	O	58	M						✓
26	[illegible]	[illegible]	O	45	F						✓
27	[illegible]	"	N	10	F						
28	[illegible]	"	O	57	F						✓
29	[illegible]	[illegible]	O	46	F	320					
30	[illegible]	[illegible]	O	36	F						
31	[illegible]	[illegible]	O	62	F						
32	[illegible]	[illegible]	O	71	F						
33	[illegible]	[illegible]					✓	✓			
34	[illegible]	[illegible]					✓	✓			
35	[illegible]	[illegible]					✓				✓
36	[illegible]	[illegible]					✓	✓			
37	[illegible]	[illegible]					✓				✓
38	[illegible]	[illegible]	O	68	M						✓
39	[illegible]	[illegible]	O	71	F						✓

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1	[illegible]	[illegible]	O	62	F						
2	[illegible]	[illegible]	O	55	M						
3	[illegible]	[illegible]	O	50	M						✓
4	[illegible]	"	O	50	M						
5	[illegible]	"	O	64	M		✓				

CVA RISK 10-20%	20-30%	>30%	Metoprolol	Ecosprin	Rosuvas	Amlodipine	Glibenclamide	Insulin	B1	Height	BMI	BP	Pulse
											25	154	120/70
✓			14	7	7							120/80	122
			21	7	7	42	28	Atenolol (7)		5'.10"	26		
			7	7	7	28	28					110/80	150/80
			Betamed (10)	14	14	14			14			110/80	142
				14	14	14	56	56				140/80	122
			Betamed (10)	14	14	14	42	56				120/70	158
				14	12	14			14	(Jardiance)		—	—
				14	14	14	84	56		(Jardiance)		150/80	119
				7	7	7	7		7			110/70	106
												150/90	140
				42	21	21				21 (Jardiance)		100/70	126
				7		7	14				27		149
										5'.3"			
				14	7	7			7		33	130/80	192
												80/110	
	✓			14	7	7	42		7			150/100	156
✓				7	7	7	42	28	7		32	150/90	132
				7	7	7	21		7		25		
									7	7			
	✓			7	7	7	42	28	7				
	✓			7	7	7	42	28	7				
				7	7	7			7				
✓				7	7	7	42	28	7				
				7	7	7			7				
				28	14	14			14	(Jardiance)		—	—
				14	14	14			14	(Jardiance)			
				872	299	378	356	406	217	35			
	✓			7	7	7	21		7.	5'.	25	150/80	126 lbs.
				7	7	7	21.	14	7.	4'.10"	26	120/70	126 lbs.
	✓			7	7	7	28	28	7.	4'.11"	28	150/100	120 lbs.
✓				7	7	7			7	4'.7"	25	120/80	122 lbs.
				7	7	7			Retained 7.	4'.7"	30.	120/80	120 lbs.

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SR	Name	Address	OLD/NEW	AGE	M/F	RBS	DISEASES					CVA RISK			Strip	lancet												BP	Best
							CVA	H/T	D/M	OTHER	<70%	10-15%	20-30%	70%			Pantop	Ecosp	Amas	Metf	Glida	Multi	B.	Height	BMI				
6	[illegible]	[illegible]	O	51	F.						✓						7	7	7	42	28.	7.		4'.10".	26.			100/70	118 lbs
7	" [illegible]	"	N.	53	M												7	7	7	14	14.	7.		4'.11"				120/70.	140 "
8	" [illegible]	[illegible]	O	52	M.			✓									21	7	7	14	14.	7.		5'.	28.			140/90.	156 "
9	" [illegible]	[illegible]	O.	59	M												28.	14	14			14.		5'.2"	19.			130/80.	108 "
10	[illegible]	[illegible]	O.	58	F.						✓	✓					7	7	7			7.		4'.11"	29.			170/90.	124 "
11	" [illegible]	[illegible]	O	34	"												14	7	7	42.	28	7.		5'.1"	27.			120/80.	136 "
12	" [illegible]	"	O		"														7	28.	28.	7		4'.11"	22.			110/70	110 "
13	" [illegible]	"	O	65	"												7		7	28.	7	7.		5'	24.			110/60	120 "
14	" [illegible]	"	O	55	"						✓						7		7			7		5'.	28.			130/80.	140 lbs.
15	" [illegible]	"	O	69	"						✓						7	7	7			7.		4'.9"				140/100	110 lbs.
16	" [illegible]	[illegible]	O.	65	"						✓						7	7	7			7			26.			110/70	135 lbs.
17	" [illegible]	"	O.	68	M						✓						7					7.	7.	5'.3"	23.			120/70	132 lbs.
18	" [illegible]	[illegible]	O	57	F.			✓			✓						7	7	7			7.	7					130/80.	90 lbs.
19	" [illegible]	"	O	36	"												14	7	7			7		5'.4".	33.			150/100.	156 lbs.
20	[illegible]	"	O.	72	M.												7	7	7	42	28.	7		4'.11"	32				
21	" [illegible]	"	O.	71	"							✓										7	7					130/80.	158 lbs.
22	" [illegible]	"	O	60	"																			5'.5"	25				
23	[illegible]	"	O	65	F.							✓					14	7	7					5'.6"	31			-	-
24	" [illegible]	[illegible]	O	62	"										>40%		21	7	7	21	28.	7						100/60.	80 lbs.
25	" [illegible]	"	O	47	"											tab: Celmeg (7)						7		4'.8".	-			150/90.	168 lbs.
26	" [illegible]	[illegible]	O	50.	"						✓						21	7	7	14.		7.		4'.8".	-			130/80	128 lbs.
27	[illegible]	"	O	50	M						✓						7	7	7			7.		4'.11"				140/90.	154 lbs.
28	[illegible]	[illegible]	O	58	F.						✓						7	7	7	21	7	7		5'	30.			130/90	184 lbs.
29	[illegible]	[illegible]	O.	70	M												7	7	7	28.		7.		5'.5"	30.			100/80	128 lbs.
30	[illegible]	[illegible]	O.	55.	F.						✓						(2wk) 14	14	14	42.		14		4'.11"	27.			130/80	200 lbs.
31	" [illegible]	"	O	46	"						✓						7	7	7	42	28.	10	7.	5'.6"				130/80	120 lbs.
32	[illegible]	"	O	74	M												21	7	7	42	28.	7		4'.10"	26.			120/80	143 lbs.
33	[illegible]	"	O	69	F.													7	7	28.		7.						120/80.	106 lbs.
34	" [illegible]	"	O	65	"			✓	✓															4'.11"	22			120/80	132 lbs.
35	" [illegible]	[illegible]	N	53	"	410.											7	7	7	28	28.	7						150/100	170 lbs.
36	" [illegible]	[illegible]	O	52	"						✓				>40%		14	7	7	42	14	7.						140/90.	130 lbs.
37	" [illegible]	[illegible]	O	70	"												7	7	7.	28.	14.			5'.1"				100/70.	124 lbs.
38	[illegible]	[illegible]	O	50	M												7		7	21.	14.			5'.	25			130/80	106 lbs
39	" [illegible]	[illegible]	O	54	"												7	7	7			7		5'	21			-	-
																	7	7	7	28	28	7						140/90	151 lbs
																	7	7	7	28	28	10.							

SR NO.	Name	Address.	O/N	Age	M/F	RBS	Diseases. CVA	H/T	D/M	Other	CVA <10%	10-20%	Risk 20-30%	>30%	Strip	Lancet	Amlong	Ecosp	Atorv	Metf.	Clacla.	Multi	B.	Height.	BMI.	BP	But..
40	[illegible]	[illegible]	O	63	F.						✓								7	4.		7				-	-
41	[illegible]	"	O	45	F.						✓						7		7	14		7				-	-
42	[illegible]	"	O	53	F.						✓						7	7	7	14		7				-	-
43	[illegible]	"	O	70	F.						✓						7	7	7	28	28.	7.		4'11"		200/130	120
44	[illegible]	[illegible]	N	41	P	320								✓			42	14	14	84	56	14.		5'		140/120	188
45	[illegible]	[illegible]	N	49	P	338											7	7	7	21	7.	7				140/100	
46	[illegible]	[illegible]	N	41		110											7	7	7			7	7				
47	[illegible]	[illegible]	O														7	7	7	21		7	7				
48	[illegible]	"	O														7	7	7	28		7	7				
49	[illegible]	"	O														7	7	7			7	7				
50	[illegible]	"	O														7	7	7			7	7				
51	[illegible]	[illegible]	N														7	7	7	28		7	7				
52	[illegible]	"	O														4	7	7			7	7				
53	[illegible]	"	O														7	7	7			7	7				
																	476	322	364	854	483	370	84				

SR NO.	Name	Address.	O/N	Age	M/F	RBS	Diseases. CVA	H/T	D/M	Other	CVA. <10%	10-20%	Risk 20-30%	>30%	strip	lancet.	Amlodj	Losap	Atorv	Metf.	Glicla	Multi	Bi	Height.	BMI.	BP	But..
40	ဆီးရပြည့်	ကုလားတန်း	O	63	F						✓								7	4.		7				-	-
41	" ခင်ခင်ဝင်း	"	O	45	F						✓								7	14		7				-	-
42	" မိုးမြေ့ကြည်	"	O	53	F						✓						7	7	7	14		7				-	-
43	" ခေမာ ဆွတ်	"	O	70	F						✓						7	7	7	28	28.	7.		4'11"		200/130	120
44	" ဖြူဖြူ	မြို့သစ်တန်း	N	44	P	320											42	14	14	84	56	14.		5'		140/120	128
45	" ခင်ခင်ဝင်း	ကုလားတန်း	N	49	P	338							✓				7	7	7	21	7.	7				140/100	
46	" ခင်ဆိုး	ကုလားတန်း	N	41		110											7	7	7			7	7				
47	ဆရာ ဦးသိန်းဝင်း	ကျောင်းတိုက်	O														7	7	7	21		7	7				
48	ဆရာ ဦးသိန်းဝင်း	"	O														7	7	7	28		7	7				
49	ဦးမြင့်ဆွေ	"	O														7	7	7			7	7				
50	ဆရာ ဝေဝေမြင့်	"	O														7	7	7			7	7				
51	ဒေါ်ခင်ခင်ဦး	ကုလားတန်း	N														7	7	7	28		7	7				
52	ဆရာ ဦးသိန်းဝင်း	"	O														4	7	7			7	7				
53	ဦးစောဝင်း	ကုလားတန်း	O														7	7	7				7	7			
																	476	322	364	854	483	370	84				
																	7		7	21		7.		4'11"		130/80	90 lbs.
																	7					7	7	4'10"		120/80	98 lbs.
																	7									140/90	132
																	7	7	7	21.		7					192
																	14	7	7			7					156
																	7	7	7	42	28.		7				
																	7	7	7	28.	14		7			110/80	110.
																	7	7	7				7				
																		86	(7).	Gelmag	(7)		7			110/70	80
																	7	7	7				7		70.		130.
																	7	7	7	21		7.		5'	23.	120/80	120.
																	7	7	7				7			120/80	130.
																	7	7	7	14	14		7			110/60	124
																	7	7	7	28.	28.				26.	100/70	120.
																	7	7	7	14			7			110/60	104
																	14	14	14	42	28.		14.			130/80	130

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SR No	Name	Address	N/O	Age	M/F	R.B.S.	Diseases. CVA	H/T.	D/M	other	Risk.
	ဖြိုးသိဒ်ဝင်း	သာလ ၇	0	54							✓
4	အုံးဦးမြင့်	ကမ္ဘာကြီးရွာ	0	47							✓
	ဦးဇော်ဦးမြ	ကွင်းရွာအောင်	0	50							
	ဦးသန်းဝေသန့်	〃	0	65							
1	ဇော်ဝေမြင့်	ရပ်ကွက်	0	68							
	ဒေါ်ဝင်းမြင့်	ကုလားအုပ်	6	55		407					
4	ဒေါ်ဖြူဖြူဝေ	မိုးကောဒ	N	47	F	320		✓	✓		
	ဒေါ်ဇင်မာဝင်း	အုတ်ကုန်း	0	41				✓			
	မိုးမိုးဝင်း	ကော်သွားကုန်း	0					✓			
	ဒေါ်ဥမ္မာထွေး	ရေ - လေး	0					✓			
	ဒေါ်တင်ဇော	-	0					✓	✓		
	မိုးသိုးထိုး	-	0					✓			
	ဒေါ်ဝင်းဝင်းသိုး	-	0					✓			
	ဒေါသန်းဆီ	ရေ - ကြီး	0					✓	✓		
	ဒေါဖြူဖြူဇင်	-	0					✓			
	ဦးဖောဒဖောင်	-	0					✓			

CVA Risk. 10%-20 20%-30 30%	Strip Risk.									B.P	B.W.
	Am-Sat	Evening	Before	Multi.	Click	multi	W.C	Hi	Bmi		
	7	7	7	28.	28.	7.	100 cm.	5'.2"	24	120/90	148 lbs.
	7	7	7			7	31c		24	120/80	142 lbs.
	7	7	7	28	28	10.					
	7		7			10					
	7	7	7		B1 ⑦	7					
	7	7	7			7	104			130/90	131 lbs
	7	7	7	28	28	7					
	7	7	7	14		7					
	7	7	7			7					
	7	7	7			7					
	7	7	7	28	28	7					
	7	7	7			7					
	7	7	7								
	7	7	7	28	28	7					
	532	413	434	984	707	321	B1-91	B6-49	Mal-7		

"30.5.2018"

SR NO	Name	Address	N/O	Age	M/F	R.B.S.	Diseases				CVA Risk			Strip	Lancet												BP	Bwt
							CVA	H/T	D/M	Other	10%-20%	20%-30%	>30%			Analog	Ecop	Atrovas	Metfor	Glicla	Multi	Bi	Uric	Hb%	BMI			
1.	ဦးဘန်းကြူ	ကလေးကြီး	0.	59.	M.			✓								7	7	7			7						120/80	106 lbs.
2.	ဒေါ်ခင်လေး	တံတားသာ	0	58	F.			✓	✓							14	7	7	42	28.	7				27.		170/90.	128 lbs.
3	" ညွှန့်	ကလေးကြီး	0	69	F.			✓		✓			✓			7	7	7			7				23		120/80.	110 lbs.
4	ဦးလှဝေ	"	0.	71	M			✓								7	7	7			7				25.		120/70.	160 lbs.
5	ဦးခိုင်ဇော်	အင်္ဂလိပ်	0.	68.	M			✓		✓	✓					14	7	7.			7				29.		110/80	132 lbs
6	ဒေါ်ခင်ပု	ကလေးကြီး	0.	51	F.			✓	✓							7	7	7			7				25.		140/90	115 lbs
7	" ရွှေ	"	0	51	F.			✓		✓						7	7	7	21	28	7				28.		110/70.	142 lbs
8	" ဆောင်းမိုး	"	0	65	F.			✓		✓						7	7	7			7				24.		120/70.	126 lbs
9	" ပြည့်ကြာ	"	0	53	F.			✓	✓							7		7			7	7			28.		130/70.	146 lbs.
10	" နီနီဆွေဆွေ	ရပ်ကွက်အကြီး	0	54	F.			✓		✓	✓					21	7	7	28.	14.	7				26.		120/70.	130 lbs.
11	ဦးမင်းခိုင်	ကလေးကြီး	0.	50.	M.			✓	✓							7	7	7	21		7	7			30		110/80	182 lbs
12	ဒေါ်သင်းဝေ	"	0	50	F.			✓	✓							7	7	7	28.		7	7.			30.		120/80	154 lbs.
13	" သင်းသင်းဝေ	" ရေဆေးရုံ	0.	47	F.			✓		✓						7	7	7	21		7				25.		120/90	120 lbs.
14	" ကြည်ကြည်	"	0	67	F.			✓	✓							7	7	7	21		7				-		130/70	143 lbs.
15.	" သဇင်.	"	0	62	F.			✓	✓							7	7	7	7		7	7			22		100/70	110 lbs.
16	" ဖြူဖြူမြင့်ဆွေ	"	0	34	F			✓	✓							7		7	28.	7.	7				27.		120/80.	123 lbs.
17	" သန့်ဇော်ဦး	"	0	50	F.			✓	✓									7	28.	28.	7				25		120/80	121 lbs
18	ဦးကျိုင်းဝင်း	"	0	60	M.			✓	✓							7	7	7	28.	28.	7				31		150/100	184 lbs
19	ဒေါ်ဝေဝင်းရွှေ	အင်္ဂလိပ်	0	62	F			✓	✓		✓					21	7	7	21	28.	7				-		150/100	148 lbs
20	" သန့်ဦးဦး	"	0.	47	F.			✓		✓						21	7	7	14		7				28.		110/80.	130 lbs
21	" ပြည့်ဖြူ	ဘီးကုန်းစု	0	46	F.			✓	✓							14	7	7			7				-		120/110	130 lbs.
22	" သုံဝင်း	တပ်ကြေးစု	0	59.	F			✓	✓		✓					14	7	7	42		7				-		140/80	120 lbs.
23	" ပြည်ဖြူ	ကုလားကုန်း	0	45	F			✓	✓							7	7	7	28.	28.	7				25.		90/90.	144 lbs.
24	ဦးခင်ညွှန့်	ဆူးပိုးကုန်း	0	50	M			✓	✓		✓						7	7	28		7				-		130/90	140 lbs.
25	ဦးတင်ဝေထွန်း	ကုလားကုန်း	0	53	M			✓	✓							7	7	7	28	28	7				-		140/90	178 lbs
26	ဒေါ်သဇင်ကြူ	"	0	65.	F			✓	✓							7	7	7	28	28	7						140/80.	170 lbs.
27	" သင်းသင်းဦး	"	0	45	F			✓	✓		✓					14	7	7	42	14.	7.				32		160/80.	122 lbs.
28	" ပြည့်.	"	0	41	F.			✓		✓			✓			7		7	21		7	7.			23.		130/90.	122 lbs
29	" သဇင်ဦး	"	0	63	F			✓	✓							7					7	7.			-		100/80	118 lbs
30	" သဇင်.	"	0	58	F.			✓	✓									7	4		7	7.					100/80.	130 lbs
31	" သင်းလွင်ကြူ	"	0	53.	F.			✓	✓							7	7	7	21	14	7						120/80	122 lbs.
																7	7	7	14	7	7	7						
																219	135	210	664	280	217	64	Rajamat	21				

7. C. 2018

SR NO	Name	Address	N/O	Age	M/F	R.B.S	Diseases				<10%
							CVA	H/T	D/M	Other	
	ဦးဝင်းလှ	ကရိဘသီး	0	66	M.			✓			
	" မောင်မြေး	ကုလားတန်း	0	62	M			✓	✓		
	" ဒေါ်ခင်ဦး	ဝေကန်အိုင်း	0	58	M.			✓	✓		
	ဒေါ်သင်းထိုက်	"	0	56	F			✓			
	ဦးဝင်းလှ	ကုလားတန်း	0	53	M.			✓	✓		
	မြို့ရေပန်း	"	0	57	F.			✓			✓
	" ဝင်းမြ	"	0	36	F			✓	✓		
	ဦးမောင်မြ	အင်းကလေး	0	41	M			✓			
	ဒေါ်နီနီဦး	"	0	41	F.			✓	✓		
	ဦးသန်းထွန်း	ကုလားတန်း	0	59	M			✓			
	ဒေါ်ကြည်ဝင်း	"	0	61	F.			✓	✓		
	ဦးမောင်မောင်	ရေပုလ	0	68	M			✓			
				13.	6.	18					
	ဦးသန်းထွန်း	ကုလားတန်း	0	57	M.			✓			
	ဒေါ်သင်းထိုက်	ဝါးလုံးကျွန်း	0	56	F.			✓	✓		✓
	" ခင်ဦးအေး	"	0	46	F			✓			
	" မျိုးဝင်း	တမ်းခေါင်း	0	59	F.			✓	✓		
	" မြေးဦးမြင့်	ဝေကန်အိုင်း	0	62	F			✓	✓		
	ဦးဝင်းမြင့်	ကုလားတန်း	0	71	M			✓	✓		
	ဒေါ်မိုးမြေ	ကဲကလေး	0	58	F.			✓			
	" ဝင်းမြ	ကရိအာယ	0	36	F.	275		✓	✓		
	ဦးသင်္ဘောပြင်	ကဲကလေး	0	60	M			✓	✓		
	ဒေါ်ပြည့်ဖြိုး	ကုလားတန်း	0	53	F.			✓			
	" အုံ့ပြ	"	0	48	F			✓	✓		
	" မြေးသင်	ကဲကလေး	0	40	F.			✓	✓		
N	ဦးသန်းထွန်း	M.C.	N	71	F.	344		✓	✓		✓
N	ဦးဝင်းမြ	"	N.	73	M	99		✓	✓		✓
	ဒေါ်သင်းမိုး	ကုလားတန်း	0	71	F.			✓			
N.	" မြင့်မြင့်	ဝိုင်ဖြူကြောင်းဆရာကြီး									

CVA Risk 10%-20%	20%-30%	>30%	Strip	Lancet	Amlong	Ecosp	Atrovas	Metfor	Glicla	Multi	B1	W.C	Ht	BMI	BP	Beat
								Betamed		(7)	—	80	(7)		100/70	41Kg.
					7	7	7	28	28.	7					130/70	82Kg
					7	7	7	42	28.	7					140/80	74Kg
					7	7	7			7	7				110/70	71Kg.
					7	7	7	28	28.	7	—				130/90	78Kg
					14	7	7			7				35.	130/80	89Kg
					7	7	7	42	28.						140/90	78Kg.
					7	7	7			7					130/80	74Kg
					7	7	7	28	28	7					90/60	54Kg
					7	7	7			7					120/80.	109lbs
					7	7	7	28	28	7					140/90	58Kg
					14	14	14			14					120/80	50Kg
	✓				7	7	7			Betamed (7)				19.	110/70	108 lbs
					7	7	7	21	14					25.	120/90.	126 lbs
					14	7	7								110/70.	120 lbs.
					7	7	7	28.	28.	Betamed (7).				25	140/80	120 lbs.
		✓			7	7	7	21		Betamed (7).				25	130/80.	134 lbs.
✓					14	7	7			Betamed (7)				25.	120/80	162 lbs.
	✓				14	7	7	42.	28.	Betamed (7).				25.	150/90	130 lbs.
✓					7	7	7	42.	28.					32	140/100	180 lbs
			(2) ပတ်ခွာ		42	14	14			Betamed (14)					140/80	130 lbs
✓					21	7	7	28.	14					28.		148 lbs.
					7	7	7	21.	28.					25.	120/80.	122 lbs
					7	7	7	14.							120/80.	122 lbs.
					7		7	21	14.	Betamed (7).				25		118 lbs
	✓				7	7	7			Betamed (5)				28	140/100	134 lbs.
I/V	25% Glucose - B12 - B6 - Compound vita.				14	28.					14	7			110/70.	82 lbs.
															140/70.	154 lbs

CR NO	Name	Address	NO	Age	M/F	R.B.S	Diseases CVA	H/T	DM	other	<10%
	[illegible]	[illegible]	0	41	M	124		✓	✓		
	[illegible]	[illegible]	0	47	F			✓	✓		
	[illegible]	[illegible]	0	71	F			✓	✓		
	[illegible]	"	0	63	F			✓	✓		
	[illegible] (1)	"	0	61	F			✓			
	[illegible]	[illegible]	0	54	F			✓	✓		✓
	[illegible]	[illegible]	0	50	F	165		✓	✓		✓
	[illegible]	"	0	50	M	199		✓	✓		✓
	[illegible] (2)	"	0	62	F	113		✓	✓		✓
	[illegible]	"	0	34	F			✓	✓		✓
	[illegible]	"	0	46	F			✓	✓		
	[illegible]	"	0	41	F			✓	✓		
	[illegible]	[illegible]	0	46	F	303		✓	✓		
	[illegible]	[illegible]	0	47	F	220		✓	✓		✓
	[illegible]	"	0	58	F	295		✓	✓		✓
	[illegible]	[illegible]	0	70	F	161		✓	✓		
	[illegible]	[illegible]	0	66	F	132		✓	✓		
	[illegible]	"	0	55	F			✓	✓		✓
	[illegible]	"	0	65	F						
	[illegible]	"	0	60	M			✓	✓		
	[illegible]	[illegible]	0	53	F			✓	✓		
	[illegible]	[illegible]	0	67	M			✓			✓
	[illegible]	[illegible]	0	58	F	126					
	[illegible]	[illegible]	0	52	F	212		✓	✓		
	[illegible]	[illegible]	0	64	F			✓	✓		
	[illegible]	"	0	49	F	118		✓	✓		
	[illegible]	[illegible]	0	62	F			✓	✓		
	[illegible]	"	0	47	F			✓			✓
	[illegible]	[illegible]	0	41	M			✓	✓		✓
	[illegible]	"	0	41	F	236		✓	✓		
	[illegible]	[illegible]	0	70	F			✓	✓		
[illegible]	[illegible]	-	0	48	F			✓	✓		✓

CVA Risk 10%-20%	20%-30%	>30%	Stno	Wound	Fasting	Random	Morning	Evening	GLICHEK	B1	W.C	Ht	BMI	BP	Bwt
							7	28						100/60	146 lbs
														140/80	141 lbs
					14	28	14	28						110/60	60 lbs
✓					14	7	7	21			Relieved (1)		25	100/70	147 lbs
			(2) wound			14	7				Relieved (10)			120/80	140 lbs.
					7	7	7	21	14		Relieved (1)			140/100	130 lbs.
					7	7	7	21					25.	140/80	140 lbs.
					7	7	7	21					30	120/80	120 lbs.
					7	7	7	28					30.	120/80	140 lbs.
					7	7	7	28	7		Relieved (3)		22	110/80	140 lbs.
							7	28	28				27.	140/80	120 lbs.
					7		7	21						120/80	140 lbs.
					7						7				
	✓				14	7	7	28						140/90	120 lbs.
					7	7	7	21					25.	120/80	122 lbs.
					7	7	7	28	28				25.	200/80	114 lbs.
	✓				14	7	7	14			Relieved (1)		25.	140/80	121 lbs.
					7	7	7	14						140/80	122 lbs.
					14	7	7	42	28				26.	100/80	81 lbs.
											Relieved (1)			140/80	144 lbs.
					21	7	7	21	28				31	120/80	132 lbs.
					7	7	7	14	7				29		
					7	7	7							140/80	122 lbs.
					7		7	21						110/80	134 lbs.
	✓				14	7	7	42	14				32	140/80	170 lbs.
						7	7	28.						120/80	144 lbs.
					21	7	7	14			Relieved (1)		25	140/80	142 lbs.
					7	7	7							120/80	122 lbs.
					7	7	7							120/80	142 lbs.
					7	7	7	28	28					110/80	140 lbs.
					7	7	7	28	28					120/90	130 lbs.
					10	30	20	30						140/80	150 lb

20.6.2018

SR NO	Name	Address	N/o	Age	M/F	R.B.S	Diseases CVA	H/T	D/M	Other	<10yr
	ဒေါ်မြင့်	ဓနုတွင်းကုန်း	●N	68	F						
	ဒေါ်ဝင်းမာ	MEC	N	52	F			✓			
	ဒေါ်ဝင်းမြင့်	ကား.လေ.ကား	O	64	F			✓	✓		
	ဒေါ်ဝင်းအေး	ကရိသာသာ	O	36	F			✓	✓		
"	မောင်ဘုန်	တောင်ကုန်းကြီး	O	62	F.			✓	✓		
"	ကြေးသို့လောရောက်ဖို့	ကုလားကုန်း	O	65	F.			✓	✓		
"	ဦးစိန်	M.C.	O.	71	F.			✓	✓		✓
	ဦးဝင်းမြင့်	"	O	73	M.			✓	✓		
	ဒေါ်သင်းမြေ	ကရိသာသာ	O.	71	F.			✓			
N "	ဖြိုးဝင်း	တောင်ကုန်းကြီး	N	54	F.						
	ဦးသန်းထွန်း	ကုလားကုန်း	O	59	M.			✓	✓		
"	ကြွေစု	"	O	71	M			✓			
	ဒေါ်နွဲ့ဖြိုး	"	O	72	F.			✓			
"	ကြီးဒ	"	O	69	F			✓	✓		✓
"	မောင်ဆိုင်	ထန်းကုလား	O	35	F.			✓			
N	ဦးဖြိုင်ဦး	ကုလားကုန်း	N	60	M.			✓	✓		
	ဒေါ်ကျော်	တန်ခြေ	O	59	F.						
"	တိုးဖြိုး	ထန်းကုလား	O	58	F.			✓	✓		
"	ဖြိုးဇော	ကုလားကုန်း	O	55	F.			✓	!		
"	ဦးဇော်ဝေ	ဘ.ဆ.ဂ	O	54	F			✓	✓		✓
"	ကြီး	ကုလားကုန်း	O	56	F			✓	✓		
"	မောင်ချမ်း	"	O	65	F.			✓			
"	ဦးဝင်း	"	O	42	F			✓			
"	ဖိုး	"	O	51	F						
"	ဖိုးမြ	"	O	51	F			✓	✓		
	ဦးစိန်ဖြိုး	ဘ.ဆ.ဂ	O	68	M.			✓	✓		✓
	ဒေါ်ဖြူဖြူမင်း	ကုလားကုန်း	O	41	F			✓			
"	သန်းဦး	"	O	45	F.			✓			
	ဦးဘသိန်း	"	O	50	M.			✓			
	ဒေါ်စိန်ဝင်း	"	O	50	F			✓			
"	ဘုန်းဘုန်း	ဘုတ်စိန်ကုန်း	O	52	F.			✓			
"	ဖေဖေဝင်း	ဘ.ဆ.ဂ	O	62	F			✓			
	သန်းဦး	"	O	47	F			✓			
	ဦးစိန်	ဖောက်စိန်း	O	58.	M.	170		✓	✓		

CVA Risk 10/20	20/30	>30	strip	Lancet	Dextrose	Cholesterol	Albumin	Protein	Calcium	Uric Acid	Bl	W.t	Ht	BMI	Bp	Bwt
											10				130/70	114
											10				120/80	
					7	7	7								120/70	130 Lb
✓					7	7	7	42	28	7				32	130/90	178 lbs
	✓				7	7	7	21		7				25.	140/80	172 lbs.
					7	7	7	14		7				26.	80/50	108 lbs
					7		7	21	14	7					120/70	114 lbs.
					7	7	7			7					130/80	134 lbs.
										7	Bc-7	Cal mag. 7			100/70	94 lbs.
					14	7	7	28	14				5.		120/80	120 lbs.
					7	7	7								140/80	108 lbs
					14	7	7			7					120/80	102 lbs
					7	7	7	28	28	7					140/80	112 lbs
					7	7	7			7				23	130/90	112 lbs.
					7	7		21							120/80	150 lbs
											7				140/80	40 lbs.
					7	7	7	28	28						-	-
	✓				14	7	7	42	28					29.	160/80	170 lbs
					21	7	7	42	28						120/80	130 lbs
					7	7	7	(21)						26	140/80	134 lbs
					7	7	7			7					120/70	142 lbs
					7		7			7					100/60	124 lbs
										7	7				120/80	122 lbs
					7	7	7		28	7					110/80	120 lbs
					7	7	7		28	7					150/90	120 lbs
					7	7	7			7					110/80	132 lbs
					7					7				23.	120/80	124 lbs
							7			7					100/70	124 lbs
					7	7	7			7					110/80	120 lbs
					7	7	7								120/80	100 lbs.
					7		7			7					120/80	110 lbs
					21	7	7			7					140/90	170 lbs.
					14	7	7			7					130/100	126 lbs
					7	7	7		28	7					140/80	100 lbs.

| | | | | | | Diseases. | | | | | |

SR NO	Name	Address	M/O	Age	M/F	RBS	Diseases CVA	H/T	DM	Other	<10% - ✓
1.	[illegible]	[illegible]	O	62.	15.						
2.	[illegible]	[illegible]	O.	57							
3	[illegible]	"	O	36	248.						
4	[illegible]	[illegible]	O.	54	202						✓
5	[illegible]	[illegible]	O.	64							
6	[illegible]	[illegible]	O.	46							
7	[illegible]	[illegible]	O	71	82.						✓
8	[illegible]	"	O	73							
9	[illegible]	[illegible]	O	71.							
10	[illegible]	[illegible]	O	56.							
11	[illegible]	[illegible]	O	53	198						
12	[illegible]	"	O	51	208						✓
13	[illegible]	"	O	50	170.						
14	[illegible]	[illegible]	O.	70	328						
15	[illegible]	"	O	60.							
16	[illegible]	"	O	58	141.						
17	[illegible]	[illegible]	O	63.	120.						
18	[illegible]	[illegible]	O	71							
19	[illegible]	[illegible]		69.							
20	[illegible]	[illegible]		62							
21	[illegible]	"		47							✓
22	[illegible]	"		68.							
23	[illegible]	[illegible]		50							
24	[illegible]	[illegible]		59							
25	[illegible]	[illegible]		45							
26	[illegible]	"		63.							
27	[illegible]	"		61							
28	[illegible]	"		64.							
29	[illegible]	"		50.							
30	[illegible]	"		50							
31	[illegible]	[illegible]		54	257						
32	[illegible]	[illegible]		34.							
33	[illegible]	"		62.							
24	[illegible]	"		47.	167.						

strip tarack

10-20	20-30	30+	DM	Comb	Amaryl	Met	Glucobay	Nesulin	B.	W.C	Ht.	BMI	B.P	Wt.
	✓		7	7	7	21.		7			5'.	25.	140/80	172 lbs.
	✓	✓	✓	7	7	7	21.		7					
			14	7	7			7.			5'4"	33.	140/90	172 lbs.
		✓											120/80	172 lbs
✓			✓								4'.11"	32		
	Celmi.	+ Amar.	7	7	7	42	28.	7.			5'.	21.	110/60	150 lbs.
		✓ ✓	14.	7	7	28.	14							120 lbs.
			14.	7	7			7.					130/90	120 lbs
											5'.2"	26.	140/80	112 lbs
		✓ ✓	7		7.	21	14.	7					120/80	130 lbs
			7	7	7			7			5'.3"	28		
	Metro 250 Glucon. ① Selesogen - ① -							7.	7.	BC. 7.			90/60	90 lbs.
			7	7	7.	21	14.	7					140/80	126 lbs.
		✓ ✓	21	7	7	28	14.	7					160/100	144 lbs
		✓ ✓	7	7	7	28.	28	7				26.	120/80	120 lbs
		✓ ✓	7	7	7	28		7					150/100	130 lbs
		✓ ✓	7	7	7	14		7			5'.10"	25	140/80	114 lbs
			28.	7	7			7					130/90	130 lbs
		✓ ✓	14.	7	7	42	28	7.				25	150/80	120 lbs
		✓ ✓	14	7	7			7					130/90	114 lbs
		✓ ✓	14	7	7			7					140/90	142 lbs
		✓	14	7	7	28.		7					120/80	92 lbs.
	Amar. + Para. + Celmag		7	7	7			7					150/90	1 c8lbs
			21	7	7			7					120/80	124 lbs.
		✓	14	7	7			7					130/90	130 lbs
		✓	7	7	7			7					170/110	124 lbs
		✓	7		7	21	28	7				28	100/70	129 lbs
		✓	7		7	28.		7				23.	130/80	130 lbs
		✓			7	4							90/60	90 lbs
		✓	7	7	7		14.	7					130/80	120 lbs
		✓	7	7	7			7				30.	-	-
		✓	7	7	7			7					120/80	182 lbs
		✓	7	7	7	21		7.					-	182 lbs
		✓	7	7	7	28		7					-	144 lbs
		✓ ✓	7	7	7		28.	7					100/70	132 lbs
					7		28						-	-
		✓	7		7		7						100/70	120 lbs
		✓ ✓	7	7	7		=	7						

SR NO	~~Address~~ Name.	Address	O/N.	Age	M/F	RBS.	Diseases. CVA	D/M	H/T	Others	<10%	<10x20	20x30	30% >
.	ဦးတိုင်ဦး	ကုလားတန်း	O	60	M	90								
	ဒေါ်ဝင်းမြ	"	O	51.										
	ဒေါ်သင်းဇွန်ထွေး	"	O	53.		144								
	" သိုးဝင်	ဗကာဆွိုင်	O	56										
	" ဦးသန်း	"	O.	58.										
	" ဦးသန်း	လယ်ကွင်း	O	52		294								
	" ဦးမြင့်	ကုလားတန်	O	54		218.								
	" ဦးဘဏ်	"	O.	45		154.								
	" ဖြိုးမြင့်ဝေး	ကုန်းတခေး	O.	41		304								
	" ဖိုးမိုင်	"	O	41.										
	ဦးစောမြဲ	ကုလားကုန်း	O	68		257								
	ဒေါ်ကြည်ဝင်း	"	O	54										
	ဦးတင်လှ	ဖွဲ့ကိုးဆောင်	O	51										
	" ခိုင်ဆွိုင်	ကုလားတန်း	O	59										
	" သိန်းဆွေ	"	O	51.										
	ဒေါ်သိန်းမြင့်ဆွိုင်					4/7/18								
1	ဒေါ်ခင်ပေါင်းသား	ကန်သာယာ	O	36	F			✓	✓			✓		
2	မောင်သောင်းဦး	ဒဂုံသာယာ	O	57	F				✓					
3	ဒေါ်ခင်မိုး	ကန်သာယာ	O	71	F					✓		✓		
4	ဒေါ်သိန်းမြ	ကန်သာယာ	O	71	F			✓	✓			✓		
5.	ဒေါ်တင်မြင့်	ကုလား ကုန်	O	64	F	-			✓			✓		
6.	ဒေါ်ခင်မို	ကုလား ကုန်	O	51	F	-		✓	✓			✓		
7	ဦးထောင်သေး	ကုလား ကုန်	O	62	M	165		✓	✓			✓		
8.	ဒေါ်ကြည်ဝင်း	တပ် ၊ အောင်ဘီး	O	59	F	326		✓	✓			✓		
9.	ဒေါ်ဆေး ဝင်း	ကုလား ကုန်	N	50	F					✓		✓		
10.	ဒေါ်ခင် ဆောင်	MEC ကုလားကုန်	O	71	F	98		✓	✓			✓		
11.	ဦးတင်ရွှေ	MEC	O	73	M				✓					✓
12	ဒေါ်ဖြူဖြူဆေး	ကုလား ကုန်	O	55	F	325		✓	✓					
13.	ဒေါ်ဖြူဝင်း	ကုလား ကုန်	O	49	F				✓			✓		
14.	ဒေါ်ခေမီ	ကုလား ကုန်	O	48	F	318		✓	✓			✓		
15.	ဒေါ်ဝင်း ကြူ	ကုန်ကလေး	O	58	F	-	✓	✓	✓					
16.	ဦးချစ်ကို	ကုလားကုန်	O	74	M					✓				
17.	ဒေါ်ဖြူဖြူစိုးမော်		O	53	F	-			✓	✓		✓		

Strip	Lancet	Probing	Scraping	Abs.	Mult	Clin	Multi	FBC	Para	AIDH	Weight	BMI	E.D.	Burst
✓	✓	7	7	7			7						130/80	158 lbs
		7	7	7		28.	7				4'11"	23.	120/80	84 lbs
✓	✓	7	7	7		7	7.						110/70.	159 lbs
		7	7	7			7							
		7	7	7		28.	7						120/80	104 lbs
✓	✓	7	7	7		.	7						140/80.	104 lbs
✓	✓	7		7		28.	7						120/80	148 lbs
✓	✓		7	7			7.						100/70.	139 lbs
✓	✓	7	7	7		28.	7						130/80.	164 lbs
		7	7	7			7.						100/70	49 lbs.
✓	✓	7	7	7		28.	7						120/80.	160 lbs
		7	7	7		28	7						-	-
		7	7	7		28.	7.						-	-
		7	7	7			7						-	-
		7	7	7		28.								
£0	£0													
		14	14	14	84	56		14	10		4'11"	37	130/80	174 88 kg
		28	14	14				14			5'4"	34	140/80	
25% Glucose+contal 1/V		once ① bt, AIDH, ① bt, FBC ① bt						14		10	4'5"	18	110/70	78 lbs
		14	14	14	42	-		14			4'11"	29	120/70	97 lbs
25% Glucose+contal 1/V		14	14	14	-	-		14	10	10	4'7"	30	130/80	130 lbs
		14	14	14	56	56		14	10	10	4'10"	26	140/80	130 lbs
	✓ ✓	14	14	14	56	56					5'6"	30	130/80	128 lbs
	✓ ✓	14	14	14	56	56		14	10	10	5'2"	24	120/80	60 kg
											5'			
25% Glucose+contal IV	✓	14	-	14	14	-		14	-	-	5'2"	20	120/80	112 lb /50kg
		14	14	14				14			5'3"	25	140/80	136 lb.
✓	✓ ✓	42	1·		84	56		14			4'10"	29	150/100	55 kg
		14						14			5'	25	130/80	60 kg
	✓ ✓	14	14	14	84	56		14			4'10"	30	140/100	66 kg
✓		42	14	14	84	56		14			4'11"	26	160/100	59 kg
Bc ① bt								14	10		4'11"		130/90	244 kg
		42	14	14	28	56		14			4'11"	29	140/100	65 kg

SR NO	Name	Address	OG	Age	M/F	RBS	Diseases CVA	HT	DM	other	<10%	Ketone 20% 30%	strip	Lancet	Amlodip	Enalapril	Losar	Metfor	GLI	BP	FBC/BIC	BP/C	Ht	BMI	BP	Bwt
18.	ဦးဘဘိုးထော်ဇေး	ကုလားကုန်း	N	45	M	94				✓					Iv. 25% Glucose						14			5'2"	23	100/60	57 kg
19.	ဦးမြင့်ဝ	ကုလားကုန်း	O	41	M			✓	✓				✓	✓							14			5'6"	27	140/80	74 kg
20.	ဦးဘဘိုး	ကုလားကုန်း	O	56	M			✓	✓						28	28	14				14			5'5"			
21.	မမိုးဝင်း	ကုလားကုန်း	O	58	F			✓	✓						14	14	14	56	-		14			5'		120/80	67 kg
22.	ဒေါ်မိုးဝင်း	ကုလားအမဲုံးစက်	O	47	F			✓	✓						14	14	14	42			14			4'10"		140/100	57 kg
23.	ဒေါ်နုဇင်းကြည်	မြောင်းအောက်	O	54	F			✓	✓						14	14	14	56	56		14			5'		140/90	60kg
24.	ဒေါ်ခိုဝင်း	ကုလားကုန်း	O	43	F					✓					14	14	14	42	-	-	14			4'10"		120/80	57 kg
25.	ဆီဆွေ	"	O	56	F			(✓)												14	14	14		4'11"		120/80	64kg
26.	ဆီဆေးဘဲ့	ကုလားကုန်း	O	65	F			(✓)							14	14	14							4'11"		140/100	57 kg
27.	ဆေးမြဲအကြေ	ကုလားကုန်း	O	65	F					✓					14		14				14			4'8"		120/80	37 kg
28.	ဦးဘိုးဝင်း	စက်ဘူးပိုင်	O	60	M			✓	✓				MoM ① BD × 7 Ds.								14	14					
29.	ဆီကြည်ဆေး	ကုလားကုန်း	O	67	F			✓	✓						42	14	14	42	56		14						
30.	ဒေါ်ဝင်းမိုးဝင်း	စေတလမ်း	O	47	F			✓	✓				AIOH ③BD × 7Ds		14	14	14	14			14			4'9"		120/80	54KG
31.	ဆီလှကြည်	ကုလားကုန်း	O	63	F	115		(✓)		✓					14	14	14	42	-		14			4'11"	24	120/80	54 kg
32.	ဒေါ်ဆေ သဲ့	"	O	70	F	-		✓	✓				✓	✓			14	7			14			4'11"	21	120/80	49KG
33.	ဆီလှဖြင့်	ကုလားကုန်း	O	61	F	222		✓	✓						14	14	14	28			14			4'9"	33	120/80	59kg
34.	ထီလှကြို	ကုလားကုန်း	O	65	F			(✓)					✓	✓	14	14	14	42	28		14			5'	28	120/80	83 kg
35	ဦးစိုးလှိုင်	ကုလားကုန်း	O	68	M		✓	(✓)		✓					14						14			5'3"	28	120/80	62kg
36.	ဆီမောမော	ကုန်ကစား	O	70	F			✓	✓						14	14	14				14			4'10"	27	120/80	60kg
37.	ဝဆေးဦး	ကုန်ကစား	O	35	F	109		✓	✓				MoM ② HS.		28	14	14	28			14					120/80	67kg
38.	ဒေါ်သုဇာသိန်းဦး	ကုလားကုန်း	O	45	F	82		✓	✓					✓	14	14		42		14	14	14		5'3"	26	120/80	55 kg
39	ဆီသုဇာသိန်းဦး	ဘလက်	O	47	F			✓	✓				Iv. 25%	✓	14		14	14		14	14	14		4'10"	25	130/90	57 kg
40.	ဆီဆဝေးဦး	ဘလက်	O	62	F	119	✓	✓	✓					✓	14	14	14				14			4'11"	25	120/80	70 kg
41.	ဆီသိန်းမြဲ	အပေါ်ထပ်အစား	O	42	F	208		✓	✓	✓					42	14	14	28			14			4'8"	37	120/100	66 kg
42	ဆီစန်းဇွန်	ဒုတိယထပ်	O	47	F			✓	✓						42	14	14	28	-		14			5'3"	24	130/90	66 kg
43	ဒေါ်ဘဝဝင်း	"	O	54	F										14	14	14				14			5'4"	37	150/110	66 kg
44	ဆီစောဆု	ကုန်ကစား	N	53	F	146									14	14	14	56	56		14					Hi	
45.	ဆီဘဝဘဝေ	ကုလားကုန်း	O	43	F	126		✓	✓					✓										4'11"	1	100/60	53 kg
46	ဆေးရိုးဦးဖိုး	ကုန်ကစား	O	41	F			✓	✓					✓	14	14	14	56	56		14						
47	ဦးစောဟန်ဆွေ	"	O	41	M			(✓)							14	14	14	56	56		14						
48	ဆီစေ:ဇော်ဦး	ကုလားကုန်း	O	76	F			✓	✓						14	14	14	-	-		14						
49.	ဆီဘဝိတင့်	"	O	50	F	124												56									
50.	ဆီကြည်ဝင်းဘဝ	"	O	69	F			✓	✓					✓										5'1"		140/90	62kg
51	ဦးစံဇွဲဦးလေး	ဖွဲ့ကုန်အောက်	O	50	M			✓	✓						14	14	14	56	56		14					110/70	61 kg
															14	14	14	56	56		14						

H/T = 19
H/T: DM = 33
DCM = 2

Sr No	Name	Address	O/N	Age	M/F	RBS	Disease: CVA	HT	DM	other	<40%	>40%	Stamp	Lancet	Amlong	Ecosprin	Atov	Metf	Glizi	FBC	B.	WC	Ht	BMI	BP	BWt
52	မိုးစဇေတ်	ကုလားကုန်း	O	53	M		✓	✓	✓						14	14	14	56	56	14			5'8"		150/100	80 kg
					18.7.2018								✓	12 1												
	ဖေါ်ဝန်း	အနှံဝန်း	N	68	F																				180/90	148 lbs
	" စိုးမြ	"													21	7	7				7					
	" အွန်းတွေ့	"	O	71	F.			✓	✓		✓														140/80	92 lbs
	" ဘိမျိုး	"	O	71	F					✓					7	7	7	21		7					110/70	80 lbs
	" အိုးမောက်	တမ်းကုန်းကျေး	O	46	F										OMEZ = (14). Gelmag (7). FBC (7).										130/80	126 lbs
	" ထိုင်ဖြစ်	ကုလားကုန်း	O	36	F.			✓	✓		✓				14.	7	7			7					140/90	174 lbs
	" ဟိုက်ကြီး	"	O	65	F	370									7	7	7	42.	21	7					140/90	170 lbs.
	" နွှဲ့ဝင့်	ရွာ/ခြံ	O	47	F.								✓		24	14	14	84	28.	14.		110.	5'	32	130/80	112 lbs
	" ဝင်းဘွဲ့	ဆေး/ကုထောက်	O	62	F										7	7	7	28.	14.	7		Para (10).			150/100	132 lbs
	ဦးတင်ဌေ	MEC	O	73	M				✓		✓				7	7	7	21.		7					140/70	132 lbs.
	ဖေါ်သင်ကောင်း	"	O	71	F			✓	✓		✓				7	7	7			7					140/90	114 lbs.
	ဦးဆောင်ထေး	ကုလားကုန်း	O	62	M			✓	✓		✓				7		7	21	14.	7						124 lbs
	" သန်းအိုး	"	O	59	M										7	7	7	28	28.			115.	5'.6"	30	140/80	108 lbs
	ဇော်အိုးတွေ့	ကုလားကုန်း	O	58	F			✓	✓						7	7	7			7		Gelmag (10) Para (10)			150/90	130 lbs
	" ဖြူဝင့်	ကုလားကုန်း	O	69	F								✓		21	7	7.	42	28.	7					120/80	108 lbs
	" ဦးဆွေလှိုင်	ဖြေင်းတောကား	O	54	F			✓	✓						7	7	7			7.					140/90	124 lbs
N-	" ဘုန်းဦး	ကုလားကုန်း	N	51	F.	118.								(2) wk =	7	7	7	21		7		95.			100/60	75 lbs.
	" ဖေးခိုင်	တံကလေး	O	35	F.			✓	✓					1/V 25% Glucose + B12 + B6.							7	B12 = (7)			120/80	150 lbs
	ဦးဘဆောင်ဖြိုး	"	O	60	M										7			21.		7					140/90	132 lbs
	ဖျောပြေမြေ	ကုလားကုန်း	O	65	F.										56	14	14			14						
	ဦးဘိုးဝင်း	"	O	60	M	158.		✓	✓		✓	✓								14.	7	MBM (14)					
	" ဇော့	"	O	71	M.			✓	✓						21	7	7	21	28	7.		118.	5'.5"	38	150/100	194 lbs
	ဖေါ်ဆုံးဦး	"	O	51	F			✓	✓		✓				14.	7	7			7.		cough syrup (1).			130/68	158 lbs
	" ပြင်ဂို	"	O	50	F.									Para (10).	7	7	7	42	28	7.					130/80	122 lbs
	ဦးစုဝင့်	"	O	74	M.			Amoxy. 250 - 14.							7	7	7	28.	42	7.					150/100	130 lbs
	ဖေါ်ပျိုးဂို	"	O	50	F			Para - 14.							7	X						B6 - (7). B12 (7).				120/80	108 lbs
	" ဖော်ဆုံ(ဟိုး)	"	O	65	F.			B12 - 14.						Para (10) Gel (10).	7	7	7			7.				25	140/90	124 lbs
	" ဝင်းမြ.	"	O	51	F.										7	7	7	14		7		Para (10)			120/80	104 lbs
	" ဇွဲ.	"	O	55	F.			✓						Para (14) Amoxy (14)	7	7	7	21	28	7					140/90	120 lbs
	" ဖေါ်းဘုန်း	"	O	65	F			✓							7	7	7			7.					140/90	142 lbs.
															7	7	7			7					130/80	128 lbs

SR NO	Name.	Address	O/N	Age	M/F	RBS	Disease: CVA	H/T	D/m	Other	<10%	<20%
	ဒေါ်ကြိုင်း	ကုလားကျင်း	O	43	F					✓	✓	
	" မြင့်မြတ်	"	O	53	F						✓	
	" ဖေဖော်ဝါ	အင်္ဂါ	O	62	F		✓	✓	✓			
	" အုံးနွဲ့	"	O	47	F			✓	✓			
	" မှ	ကုလားကျင်း	O	62	F	399		✓	✓		✓	
	" ဖေဘဘကြက်	"	O	34	F				✓	✓	✓	
	" အုံးမြင့်	"	O	64	F			✓			✓	
	" အုံးဝင်း	"	O	50	F			✓	✓		✓	
	ဦးအင်းဒိုး	"	O	50	M			✓	✓		✓	
	ဒေါ်သွယ်ဝင်	အင်္ဂါ	O	59	F						✓	
	ဦးမိုးသိုင်း	အင်္ဂါ	O	68	M			✓	✓		✓	
	ဒေါ်ကြူရှိ	"	O	65	F			✓				
	" ဝမ်းမြင့်	"	O	56	F						✓	
	" သန်းမြင့်	ကုလားကျင်း	O	45	F			✓	✓		✓	
	" မြမြသူ	"	O	44	F			✓				
	" ဘဘသင်	ပဂုံကိုန်	O	52	F						✓	
	" အုံးဦးလှ	နှစ်ဆယ်တိုး	O	47	F			✓	✓		✓	
	" ဦးဘဘသိန်း	ကုလားကျင်း	O	53	F							
	" ဦးဘိုးဝင်း	ကျိုက်ဖလော	O	41	I			✓	✓		✓	
	ဦးကျော်ဇွဲ	"	O	41	M							
	ဘုန်းမော်ဦး	ကုလားကျင်း	O	53	F			✓	✓		✓	
N	ဖြိုးပန်းဖြူ	ဝါးဖြူမြောက်	N	37	F	404		✓	✓		✓	
N	" ဖေးဆောင်ဦး	ဖြောင်းတောက	N	39	F	151				✓	✓	
	" ဝမ်းမြင့်	ကုလားကျင်း	O	57	F						✓	
	" ကြည်ဝင်	"	O	63	F	264		✓	✓		✓	
	" ဘင်ဘော	"	O	53	M			✓	✓			

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	ဝန်ထမ်းပြဇင်	ကုလားကျင်	O	64	F							
	" သိုးဆော်ဦး	"	O	80	F							
	" မြင့်ဝ	"	O	50	F							
	" ဆွဲဦး	"	O	51	F							
	" ဘင်ဦး	"	O	71	F							✓
	" ဘဘကောင်မြင့်	"	O	60	M							

0%	20%	30%	Strip Lancet.	Amlo5	Glipi	Atov	Metf	Gliclo	multi	B1	Wt	Ht.	BMI	B.P	Bwt.
				7.					7.	10.				120/80	120lbs
		B6-⑦	Para⑦ Amar③	7.					7			4.11"	32	120/80	150 lbs
		B6⑦	B12⑦	21	7	7	28.	14	7			4.8"	37.	140/90.	170 lbs
		✓		21	7	7	14.		7.			4'11"	28.	130/80	126 lbs
				7	7	7			7			5'.	22	120/80	112 lbs.
				7		7	28.	7	7			5'1".	27	100/70.	132 lbs
						7	28.	28.	7.	7.		4'7".	30.	130/80	130 lbs.
			Para ⑥ Gelmag ⑥	7	7	7	Calbose 25%+B12.		7.		Vitacompg⑥	5'.	30.	120/80	154 lbs
				7	7	7	21		7			5'5".	30.	120/80	182 lbs.
				7	7	7	28		7			5'2".	26	120/80.	130 lbs.
				7	7	7	28	28.	7			5'3".	23.	130/80	130 lbs
				7	7	7			7			5'.	25	120/80	135 lbs.
				7.					7			5'4".	29.	160/100	140 lbs.
				7	7	7			7			4'10"	25.	120/80	122 lbs
				7		7	7		7	7	81	5'.	—	130/80.	136 lbs.
				7					7			5'.	25.	120/80.	128 lbs
				7	7	7	21		7			5'4".	24.	120/80	150 lbs
				7	7	7			7			4'11"	23.	140/90	120 lbs
				7	7	7	14.	7	7.		78.	4'11".	23.	130/90	140 lbs.
				7	7	7.	28.	28.	7		110	4'9"		120/80	145 lbs.
				7	7	7			7					140/90	130 lbs.
				7	7	7	42.	28.	7					110/80.	151 lbs.
						28.	28	7	7.		112.	4.9"	28.	130/80.	150 lbs
			Para. ⑭ Gelmag. ⑭. B6 - ⑭.								99.	5'.		140/90	190 lbs.
				14	7	7			7	7		5.4	33	140/90	140 lbs.
				7	7	7.	28.	28	7	7				150/100	175 lbs.
				7	7	7	28	28	7	7		5.7			
				7	7	7			10					120/70	130 lbs
				7	7	7	28	28.	7					120/80	122 lbs
				7	7	7	28	42.	7.					150/100.	126 lbs
				7	7	7	28	28.	7				26	100/70	120 lbs
			OMer-14, + Gelmag-4 +	14.										110/70	80 lbs
				28.	7	7			7						

SR NO	Name.	Address	O/N	Age	M/F	RBS	Diseases. CVA	H/T	D/M.	Other	CVA Risk <10%	<10%-20%	>20%-30%	>30%.	Strip: Lancet.	Amlong	Exapin	Atmeyer.	Multi.	Glicide	Meditab	B.I.	BMI	B.P.	Wt:
	ခိုင်သန့်ဦး	၁၀.၁.၅.	O	47.	F.						✓					7	7	7			7		25.	130/90.	124 lbs
"	ခေါ်သုံး	အောင်ကျော်ကြီး	O	62	F.											7	7	7	21.		7		28.	130/80.	130 lbs
"	ထွေးထွေး.	ကုန်းဘေး.	O.	36	F.							✓		40%.		7	7	7	42.	28.	7.		32	140/90	124 lbs
"	ခေါ်ဆွေ.	MEE.	O.	71	F.						✓					7		7	21	14.	7		34.	140/90.	130 lbs.
"	ဦးတင်ဝင်း	"	O	73.	M							✓				7	7	7			7		26.	140/80.	110 lbs
"	ဦးတင်ဝင်း	ကုန်းကြီး.	O	60	M										✓	21	7	7	21	28.	7		25.	120/80	190 lbs
"	သိန်းဝင်း	ကုန်းကြီး.	O	44	F.											7					7		74.	160/90	196 lbs
"	သန်းဝင်း	"	O	47	F.						✓					7	7	7	21		7		25.	110/80	118 lbs
"	ကြည်ဝင်း	"	O	67	F							✓				7	7	7	7		7.		25.	130/90	118 lbs.
"	မြတ်မြင့်	"	O	57	F.						✓							7	4		7		27.	110/70	118 lbs.
	ဦးမြင့်ဦး	၁၀.၁.	O	58	M.											14	7	7			7		24.	160/90.	132 lbs.
	ခေါ်ဝင်းအေး	ကံကခေ.	O.	58	F.									40%.		14	7	7	42	28.	7		24.	160/100	130 lbs.
"	ခင်းဝင်း	"	O.	40.	F.						✓					7	7	7	14.		7		25.	130/90	120 lbs
"	ဝင်းဦး	"	O	35.	F.						✓					7	7		21		7		25	110/80	145 lbs.
"	ဦးဝင်း	ဂျ/ဖြူ	O	47	F.						✓					7	7	7	28.	14.	7		23.	140/90.	140 lbs
"	ထွေးဝေ	ကံကခေ.	O	70	F.			✓	✓					40%.		14	7	7	14.		7		27.	140/90	112 lbs
N	" သန့်ဝင်း	ခုလပ်ကြီး.	N	64	F.			✓	✓					✓		14	7	7.	14		7	Glibaran	28.	160/80	140 lbs
"	ထွန်းဦး	"	O	47	F.			✓			✓					21	7	7			7.		24.	110/80	144 lbs
	ဦးဖိုးသိန်း	၁၀.၁.၅.	O.	68	M.			✓.			✓					7	7	7			7		23.	130/90	130 lbs.
	ခေါ်ဘုကြီး	"	O	65.	F.						✓					7					7.		—	130/80.	118 lbs
"	ဝမ်းဝင်း	"	O	62	F.			✓	✓					40%.		28.	7	7	14.		7.		37.	120/80	170 lbs
"	ခင်းဝင်း	ကုလားတန်း	O.	50	F.			✓	✓							7	7	7	21		7			120/80	148 lbs
	ဦးဘိုးသိန်း	"	O.	50	M.						✓					7	7	7	28.		7.		30.	120/80	186 lbs
	ခေါ်ပြည်ကြေး	"	O.	65	F.						✓										7	Mom.	18.	110/70.	80 lbs.
	ဦးသမုဒ္ဒ	"	O	59.	M											7	7	7			7		19.	120/80.	108 lbs
	ခေါ်မှုဝင်း	တပ်ကော.	O	59	F.						✓					7	7	7	28.	28.	7	(J)Glibaran.	26.	130/80.	120 lbs
"	စန်းထွန်း	ဖောက်ခွ	O	46	~~F~~ M											14.	7	7			7.		25.	130/80	158 lbs.
	ဦးဝင်းဝေ.	ကုလားတန်း	O	71	M											7	7	7	28.	28.	7			120/80	126 lbs.
	ခေါ်ဖြစ်ပြော	"	O.	57.	F.						✓					21	7	7	28.	14.	7.		32	120/90	150 lbs
	ဦးမင်းဦး	ဖောကအိုင်း	O	58	M.											7	7	7	42.	28.	7			—	—
	ခေါ်ကြီးဝင်း	"	O	56	F.											7	7	7			7.			—	—
"	ခိုးဖြေ.	ကုလားတန်း	O	51	F.			✓	✓		✓					7	7	7	21	28.	7			140/80	115 lbs
"	ဖောသန့်(သေ)ခိုး.	"	O	65.	F.											7	7	7	14.		7		21	110/60	108 lbs

SE NO	Name	Address	O/N	Age	M/F	RBS	Diseases. CVA.	H/T	D/M	Other	<10%	<20%	30%	70%	strip	lancet	BMI.	B.P	Bwt.
	ဒေါ်သုဝဏ်	ကုလားကျိုး	O	51	F.													100/70	142 lbs
	ဦးမြင့်ထန်	"	O	45	F.	151.												120/80	144 lbs.
	ဦးသန်းဆွေ	ဒါဇင်ဖြူကြေတ	O	37	F.	167.												110/80	152 lbs
	ဦးဆင့်ကြော်	ကုလားကျိုး	O	53	F.												28.	120/80	128 lbs
	ဦးဘိုးမာ	"	O	43	F.	250											29.	-	-
	ဦးသိန်းဦး	"	O	45	F.												-	-	-
	ဒေါ်ခင်မြင့်	ကုလားကျိုး	O	41	F.	388.		✓	✓		✓							150/80	142 lbs.
	ဦးကျော်ဇွဲ	"	O	41	M.													150/90.	172 lbs
	ဒေါ်ခင်ဦး	"	O	59	F													110/70.	160 lbs

1. 8. 2018"

	ဒေါ်အင်ဦး	ကင်းသာယာ	O	71	F.																								
	ဦးဆင်း	တောင်ငူ(ရ)	O	56	F.						✓																		
	ဦးဘုန်းတင်	ကုလားကျိုး	O	59	M.																								
	ဦးတင်ထွဋ်	MEC.	O.	73	M.																								
	ဒေါ်သင်းသင်း	"	O	71	F.						✓																		
	ဦးဆင့်	ရေကြီး.	O	47	F.						✓																		
	ဦးဘိုးဇော်	ကုလားကျိုး	O	64	F.			✓			✓																		
	ဦးကောင်းလေး	"	O.	63	M.			✓			✓																		
	ဒေါ်ဝေဝေဆွေ	ကံတလဲး	O	70	F.			✓	✓																				
	ဒေါ်သန်းဖြိုး	ကုလားကျိုး	O.	63	F.						✓																		
	ဦးထွန်း	"	O	73	M.						✓																		
	ဦးဆင်မိုး	"	O	50	M.						✓																		
	ဒေါ်ဝင်းဝင်း	"	O	50	F.						✓																		
	ဒေါ်ဘဝ်ဖြူ	"	O	51	F			✓	✓		✓																		
	ဒေါ်နုဝ်းဆွေလှိုင်	ဖြောင်းတကာ	O	54	F.			✓	✓		✓																		
	ဒေါ်ဘဝ်ဘုံဝေ	တပ်ကုန်း(၆)	O	46	F.			✓																					
N	ဒေါ်နုဝ်းမာန်းမုံ	ဖြောင်းတကာ	N.	69	F.	174.		✓	✓																				
	ဒေါ်စောမွန်	ကုလားကျိုး	O	57	F.						✓																		
	ဒေါ်ဆုံးဝေး	"	O	36	F.			✓	✓																				
	ဒေါ်စောမွန်	အောင်းကြီးတန်း	O	62	F			✓	✓																				

Omaz ⑭ Gelucas ⑭ B_{12} ⑦. I/N 25% + pdy + B_6 + B_{12}

SR NO	Name.	Address	O/N	Age	M/F	RBS	Diseases CVA.	H/T	D/M	other	CVA Risk <10%	10%-20%	>20%-30%
	ဒေါ်တွေ့.	ကုလားတန်း	O	58	F.						✓		
	" ခင်ဝေးဆိုး	"	O	65.	F.						✓		
	" သန်းဆွေ	ဗိုလ်တထောင်ကြီး	O	37	F.						✓		
	" သန်းမြင့်	ကုလားတန်း	O	45	F.								
	" ထွန်းဝင်း	"	O	43	F.								
	" မြင့်မြင့်ဦး	ကုန်းတော်ကြီး	O	41	F.		✓	✓		✓			
	" မြင့်မြင့်ဦး	"	O	41	M					✓			
	မြင့်မြင့်ထွေး.	"	O	53	F.							✓	
	ဒေါ်ခြေမ ကြည်	ကုလားတန်း	O	54	F					✓			
	ဒေါ်သင်းဝင်း	ဒိုးပျော်ကြီး	O	47	F.					✓			
	ဒေါ်သန်းမွန်	"	O	51	F					✓			
	ဒေါ်သန်းဝင်း.	ဘောလုံကွင်း.	O	58	F.					✓			
	မြင့်မင်းဦး.	"	O	44	F.					✓			
	ဒေါ်ဖြူဖြူ	ကုလားတန်း	O	62	F.		✓	✓					
	ဒေါ်ဝေဝေမြင့်	ဘ.ဂ.ဂ.	O	47	F.					✓			
	ဒေါ်ဝေဝေမြင့်/ဟိန်	ကုလားတန်း	O	45	F.								
	မြင့်မြင့်ဝင်း	ဘ.ဂ.ဂ	O	68	M								✓
	ဒေါ်ဝေဝေ	"	O	65	F.								✓
	မြင့်ဇင်းဝေး.	ကုလားတန်း	O	60	M.		✓	✓					
	ဒေါ်ဖြူဖြူဆွေ.	"	O	45	F.								
	ဒေါ်ခင်မင်းသန်းမြင့်	"	O	50	F.								
	မြင့်ဘဏ္ဍာဝ	ကုမ္ပဏီဘောင်	O	50	M.								
	မြင့်ဇော်လင်း	ကုလားတန်း	O	53	M								
	ဒေါ်ဦးဦးမိုး	ဘုရားကုန်း.	O	52	F					✓			
	ဒေါ်ခင်ဝင်းဝင်း	ကုလားတန်း	O	47	F					✓			
	ဒေါ်ဖြူဖြူဆွေ	"	O	67	F		✓	✓				✓	

	strip lancet. Amlodip	Enalapril	Atenolol	Metf	Gliclazide	Multivit	B1	B6	BMI.	B.P.	Bwt.
70%	7	7	7			7			28.	110/70	138 lbs.
	7		7			7			21	110/70	121 lbs.
			7	28.		7			28.	90/60	150 lbs
	7			7		7				90/70	122 lbs.
						7	7	7		120/80	120 lbs
	7	7	7	28.		7				-	-
	7	7	7			7				-	-
	7	7	7	28		7			32.	130/90	148 lbs
	7	7		28.		7			25.	110/70	142 lbs
	21	7				7			24.	110/80	146 lbs
	7	7	7			7			30.	-	-
	7	7	7	28		7				-	-
	7					7				100/70	134 lbs
40%	21	7	7	14.		7			37.	150/100	164 lbs.
	7	7	7			7			25.	120/80	124 lbs
	7	7	7	14.		7			21	110/70	104 lbs
	7	7	7			7				120/80	128 lbs
	7					7	7.			-	-
40%	21	7	7	21					31.	130/90	200 lbs
		7	7			7				120/80	144 lbs
	7	7	7	28		7				-	-
	7	7	7	28		7				-	-
	7	7	7	28		7				140/90	174 lbs
	7	7	7	21		7		10.	25.	130/80	124 lbs
	7	7		21		7			25	110/80	120 lbs
	7	7	7	7		7				-	-