SCOPING REPORT OF
ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR
HEINDA MINE BEING INVESTED BY
MYANMAR PONGPIPAT MINING CO., LTD.












Reported by

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CONTENTS

List of Table

List of Figure

၁။ အနှစ်ချုပ်အစီရင်ခံစာ

၁-၁။ နိဒါန်း

Myanmar Pongpipat Company Limited မှ တနင်္သာရီတိုင်းဒေသကြီး၊ ထားဝယ်မြို့နယ်အနီး၊ မေတ္တာကျေးရွာအုပ်စု၊ဟိန္ဒားကျေးရွာအနီးတွင် ဟိန္ဒားသတ္တုတွင်းအား တည်ဆောက်လည်ပတ်လျက်ရှိပါသည်။ ဟိန္ဒားသတ္တုတွင်းသည် ဟင်းလင်းဖွင့်သတ္တုတူးဖော်သည့်နည်းစနစ် (Surface Mining Method) တစ်ခုဖြစ်ပြီး ခဲမဖြူ (Tin) သတ္တုအား အဓိကထားထုတ်လုပ်လျက်ရှိပါသည်။ အဆိုပါသတ္တုတွင်းသည် ရှေးယခင်နှစ်ပေါင်းများစွာကတည်းက သတ္တုတွင်းဝန်ကြီးဌာန၊ အမှတ် (၂)သတ္တု တွင်းဦးစီးဌာနလက်အောက်တွင် လည်ပတ်ခဲ့ခြင်းဖြစ်သော်လည်း ယခုအခါ ထိုင်းနိုင်ငံမှ ကုမ္ပဏီတစ်ခုဖြစ်သော Myanmar Pongpipat ကုမ္ပဏီ နှင့် အမှတ် (၂) သတ္တုတွင်းလုပ်ငန်းဦးစီးဌာနတို့ ထုတ်လုပ်မှုခွဲဝေမှု အချိုးအရ အကျိုးတူ ခွဲဝေလုပ်ကိုင်ကြခြင်းဖြစ်ပါသည်။ ယခုအခါ ဟိန္ဒားသတ္တုတွင်းသည် မြန်မာနိုင်ငံပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၅) အရ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) အားလုပ်ဆောင်ရမည်ဖြစ်ပါသည်။ ထိုသို့လုပ်ဆောင်နိုင်ရေးအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းလုပ်ငန်းများ လုပ်ဆောင်လျက်ရှိသည့် တတိယအဖွဲ့အစည်း တစ်ခုဖြစ်သော Ever Green Tech Environmental Services and Training Co., Ltd. (EGTEST) အား အပ်နှံဆောင်ရွက်ခဲ့ပါသည်။

၁-၂။ စီမံကိန်းတည်နေရာ

အဆိုပြုစီမံကိန်းသည် တနင်္သာရီတိုင်းဒေသကြီး၊ ထားဝယ်မြို့နယ်အနီး၊ မေတ္တာကျေးရွာအုပ်စု၊ ဟိန္ဒားကျေးရွာအနီး မြောက်လတ္တီကျူ (၁၄˚၈′ ၃၉.၁၈″) နှင့်အရှေ့လောင်ဂျီကျူ (၉၈˚၂၆′ ၂၄.၇၀″) တွင် တည်ရှိပါသည်။

စီမံကိန်းတည်နေရာ

၁-၃။ စီမံကိန်းအဆိုပြုသူ အကျဉ်းဖော်ပြချက်အကျဉ်း

စီမံကိန်းအဆိုပြုသူ အကျဉ်းအား အောက်ပါဇယားတွင်ဖော်ပြထားရှိပါသည်။

စီမံကိန်းအဆိုပြုသူ	Myanmar Pongpipat Company Limited
စီမံကိန်းအမျိုးအစား	ခဲမဖြူသတ္တုတူးဖော်သန့်စင်ခြင်း
စီမံကိန်းတည်နေရာ	တနင်္သာရီတိုင်းဒေသကြီး၊ထားဝယ်မြို့နယ်အနီး၊ မေတ္တာကျေးရွာအုပ်စု၊ ဟိန္ဒားကျေးရွာ
ဆက်သွယ်ရန်ပုဂ္ဂိုလ်	ဦးခိုင်စွမ် မန်နေဂျာ ၀၉-၈၇၄၂၆၈၂

၁-၄။ စီမံကိန်းအကောင်အထည်ဖော်ဆောင်မည့်တတိယအဖွဲ့အစည်းအကျဉ်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ဆောင်မည့် Ever Green Tech Environmental Services and Training Co., Ltd. နှင့် သက်ဆိုင်သောအချက်များမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

Ever Green Tech Environmental Services & Training Co., Ltd.	
ပါဝင်လုပ်ဆောင်မည့်ပညာရှင်များ	Dr. Kyaw Swar Tint Ph.D. (Mining) Dr. Thein Tun Ph.D. (Metallurgy) Dr. Myo Min Tun Ph.D. (Metallurgy) Dr. Kyaw Soe Ph.D. (Metallurgy) Dr. Kyaw Zay Moe Ph.D. (Botany) Dr. Ko Myint Ph.D. (Zoology) Dr. Khon Aung M.B.B.S (Ygn) U Min Aung M.Sc. (Chemistry) Ms. Thazin Htwe BE (IT), Dip. in EIA/EMS, M.S. in EAM Ma Nandar Nwe B.E.(IT); Dip. in EIA/EMS, M.S. in EAM Mg Myat Thu Kyaw (Environmental Engineering and Management) Ma May Thet Zaw M.E. (Civil)
Company မှတ်ပုံတင်အမှတ်	3344/2015-2016 (Ygn)
ဆက်သွယ်ရန်လိပ်စာ	တိုက်အမှတ် (၁၄)၊ သီရိမြိုင် (၈)လမ်း၊ ၁၃ ရပ်ကွက်၊ လှိုင်မြို့နယ်၊ ရန်ကုန်မြို့။
ဆက်သွယ်ရန်ဖုန်းနံပါတ်	09-43106929, 09-91019166, 09-799700171
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ဆက်သွယ်ရန်ပုဂ္ဂိုလ်	Dr. Kyaw Swar Tint အမိကအကြံပေး 09-5099232

၁-၅။ စီမံကိန်းအကြောင်းအရာအကျဉ်းဖော်ပြချက်

စီမံကိန်းအကျဉ်းအား အောက်ပါဇယားတွင်ဖော်ပြထားရှိပါသည်။

အကြောင်းအရာ	ဖော်ပြချက်
သတ္တုတူးဖော်ခြင်း	
အဓိကရှာဖွေသည့်သတ္တုရိုင်း	ခဲမဖြူ နှင့်ရောရာ သတ္တုများ
သတ္တုရိုင်းတွင် ပါဝင်နှုန်း	ခဲမဖြူပါဝင်နှုန်း (၁၀-၂၀%)
သတ္တုရိုင်း အမျိုးအစား	Alluvial Deposit
သတ္တုတူးဖော်သည့်နည်းစနစ်	ဟင်းလင်းဖွင့် (Open Cut) စနစ်
မြေတူးစက်	၃ စီး
မြေသယ်ယာဉ်	၆ စီး
သတ္တုသန့်စင်ခြင်း	
အဓိကထုတ်ကုန်	Gravity concentration နည်းစနစ်အား အသုံးပြုပြီး ခဲမဖြူ ၆၅% ရရှိအောင်သန့်စင်ထုတ်လုပ်ခြင်း
သန့်စင်သည့်နည်းစနစ်	Hydraulic mining with sluicing
ထုတ်လုပ်မှု	တစ်ရက် ၀.၅ တန်
ရေသုံးစွဲမှု	Side B သန့်စင်စက်ရုံ (တစ်နေ့ ဂါလံ ၃၀၀၀ခန့်) Side C သန့်စင်စက်ရုံ (တစ်နေ့ ဂါလံ ၂၀၀၀ခန့်)
သုံးစွဲသည့်ရေအရင်းအမြစ်	ဘဝပင်ချောင်းရေ
သတ္တုရိုင်းသယ်ယူပို့ဆောင်ခြင်း	သတ္တုသန့်စင်စက်ရုံ လိုအပ်သည့် ပမာဏအတိုင်း စက်ရုံသို့ မြေသယ်ကားများဖြင့် ပို့ဆောင်ခြင်း
အလုပ်သမားများအား ပို့ဆောင်ခြင်း	သီးသန့်ပို့ဆောင်ပေးရန် မလိုအပ်ပါ။ အလုပ်သမားများသည် ကိုယ့်နည်းကိုယ့်ဟန်ဖြင့်လုပ်ငန်းခွင်သို့သွားရောက်ကြပါသည်

စွန့်ပစ်သည့်နည်းစနစ်	
အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း	ပြန်လည် အသုံးပြုနိုင်သော လုပ်ငန်းသုံးအမှိုက်များနှင့် အိမ်သုံးအမှိုက်များ ပြန်လည်အသုံးပြုသွားမည်ဖြစ်ပါသည်။ အိမ်သုံးအမှိုက်များအား အမျိုးအစားခွဲခြားစွန့်ပစ်ပြီး စည်ပင်သာယာရေး ကော်မတီ၏ လမ်းညွှန်ချက်နှင့်အညီစွန့်ပစ်သွားမည်ဖြစ်ပါသည်။ စက်သုံးဆီ ရောနှောပါဝင်နေသည့် လုပ်ငန်းသုံးစွန့်ပစ်ပစ္စည်းများ အား စွန့်ပစ်ခြင်းမပြုပဲပြန်လည် အသုံးပြုနိုင်ရေး စီစဉ်ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။
စွန့်ပစ်ရေ	နေရာသီနှင့်ဆောင်းရာသီကာလများတွင် လုပ်ငန်သုံးစွန့်ပစ်ရေများအား စက်ရုံသို့ပြန်လည်ပို့ဆောင်ပြီး သန့်စင်ကာ လုပ်ငန်းတွင် ပြန်လည် အသုံးပြုပါသည်။ မိုးရာသီကာလတွင် သန့်စင်ကန်အဆင့်ဆင့်တွင် သန့်စင်ပြီး မြောင်းပြု ချောင်းအတွင်းသို့ပို့လွှတ်ပါသည်။
အခြေခံအဆောက်အဦးများ	
ရုံး နှင့်လုပ်ငန်းဆိုင်ရာများ	ရုံးအဆောက်အဦးများ၊ ရုံးသုံးပစ္စည်းများ၊ ရေ၊ မီး၊ သတ္တုသန့်စင်သည့်စက်ပစ္စည်းများ
နေထိုင်ရာ အဆောက်အဦး	ရေ ၊မီးစုံ ပါဝင်၍ လူဦးရေ ၃၀ ခန့် (အလုပ်သမား နှင့် ဧည့်သည်) နေထိုင်နိုင်သည့် အဆောက်အဦး
ဆက်သွယ်မှုလမ်း အမျိုးအစား	ထာဝယ်- ဟိန္ဒား ကားလမ်းမကြီးနှင့် ဆက်သွယ်ထားသည့် မြေသားလမ်း
အလုပ်သမား ခန့်ထားနိုင်မှု	အနီးအနားဒေသမှ အလုပ်သမား ၃၅၀ ခန့်အား အမြဲတမ်း

	အလုပ်သမားအဖြစ်ခန့်အပ်ထားနိုင်မည်ဖြစ်ပါသည်။ထိုင်းနိုင်ငံမှကျွမ်းကျင်ပညာရှင် ၅ ဦးနှင့် ပြည်တွင်းမှ ၅ ဦး ခန့်ထားပါသည်။

၁-၆။ စီမံကိန်းတည်ဆောက်ရသည့်ရည်ရွယ်ချက်အကျဉ်း

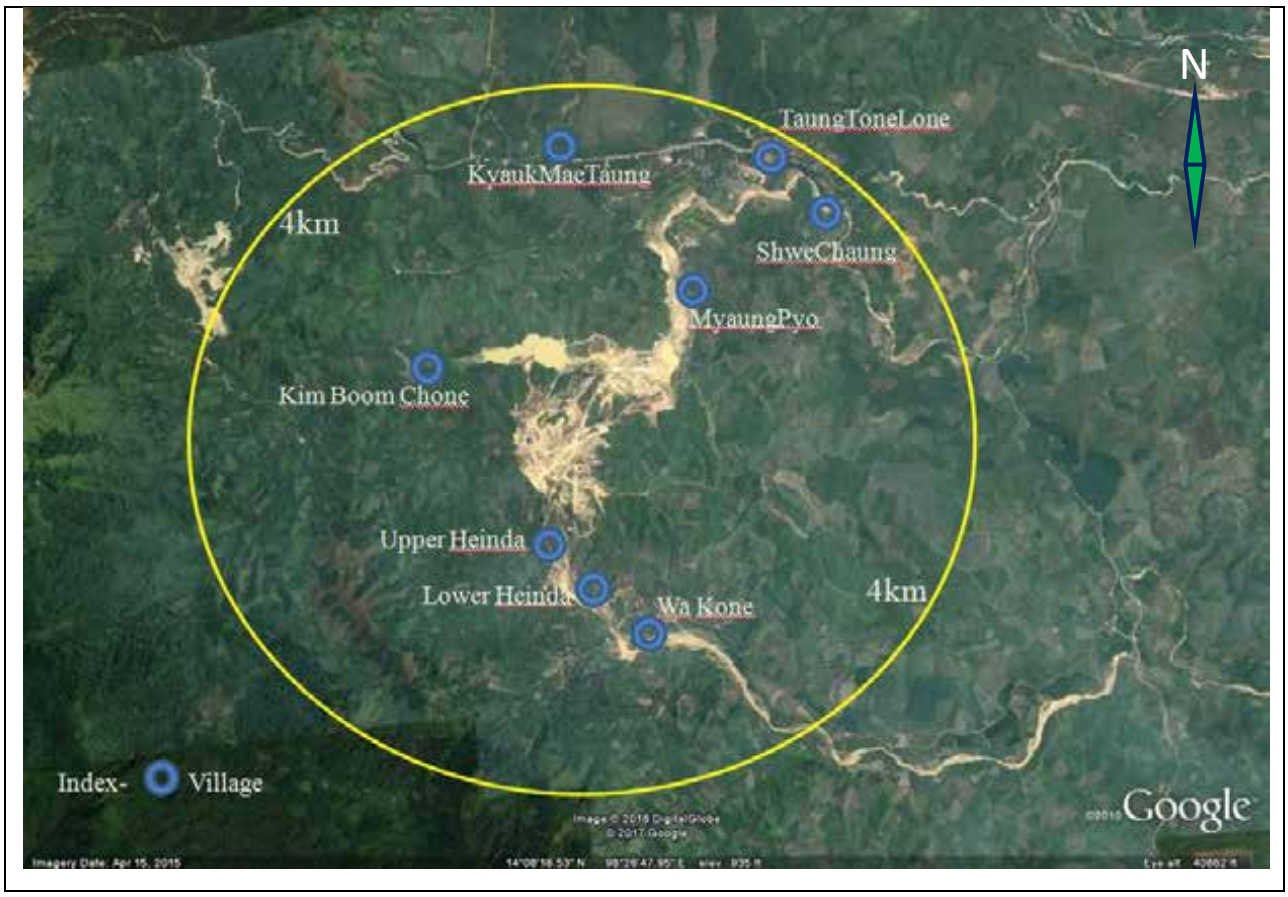
ဟိန္နားသတ္တုတွင်းအား အောက်ဖော်ပြပါ ရည်ရွယ်ချက်များဖြင့် လုပ်ဆောင်လည်ပတ်လျက်ရှိပါသည်။

(က) ဒေသခံလုပ်အားကို အသုံးပြု အရည်အသွေးမြင့် ခဲမဖြူ (၆၅% သန့်စင်ပြီး)အား ထုတ်လုပ်ရောင်းချနိုင်ရန်

(ခ)သတ္တုရိုင်းများအားနိုင်ငံတစ်ကာသို့တင်ပို့ခြင်းဖြင့်နိုင်ငံခြားဝင်ငွေရရှိစေရန်၊ဒေသခံပြည်သူများအလုပ်အကိုင်အခွင့်အလမ်းရရှိစေရန်၊နိုင်ငံတော်အစိုးရနှင့်အကျိုးတူဝေဖက်လုပ်ကိုင်ခြင်းကြောင့် နိုင်ငံတော်အခွန်အခရရှိစေရန်၊

၁-၇။ ထိခိုက်မှုဆန်းစစ်လုပ်ဆောင်သွားမည့် နယ်နိမိတ်သတ်မှတ်ချက်

ပတ်ဝန်းကျင်နှင့်လူမှုဝန်းကျင်ထိခိုက်မှုလေ့လာဆန်းစစ်ခြင်းအား အချင်း(၄)ကီလိုမီတာအား သတ်မှတ်လုပ်ဆောင်သွားမည်ဖြစ်ပါသည်။ အချင်း (၄) ကီလိုမီတာ သတ်မှတ်လုပ်ဆောင်ရခြင်းမှာ စီမံကိန်းသည် သတ္တုတွင်းပိုင်နယ်မြေအတွင်းဖြစ်သော်လည်း အသုံးပြုမည့်သတ္တုသန့်စင်သည့်နည်းစနစ်သည် ရေဖြင့် အသုံးပြုသန့်စင်သည့် Gravity Concentration Method ဖြစ်သောကြောင့်စွန့်ပစ်ရေတွင် မြေသားများ ပါဝင်လာမည်ဖြစ်သည့်အတွက် စွန့်ပစ်ရေစီးဆင်းရာ လမ်းတစ်လျှောက်ရှိ လူနေကျေးရွာများ အနေဖြင့် စွန့်ပစ်ရေများစိုက်ခင်းများအတွင်းသို့ဝင်ရောက်နိုင်ခြေရှိခြင်းကြောင့်အဆိုပါထိခိုက်မှုရှိနိုင်သည့် ကျေးရွာများအားလုံး ပါဝင်မှုရှိစေရေးအတွက် ထိခိုက်မှုပမာဏအား(၄)ကီလိုမီတာအချင်း သတ်မှတ်လုပ်ဆောင်ခြင်း ဖြစ်ပါသည်။

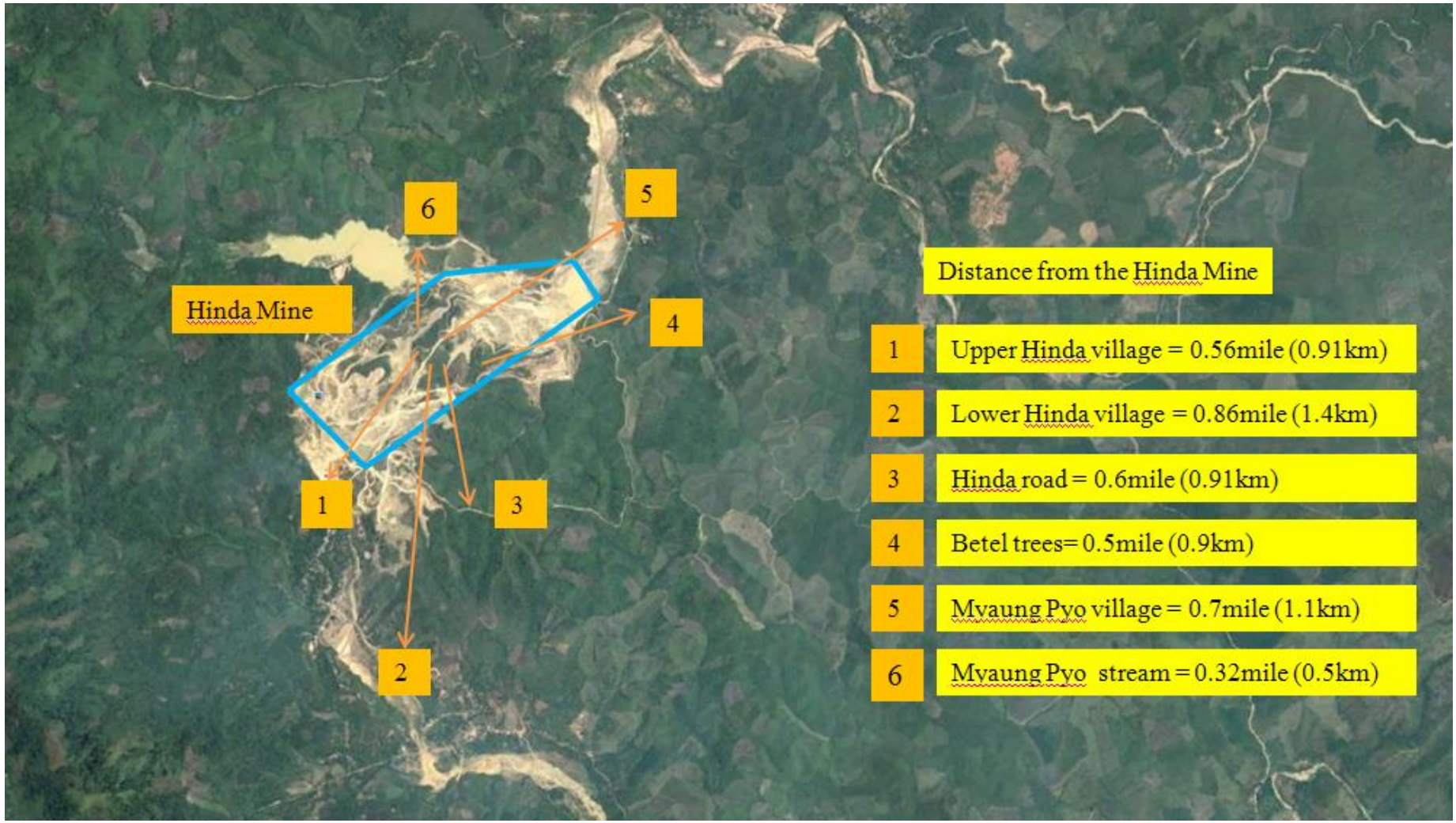


၄ ကီလိုမီတာ အဝန်းဝိုင်းအတွင်းကျရောက်သည့် လူနေရပ်ကွက်များ

၁-၈။ စီမံကိန်းအနီးပတ်ဝန်းကျင်

စီမံကိန်းအနီးအနားတွင် ထိခိုက်မှုရှိနိုင်သည့် အရာများအား အောက်ပါဇယားတွင်ဖော်ပြထားရှိပါသည်။

စဉ်	အကြောင်းအရာ	ဖော်ပြချက်	အကွာအဝေး (ကီလိုမီတာ)
၁။	အနီးဆုံးလူနေရပ်ကွက်	ဟိန္ဒားကျေးရွာ	၀.၉
၂။	အနီးဆုံး မျက်နှာပြင်ရေထု	မြောင်းပြီကျောင်း	၀.၅
၃။	အနီးဆုံးလူနေအထူထပ်ဆုံးနေရာ	ဟိန္ဒားကျေးရွာ	၀.၉
၄။	အနီးဆုံးလမ်း	ထာဝယ်-ဟိန္ဒား ကားလမ်း	၀.၉
၅။	အနီးဆုံးစိုက်ခင်း	ကွမ်းခြံ	၀.၉


Hinda Mine
1
2
3
4
5
6
Distance from the Hinda Mine
1 Upper Hinda village = 0.56mile (0.91km)
2 Lower Hinda village = 0.86mile (1.4km)
3 Hinda road = 0.6mile (0.91km)
4 Betel trees= 0.5mile (0.9km)
5 Myaung Pyo village = 0.7mile (1.1km)
6 Myaung Pyo stream = 0.32mile (0.5km)

စီမံကိန်းအနီးရှိအရာများ

၁-၉။ စီမံကိန်းအနီးပတ်ဝန်းကျင်ရှိထိခိုက်မှုရှိနိုင်သည့်အရာများ

(က) အနီးအနားရှိလူနေရပ်ကွက်/ကျေးရွာများ

အနီးဆုံးလူနေရပ်ကွက်များအနေဖြင့် ဟိန္နားကျေးရွာအုပ်စုနှင့် မြောင်းပြိုကျေးရွာတို့ တည်ရှိမည်ဖြစ်ပါသည်။ဟိန္နားကျေးရွာအနေဖြင့် စီမံကိန်းမှအသုံးပြုသောယာဉ်များ ဝင်ထွက်သွားလာခြင်းကြောင့် ဖုန်ထခြင်းနှင့်လမ်းများပျက်စီးခြင်းအစရှိသည့် ထိခိုက်မှုများအားခံစားရမည်ဖြစ်ပြီး မြောင်းပြို ကျေးရွာအနေဖြင့် စီမံကိန်းမှထုတ်လွှတ်လိုက်သည့် မြေသားပါရှိသော ရေများစီးဆင်းရာ မြောင်းပြိုချောင်းဘေးဘက်တွင် တည်ရှိသောကြောင့် မတော်တဆရေကြီးရေလျှံမှုများဖြစ်ပါက အနီးရှိ လယ်မြေများအတွင်းသို့မြေသားပါရှိသောရေများဝင်ရောက်ပြီး စိုက်ခင်းများပျက်စီးခြင်း၊ လူနေရပ်ကွက်များအထိဝင်ရောက်ပါက လူနေအိမ်များ ပျက်စီးခြင်း အစရှိသည့်ထိခိုက်မှုများနှင့် တွေ့ကြုံရမည်ဖြစ်ပါသည်။

(ခ) အနီးဆုံးရှိ မြစ်ချောင်းများ

စီမံကိန်းနှင့် ကပ်လျက်တွင် မြောင်းပြိုချောင်း တည်ရှိပြီးစီမံကိန်းမှ စွန့်ပစ်လိုက်သော ရေများသည် အဆိုပါ မြောင်းပြိုချောင်းအတွင်းသို့စီးဝင်ခြင်းကြောင့် စီမံကိန်းမှစွန့်ပစ်လိုက်သော မြေသားတွင်ပါဝင်လာမည့် မြေများအား အနယ်ထိုင်သန့်စင်ခြင်း (အနယ်ထိုင်ကန်များဖြင့်သန့်စင်ခြင်း) မရှိပါက အဆိုပါချောင်းအတွင်း အနယ်ထိုင်မှုများပြားပြီးမြစ်ချောင်းတိမ်ကောခြင်းဖြစ်ပေါ်ကာ ရေကြီးရေလျှံခြင်းဖြစ်ပေါ်နိုင်သဖြင့် အဆိုပါ ထိခိုက်မှုအား အထူးသတိပြု ရမည်ဖြစ်ပါသည်။

(ဂ) စီမံကိန်းအနီးအနားရှိစိုက်ခင်းများ

စီမံကိန်းအနီးအနားရှိစိုက်ခင်းများ(ကွမ်းသီးခြံ)များသည်မြောင်းပြိုချောင်းအတွင်းမှ ရေများရေကြီးရေလျှံခြင်းဖြစ်ပေါ်ပါက စိုက်ခင်းများအတွင်းသို့ မြေသားပါသောရေများဝင်ရောက်ပြီး မြေသားများသည် အမြစ်များအားဖုံးအုပ်ကာ အမြစ်များပုပ်ပြီးကွမ်းပင်များသေမည်ဖြစ်သောကြောင့် အဆိုပါထိခိုက်နိုင်မှုအား စနစ်တကျရှောင်လွှဲရမည်ဖြစ်ပါသည်။

၁-၁၀။ မူဝါဒ၊ ဥပဒေဆိုင်ရာနှင့် အဖွဲ့အစည်းဆိုင်ရာလိုက်နာဆောင်ရွက်ချက်

မြန်မာနိုင်ငံတွင် ပြဌာန်းထားရှိပြီးသောအဆိုပြုစီမံကိန်းနှင့်သက်ဆိုင်သည့် မူဝါဒ၊ဥပဒေဆိုင်ရာ နှင့် အဖွဲ့အစည်းဆိုင်ရာ လိုက်နာဆောင်ရွက်ရမည့်ဥပဒေများအကျဉ်းချုပ်မှာအောက်ပါအတိုင်းဖြစ်ပါသည်။

Laws and Regulations	Year
Constitution of the Republic of the Union of Myanmar (Articles 24,45,349,359)	2008
Environmental Conservation Law (Law No.7(o), 14,15,24,25,29)	2012
Environmental Conservation Rules (Rule 55, 69 (a), (b))	2014
EIA Procedures (Article 102 to 110, 113, 115, 117)	2015
National Environmental Quality (Emission) Guidelines	2015
Myanmar Investment Law (Law No. 50(d), 51, 73)	2016
Labour Organization Law, (Law No. 1,7 to 11)	2011
The Settlement of Labour Dispute Law, (Law No. 38, 39, 40, 51)	2012
Employment and Skill Development Law, (Law No. 5, 14, 30(a,b))	2013
The Leave and Holiday Act, 1951 (Law Amended July, 2014)	2014
Minimum Wages Law (Law No. 12, 13 (a to g)	2013
Payment of Wages Act (Law No. 3,4, 5, 14, 8 with 7,10)	2016
The Myanmar Insurance Law (Law No. 15, 16)	1993
The Social Security Law (Law No. 11(a), 15(a), 18(b), 48, 49, 75)	2012
Workman Compensation Act	1951

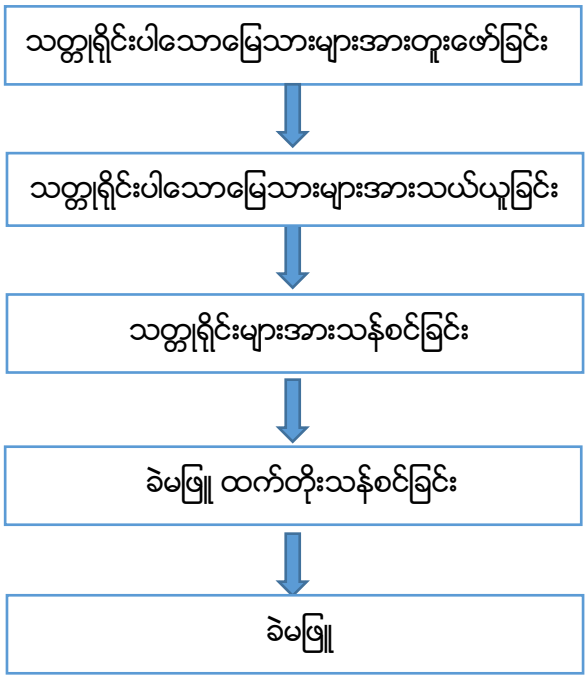
Law Amending the Factories Act 1951 (Pyidaungsu Hluttaw Law No. 12/2016)	2016
Public Health Law (Law No. 3, 5)	1972
Pesticide Law (Pyidaungsu Hluttaw Law No. 14/2016)	2016
Private Industrial Enterprise Law	1990
Forest Law	1992
Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law	1994
Protection and Preservation of Cultural Heritage Regions Laws (Law No. 15, 16)	1998
Prevention and Control of Communicable Diseases Law (Law No. 3, 4, 9, 11)	1995
The Control of Smoking and Consumption of Tobacco Product Law (Law No. 9)	2006
Conservation of Water Resources and Rivers Law (Law No. 8, 11(a), 13, 19, 24(b), 30)	2006
Environmental Conservation Law	2012
Agricultural Land Law	2012
The Protection and Preservation of Antique Objects Law (Law No. 12,15 20)	2015
The Protection and Preservation of Ancient Monuments Law (Law No. 12,15 20)	2015
The Prevention of Hazard from Chemical and Related Substances Rules (Law No. 8,15,16,17, 20, 22, 23, 27)	2013

The Freshwater Fisheries Law (Law No. 36,40,41)	1991
Myanmar Petroleum and Petroleum Products Law (Article 32, 33)	2017
Automobile Law (Pyidaungsu Hluttaw Law No. 55/2015)	2015
The Myanmar Engineering Council Law (Law No. 20,24,25, 31(a), 37)	2013
Myanmar Mining Law	2018
Myanmar Mining Rule	2018
Tanintharyi Region Environmental Conservation and Cleaning Law	2018

၁-၁၁။ စီမံကိန်းနှင့်ပက်သက်ပြီးဖော်ပြချက်များ

စီမံကိန်းလုပ်ငန်းစဉ်များ

အဆိုပြုစီမံကိန်းသည်ယခင်ကတည်းက တည်ဆောက်လည်ပတ်ခဲ့ခြင်းဖြစ်ခြင်းကြောင့်အဆောက်အဦးများတည်ဆောက်ခြင်းလုပ်ငန်းစဉ်များပါဝင်ခြင်းမရှိပဲသတ္တုတွင်းတူးဖော်ထုတ်လုပ်ခြင်းလုပ်ငန်းစဉ်များအားသာလျှင်ဖော်ပြသွားမည်ဖြစ်ပါသည်။လည်ပတ်ခြင်းလုပ်ငန်းစဉ်တွင်သတ္တုများထုတ်ယူနိုင်ရေးအတွက်အပေါ်ယံမြေသားများအားဖယ်ရှားခြင်း၊အပေါ်ယံမြေသားများအားစုပုံခြင်း၊သတ္တုပါသောမြေသားများအားသန့်စင်သည့်နေရာသို့သယ်ယူခြင်း၊ သတ္တုရိုင်း(ခဲမဖြူ)များအား Gravity နည်းဖြင့်သန့်စင်ခြင်းစသည်တို့ဖြစ်ပါသည်။လည်ပတ်ခြင်းအကျဉ်းချုပ်အား အောက်ပါပုံတွင် တွေ့ရှိနိုင်ပါသည်။



သတ္တုတူးဖော်သန့်စင်ခြင်းလုပ်ငန်းစဉ်အဆင့်ဆင့်

သတ္တုရိုင်းပါသောမြေသားများအားတူးဖော်ခြင်း

သတ္တုရိုင်းပါသော မြေသားများအား မြေထိုးကော်စက် (Back Hoe) များဖြင့် တူးဖော်ပြီး မြေသယ်ယာဉ် (Truck) ကားများပေါ်သို့တင်ပို့ပါသည်။

သတ္တုရိုင်းပါသော မြေသားများအားသယ်ယူခြင်း

သတ္တုရိုင်းပါသော မြေသားများအား သတ္တုတူးဖော်သည့်နေရာမှ ထရပ်ကား (Truck) ကားများဖြင့် သတ္တုသန့်စင်သည့်နေရာသို့ သယ်ယူပို့ဆောင်ပါသည်။

သတ္တုရိုင်းများအားသန့်စင်ခြင်း

သတ္တုရိုင်းများအား သန့်စင်သည့်နေရာတွင် ခဲမဖြူသတ္တု ၅ ရာခိုင်နှုန်းခန့်ပါဝင်သည့် မြေသားများအား ရေဖြင့် ထိုးချပြီး သတ္တုသန့်စင်သည့်စက်ရုံသို့ပို့ဆောင် သန့်စင်ပါသည်။

သတ္တုသန့်စင်သည့်စက်ရုံ၌ခဲမဖြူသတ္တု(၃၅-၅၀)ရာခိုင်နှုန်းခန့်ထက်တိုးသန့်စင်ခြင်းလုပ်ဆောင်ပါသည်။

သတ္တုရိုင်းများအား အဆင့်တက်ပြုပြင်ခြင်း

သတ္တုရိုင်းများအားအဆင့်တက်ပြုပြင်ခြင်း လုပ်ငန်းမှာ ရရှိပြီးသော ခဲမဖြူသတ္တု (၃၅-၅၀) ရာခိုင်နှုန်းခန့် အား hydro sizer, tableing and magnetic separator များအသုံးပြု၍ ဈေးကွက်ဝင်အဆင့် ခဲမဖြူသတ္တု ပါဝင်မှု(၆၅) ရာခိုင်နှုန်းနှင့်အထက်ရရှိအောင် ထက်တိုးသန့်စင်ခြင်းလုပ်ဆောင်ပါသည်။

စီမံကိန်းမှထွက်ရှိလာသောရေများအားသန့်စင်စွန့်ပစ်သွားမည့်စနစ်

စီမံကိန်းအတွင်းမှမြေသားနှင့်ရောနှောထွက်ရှိလာမည့်စွန့်ပစ်ရေများအားအနယ်ထိုင်ကန်များဖြင့်အနယ် ထိုင်စေပြီးမှ မြေသားပါဝင်မှု အနည်းဆုံးဖြစ်သည့် ရေများအားသာလျှင် စွန့်ပစ်သွားမည် ဖြစ်ပါသည်။

ပိတ်သိမ်းခြင်းလုပ်ငန်းစဉ်

ပိတ်သိမ်းခြင်းလုပ်ငန်းစဉ်တွင်သတ္တုတူးဖော်သည့်နေရာများ၊ စွန့်ပစ်မြေစာများစုပုံထားသည့် နေရာများ၊ အနယ်ထိုင်ကန်များအားမူလအခြေအနေနှင့်အနီးစပ်ဆုံးတူညီစေရန်ပြန်လည်လုပ်ဆောင်ရမည့်လုပ်ငန်း စဉ်များပါဝင်မည်ဖြစ်ပါသည်။ စီမံကိန်းဝင်းအတွင်းရှိသည့်အဆောက်အအုံများနှင့်သတ္တုသန့်စင်စက်များ သည် သတ္တုတွင်းဝန်ကြီးဌာနပိုင်များဖြစ်သဖြင့်ပြန်လည်အပ်နှံထားရှိရမည်ဖြစ်ပါသည်။

၁.၁၂။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာတွင်ပါဝင်သော အကြောင်းအရာများ

အဆိုပြုစီမံကိန်းသည် ယခင်ကတည်းက တည်ဆောက်လည်ပတ်ခဲ့ခြင်း ဖြစ်နေပါသောကြောင့် အဆောက်အဦးများတည်ဆောက်ခြင်းလုပ်ငန်းစဉ်များ ပါဝင်ခြင်းမရှိပဲသတ္တုတွင်းတူးဖော်ထုတ် လုပ်ခြင်းလုပ်ငန်းစဉ်များနှင့်လုပ်ငန်းပိတ်သိမ်းသည့်ဖြစ်စဉ်များအားသာလျှင် ဖော်ပြသွားမည် ဖြစ်ပါသည်။လည်ပတ်ခြင်းလုပ်ငန်းစဉ်တွင်သတ္တုများထုတ်ယူနိုင်ရေးအတွက်အပေါ်ယံမြေသား များအားဖယ်ရှားခြင်း၊အပေါ်ယံမြေသားများအားစုပုံခြင်း၊သတ္တုပါသောမြေသားများအားသန့်စင် သည့်နေရာသို့သယ်ယူခြင်း၊ သတ္တုရိုင်း(ခဲမဖြူ၆၅%) များအား Gravityနည်းဖြင့် သန့်စင်ခြင်း စသည်တို့ဖြစ်ပါသည်။

၁-၁၃။ အဓိကထိခိုက်နိုင်မှုများနှင့်လျော့နည်းသက်သာစေရန်လုပ်ဆောင်ရမည့်နည်းလမ်းများ (က)။ အဓိကထိခိုက်နိုင်မှုများ နှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများ

အဓိက သက်ရောက်နိုင်မှုများ အနေဖြင့်လည်ပတ်သည့်ကာလအတွင်းမြေသားပါဝင်မှုများပြားသော စွန့်ပစ်ရေထွက်ရှိခြင်း၊သန့်စင်ကန်များမှ ဆယ်ယူရရှိသည့်အနယ်အနှစ်များအား စွန့်ပစ်ခြင်း အစရှိသည့် ထိခိုက်မှုများ ပါဝင်မည်ဖြစ်ပါသည်။ မြေသားပါဝင်မှုများပြားသော စွန့်ပစ်ရေများအား အနယ်ထိုင်ကန်များတွင် သန့်စင်ပြီးမှစွန့်ပစ်မည်ဖြစ်ပါသည်။ သန့်စင်ကန်များမှ ထွက်ရှိလာမည့် အနယ်အနှစ်များအားပတ်ဝန်းကျင်ထိခိုက်မှုအနည်းဆုံးနေရာအားရွေးချယ်စွန့်ပစ်သွားမည်ဖြစ်ပါသည်။ ထို့အပြင်

- ကြွင်းကျန်သက်ရောက်မှုများ နှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများ
- ဆက်စပ်သက်ရောက်မှုများနှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများ
- ကုန်းမြေဂေဟထိခိုက်မှုများ နှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများ
- ရေထုဂေဟအပေါ် ထိခိုက်မှုများနှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများ
- မြေပေါ်မြေအောက်ရေအပေါ်ထိခိုက်မှုနှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများ
- လေထုအရည်အသွေးပေါ်ထိခိုက်မှုများနှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများ
- စွန့်ပစ်ပစ္စည်းများကြောင့်ထိခိုက်မှုများနှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများ
- လူမှုစီးပွားရေးအပေါ်ထိခိုက်မှုများ နှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများ
- ကျန်းမာရေးအပေါ်ထိခိုက်မှုများဆန်းစစ်ခြင်း များကိုလည်းလုပ်ဆောင်သွားမည်ဖြစ်ပါသည်။

၁-၁၄။ လူထုပူးပေါင်းပါဝင်မှုရှိရေး လုပ်ဆောင်ထားရှိချက်များ

လူထုပူးပေါင်းပါဝင်ခြင်းသည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းများ လုပ်ဆောင်ရေးအတွက် အဓိကအရေးကြီးသော လုပ်ငန်းစဉ် ဖြစ်သဖြင့် ထိရောက်မှုရှိသော လူထုပူးပေါင်းပါဝင်ခြင်း လုပ်ငန်းစဉ်များဖြစ် စေရန် အောက်ဖော်ပြပါအတိုင်း လုပ်ဆောင်သွားရှိပါမည်။

(က) အဓိကသက်ဆိုင်သူများ သတ်မှတ်လုပ်ဆောင်ခြင်း (Stakeholder Engagement and Identification)၊

(ခ) လူနေရပ်ကွက်များအတွင်းသို့ကွင်းဆင်းဆောင်ရွက်ခြင်း (Household survey)၊

(ဂ) အဓိကသက်ဆိုင်သူများ တွေ့ဆုံပွဲပြုလုပ်ခြင်း (Key stakeholders meetings)

(ဃ) လူထုတွေ့ဆုံပွဲများပြုလုပ်ခြင်း (Public meetings)၊

(င) အစီရင်ခံစာ အားချပြဆွေးနွေး အကြံညဏ်ရယူခြင်း (Public disclosure process)၊

(က) အဓိကသက်ဆိုင်သူများ သတ်မှတ်လုပ်ဆောင်ခြင်း

စီမံကိန်းနှင့်ပက်သက်ပြီး အဓိကသက်ဆိုင်သူများအနေဖြင့် အောက်ဖော်ပြပါသက်ရောက်သူများအား သတ်မှတ်ထားရှိပါသည်။

(က) တနင်းသံ်ရီတိုင်းဒေသကြီးအစိုးရအဖွဲ့၊

(ခ) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန(တနသံ်ရီတိုင်း)၊

(ဂ) အမှတ်(၂)သတ္တုတွင်းလုပ်ငန်း (တနသံ်ရီတိုင်း)၊

(ဃ) စည်ပင်သာယာရေးကော်မတီ (တနသံ်ရီတိုင်း)၊

(င) သစ်တောဦးစီဌာန (ထားဝယ်)

(စ) စည်ပင်သာယာရေးကော်မတီ (ထားဝယ်ခရိုင်)၊

(ဆ) စည်ပင်သာယာရေးကော်မတီ (မေတ္တာမြို့)

(ဇ) ရေအရင်းအမြစ်နှင့်အသုံးချရေးဦးစီးဌာန (တနသံ်ရီတိုင်:)

(ဈ) အလုပ်သမားညွှန်ကြားမှုဦးစီးဌာန (တနင်းသံ်ရီတိုင်း)

(ည) ကျန်းမာရေးဦးစီးဌာန (တနင်းသံ်ရီတိုင်း)

(ဋ) မြန်မာနိုင်ငံရဲတပ်ဖွဲ့ (တနင်းသံ်ရီတိုင်း)

(ဌ) သတ္တုတွင်းလုပ်ငန်းရှင်များအသင်း

(ဍ) ဟိန္ဒားသတ္တုတွင်းစောင့်ကြည့်လေ့လာရေးအဖွဲ့ အဖွဲ့ဝင်များ

(ဎ) စီမံကိန်းနှင့် စာရင်းအင်းဦးစီးဌာန (ထားဝယ်)

(ဒ) အနီးအနားရှိကျေးရွာများ မှာကျေးရွာသူ၊သားများ နှင့် အုပ်ချုပ်ရေး အဖွဲ့ဝင်များ

(ဓ) ဒေသအခြေစိုက်မီဒီယာများ၊အစိုးရမဟုတ်သောအဖွဲ့အစည်းများအစရှိသည်တို့ပါဝင်မည်ဖြစ်ပါသည်။

(ခ) လူနေရပ်ကွက်များအတွင်းသို့ကွင်းဆင်းဆောက်ရွက်ခြင်းမှတွေ့ရှိချက်များ

ထိခိုက်မှုဆန်းစစ်လေ့လာခြင်းအဖွဲ့အနေဖြင့် အောက်ဖော်ပြပါ ရပ်ကွက်ကျေးရွာများအတွင်းသို့ ကွင်းဆင်းဆောင်ရွက်ခဲ့ပါသည်။ အဆိုပါလူနေရပ်ကွက်များအတွင်းသို့ ကွင်းဆင်းဆောက်ရွက်ရာမှ အောက်ဖော်ပြပါအချက်များအား အဓိကတွေ့ရှိရပါသည်။ ဒေသခံပြည်သူများ၏ လိုလားချက်များနှင့်စိုးရိမ်မှုများသည် ပုံစံအမျိုးမျိုးကွဲပြားခြားနားသော်လည်း အဓိကတူညီသည့်အချက်များအားဖော်ပြထားခြင်းဖြစ်ပါသည်။

	လိုလားချက်များ	စိုးရိမ်မှုများ
မြောင်းပြို	လမ်း၊တံတား၊ရေမီး၊ဆေးခန်း၊လျော်ကြေး၊ လစာ၊ချောင်းဖော်၊	မြေစာစွန့်ပစ်မှု၊ထိခိုက်မှုထပ် မဖြစ်စေရန်၊
အထက်ဟိန္ဒား	လမ်း၊တံတား၊ရေမီး၊ဆေးခန်း၊နုန်းများ ဆယ်ရန်၊ လစာ၊	
အောက်ဟိန္ဒား	လမ်း၊တံတား၊ရေမီး၊လစာ၊ ကျောင်းဆရာမ	မြေစာစွန့်ပစ်မှု
ရေပူဝ	လမ်း၊တံတား၊ရေမီး၊	
ကင်ပွန်းခြံ	လမ်း၊တံတား၊ရေမီး၊နုန်းများဆယ်ရန်၊ လျော်ကြေး၊ချောင်းဖော်၊	ထိခိုက်မှုထပ် မဖြစ်စေရန်၊
ကျောက်မဲတောင်	လမ်း၊တံတား၊ရေမီး၊ဆေးခန်း၊ ဘုန်းကြီးကျောင်း၊ချောင်းဖော်၊	မြေစာစွန့်ပစ်မှု၊
တောင်သုံးလုံး	လမ်း၊တံတား၊ရေမီး၊ဆေးခန်း၊ရေတွင်းများ ရေအရည်အသွေး စမ်းရန်၊လျော်ကြေး၊ချောင်းဖော်	မြေစာစွန့်ပစ်မှု၊ထိခိုက်မှုထပ် မဖြစ်စေရန်၊
ရွှေချောင်း	လမ်း၊တံတား၊ရေမီး၊ဆေးခန်း၊ရွာဘောလုံး ကွင်း၊ခဲသင်္ဘော ပြန်စားရန်၊လျော်ကြေး၊ချောင်းဖော်၊ ကျောင်းဆရာမ	ထိခိုက်မှုထပ် မဖြစ်စေရန်၊

(ဃ) လူထုတွေ့ဆုံပွဲများပြုလုပ်ခြင်း

လူထုပူးပေါင်းပါဝင်ခြင်း လုပ်ငန်းစဉ်တစ်ခုအဖြင့် လူထုတွေ့ဆုံပွဲများ ပြုလုပ်ခဲ့ပြီး တွေ့ဆုံပွဲများ အတွင်းတက်ရောက်လာသူအသီးသီးမှ ဆွေးနွေးချက်များမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

(၁) ထိခိုက်မှုနှင့်သက်ဆိုင်ရာလူထုတွေ့ဆုံပွဲမှတွေ့ရှိချက်များ

- ဆွေးနွေးပွဲအတွင်းတွေ့ဆုံဆွေးနွေးမှုများ

EGTEST ၏ တာဝန်ရှိသူတစ်ဦးမှ ပတ်ဝန်ကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းဆိုင်ရာနှင့် သတ္တုတူးဖော်ခြင်းလုပ်ငန်းစဉ်ကြောင့်ထိခိုက်နိုင်မှုများအားရှင်းလင်းတင်ပြပါသည်။

ဒေသခံများအနေဖြင့်နှန်းစစ်ကန်များမှရေများကြောင့်ပတ်ဝန်းကျင်ရေထုအပေါ်ညစ်ညမ်းမှုများ ဖြစ်ပေါ်လာနိုင်ခြင်းနှင့်လယ်ကွင်းများအတွင်ဝင်ရောက်လာနိုင်ခြင်းများကိုအဓိကထားဆွေးနွေးသွားကြပါသည်။

- ထိခိုက်မှုနယ်နမိတ်သတ်မှတ်ခြင်းဆိုင်ရာလူထုတွေ့ဆုံအတွင်းစာဖြင့်အကြံပြုရေးသားချက်များကိုနောက်ဆက်တွဲ ၂ ဖော်ပြထားပါသည်။

(၂) ပထမအကြိမ်လူထုတွေ့ဆုံပွဲမှတွေ့ရှိချက်များ

ဆွေးနွေးပွဲအတွင်းတွေ့ဆုံဆွေးနွေးမှုများ

EGTEST ၏ တာဝန်ရှိသူတစ်ဦးမှသတ္တုတူးဖော်ခြင်းလုပ်ငန်းစဉ်နှင့်သတ္တုသန့်စင်ခြင်းလုပ်ငန်းစဉ်းများကြောင့်ထိခိုက်နိုင်မှုများ၊လျော့ချနိုင်သည့်နည်းလမ်းများကိုရှင်းလင်းတင်ပြပါသည်။ ဒေသခံများမှလည်းမိုးရာသီအတွင်း နှန်းစစ်ကန်များ ပြိုကျပြီးလယ်ကွင်းများအတွင်းဝင်ရောက် ထိခိုက်နိုင်သောကြောင့် စိုးရိမ်မှုများရှိကြောင်း ဆွေးနွေးတင်ပြသွားပါသည်။

၁-၁၅။ ပတ်ဝန်းကျင်နှင့်လူမှုဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်သည်လုပ်ငန်းရှင်၊တစ်ဆင့်ခံကဲထရိုက်များအားလုံးအပါအဝင် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး လုပ်ငန်းများအားစတင်တည်ဆောက်သည့် အချိန်မှစတင်ပြီး ပိတ်သိမ်းသည့် အချိန်သည့်တိုင်ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးလုပ်ငန်းများအား လုပ်ဆောင်နိုင်ရန်အတွက် တာဝန်ဝတ္တရားများသတ်မှတ်ခွဲဝေပေးခြင်း၊လိုအပ်သောစီမံခန့်ခွဲမှုများလမ်းညွှန်ပေးခြင်း၊ စောင့်ကြည့်လေ့လာရေးအစီအစဉ်များ(စောင့်ကြည့်ရမည့်အရာများ ၊စောင့်ကြည့်ရမည့်အကြိမ်အရေအတွက်၊ စောင့်ကြည့်ရမည့်သူ)အစရှိသည့်များအားသတ်မှတ်ပေးခြင်းတို့ပါဝင်မည်ဖြစ်ပါသည်။ ပတ်ဝန်းကျင်နှင့်လူမှုဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကျဉ်းချုပ်အား နယ်နိမိတ်သတ်မှတ်ခြင်း အစီရင်ခံစာအခန်း(၁၂)တွင် ဖော်ပြထားပါသည်။

၁-၁၆ အရေးပေါ်အခြေအနေစီမံခန့်ခွဲမှုအစီအစဉ် (Emergency Response Plan)

အဆိုပြုစီမံကိန်းမှ ဖြစ်ပေါ်နိုင်သည့် အရေးပေါ်အခြေအနေများမှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

(က) မီးဘေးအန္တရာယ်၊

(ခ) မြေစာပုံပြိုကျခြင်း၊

(ဂ) အနယ်ထိုင်ကန်များပြိုကျခြင်း စသည်တို့ဖြစ်ပါသည်။

အစီရင်ခံစာထဲတွင် အဆိုပါဖြစ်ပေါ်လာနိုင်သည့်အရေးပေါ်အခြေအနေများနှင့် ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများအားနယ်နိမိတ်သတ်မှတ်ခြင်းဆိုင်ရာအစီရင်ခံစာအခန်း(၈)တွင် ဖော်ပြထားရှိပါသည်။

၁-၁၇။ သဘာဝဘေးအွန္တရာယ်စီမံခန့်ခွဲမှုအစီအစဉ် (Diasaster Management Plan)

အဆိုပြုစီမံကိန်းတွင်သဘာဝဘေးအွန္တရာယ်များအနေဖြင့်အောက်ဖော်ပြပါတို့ပါဝင်မည်ဖြစ်ပါသည်။

(က) မီးဘေးအွန္တရာယ်၊

(ခ) ငလျင်ဘေးအွန္တရာယ်၊

(ခ) ရေကြီးခြင်း စသည်တို့ဖြစ်ပါသည်။

အစီရင်ခံစာထဲတွင် အဆိုပါဖြစ်ပေါ်လာနိုင်သည့် ဘေးအွန္တရာယ်များနှင့်ကာကွယ်လုပ်ဆောင်သွားရမည့်နည်းလမ်းများအား နယ်နိမိတ်သတ်မှတ်ခြင်းဆိုင်ရာအစီရင်ခံစာအခန်း(၈)တွင် ဖော်ပြထားရှိပါသည်။

၁-၁၉။ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ဆောင်ရန်အတွက်လိုအပ်သောအချက်အလက်များ စုဆောင်းခြင်း

စီမံကိန်းနှင့်သက်ဆိုင်သော အချက်အလက်များအား စီမံကိန်းအကောင်အထည်ဖော်ဆောင်သည့် Myanmar Pongpipat မှစုဆောင်းပေးပါသည်။ လူမှုစီးပွားနှင့်သက်ဆိုင်သည့်အချက်အလက် (Secondary Data)များအား ထားဝယ်မြို့နယ် အထွေထွေအုပ်ချုပ်ရေးရုံးမှစုဆောင်းရရှိပါသည်။ ကျန်းမာရေးနှင့်သက်ဆိုင်သည့်အချက်အလက်များ(Secondary Data)အားထားဝယ်မြို့နယ်ကျန်းမာရေးဦးစီးဌာနမှရရှိပါသည်။(Primary Data)များအား လူနေရပ်ကွက်များအတွင်းသို့ Household Survey ကွင်းဆင်းဆောင်ရွက်ခြင်းမှရရှိပါသည်။

၁-၂၀။အနှစ်ချုပ်သုံးသပ်ချက်

အနှစ်ချုပ်သုံးသပ်ချက်အနေဖြင့်ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအဖွဲ့မှဒေသခံများ၊ အစိုးရမဟုတ်သောအဖွဲ့အစည်းများနှင့်ပူးပေါင်းကာမြေပေါ်ရေညစ်ညမ်းခြင်းများ နှင့် ပတ်ဝန်းကျင်လယ်ယာများထိခိုက်ခဲ့မှုများအပေါ်လိုအပ်ပါကလျော်ကြေးများပေးခြင်းကိုညှိနှိုင်းဆောင်ရွက်ရပါမည်။ လုပ်ငန်းရှင်ဘက်မှလည်းသက်ဆိုင်ရာဒေသခံအာဏာပိုင်များ၊ လူထုများနှင့်အတူကော်မတီများဖွဲ့စည်းပြီးအလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးခြင်းနှင့်လျော်ကြေးငွေပေးလျော်ခြင်းများကိုဆောင်ရွက်နေပါသည်။

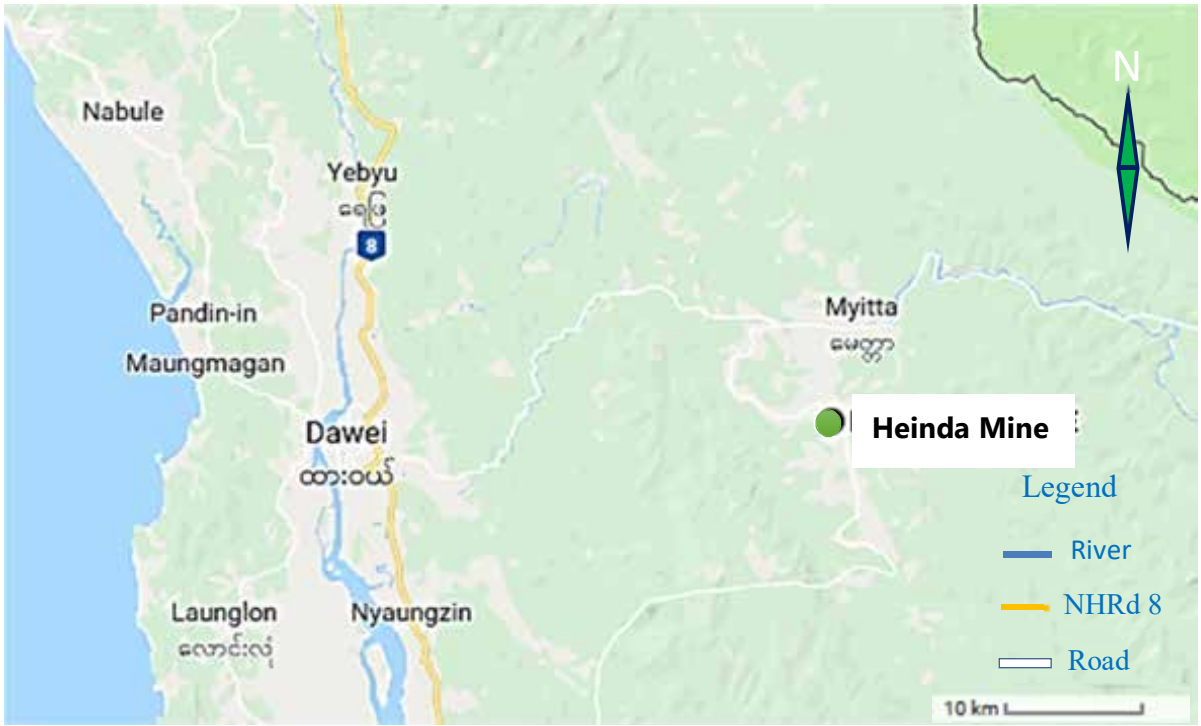
1. EXECUTIVE SUMMARY

1.1. Introduction

Myanmar Pongpipat Co., Ltd. will operate surface mining for Tin in Heinda Mine, near Heinda Village, Myitta Township, Tanintharyi Region. Myanmar Pongpipat has now initiated an Environmental and Social Impact Assessment (ESIA) to determine the feasibility of the project from an Environmental and social perspective. Ever Green Tech Environmental Services and Training Co., Ltd. has been appointed as the independent Environmental Assessment Practitioner (EAP) responsible for managing the ESIA and supporting Public Participation (PP) process.

1.2 Project Location

The project is located in Heinda Village, Myitta Village Cluster, near Dawei, Tanintharyi Region (14° 8'39.18"N and 98°26'24.70"E).



Project Location

1.3. Brief Description of the Project Proponent

The followings are the brief of project proponent.

Project Developer	
Project Developer	Myanmar Ponpipat Co., Ltd.
Type of Project	Surface Mining Project for Tin
Project Location	Heinda Village, Myitta Township, Near Dawei Township
Contact Person	U Khaing Swan (09-8742682)

1.4. Brief Description of the Environmental Assessment Practitioner

Below is the background information on Ever Green Tech Environmental Services and Training Co., Ltd., (Third party) who draw up the ESIA.

Ever Green Tech Environmental Services & Training Co., Ltd.	
Specialists including the written report	Dr. Kyaw Swar Tint Ph.D. (Mining) Dr. Thein Tun Ph.D. (Metallurgy) Dr. Myo Min Tun Ph.D. (Metallugy) Dr. Kyaw Zay Moe Ph.D. (Botany) Dr. Khon Aung M.B.B.S (Ygn) Dr. KoMyint Ph.D. (Zoolgoy) U Min Aung M.Sc. (Chemistry) Ma Nandar Nwe B.E. (IT); Dip. in EIA/EMS Ma Yuzuna Moe Myint B.Sc. (Forestry) Mg Thant Zin B.Sc. (Forestry) Ma May Thet Zaw M.E. (Civil)
Company Name	Ever Green Tech Environmental Services and Training Co., Ltd.
Company Registration No.	3344/2015-2016 (Ygn)

Contact Address	No.14, Thiri Mying (8th)Street, 13th Quarter, Hlaing Township, Yangon
Telephone Number	09-43106929, 09-91019166, 09-799700171
E-mail	11kyawswar@gmail.com
Contact person	Dr. Kyaw Swar Tint Principal Environmental and Social Consultant 09-5099232, 09-43106929

1.5 Project at a Glance

The following table shows the brief descriptions of the proposed project.

Aspects	Descriptions
Mining	
Area	Over 2000 acres
Raw material	Tin ore from Heinda Mine Site
Ore grade	The average ore grade is 10 to 20% Tin
Type of mineral deposit	Alluvial Deposit
Ore grade	The average ore grade is 10 to 20% Tin
Mining method	Open Cut Mining Method
No. of back hoe	3 Nos.
No. of dump truck	10 Nos.
Mineral Processing	
Target products	Tin concentrate (over 65%) by gravity concentration method
Processing method	Hydraulic mining with sluicing
Production rate	0.5 ton/day
Water usage for mineral processing	3000 gallons per day for Side B processing plant 2000 gallons per day for Side C processing plant
Source of water	Surface water from Ba Wa Pin Creek (0.9 km far away)
Transportation for ore	Raw material (ore) from mine site was transported to the processing plant directly and there will need no storage facility for ore by trucks.

Transportation for workers	It is not necessary to transport to the workers to the mining and processing sites. Most of the workers will go there by their by their own motorbikes.
Waste management	
Solid wastes	1. Recyclable domestic waste will be recycled. Other domestic waste will be disposed of in a domestic waste disposal site inside the mine. 2. Process solid wastes (parking material, oil storage container, etc.) will be recycled.
Liquid wastes	1. Process water was pumped back to the plant and re-used in the treatment process during summer and winter seasons. 2. Waste water will be treated in settling ponds and re- during rainy seasons.
Other Infrastructures	
Office and other facilities	These include offices, equipment and furnishings, sewerage, power, water and water treatment, and mineral process equipments and materials.
Camp	The camp will be provided accommodation for the employee during the operational phase. It will house about 30 employees and visitors. This will include accommodation units, kitchen, messing facilities, power, sewerage and waste disposal.
Access and haul roads	Main access to the proposed project site is mainly via a gravel road from Dawei-Heinda road.
Employment	
Employment	At full production a total of 350 permanent people will be employed of which 350 will be sourced locally, 5 technicians from other places and 5 from Thailand (Mother Company).

1.6. Aim of the Project

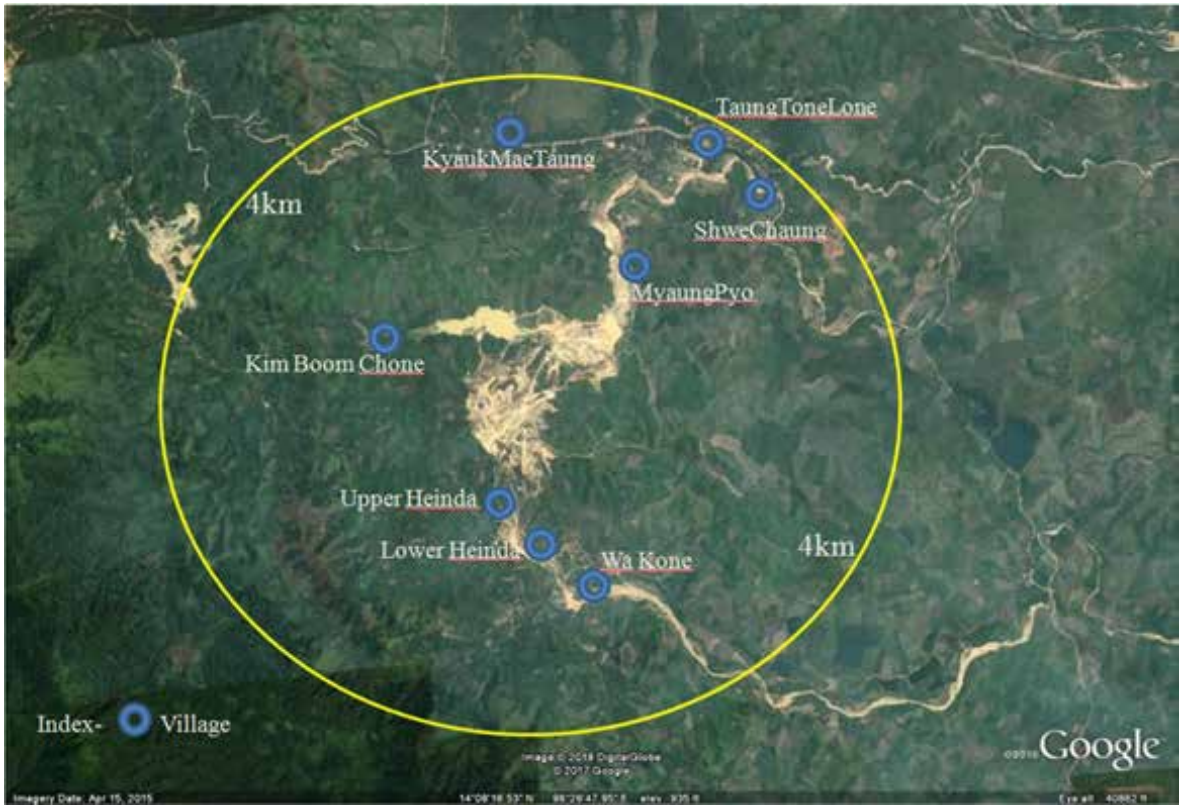
The developer statements publicly that the proposed project is needed in Myanmar according to the following reasons:

(a) Since the use of Tin is in urgent demand in the world to cope with technology development, the proposed project will produce good quality tin concentrate (over 65%) with national human resources.

(b) Myanmar Ponpipat Co., Ltd. will deploy a total investment of 230 million US $ and the investment will create direct and indirect employment for over 350 local people during operation phase.It will increase the use of low-grade ore, benefits to local miners and suppliers, increasing employment as well as resulting in government revenues.

1.7. Scope of the EIA Study

All the environmental and social impact assessment will be conducted within 4km radius around the proposed project. As the proposed project will be opertated wthin the existing mine area, the reason for conducting 4 km radius around the proposed project are that the impacts on the nearest local residents, the agricultural land and surfacewater pollutin due to the soil particles in waste water.



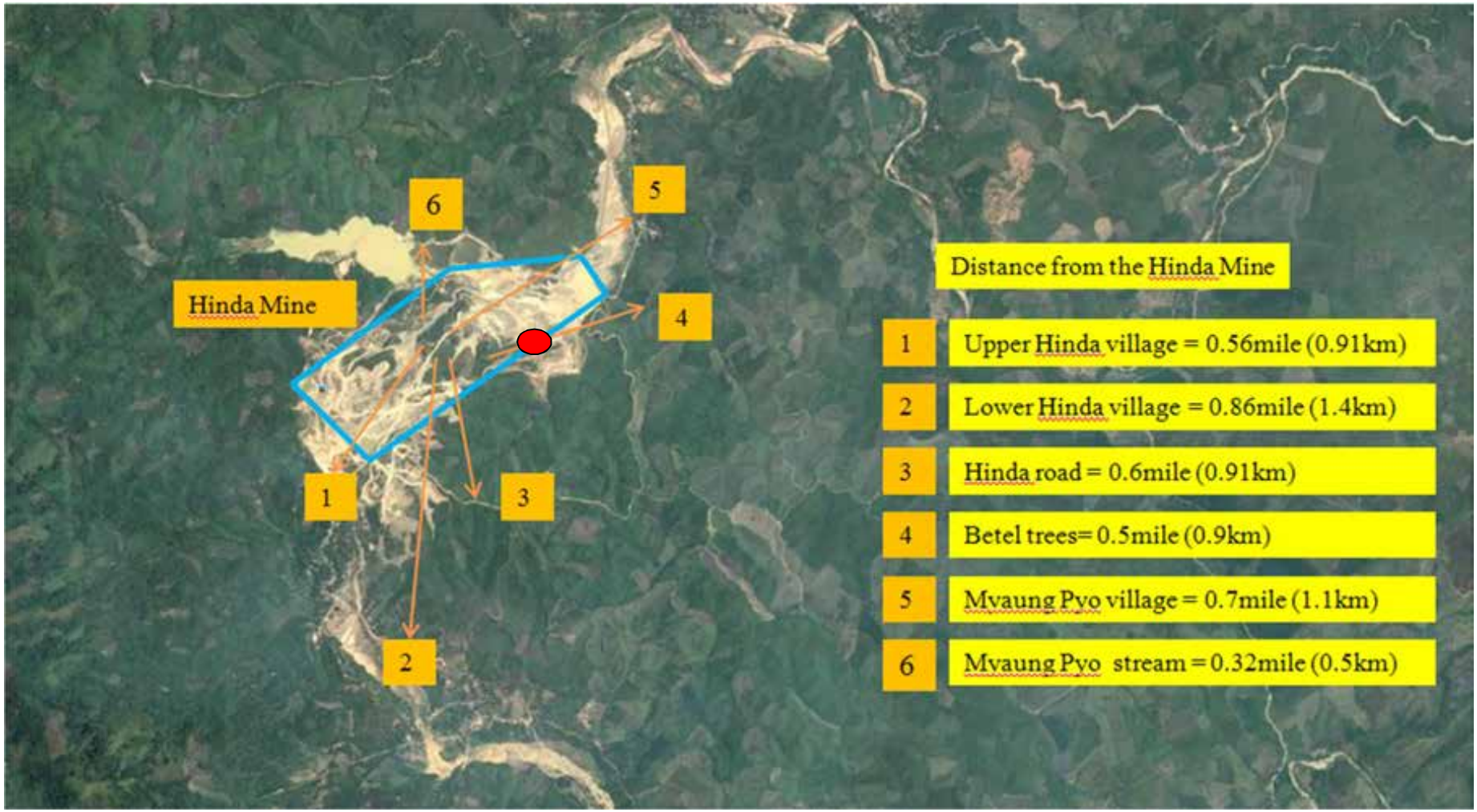
Residents within 4 km Radius around the Proposed Project

1.8. Vicinity around the Project

The most environmentally sensitive areas of the proposed project are shown in the following Table and Figure.

Table - Vicinity around the Proposed Project

No.	Vicinity	Description	Distance (km)
1.	Nearest Public Residents	Local residents in upper Heinda Village	0.91
2.	Nearest Road	Dawai-Heinda Road	0.9
3.	Nearest Water Body	Myaung Pyo creek	0.5
4.	Nearest Densely Populated Area	Heinda Villages	0.9
5.	Nearest Plantation	Betel Trees in Heinda Village	0.9



Vicinity around the Heinda Mine

1.9. Nearest Environmentally Sensitive Areas

(1) Nearest Local Residents

Nearest local residents are Heinda Village and Myaung Pyo Village. Heinda Village might impact air pollution and damage of roads due to the mine trucks movement activities in village. Myaung Pyo village might impact on agricultural and village land during flood conditions due to rainy season water way in myaungpyo creek if they are not properly managed.

(2) Nearest Surface Water Bodies

Nearest surface water bodies (myaung pyo creek) might impact due to the dispose of soil particles in wastewater if final effluence water from mine site was incomplete waste water treatment condition. There might be potential to flood at nearest area due to shallow water way Myaungpyo creek..

(3) Nearest agricultural land

Nearest agricultural land (betel field) might be damage due to the soily water from Myaungpyo creek during flood condition if they are not properly managed.

1.10. Legal and Other Requirements

Myanmar has promulgated several laws and regulations concerning protection of the environment. The following table describes laws and regulations which are directly or indirectly associated with the proposed project.

Table - Relevant Environmental Laws and Regulations in Myanmar

Laws and Regulations	Year
Constitution of the Republic of the Union of Myanmar (Articles 24,45,349,359)	2008
Environmental Conservation Law (Law No.7(o), 14,15,24,25,29)	2012
Environmental Conservation Rules (Rule 55, 69 (a), (b))	2014
EIA Procedures (Article 102 to 110, 113, 115, 117)	2015
National Environmental Quality (Emission) Guidelines	2015
Myanmar Investment Law (Law No. 50(d), 51, 73)	2016

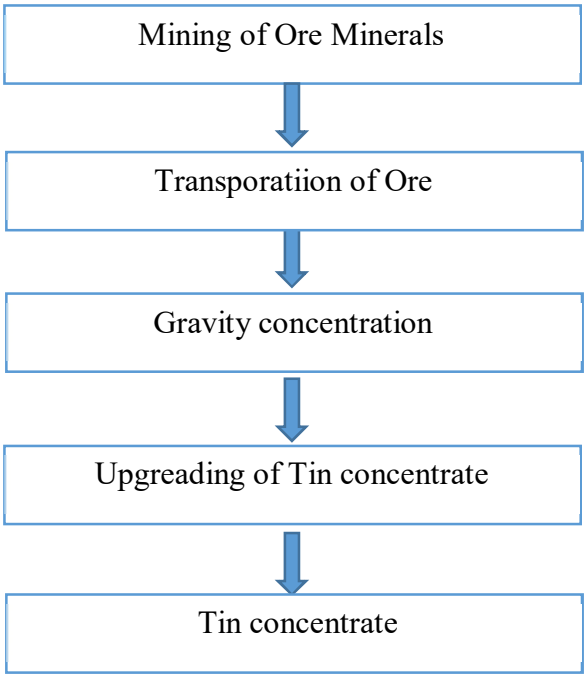
Labour Organization Law, (Law No. 1,7 to 11)	2011
The Settlement of Labour Dispute Law, (Law No. 38, 39, 40, 51)	2012
Employment and Skill Development Law, (Law No. 5, 14, 30(a,b))	2013
The Leave and Holiday Act, 1951 (Law Amended July, 2014)	2014
Minimum Wages Law (Law No. 12, 13 (a to g)	2013
Payment of Wages Act (Law No. 3,4, 5, 14, 8 with 7,10)	2016
The Myanmar Insurance Law (Law No. 15, 16)	1993
The Social Security Law (Law No. 11(a), 15(a), 18(b), 48, 49, 75)	2012
Workman Compensation Act	1951
Law Amending the Factories Act 1951 (Pyidaungsu Hluttaw Law No. 12/2016)	2016
Public Health Law (Law No. 3, 5)	1972
Pesticide Law (Pyidaungsu Hluttaw Law No. 14/2016)	2016
Private Industrial Enterprise Law	1990
Forest Law	1992
Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law	1994
Protection of Biodiversity and Protected Area Law	2018
Protection and Preservation of Cultural Heritage Regions Laws (Law No. 15, 16)	1998
Prevention and Control of Communicable Diseases Law (Law No. 3, 4, 9, 11)	1995
The Control of Smoking and Consumption of Tobacco Product Law (Law No. 9)	2006
Conservation of Water Resources and Rivers Law (Law No. 8, 11(a), 13, 19, 24(b), 30)	2006
Environmental Conservation Law	2012
Agricultural Land Law	2012
The Protection and Preservation of Antique Objects Law (Law No. 12,15 20)	2015
The Protection and Preservation of Ancient Monuments Law	2015

(Law No. 12,15 20)	
The Prevention of Hazard from Chemical and Related Substances Rules (Law No. 8,15,16,17, 20, 22, 23, 27)	2013
The Freshwater Fisheries Law (Law No. 36,40,41)	1991
Myanmar Petroleum and Petroleum Products Law (Article 32, 33)	2017
Automobile Law (Pyidaungsu Hluttaw Law No. 55/2015)	2015
The Myanmar Engineering Council Law (Law No. 20,24,25, 31(a), 37)	2013
Myanmar Mining Law	2018
Myanmar Mining Rule	2018
Tanintharyi Region Environmental Conservation and Cleaning Law	2018

1.11. Project Descriptions

Because of the proposed project is already being operations mining process, and instead only the mining exploration and production processes will be described.

The operation processes include removing of top soil layer for the extraction of the ores, dumping of the removed top soil, transporting the ore minerals to the purification site and purification of ore (tin) by means of gravity concentration method. The summery of the operation processes is shown in the following diagram



Steps of proposed mine project

Exploration of Ore Minerals

The soils mixing with the ore are dug by Back Hoe and put them in the Truck.

Transporatiion of Ore

The run of mine ore are transported to the gravity concentration plan by means dump truck.

Gravity concentration plant

Firestly, the liberation of unwanted materials from mine ore was done by using high pressure water jet. Then the liberate ore bypassing of two stages screen (2inch and 1.5 inch trommels) before gravity concentration process. Gravity concentration stage includes the process of sluice box, two stages of jigging and tabling. The gravity concentration is upgrading of concentrate at about (35-50% Tin).

Upgreading of Tin concentrate

This stage will include beneficiations of the upgrading of tin concentrates from gravity separation process with hydro sizer, tableing and magnetic separator. These processes are considered essential for the production of concentrates of desirable and marketable grade. The final concentrate is containing about greater than 65 per cent tin.

Process of Disposing the Waste Water from the Project

The waste water from the project mixed with soil particles are made to pass the tailing ponds and settle down the soil particles; and the water with proper natural condition with less mixed soil particles is only disposed.

Decommission Process

In the decommission process, the processes of making the exploration areas, areas of dump of dug soil/ disposed soil and tailing ponds to their primary conditions before the project, as close as possible. The infracture of buildings and concentration plants inside the project compound are gave back to the Ministry of Natural Resources and Environmental Conservation as these are owned by the Ministry.

1.12. Phases for the EIA Report

This report will not cover construction phase of the proposed project because Heinda Mine had been operated since 1999. However, this report will cover not only operation phase but also decommissioning phase (mine closure) of the proposed project. The operation phase will

include treating an alluvial ore to become Tin concentrates (over 65%) by gravity concentration and magnetic separation method. This stage will include beneficiations of alluvial ore with jigging, tableing, hydro sizer, magnetic separator and treatment of waste water.

1.13. Key Anticipated Environmental Impacts and Mitigation Measures

1.13.1. Major Impacts and Mitigation Measures

As the proposed project will be operated in existing mine area and there will be no issues for resettlement and impact on agricultural land. Surface water pollution due to the soil particles in wastewater and unsafe condition of tailing ponds might have a chance to environmental impacts. These impacts are also the most public concerns of the local people in the nearest residents.

Mitigation Measures

In order to reduce the impacts of wastewater, proper wastewater treatment system (construction of tailing ponds) with conceptual design are proposed. This treatment system will also reduce unsafe condition of tailing ponds. Other possible mitigation measures for different moderate or minor impacts are also included appropriately.

1.13.2 Residual Impacts and Proposed Mitigation Measures

The main residual impacts after mitigation measures will be surface water pollution. Removal of sediments in Myaungpyo Chaung regularly and safe drinking water supply system for nearest villages are proposed for residual impact.

1.13.3 Cumulative Impacts and Proposed Mitigation Measures

As the proposed project is situated in tin valuable mining area, the cumulative impact due to the proposed project will be surface water pollution together with other existing mines (Ba-Wa-Bin Mine -5.8 km far away and Dawei Myae Mines- 4.2 km far away). All of the waste water from hydraulic mining process will impact on Taninthayi River as cumulative impact. Effective wastewater system and digging of river bed along the Myaung Pyo creek bed regularly are proposed for cumulative impacts. Myanmar Pongpipat Co., Ltd has implemented the systematic detension ponds and recirculated the treated water for the mining process usage, ensuring the minimal environmental impact with “Zero Discharge System”.

In summarising the findings and recommendations of the preceding chapters the following summary conclusions can be drawn.

1.13.4. Terrestrial Ecology Impacts

The proposed mining operation will contribute to limited local deforestation which may cause the loss of some species of conservation concern, sensitive habitats, such as the riparian habitats along the valley bottoms, and the displacement of some faunal species from the immediate area of the mining footprint. However if the mine development incorporates the mitigation measures described in this ESHIA, and considering that the mine footprint (i.e. the scale of the mining development in relation to the extent of the surrounding forests) is small, and that this area has already seen many years of mining activity, the overall ecological impact could be defined as moderate to low.

Without mitigation and access control, commercial loggers and charcoaling groups will probably take advantage of the road to move quickly and easily in and out of the area, and it will probably be utilised by non-mining vehicles (e.g. public transport or motorbikes) to access nearest villages.

Even after the mine is closed it is certain that the local communities will continue to use the access road which will provide easy access to Heinda village. The road will provide ongoing access to the natural resources and result in permanent damage to the forest which may never recover. This secondary impact will be difficult to mitigate.

1.13.5. Aquatic Ecology Impacts

Project induced impacts on aquatic ecology are deemed to be of generally low significance as it relates to proposed project activities and infrastructure aspects. The risk of future acid mine drainage (AMD) arising from the waste rock dump or TSF appears to be very low, according the acid base accounting. However, if the recommended mitigation strategies listed in this report and the ESHIA be implemented correctly, these potential risks and aquatic impacts will be reduced to low overall significance.

1.13.6. Ground and Surface Water Impacts

All surface and groundwater sources are used by the local population as sources of supply for domestic use. Existing human impacts relate mainly to small-scale agriculture, clothes

washing, clearing of the riparian areas in some places, and the construction of informal river crossings. Artisanal minings have resulted in deposition of sediment in the Myaungpyo Creek. Surface water samples were taken from 15 points around the site, and analysis indicates that surface water is not suitable for human direct consumption when compared with WHO guidelines. Slightly elevated levels of iron (Fe) were detected, as well as elevated levels of manganese (Mn) in samples taken on the ridge, but both were within SANS limits for the limited period (less than seven years) consumption.

Geochemical studies indicated that the hanging and foot wall rocks have a little variable sulphur contents, and that in most samples the sulphur content is not sufficiently high to generate acidic drainage if exposed to oxygen and water.

1.13.7. Air Quality Impacts

The project's operations are not likely to result in exceedances of the selected criteria for NO_2, SO_2, and VOCs at surrounding sensitive receptors. There are likely to be exceedances of the daily PM_{10} and $PM_{2.5}$ levels outside the project boundary as a result of dust generation.

Simulated diesel particulate matter (DPM) concentrations as a result of vehicle and generator exhaust are likely to result in moderate to high increased life-time cancer risk at the plant boundary. Fitting diesel particulate filters (DPF) to the exhausts is likely to reduce the increased life-time cancer risk at the plant boundary to between moderate and low.

The largest source of GHG emissions at the project will be the diesel fuel usage, due to the large volumes of fuel used for mining and for electricity generation on-site. In addition to this, diesel required for refuelling of the plant operation as well as the clearance of approximately 70 ha of vegetation (access road, TSF and other surface infrastructure) will also contribute to the production of carbon emissions. It is recommended that a carbon footprint be established for the facility within the first year of operation. This must take into consideration the loss of vegetation.

Thereafter it will be necessary to develop a greenhouse gas management plan for the operation with the specific intention of reducing GHG emissions as far as practicable.

1.13.8. Waste Impacts

MPC will manage all waste streams according to the waste management hierarchy and, as a minimum, according to No.(2) Mining Enterprise legislation and Mining Law. Wherever

practical, production of wastes should be prevented or minimised at source. Where prevention or further minimization is not possible, wastes should be re-used, recycled and then disposed of responsibly so as to minimise impacts to the environment. Further guidance on the management of waste streams is provided in the IFC General EHS Guidelines (2007) and the IFC EHS Guidelines for Mining (2007). In the event that there are no national standards available in Dawei Region, the proponent must comply with internationally recognised standards developed by international organisations such as the IFC. In considering the context of this project, it is also concluded that inclusion of on-site landfill facilities for final disposal of non-hazardous and hazardous wastes is appropriate from an environmental risk perspective. However, the Closure Plan for the mine will need to include details of closure of these facilities as well as post-closure monitoring requirements.

1.13.9. Social and Economic Impacts

Opportunities exist in terms of employment, mining capacity building, creation of small businesses and social development. These impacts are particularly important in nearest villages where poverty is endemic and people lack employment opportunities.

Enhancement Measures for Job Opportunities

The skills base in the area is low. In order to optimise local employment opportunities, skills training will be necessary. Particular attention will need to be given to women and youth as they left in villages when their household head (male partner) is go away (Thailand) for job.

Impact on Surface Water Environment

Although there is no need for economic and physical resettlement at all, a small amount of agricultural land, which is the most important asset of local residents, might likely to be affected by water flow in the creek during rainy season.

Mitigation Measures for Waste Water

This potential loss of agricultural land needs to be managed. A detailed and transparent Stakeholder Engagement Plan would be critical to mitigate the potential loss of agricultural land and livelihoods as follow:

1.13.10. Health Impact Assessment

An influx of migrants/job seekers into the study area potentially leading to prostitution and increased HIV and AIDS infections, an increase in crime or communal conflict, inflation and land speculation are impacts that are particularly difficult to manage. Since Myanmar Ponpipat does not have direct control over these aspects they will need to work in collaboration with other stakeholders to minimise these potentially harmful impacts, realising that full or entire mitigation is probably not possible, but that robust and transparent conflict analyses and resolution approaches - along with proactive management planning around these potential flashpoints - is essential to ensure the minimisation of these triggers. Although mitigation measures are available to deal with these potential conflicts, the issue remains of moderate to high overall significance.

1.14. Public Consultation and Public Participation Process (PCPP)

PCPP was conducted as primary data collection by household survey, group site survey with Heinda Mine Watchdog, group discussion, and public meetings as follows:

(a) Stakeholders Identification

The following local communities, authorities and NGOs can be considered as key stakeholders who are directly or indirectly related to the proposed project.

(a) Local People (Heinda Village, Myaung Pyo Village, Wa Kone Village, Kim Boom Chone Village, Shwe Chaung Village, Myauk Mae Taung Village, Taung Thone Lone Village);
(b) Village Administrative Offices (Heinda Village, Myaung Pyo Village, Wa Kone Village, Kim Boom Chone Village, Shwe Chaung Village, Myauk Mae Taung Village, Taung Thone Lone Village);
(c) No. (2) Mining Enterprise (Tanintharyi);
(d) Environmental Conservation Department (Tanintharyi);
(e) Head of Local Administration Office (Dawei);
(f) City Development Committee (Dawei);
(g) Department of Public Health (Dawei);
(h) Department of Forestry (Dawei);
(i) Planning and Statistics Department (Dawei);

(j) Department of Settlement and Land Record (Dawei);

(k) Department of Water Resources Utilization Department (Dawei);

(l) Department of Labour (Dawei); and

(m) Local Media, NGOs and CBOs (Dawei Watch, D.R.A, TKP etc.).

(b) Household Survey

Household surveys were conducted in all of the affected villages near the proposed project. Detailed of household survey was described in Section 10.

(c) Group Site Survey with Local Mine Supervision Team

Site survey to Heinda Mine Site together with local mine inspection team (Watchdog for Heinda Mine organized by interested persons in nearest villages) was done and discissed about the mining impact and mithgation measures. According to the discussion results, all of the partcipants concernabout (i) surface water and (ii) the failure of tailing ponds.

(d) Public Meetings

Public meetings were conducted three times as for scoping proposal, for first public meeting and for second public meeting. Detailed of public meetings are described in Section 10.

(e) Public Disclosure Process

Public disclosure processes of proposed project include: (a) distribution of meeting minutes of public meetings to all key stakeholders,, (b) distribution of summary of EIA report in local language to key stakeholders (b) formal disclosure of completed project reports by making copies available at convenient locations in the study areas and informing the public of their availability. Detailed of public disclosure process are described in Section 10.

1.14.1. Key Findings from the Study

The following are the key findings from the EIA study.

(a) Key Findings from Household Survey (Findings from Primary Data Collection)

According to the household survey, all of the respondents concerns about surface water due to the muddy water from processing plant and damage of agricultural lands in the mine leased area in the past (entering of muddy water into agricultural lands during heavy rain in 2008)

along the Myaung Pyo Creek. The most public needs are upgrading of villages' road in Heinda Village.

(b) Key Findings from the Public Meeting of Scoping Report

During public meeing for scoping report, EGTEST explained about the procedure of EIA and Impacts of surface mining. Most of the local people are discussed about the damage of agricultural land located in the mine leased area in the past (during heavy rain in 2008) and CSR program.

(c) Key Findings from the First Public Meetings

During public meetings, consultants from EGTEST explained the impacts of mining and mineral processing of Heinda Mine and mitigation measures. Local people concern about the damage to agricultural land located in the mine leased area in the past and compensation for these damage area. They also concern about the surface water and failure of tailing ponds during heavy rain.

1.14.2. Public Disclosure Process

Summary of EIA report in Myanmar Language will distribute to all key stakeholders as public disclosure process. Softcopies for meeting minutes and summary will also distribute to all participants during second public meeting.

Public participation during the Impact Assessment Phase revolves around a review of the findings of the ESIA, presented in the Draft EIA Report. This report will be made available for public comment for a period of 40 days. Stakeholders will be invited to comment on the Draft EIA Report and ESMP in the following ways:

- By raising comments during a series of Public Meetings where the content of the Draft ESIA Report will be presented;
- By completing a comment sheet made available together with the report at the public places, and by submitting additional written comments, by email or fax, or by telephone, to the public participation office; and
- The Draft ESIA Report and ESMP Report and its accompanying Specialist Studies will be distributed for comment to public places in the project area, to everyone who requests a copy, and placed on the Ever Green Tech's office:

All comments and issues raised during the comment period on the Draft ESIA report will be added to the Comment and Response Report that will accompany the Final ESIA Report and ESMP.

1.15. Environmental Management Plan (EMP)

EMP is a site specific plan developed to ensure that the project is implemented in an environmental sustainable manner where all contractors and subcontractors, including consultants, understand the potential environmental impacts arising from the proposed project and take appropriate actions to properly manage that risk. EMP also ensures the project implementation is carried out in accordance with the design by taking appropriate mitigation actions to reduce adverse environmental impacts during its life cycle. EMP for proposed mine site will include the following essential parts.

(a) Mitigations and enhancement measures for all anticipated impacts;
(b) Consideration of residual and cummulative impacts after mitigation measures;
(c) Compensation program;
(d) Environmental monitoring plan,
(e) Training Program,
(f) Record Keeping and Reporting, and
(g) Audit and Corrective Action Plan.

(a) Environmental Monitoring Program

The purpose of environmental monitoring is to evaluate the effectiveness of implementation of Environmental Management Plan (EMP) by periodically monitoring the important environmental parameters within the impact area, so that any adverse affects are detected and timely action can be taken. Main objectives of environment monitoring plan include:

(a) Identify all environment changes which may cause adverse effects on environment by the project implementation;
(b) Monitor discharge sources (gas emission, waste water and solid waste) and operation of environmental protection equipments in order to ensure that these activities will comply with legislative requirements;
(c) Check monitoring process and inspect installation system and equipments in respect of pollution prevention and control;

(d) Prevent potential incidents;

(e) Propose appropriate environment protection measures based on results of environmental monitoring;

(f) Overcome and repair all weak-points based on results of environment monitoring program.

(b) Occupational Safety and Health Management Plan

Occupational safety and health management plan for the proposed mine site will include the following:

(a) Potential Safety and Health Impacts on Workers

(b) Emergency and First-aid Procedures

(c) Medical Precautionary Measures

(d) Maintenance and Troubleshooting Precautions

(e) House Keeping

(f) Safety awareness

(g) Safety training

(c) Emergency Response Plan (ERP)

An emergency is an unplanned event when a project operation loses control, or could lose control, of a situation that may result in risks to human health, property, or the environment, either within the facility or in the local community. Emergency incident response plan for proposed mine site is proposed to mitigate harms on humans and environment in the project area and its vicinity in case of incident. This plan provides the management structure, key responsibilities, emergency assignments and general procedures to follow during and immediately after an emergency. Moreover, it is necessary to establish ERP to address the immediate requirements for a major disaster or emergency in which normal operations are interrupted and special measures must be taken to:

- Save and protect the lives of employees;
- Manage immediate communications and information regarding emergency operations and work site safety;
- Provide essential services and operations;

- Provide and analyze information to support decision-making and action plans; and
- Manage resources effectively in an emergency operation.

(d) Natural Disaster Management Plan

Disaster means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made cause, or by accident or negligence which result in substantial loss of life or human suffering or damage to, or degradation of, environment, and is of such nature or magnitude as to be beyond the coping capacity of the community of the affected area. Disaster Management implies continuous and integrated process of planning, organising, coordinating and implementing measures which are necessary as expedient for

- Prevention of danger or threat to any disaster.
- Mitigation or reduction of risk of any disaster or its severity or consequences.
- Capacity building.
- Preparedness to deal with any disaster.
- Prompt response to any threatening disaster situation or disaster.
- Assessing the severity of magnitude of effect of every disaster.
- Evacuation rescue & relief.
- Rehabilitation and reconstruction.

Types of Disasters

1. Fire
2. Accidents – Collision, transport or work place accidents.
3. Natural calamities – Flood and Earth quake

1.16. Conclusion

According to the study for the scoping processes, the ESIA team will make with participants from local communities and local NGOs for concerning about the surface water and compensation for damage to agricultural lands on mine leased area in the past. So, the developer has been working with the local authorities to setup a committee to work with local community. MPC has issued the complete compensation in accordance to the committee resolution.

2. INTRODUCTION

2.1 Projcet Background

Myanmar Pongpipat Co., Ltd. will operate surface mining for Tin in Heinda Mine, near Heinda Village, Myitta Township, Tanintharyi Region. Myanmar Pongpipat has now initiated an Environmental and Social Impact Assessment (ESIA) to determine the feasibility of the project from an Environmental and social perspective. Ever Green Tech Environmental Services and Training Co., Ltd. has been appointed as the independent Environmental Assessment Practitioner (EAP) responsible for managing the ESIA and supporting Public Participation (PP) process.

2.2. Aim of the Project

The developer statements publicly that the proposed project is needed in Myanmar according to the following reasons:

(a) Since the use of Tin is in urgent demand in the world to cope with technology development, the proposed project will produce good quality tin concentrate (over 65%) with national human resources.

(b) Myanmar Ponpipat Co., Ltd. will deploy a total investment of 230 million US $ and the investment will create direct and indirect employment for over 350 local people during operation phase.

It will increase the use of low-grade ore, benefits to local miners and suppliers, increasing employment as well as resulting in government revenues.

The developer claims that the followings will be the direct and the indirect benefits of the proposed project.

2.3. The Need of EIA

An EIA is required for environmentally approvals from Environmental Conservation Department (ECD, Nay Pyi Daw) and Environmental Conservation Department (ECD, Taninthayi State). The Environmental Conservation Department under Ministry of Natural Resources and Environmental Conservation is the lead authority for this ESIA process and the development needs to be authorized by this department in accordance with this Environmental Conservation Law (2012). The environmental impacts associated with the proposed project require investigation in compliance with the EIA (Environmental Impact Assessment) procedures (2015).

2.4. Brief Description of the Project Proponent

The followings are the brief of project proponent.

Project Developer	
Project Developer	Myanmar Ponpipat Co., Ltd.
Type of Project	Surface Mining Project for Tin
Project Location	Heinda Village, Myitta Township, Near Dawei Township
Contact Person	U Khaing Swan (09-8742682)

2.5. Brief Description of the Environmental Assessment Practitioner

Below is the background information on Ever Green Tech Environmental Services and Training Co., Ltd., (Third party) who draw up the ESIA.

Ever Green Tech Environmental Services & Training Co., Ltd.	
Specialists including the written report	Dr. Kyaw Swar Tint Ph.D. (Mining) Dr. Thein Tun Ph.D. (Metallurgy) Dr. Myo Min Tun Ph.D. (Metallugy) Dr. Kyaw Zay Moe Ph.D. (Botany) Dr. Khon Aung M.B.B.S (Ygn) Dr. KoMyint Ph.D. (Zoolgoy) U Min Aung M.Sc. (Chemistry) Ma Nandar Nwe B.E. (IT); Dip. in EIA/EMS Ma Yuzuna Moe Myint B.Sc. (Forestry) Mg Yaw Ma Nar B.Sc. (Forestry) Ma May Thet Zaw M.E. (Civil)
Company Name	Ever Green Tech Environmental Services and Training Co., Ltd.
Company Registration No.	3344/2015-2016 (Ygn)

Contact Address	No.14, Thiri Mying (8th)Street, 13th Quarter, Hlaing Township, Yangon
Telephone Number	09-43106929, 09-91019166, 09-799700171
E-mail	11kyawswar@gmail.com
Contact person	Dr. Kyaw Swar Tint Principal Environmental and Social Consultant 09-5099232, 09-43106929

2.6. Selected Consultants for Conducting EIA

	Name	Degree	Responsibility	Area of Expertise
Our Consultants	Dr. Kyaw Swar Tint	Ph.D. (Mining)	Principal Consultant	(a) Air Pollution Control (b) Noise and Vibration (c) Socio-Economy (d) Environmental Management and Monitoring
	Mr. Min Aung	M.Sc. (Chemistry)	Key Consultant	(a) Water Pollution Control (b) Modelling of Water Quality (c) Meteorology, Modeling for Air Quality (d) Soil and Ground Water Pollution Control
	Dr. Thein Tun	Ph.D. (Metallurgy)	Senior Consultant	(a) Risk Assessment and Hazard Management (b) Facilitation of Meeting (c) Legal Analysis (d) Occupational Safety and Health
	Dr. Myo Min Tun	Ph.D. (Metallurgy)	Senior Consultant	(a) Evaluation of Alternatives

				(b) Traffic and Transportation System (c) Resources Utilization Management (d) Waste Management
	Dr. Kyaw Soe	Ph.D. (Metallurgy)	Consultant	Environmental Baseline Study
	Ms. Nandar Nwe	M.S. in EIA/EMS (YTU), Dip; in Applied Psychology (YU)	Consultant	Social Impact Assessment (Household Survey)
	Ms. Thazin Htwe	M.S. in EIA/EMS (YTU), Dip; in Applied Psychology (YU)	Consultant	Social Impact Assessment (Public Consultation and Stakeholder Engagement)
	Mr. Yaw Ma Nar	B.Sc. (Forestry); Dip in EIA/EMS	Field Coordinator	Project Coordinator
	Dr. Kyaw Zay Moe	Ph.D. (Botany)	Consultant	Flora Diversity
	Dr.Ko Myint	Ph.D. (Zoology)	Consultant	Fauna Diversity
	Dr. Khon Aung	M.B.B.S. (Ygn)	Consultant	Health Impact Assessment
	Ms. May Thet Zaw	M.E. (Civil)	Consultant	Construction Impacts and Risk Assessment

2.7. Purposes of the ESIA Study

The main purposes of an ESIA are to provide the relevant authorities with sufficient information on the proposed activities to allow them to make an informed decision on whether or not the ESIA should be authorized. This ESIA will be conducted according to Environmental Impact Assessment Procedures, 2015. The objectives of an ESIA are to:

- Ensure that social and Environmental considerations are explicitly addressed and incorporated into the development decision-making process;
- Anticipate and avoid, minimize or offset significantly adverse biophysical, social and other relevant impacts of proposed developments;
- Protect the productivity and capacity of natural systems and the ecological processes which maintain their functions; and
- Promote development that is sustainable and that optimizes resource use and management opportunities.

An ESIA functions as a planning tool which helps determine the social, economic and Environmental impacts of a proposed project through Public Participation (PP) and independent specialist assessment. Through the ESIA, potential negative and positive impacts are identified, and recommendations are made for reducing or avoiding negative impacts, and enhancing positive impacts.

The findings of an ESIA are transferred into clear and measurable objectives that must be achieved during construction, operation and decommissioning of a proposed project. These objectives, and plans for achieving them, are captured in an Environmental and Social Management Plan (ESMP). The ESMP is a public document and typically becomes a component of the project financing terms and conditions should the project go ahead.

The basic guiding principles of the ESIA are:

- To inform decision-makers and result in appropriate levels of Environmental protection and community well-being;
- To provide timely information and outputs which assist with design and engineering modifications that reduce negative impacts;
- To identify any significant Environmental effects and key issues (i.e. the matters that must be taken into account when making decisions) and apply the necessary mitigation measures;
- To provide opportunities to inform and involve Interested and Affected Parties (I&APs), incorporating their inputs and concerns explicitly into the documentation and decision-making;
- To allow opportunities for participation by the authorities involved;
- To ensure that the ESIA team has implemented appropriate methodologies and experts from the relevant disciplines, and to ensure the team has assessed potential interrelationships between the biophysical, social and economic issues; and

- To provide, as far as possible, an objective, rigorous and balanced assessment of the issues.

2.8 The Need of the Scoping Report

Scoping is the process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined. The ESS provides a description of the receiving environment and how the environment may be affected by the development of the proposed project. Desktop studies making use of existing information will be used to highlight and assist in the identification of potential significant impacts (both social and biophysical) associated with the proposed project. Additional issues for consideration will be extracted from feedback from the public participation process, which commenced at the beginning of the Scoping phase, and will continue throughout the duration of the project. All issues identified during this phase of the study have been documented within this final version of the Environmental Scoping Report and have been highlighted in teal for easy reference. Thus, this environmental Scoping Report (document at hand) hereby provides a record of all issues identified as well as any fatal flaws, in order to make recommendations regarding the project and further studies required to be undertaken within the EIA phase of the proposed project.

The scoping report is required to approve the procedures and methodologies for EIA studies by Environmental Conservation Department (ECD, Nay Pyi Daw) and Environmental Conservation Department (ECD, TaninthayiRegion). The Environmental Conservation Department under Ministry of Natural Resources and Environmental Conservation is the lead authority for this process and the development needs to be authorized by this department in accordance with this Environmental Conservation Law (2012). The environmental impacts associated with the proposed project require investigation in compliance with the EIA (Environmental Impact Assessment) procedures (2015).

2.9. About the EIA and EMP Report

EIA is a formal process used to predict how the proposed project will affect natural resources such as water, air, land, socio-economic and wildlife. It is desirable to ensure that the

development options under consideration are sustainable. It also aims to make recommendations for the mitigation of the potential negative impacts and enhancement of the positive ones.

EMP is a site specific plan developed to ensure that the project is implemented in an environmental sustainable manner where all contractors and subcontractors, including consultants, understand the potential environmental impacts arising from the proposed project and take appropriate actions to properly manage that risk. EMP also ensures the project implementation is carried out in accordance with the design by taking appropriate mitigation actions to reduce adverse environmental impacts during its life cycle.

The EIA and EMP reports will contain:

(a) the present status of air, noise, water, land, biological, socio-economic and health components of the environment;
(b) identification and evaluation of positive and negative impacts due to the development of the project;
(c) proposed pollution control measures, environmental management plan (EMP) to be adopted for mitigation of adverse impacts;
(d) measures for the improvement of the community around the area, and
(e) post-project environmental quality monitoring programme.

In making impact assessment, Green Tech ESIA Team mostly referred to the pollution limits set by Myanmar National Emission Guidelines, USEPA, OSHA and WHO.

2.10. Scope of the EIA Study

Firstly, the need of the project, the need of the EIA report, objectives and scope of the EIA report are described. Then, laws and regulations related to the EIA study are described. Then, alternative analysis, methodologies for EIA study, data collection system, public participation process are described. Then, anticipated environmental, social and health impacts and mitigation/enhancement measures in all phases (construction, operation, and decommissioning phases), residual and cumulative impacts are described. Finally, environmental management system, environmental monitoring program, occupational health and safety management plan, emergency control plan, disaster response plan and CSR program for described in the last section.

2.11. Phases for the EIA Report

This report will not cover construction phase of the proposed project because Heinda Mine had been operated since 1999. However, this report will cover not only operation phase but also decommissioning phase (mine closure) of the proposed project. The operation phase will include treating an alluvial ore to become Tin concentrates (over 65%) by gravity concentration and magnetic separation method. This stage will include beneficiations of alluvial ore with jigging, tableing, hydro sizer, magnetic separator and treatment of waste water.

2.12. Data Collections

The project related data, factory layout plans and design parameter are provided by Myanmar Pongpipat Co., Ltd. and No. (2) Mining Enterprise (Tanintharyi). Secondary data on demographic distribution in the area are sourced from Head of Local Administration Office (Dawei) and data on public health are sourced from Public Health Department (Dawei). Primary data for public concerns, socio-economic and health profiles are conducted by household survey.

2.13. Corporate Social Responsibility (CSR) Fund

MPC promises to set up at least 2% of annual net profit (or at least 150 Lakhs per year) as CSR fund. They also promise environmental mitigation and monitoring costs will not take account as CSR fund.

2.14. Developer's Policies for Socio-economic Development of Local People

The company's policies for local socio-economic development are shown in the following table.

No.	Description	Company's Policy
1.	Local Community Development Policy	Appoint local people with relevant skills as much as possible (At least 50% of Local People)
2.	Corporate Social Responsibility (CSR) Policy	Contribute at least 2 percent of the annual net profit after tax as CSR fund or at least 150 Lakhs per year.

2.15. Structure of the Scoping Report

This Scoping Report (SR) prepared as part of the EIA for proposed project is structured as follows:

Section 1: **Executive Summary** –Concise description to detail the significant findings and recommended actions as the purpose of the EIA and SR;

Section 2: **Introduction** – provides the introduction and background of the proposed project, introduces the Proponent and EAP as well as the purpose of the EIA and SR;

Section 3: **The Legal Description and other Requirements** – provides details of applicable Environmental legislation;

Section 4: **The Project Description** – provides details of the proposed project including design features and proposed infrastructure;

Section 5: **The Project Alternatives** – provides details of the proposed project including analysis of alternatives, no project alternative alternative technologies and locations and alternatives considered;

Section 6: **The Baseline Conditions** – provides a summary of knowledge about the existing physical, biological, social and cultural Environment in the study area that the project may influence;

Section 7: **Impact Assessment and Mitigation Measures** – describes the objectives positive and negative environmental, socio-economic and health impacts are identified and evaluated and the processes to be followed during the Scoping and Impact Assessment phases;

Section 8: **Risk Assessment** – describes the methodology and approach, natural hazards and disaster risk, mining industrial hazards, analysis of likelihood of hazards and the consequences, identification of measures to reduce risks and the processes to be followed during the Scoping and Impact Assessment phases;

Section 9: Cumulative Impacts – describes the identification and assessment of the potential cumulative impacts on the components in the surrounding environment and the Project's contribution to such impacts and the processes to be followed during the Scoping and Impact Assessment phases;

Section 10: ESIA and Public Participation Process – describes the objectives of PP in an ESIA and the processes to be followed during the Scoping and Impact Assessment phases;

Section 11: Mine Closure Plan – describes the objectives of the Plan is to include activities for progressive rehabilitation of the site over the life of the mine. This will minimize the effort and cost for the final rehabilitation;

Section 12: ESIA Plan of Study – describes the EIA methodology and the PP process, summarises the potential Environmental and social impacts associated with the proposed project, and describes how such issues should be assessed in the Impact Assessment phase of the EIA;

Section 13: Proposed Content of the EIA Report – the chapters for the EIA report and the content of each chapter are described.

Section 14: Next Steps in the EIA Process – concludes and provides details on the next phase of the EIA.

3. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

This chapter sets out the relevant legal and policy context in Myanmar and documents the environmental and social standards with which the Project has to comply with, as well as the international standards that the Project will follow.

3.1 Project's Environmental, Social and Health Policies

The main policy and commitment of Myanmar Ponpipat Co., Ltd. can be identified in the following points:

- the protection of public safety, the health and safety of the workforce and the local communities
- the protection and promotion of human rights, the economic and social development of local communities;
- Since establishment, we have always adhered to the principle of maintaining equal emphasis on production management and environmental protection;
- We follow concept of scientific development, strengthen environmental protection, reduce emission efforts, and work hard to achieve effective results;
- In order to better focus on energy conservation and environmental protection, we invest heavily and use advanced treatment technology to ensure the treatment of the air, water, and solids discharge. We will ensure that the environmental impact is minimized.

Sustainability Policy

Myanmar Ponpipat Co., Ltd.'s sustainability model is "To operate in a sustainable manner means to create value for stakeholders, and to use resources so that the needs of future generations will not be compromised, respecting people, the environment and the society as a whole." Myanmar Ponpipat Co., Ltd. adheres to a sustainability policy, which is composed of the following principles:

- *Stakeholder relations* – "Engaging stakeholders and involving them in company's business are both prerequisites for sustainability and for the construction of reciprocal value."

- *Human Rights* – "The respect of Human Rights represents the basis for an inclusive growth of societies, of the territories and, consequently, of the companies that work there."
- *Relations with communities and contribution to local development* – "Dialogue, the respect of local communities, the evaluation of impacts are all preconditions for an effective cooperation, targeted at creating territorial value."
- *Climate strategy* – "To satisfy the world's energy demand, by containing, at the same time, emissions of gases that have an impact on climatic change, is one of the greatest challenges of modern society."

Safeguarding biodiversity and ecosystems – "The conservation of biodiversity and ecosystems is a fundamental need of humanity. They support life, human wellbeing and business activities. The benefits they provide (ecosystem services) such as food, fresh water, climate regulation and nutrient recycling, are vital for the livelihood communities and for the equilibrium of the whole planet."

The company's policies for local socio-economic development are shown in the following table.

Table - Company's Policies for Local Socio-economic Development

No.	Description	Company's Policy
1.	Local Community Development Policy	Appoint local people with relevant skills as much as possible (At least 50% of all workers will be local workers)
2.	Corporate Social Responsibility (CSR) Policy	Contribute at least 2 percent of the annual net profit after tax as CSR fund or at least 150 Lakhs per year.

3.2. Statement of Commitments

3.2.1 Commitments of Project Developer

We, Myanmar Ponpipat Co., Ltd commit to comply with the followings:

a) Comply with the commitments of the environmental and socio-economic development revealed in the Environmental Impact Assessment report.
b) Acknowledge and comply the laws, regulations and guidelines associated with the project, included in the report.
c) Comply and proceed the alternative methods, mitigation measures and monitoring plans included in the report for the reduction of the negative environmental impacts; and take responsibility for the environmental impacts due to non-compliance of the commitment.
d) Give priorities for the occupational health and safety of the workers.
e) Utilize the exact amount of fund as stated in proposed expenditure for cooperate social responsibility funds.
f) Take responsibility for all of the works and absence of the contractors, sub-contractors, officers and representatives of the company in operating the processes.
g) Take responsibility to support after discussion for the impacted people to ensure for their stable livelihood not lower than before the project; and resettlement and rehabilitate the impacted local people, government organizations and other related people and organizations.
h) We, Myanmar Ponpipat Co., Ltd. commit to follow the environmental commitments, mitigation measures, management plans illustrated in the EIA report. We also commit to follow the Environmental Conservation Laws 2012, the Environmental Conservation Rules 2015 that stated in EIA.

(Signature)

Name -

Position -

Date -

3.2.2 Commitments of the Environmental Assessment Practitioner

The EIA report was written by Ever Green Tech Environmental Services and Training Co., and EIAs in this report were designed by the following criteria;

(a) The designed EIA complied with the National Constitution, Environmental Conservation Law, EIA Procedures, and National Environmental Quality Guideline.

(b) This EIA also complied with the existing or future Labor laws, Occupational Health and Safety Laws, Rules and Procedures.

(c) These environmental impact protection procedures are designed of incident avoiding, mitigation and replacing for the project proponent who commits to follow the environmental impact protection procedure.

(d) This environmental management report is systematically designed not only for environmental impact protection procedures and occupational safety and health but also emergency management planning and social welfare programs.

(e) All facts including in this report are systematically surveyed without bias. As a third party, we commit and take full responsibility for all facts in this report.

Dr. Kyaw Swar Tint
Principal Environmental and Social Consultant
Ever Green Tech Environmental Services and
Training Co., Ltd.

3.3. Relevant Environmental Laws and Regulations in Myanmar

Myanmar has promulgated several laws and regulations concerning protection of the environment. The following table describes laws and regulations which are directly or indirectly associated with the proposed project.

Table - Relevant Environmental Laws and Regulations in Myanmar

Laws and Regulations	Year	Purposes
Constitution of the Republic of the Union of Myanmar (Articles 24,45,349,359)	2008	- To conserve the natural environment, - To prevent and upgrade the rights and lives of the workers
Environmental Conservation Law (Law No.7(o), 14,15,24,25,29)	2012	- To enable to implement the Myanmar National Environmental Policy; - To enable to lay down the basic principles and give guidance for systematic integration of the matters of environmental conservation in the sustainable development process;
Environmental Conservation Rules (Rule 55, 69 (a), (b))	2014	- To implement correctly according to the environmental management plan
EIA Procedures (Article 102 to 110, 113, 115)	2015	- To develop the environmental impacts and to draw the environmental management plan;
National Environmental Quality (Emission) Guidelines	2015	These national Environmental Quality (Emission) Guidelines (hereafter referred to as Guidelines) provide the basis for regulation and control of noise and vibration, air emissions, and liquid discharges from various sources in order to prevent pollution for purposes of protection of human and ecosystem health.
Myanmar Investment Law (Law No. 50(d), 51, 73)	2016	To develop responsible investment businesses which do not cause harm to the natural environment and the society for the benefit of the Union and its citizens
Labour Organization Law, (Law No. 1,7 to 11)	2011	This Law was enacted, to protect the rights of the workers, to have good relations among the workers or between the employer and the worker, and to enable to form and carry out the labour organizations systematically and independently
The Settlement of Labour Dispute Law, (Law No. 38, 39,	2012	The Pyidaungsu Hluttaw hereby had enacted this Law for safeguarding the right of workers or having good relationship between employer and workers and making peaceful workplace.

40, 51)		
Employment and Skill Development Law, (Law No. 5, 14, 30(a,b))	2013	- 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 Leave and Holiday Act, 1951 (Law Amended July, 2014)	2014	- To allow worker for leave and holiday allowances, religious or social activities with earn allowance, and benefits for Health allowances. - Concerned workers: Daily wage workers/ temporary workers/permanent workers.
Minimum Wages Law (Law No. 12, 13 (a to g)	2013	This Law was enacted to meet with the essential needs of the workers, and their families, who are working at the commercial, production and service, agricultural and livestock breeding businesses and with the purpose of increasing the capacity of the workers and for the development of competitiveness,
Payment of Wages Act (Law No. 3,4, 5, 14, 8 with 7,10)	2016	(a) Pay in local currency or foreign currency recognized by the Central Bank of Myanmar. This may be in cash, check or deposit into the bank account of Employee. (b) Moreover, pay can be in the means of… (1) Totally in cash OR half the cash and half in things set according to the local price to those employees working in trade, manufacturing and service sectors. (2) Totally in cash OR half the cash and half in things set as local price according to local traditions or common agreement to those working in agriculture and livestock sectors. But, this must be for the sake of the employees and their families. And, it also must be reasonable/fair. (3) An employee shall receive the payment for 60 days when he/she is in Alternative Civil Service.
The Myanmar Insurance Law (Law No. 15, 16)	1993	(a) to overcome financial difficulties by effecting mutual agreement of insurance against social and economic losses which the people may encounter, due to common perils; (b) to promote the habit of savings individually by effecting life assurance, thus contributing to the accumulation of resources of the State; (c) to win the trust and confidence of the people in the insurance system by providing effective insurance safeguards which may become necessary in view of the social and economic developments.
The Social Security Law (Law No. 11(a), 15(a), 18(b), 48, 49, 75)	2012	The employers and workers shall co-ordinate with the Social Security Board or insurance agency in respect of keeping plans for safety and health in order to prevent employment injury, contracting disease and decease owing to occupation and in addition to safety and educational

		work of the workers and accident at the establishment.
Workman Compensation Act	1951 (amended 2005)	To protect personal injury caused to a workman by accident arising out of and in the course of his employment and to compensate in accordance with the provisions of Workman Compensation Act
Law Amending the Factories Act 1951 (Pyidaungsu Hluttaw Law No. 12/2016)	2016	To make effective arrangements in every factory for disposal of waste and effluent, and matters on health, cleanliness and precaution against danger.
Myanmar Fire Force Law,	2015	-To take precautionary and preventive measure and loss of state own property, private property, cultural heritage and the lives and property of public due to fire and other natural disasters -To organize fire brigade systemically and to train the fire brigade -To prevent from fire and to conduct release work when fire disaster, natural disaster, epidemic disease or any kind of certain danger occurs -To educate, organize an inside extensively so as to achieve public corporation -To participate if in need for national security, peace for the citizens and law and order
Public Health Law (Law No. 3, 5)	1972	To promote and safeguard public health and to take necessary measures in respect of environmental health.
Pesticide Law Pyidaungsu Hluttaw Law No. 14/2016	2016	To direct the Myanmar Agriculture Service to analyze and test pesticides or any active ingredient received as samples as to conformity with the content of ingredient as claimed on the label; and to undertake bio-efficacy trials on crops for determining effectiveness in practical use.
Private Industrial Enterprise Law	1990	To narrow down the gap between rural development and urban development by the development and improvement of industrial enterprises; to avoid or reduce the use of technical know-how which cause environmental pollution; to cause the use of energy in the most economical manner.
Forest Law	1992	To implement forest policy and environmental conservation policy, to promote public cooperation in implementing these policies, to develop the economy of the State, to prevent destruction of forest and biodiversity, to carry out conservation of natural forests and establishment of forest plantations and to contribute towards the fuel requirement of the country.
Protection of Biodiversity and Protected Area Law	2018	To protect wildlife, wild plants and conserve natural areas, to contribute towards works of natural scientific research, and to establish zoological gardens and botanical gardens.
Protection and Preservation of	1998	To implement the protection and preservation policy with respect to perpetuation of cultural heritage that has

Cultural Heritage Regions Laws (Law No. 15, 16)		existed for many years; to protect and preserve the cultural heritage regions and the cultural heritage.
Prevention and Control of Communicable Diseases Law (Law No. 3, 4, 9, 11)	1995	To prevent the outbreak of Communicable Diseases, by implementing following project activities:- (a) immunization of children by injection or orally; (b) immunization of those who have attained majority, by injection or orally, when necessary; (c) carrying out health educative activities relating to Communicable Disease.
The Control of Smoking and Consumption of Tobacco Product Law (Law No. 9)	2006	-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; -To protect from the danger which affects public health adversely by creating tobacco smoke-free environment; -To obtain a healthy living style of the public including child and youth by preventing the habit of smoking and consumption of tobacco product;
Conservation of Water Resources and Rivers Law (Law No. 8, 11(a), 13, 19, 24(b), 30)	2006	To conserve and protect the water resources and rivers system for beneficial utilization by the public; to prevent environmental impact.
The Protection of rights of National Race Law,	2015	Consists of four bills, as submitted to the legislature; Buddhist Women's Special Marriage Bill, Religious Conversion Bill, Monogamy Bill and Population Control Bill.
Agricultural Land Law	2012	To protect the rights of the people who are working on the farm.
the Prevention of Hazard from Chemical and Related Substances Rules (Law No. 8,15,16,17, 20, 22, 23, 27)	2013	- Performing the sticking pictogram for being least the health impacts and accident injuries in the occupational area according to the prescribed standards and norms of the Globally Harmonized System GHS); - Making the necessary arrangements to be safety of the occupational area and issuing orders and directives for preventing and decreasing the accident; - Laying down the proliferation plans on knowledge, and safety of chemical and related substances to administrators, license holders, public and workers; - Cooperating with local and foreign governmental departments, organizations and non-governmental

		organizations in respect of safety management for chemicals hazard.
The Freshwater Fisheries Law (Law No. 36,40,41)	1991	- To further develop the fisheries; - To prevent the extinction of fish; - To safeguard and prevent the destruction of freshwater fisheries waters; - To obtain duties and fees payable to the State; - To manage the fisheries and to take action in accordance with the Law.
The Export and Import Law	2012	Export and Import Law was enacted and the Control of Imports and Exports Act (1947) was abolished. It aims to implement the economic principles of the State successfully, to lay down the policies to export and import that support the development of the State; and that are to be in conformity with the international trade standards.
Automobile Law Pyidaungsu Hluttaw Law No. 55/2015	2015	- For the safe driving of motor vehicles in public areas through registration according to official rules and regulations. - To provide driving licenses for driving particular types of motorized vehicles after qualification checks. - For the easy flow of road users and for the protection against road risks and vehicle perils. - To avoid traffic congestion and to use high technology transportation systems efficiently in order to implement protection against road risks and vehicle perils. - To reduce environmental pollution caused by motor vehicles.
The Myanmar Engineering Council Law (Law No. 20,24,25, 31(a), 37)	2013	- To uphold and upgrade the dignity, ethics and quality of the Myanmar citizen engineers, graduate technicians and technicians who are practicing engineering works; - To explore using engineering technology and information technology combined the good methods, research and development activities by which the natural resources and human resources of the State may be beneficially applied with least impact environment; - To carry out guidance and supervision, and to take necessary actions for fulfillment of the requirements of stipulated technical standard, proper method, free from danger, keeping ethic and being dutiful in the fields of engineering and technology education, researches and services; - To service engineering and technology related functions and duties beneficial for the State assigned by the relevant Ministry and relevant organizations.

The following table shows more detailed about the rules and regulations associated with the proposed project.

Laws and Regulations Associated with the Proposed Project

Laws and Regulations	Year	Descriptions	Objectives
Local Laws			
Constitution of the Republic of the Union of Myanmar	2008	Article 45- The Union shall protect and conserve natural environment. Article 24 - The Union shall enact necessary laws to protect the rights of workers. Article 349 - Citizens shall enjoy equal opportunity in carrying out the following functions: Article 359 - The Union prohibits forced labor except hard labor as a punishment for crime duly convicted and duties assigned by the Union in accord with the law in the interest of the public.	- To conserve the natural environment, - To prevent and upgrade the rights and lives of the workers
Environmental Conservation Law	2012	Article 16 - A person or organization operating business in the industrial estate or business in the special economic zone or category of business stipulated by the Ministry: (a) is responsible to carry out by contributing the stipulated cash or kind in the relevant combined scheme for the environmental	- to enable to implement the Myanmar National Environmental Policy; - to enable to lay down the basic principles and give guidance for

		conservation including the management and treatment of waste;	systematic integration of the matters of environmental conservation in the sustainable development process;
Environmental Conservation Rules	2014	**Rule 55 -** Government department, organization or an individual which has been established before the enation of these rules and is responsible to conduct the environmental impact assessment or initial environmental examination for the project, business, service or activity: (a) Shall prepare the environmental management plan according to environmental impact assessment procedure and submit it to the Ministry; (b) Shall implement an environmental management plan with stipulated terms and conditions approved by the Ministry within the time stipulated by the Ministry.	- To implement correctly according to the environmental management plan
EIA Procedures	2015	**Article 8** -Any Project already in existence prior to the issuance of the Rules, or the construction of which has already commenced prior to the issuance of the Rules, and which, in either case, shall be required to undertake, within the timeframe prescribed by the Department, an environmental compliance	- To develop the environmental impacts and to draw the environmental management plan;

		audit, including on-site assessment, to identify past and/or present concerns related to that Project's Environmental Impacts, and to: (a) develop an EIA or EIA or EMP; (b) obtain an ECC; and (c) Take appropriate actions to mitigate Adverse Impacts in accordance with the Law, the Rules, and other applicable laws.	
Foreign Investment Law	**2012**	**Article 4 -** The investment economic activities are designated as restricted or prohibited activities:- (b) The activities prejudicial to public health. (c) The activities prejudicial to the natural resources, environment and biodiversity. **Article 17 -** The duties of investor are as follows:- (h) To perform not to affect environmental pollution and spoilage as per existing law in connection with the investment activities.	- not to destruct the environment due to the investment activities
Myanmar Mine laws And Laws Amending Myanmar Mine Laws	1994 2015 2018	**Article 2** **(i) –** feasibility Study means a study on the commercial viability of a project which should include information on extraction, processing, financial information including anticipated investment, and the environmental and social impact of a	-to carry out for the development of conservation, utilization and research works of mineral resources; -to protect the environmental conservation works that may have detrimental effects

		project. **Article 13 -** (a) appointment of mine personnel and workers, assignment of work, prescribing of age, wages, salaries and other fees; (b) fixing of working days and working hours for the above and underground workers in a mine; (c) making provisions for safety and the prevention of accidents in a mine and their implementation; (d) making and implementation of plans relating to the welfare, health, sanitation and discipline of personnel and workers in a mine; (e) making provisions for the environmental conservation works that may have detrimental effects due to mining operation; **(e-1) –** By launching the mineral extraction work, to act the least destruction of the environment, and not to destruct the social economic effect of the local people to keep the fund annually for the environment. **(e-2) –** After the mining work is implemented or closing, the sites are preserved, maintain, and rehabilitation, preserve to promised land by the mining implementation program and to	due to mining operation.

		raise the fund. (f) reporting of accidents, loss of life and bodily injury received due to such accidents in the mine; (g) submission to the inspection of the Chief Inspector and inspectors. **CHAPTER V** **RIGHT OF UTILIZATION OF LAND AND WATER FOR MINERAL PRODUCTION** **Article 15 -** If, in the interest of the State, it is necessary to acquire the land where mineral production could be undertaken on commercial scale, the Ministry shall co-ordinate with the relevant Ministry for the acquisition of such land in accordance with the existing law. **Article 16 -** If the holder of mineral production permit requires the use of public water for mineral production he shall first and foremost inform the Department of such requirement in accordance with the prescribed manner. Article 17- If the Department, after scrutinizing the requirement submitted under section 16 finds that the use of public water is	

		really necessary for the holder of mineral production permit, it shall co-ordinate with the relevant government department and organization for obtaining permission to use water in accordance with the existing law.	
The Forest Law	1992	**Article 12 -** Whoever, within a forest land and forest covered land at the disposal Government: (a) is desirous of carrying out any development work or economic scheme shall obtain the prior approval of the Forestry Ministry; **Article 40** – Whoever commits any of the following acts shall, on conviction, be punished with fine which may extend to kyats 5,000 or with imprisonment for a term which may extend to 6 months or with both:- (a) trespassing and encroaching in a reserved forest; (b) pasturing domestic animals or permitting domestic animals to trespass in a reserved forest; (c) breaking up any land, clearing, digging or causing damage to the original condition of the land without a permit in a reserved forest; (d) causing damage to a water-course, poisoning the water, using chemicals or explosives in the water in a reserved forest; (e) catching animals, hunting or fishing in a reserved forest; (f) kindling, keeping and carrying and fire or leaving any	- To conserve the natural forests and trees;

		fire burning which may set fire to the forests in a reserved forest; (g) moving forest produce without submitting to examination at the revenue station; (h) violating any provision of the rule, procedure, order, directive or notification issued under this Law. **Article 44** – Whoever commits any of the following acts shall, on conviction, be punished with fine which may extend to kyats 30,000 or with counterfeit marking hammer; **(c)** altering, defacing or obliterating and mark affixed on the forest produce by the forest staff or by a person delegated by him; **(d)** altering, moving, destroying of defacing any boundary mark of a forest land without permission. **Article 42 -** Whoever commits any of the following acts shall, on conviction, be punished with fine which may extend to kyat 20,000 or with imprisonment for a term which may extend to 2 years or with both: (a) felling, cutting, girdling, marking, lopping, tapping or injuring by fire or otherwise any tree in a reserved forest;	
The Forest rules	1995	**Rule 20-** The forest area and land cover with the forest which are undertaken by the government: **(b)** The Ministry of forestry can allow to launch the	- to promote the sector of public co-operation in implementing the forestry policy and the environ- mental conservation policy of the Government;

		developing and economic plan if the environment is not destruct. **Rule 22-** The granted person can launch and must aware only to operate the permitted issues and not to destruct the environment.	
Myanmar Mines Rules	1996 2018	**Chapter XIX** - Measures for Safety and Prevention of Accidents in the Mine **Chapter XXI** - Making Provisions to prevent Detrimental Effects due to Mining operations on the Environmental Conservation Works **Article 105 -** The holder of a mineral exploration permit or a mineral production permit shall;- (a) backfill or otherwise make safe bore holes, excavations, surface of land damaged during the course of underground mining operations to the satisfaction of the Ministry or the Department. (b) establish forest plantations or pay compensation to as agreed when permission of the Ministry of Forestry was sought, if trees were cut and cleared for mineral exploration or mineral production within a forest land or in a land area covered with forests and which is at the disposal of the Government. 106. In disposing of liquids, wastes, tailings and fumes which	- to perform according to the rules of the mines

		have resulted from mineral production the holder of a mineral production permit or a manager shall undertake laboratory tests as may be necessary for the prevention of pollution of water, air and land in the environment and for the safety of living beings. When in the course of tests toxic materials are found, which are harmful to living beings, degradation shall be made by chemical means and systematic disposal shall be made only when it is assured that there is no danger.	
The Protection of Wildlife and Conservation of Natural Areas Law	1994	**Article 35 -** Whoever commits any of the following acts shall, on conviction be punished with imprisonment for a term which may extend to 3 years or with fine which may extend to kyats 10,000 or with both (a) causing water and air pollution, causing damage to a water-course or putting poison in the water in a natural area; (b) possessing or disposing of pollutants or mineral pollutants in a natural area; **Article 36 -** Whoever commits any of the following acts shall, on conviction be punished with imprisonment for a term which may extend to 5 years or with fine which may extend to kyats 30,000 or with both- (a) killing, hunting or wounding a normally protected wild animal or seasonally protected wild animal without permission, possessing, selling, transporting or transferring such wild	- to protect endangered species of wildlife and their natural habitats;

		animal or any part thereof without permission; (b) extracting, collecting or destroying in any manner any kind of protected wild plants within the prescribed area without permission; (c) destroying ecosystem or any natural state in the natural area; **Article 37** - Whoever commits any of the following acts shall, on conviction be punished with imprisonment for a term which may extend to 7 years or with fine which may extend to kyats 50,000 or with both- (a) killing, hunting or wounding a completely protected wild animal without permission, possessing, selling, transporting or transferring such wild animal or any part thereof without permission;	
Protection and Preservation of Cultural Heritage Regions Laws	1998	**CHAPTER VII – Prohibitions 20.** No person shall carry out any of the following in the cultural heritage region:- (d) exploring for petroleum, natural gas, precious stones or minerals	- To protect the cultural heritage regions from destruction.

3.4. International Agreements and Conventions

In addition to the domestic laws listed above, Myanmar is also a signatory to the following International conventions and these may have relevance to the proposed survey activities. Refer to the following Table.

Table - International Agreements and Conventions Relevant to the Proposed Project

International Agreements and Conventions	Status	Purposes
Vienna Convention for the Protection of the Ozone Layer, 1985	1998	Aims at the protection of the ozone layer, including requirements for limiting the production and use of ozone depleting substances.
Montreal Protocol on Substances that Deplete the Ozone Layer, 1989	1993	Aims at the protection of the ozone layer, including requirements for limiting the production and use of ozone depleting substances.
Basel Convention, 1989	2015	The Convention regulates the trans boundary movements of hazardous wastes and provides obligations to its parties to ensure that such wastes are managed and disposed of in an environmentally sound manner.
United Nations Framework Convention on Climate Change (UNFCCC), New York, 1992 and Kyoto Protocol 1997	1995 and 2005	Provide a framework for intergovernmental efforts to tackle climate change. Recognises that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases.
Convention on Biological Diversity, Rio de Janeiro, 1992	1994	Aims to promote national policies for the conservation of wild flora, fauna and habitat that needs to be included in planning policies. The three main goals are: (1) the conservation of the biological diversity; (2) the sustainable use of its components; (3) fair and equitable sharing of the benefits.
Asia Least Cost Greenhouse Gas	1998	Develop national and regional capacity for preparation

Abatement Strategy (1998 ALGAS)		of GHG inventories. Assist in identifying GHG abatement options and preparation of a portfolio of abatement projects for each country.
United Nations Agenda 21	1997	Formed by the National Commission for Environmental Affairs (NCEA) in Myanmar. Provides a framework of programmes and actions for achieving sustainable development in the country. Building on the National Environment Policy of Myanmar, takes into account principles contained in the Global Agenda 21. Myanmar Agenda 21 also aims at strengthening and promoting systematic environmental management in the country.
Relevant ILO Conventions in force in Myanmar • C1 Hours of Work (Industry) • C14 Weekly Rest (Industry) • C17 Workmen's Compensation (Accidents) • C19 Equality of Treatment (Accident Compensation) • C26 Minimum Wage Fixing Machinery • C29 Forced Labour Convention • C42 Workmen's Compensation (Occupational Diseases) Revised 1934 • C52 Holidays with Pay • C87 Freedom of Association and Protection of the Right to Organize		Sets out legal instruments drawn up by the ILO's constituents (governments, employers and workers) and setting out basic principles and rights for workers.

3.5 National and International Guidelines for Proposed Project

National Guidelines and Internal standard guidelines are referred for Environmental Management Plan of the proposed project.

1. Environmental Impact Assessment Procedure (2015)
2. National Environmental Quality (Emission) Guidelines (2015) for Poultry Production
3. World Health Organization Guidelines (WHO)
4. National Ambient Air Quality Standard (NAAQS), USEPA
5. IFC Guidelines for Waste Management Facilities, 2007
6. IFC Guidelines for Water and Sanitation, 2007
7. IFC Guidelines for Community Health and Safety
8. IFC Guidelines for Occupational, Health and Safety

3.6. National Environmental Quality (Emissions) Guideline for Proposed Project

Ore and Mineral Extraction

This guideline applies to underground and open-pit mining, alluvial mining, solution mining, and marine dredging. Effluent and storm water flows should be managed so as to achieve the following effluent levels. The principle sources of air emission are fugitive dust from earth works and materials handling and transport facilities. Prevention and control of air emissions should be sufficient to achieve the general air emission guideline for ambient air quality.

Table - Effluent Levels for Ore and Mineral Extraction

Parameter	Unit	Guideline Value
Arsenic	mg/l	0.1
Cadmium	mg/l	0.05
Chemical oxygen demand	mg/l	150
Chromium (hexavalent)	mg/l	0.1
Copper	mg/l	0.3
Cyanide	mg/l	1
Cyanide (free)	mg/l	0.1
Cyanide (weak acid dissociable)	mg/l	0.5
Iron (total)	mg/l	2

Lead	mg/l	0.2
Mercury	mg/l	0.002
Nickel	mg/l	0.5
pH	S.U.[a]	6-9
Temperature	°C	<3 degree differential
Total suspended solids	mg/l	50
Zinc	mg/l	0.5

[a] Standard unit

Table - Air Emission Levels for Ore and Mineral Extraction

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

[a] Particulate matter 10 micrometers or less in diameter
[b] Particulate matter 2.5 micrometers or less in diameter

Table - Ambient Air Quality Standards

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

[a] Equivalent continuous sound level in decibels

3.7 Penalties and other Administrative Punishment

The developer must have to know the penalties and other administrative punishment granted in EIA Procedures in Myanmar.

No	Non-Compliance	Penalties	Specific Administrative Punishment of the Ministry
1.	Failure or delay in timely submission of reports within Period prescribed by Ministry	100 to 500 US$ or equivalent Myanmar Kyat + 10-25 US$/ day unit cured or equivalent Myanmar Kyat	-Issue Enforcement Notice
2.	Obstruction or interference with an official in the course of their duties	250 to 5,000 US$ or equivalent Myanmar Kyat	-Issue Enforcement Notice -Criminal prosecution
3.	Failure to provide information to the Ministry or any representative	1,000 to 5,000 US$ or equivalent Myanmar Kyat	-Suspension of Approval of EMP, EMP-CP, EMP-OP in whole or in part
4.	Failure to provide information to the Ministry Inspector or any representative when requested in regard to inspection and monitoring	250 to 5,000 US$ or equivalent Myanmar Kyat	- Issue Enforcement Notice
5.	Undertaking or allowing any preparatory or other construction works without the prior approval by the Ministry of a reserved EMP or EMP-CP	1,000 to 5,000 US$ or equivalent Myanmar Kyat +50 to 500 US$/ day until cured or equivalent Myanmar Kyat	-Criminal prosecution

6.	Operating/implementing without a permit, or approval by the Ministry of an EMP or EMP-Op	1,000 to 5,000 US$ or equivalent Myanmar Kyat +50 to 500 US$/ day unit cured or equivalent Myanmar Kyat	- Criminal prosecution
7.	Non-compliance with an Enforcement Notice or Suspension Notice issued by the Ministry	2,000 to 10,000 US$ or equivalent Myanmar Kyat +100-500 US$/day unit cured or equivalent Myanmar Kyat	-Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
8.	Failure to notify to the Ministry of any knowledge of any event of an imminent of environmental damage	1,000 to 5,000 US$ or equivalent Myanmar Kyat	- Issue Enforcement Notice - Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
9.	Failure to take reasonable steps to prevent an imminent thread of damage to the environment, social, human health, livelihoods, or property, where application based on the EMP, EMP-CP or EMP-OP	2,500 to 10,000 US$ or equivalent Myanmar Kyat	-Issue Enforcement Notice - Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part

10.	Non-compliance with conditions in 'the ECC and allowable Emission Limit Values	1,000 to 10,000 US$ or equivalent Myanmar Kyat	-Issue Enforcement Notice - Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
11.	Failure to take pay compensation amounts required in respected in respect of social impacts	1,000 to 10,000 US$ or equivalent Myanmar Kyat	-Issue Enforcement Notice - Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part
12.	Failure to fully restore social conditions upon resettlement	1,000 to 10,000 US$ or equivalent Myanmar Kyat	-Issue Enforcement Notice - Suspension of Approval of EMP, EMP-CP or EMP-OP in whole or in part -Revocation of Approval of EMP, EMP-CP or EMP-OP in whole or in part

Notes:

1. All penalty amounts set forth in this Annex are denominated in United states Dollars (US$) and are subject to annual inflation adjustment
2. Abbreviations are as follows;
   EMP =Environmental Management Plan
   EMP-CP = Environmental Management Plan – Construction Phase (OP- Operation Phase)

4. PROJECT DESCRIPTION

4.1. Project Background

Myanmar Ponpipat Co., Ltd. will operate surface mining for Tin in Heinda Mine, near Heinda Village, Myitta Township, Tanintharyi Region. The land use for all working area is Heinda Mine area. The Myanmar Ponpipat Co., Ltd submitted his application for mining lease over this area and after completion of all the formalities, No. (2) Mining Enterprise (Tanintharyi) has granted mining lease for the proposed mining project. The project area has over 2000 acres wide including three villages, one lake and two seasonal ponds.

Myanmar Ponpipat has now initiated an Environmental and Social Impact Assessment (ESIA) to determine the feasibility of the project from an Environmental and social perspective. Ever Green Tech Environmental Services and Training Co., Ltd. has been appointed as the independent Environmental Assessment Practitioner (EAP) responsible for managing the ESIA and supporting Public Participation (PP) process.

4.2. Location

The project is located in Heinda Village, Myitta Village Cluster, near Dawei, Tanintharyi Region shown in Appendix A.

4.3. Project at a Glance

The following table shows the brief descriptions of the proposed project.

Aspects	Descriptions
Mining	
Area	Over 2000 acres
Raw material	Tin ore from Heinda Mine Site
Ore grade	The average ore grade is 10 to 20% Tin .
Type of mineral deposit	Alluvial Deposit
Ore grade	The average ore grade is 10 to 20% Tin
Mining method	Open Cut Mining Method

No. of back hoe	3 Nos.
No. of dump truck	10 Nos.
Mineral Processing	
Target products	Tin concentrate (over 65%) by gravity concentration method
Processing method	Hydraulic mining with sluicing
Production rate	0.5 ton/day
Water usage for mineral processing	3000 gallons per day for Side B processing plant 2000 gallons per day for Side C processing plant
Source of water	Surface water from Ba Wa Pin Creek (0.9 km far away)
Waste management	
Transportation for ore	Raw material (ore) from mine site was transported to the processing plant directly and there will need no storage facility for ore by trucks.
Transportation for workers	It is not necessary to transport to the workers to the mining and processing sites. Most of the workers will go there by their by their own motorbikes.
Solid wastes	1. Recyclable domestic waste will be recycled. Other domestic waste will be disposed of in a domestic waste disposal site inside the mine. 2. Process solid wastes (parking material, oil storage container, etc.) will be recycled.
Liquid wastes	1. Process water was pumped back to the plant and re-used in the treatment process during summer and winter seasons. 2. Waste water will be treated in settling ponds and re-used in the treatment process during rainy seasons.
Domestic Effluent	Sewage treatment facilities will be provided for all sewage generated on site.
Other Infrastructures	

Office and other facilities	These include offices, equipment and furnishings, sewerage, power, water and water treatment, and mineral process equipments and materials.
Camp	The camp will be provided accommodation for the employee during the operational phase. It will house about 30 employees and visitors. This will include accommodation units, kitchen, messing facilities, power, sewerage and waste disposal.
Access and haul roads	Main access to the proposed project site is mainly via a gravel road from Dawei-Heinda road.
Source of Process Water and Domestic Water	Water reservoir pond near the Heinda Village
Employment	
Employment	At full production a total of 350 permanent people will be employed of which 350 will be sourced locally, 5 technicians from other places and 5 from Thailand (Mother Company).

4.4. Mining Operation

The proposed project will make use of opencast (surface) mining method. Opencast mining involves the removal of non-mineral material, referred to as "overburden", to provide access to the ore body located beneath. The following standard activities will take place at the Heinda Mine Site:

- Pre-stripping and site preparation;
- Removal of overburden; and
- Loading and hauling.

4.4.1 Pre-stripping and Site Preparation

Pre-stripping activities include the removal of vegetation, topsoil and subsoil to allow for mining activities. Site preparation activities required onsite include the preparation of access and haul roads, waste rock dumps, and other construction and protective works. Areas identified for the base camp, work shop, fuel and explosives storage and warehouses will also be prepared.

4.4.2 Removal of Overburden

Once the site has been prepped overburden will be removed. Overburden will be excavated by back hoe and trucked to a waste rock dump.

4.4.3 Loading and Hauling

Loading and hauling of ore and waste rock will be done by using dump truck.

4.4.4. Mining Pit Area

The mining pit area refers to the area to be mined for its tin ore resource. In opencast mining the project layout starts with the basic design of the pit itself. Pit layouts are planned in intervals for the full project lifecycle to allow for the full production capacity to be reached. Once the mining pit area has been established associated infrastructure including surface haul roads, stockpiles, and waste dumps can be finalized.

4.4.5. Waste Rock Dumps

Waste rock dumps are required to accommodate overburden and waste rock excavated as part of the mining process.

4.4.6. Office Complex

An office complex is required to accommodate all management, technical, and administration staff for the mine. The office complex will include a car park, meeting rooms, dining hall, security and first aid station.

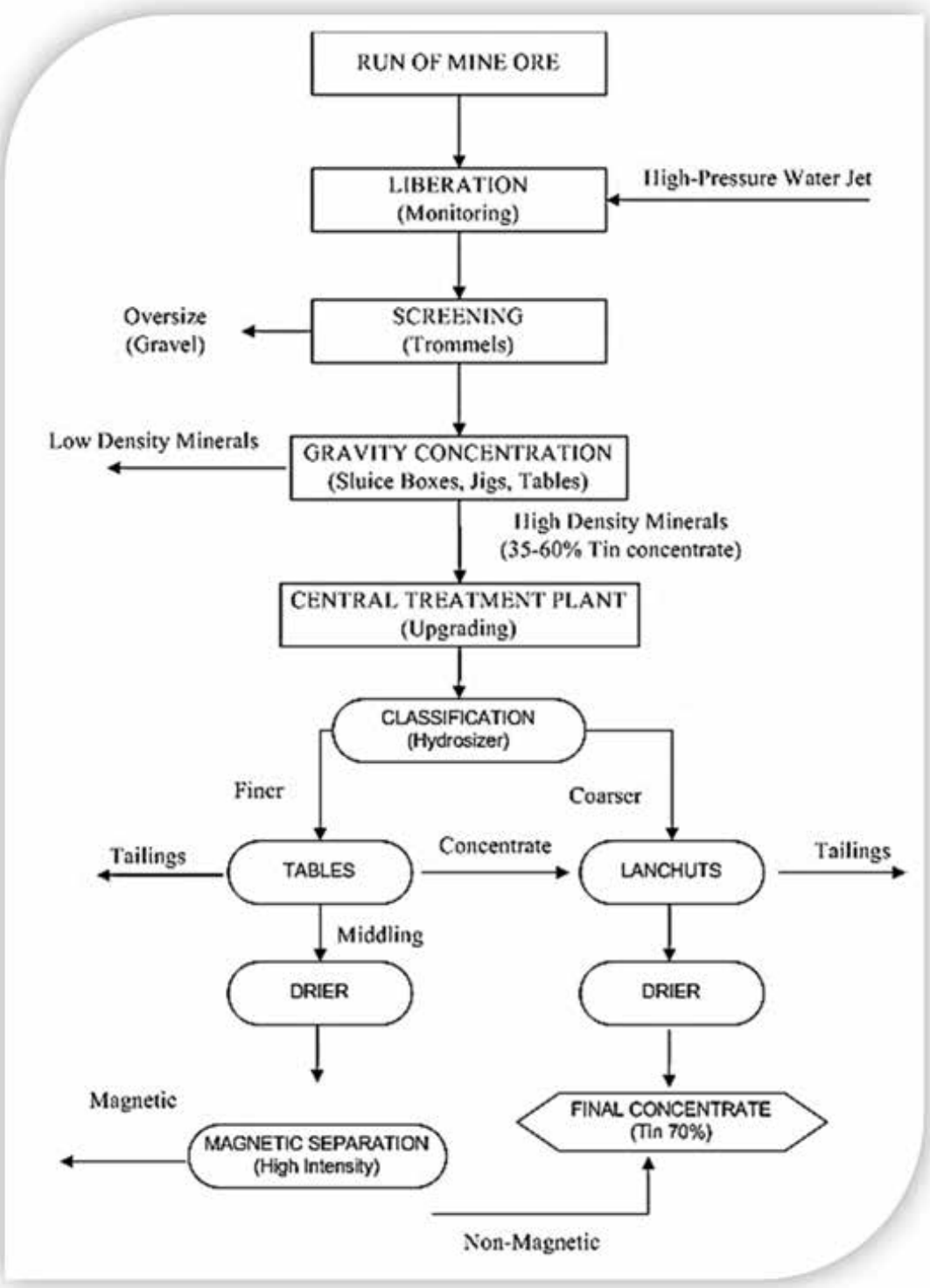
4.4.7. Workshops

Engineering and vehicle workshops, wash downs, garages, and fuel depots were located near the office inside the mine area.

Location of Office Complex and Workshop

4.5. Mineral Processing Operation

The production of tin concentrate by gravity method is shown in the following flow chart.



Flow Diagram of Concentration of Tin & Tungsten

4.5.1. Ore

Alluvial ore deposite (10 – 15% tin) is used as raw ore and it is taking from Heinda mine site.

4.5.2. Liberation and Screening

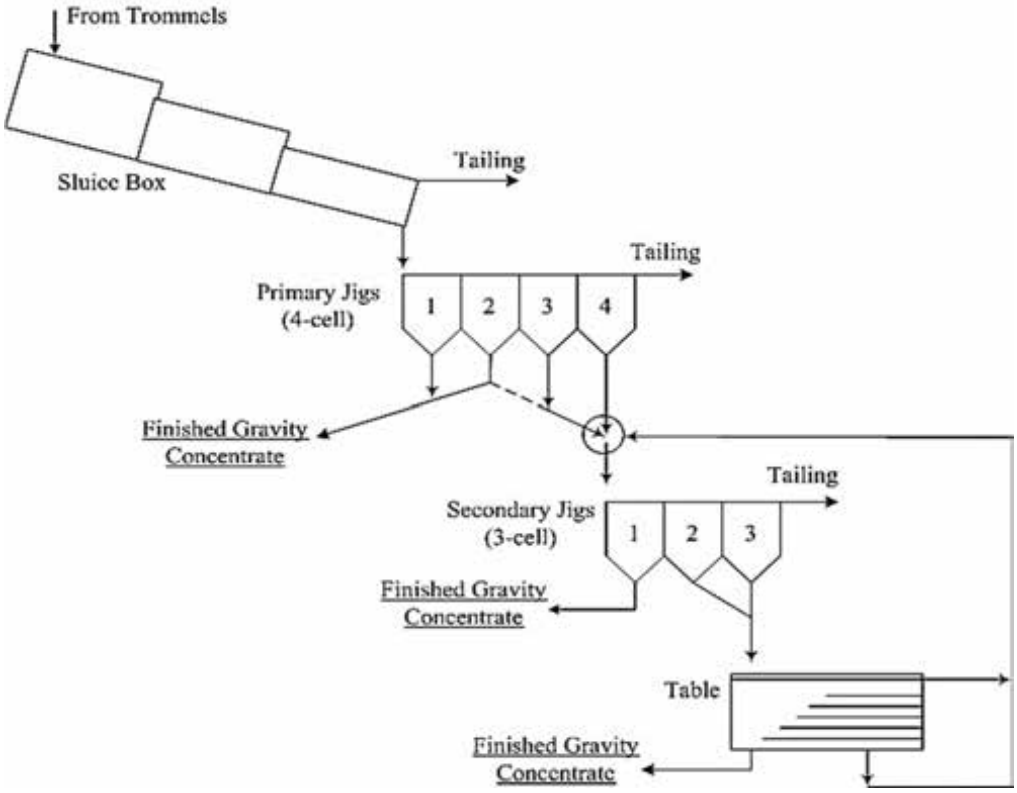
Liberation by making high pressure water jet as shown in the following figure. And then two stages of screening process with 2 inch and 1.5 inch trommels before gravity concentration.

Liberation Process

Screening Process

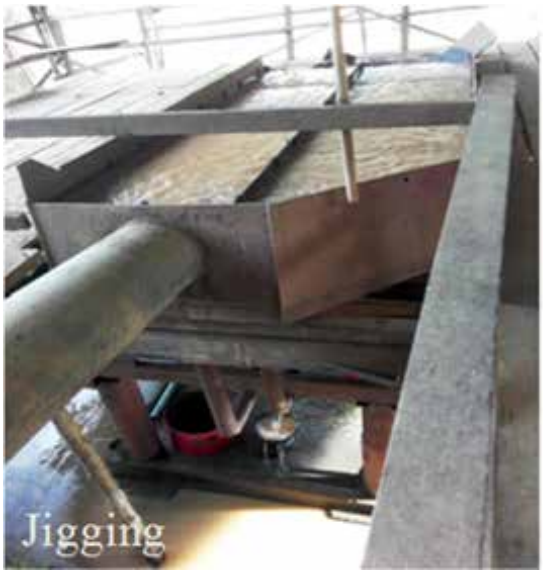
4.5.3. Gravity Concentration

The gravity concentration is upgrading of tin concentrate at about (35-50% tin). Gravity concentration stage includes sluice box, two stages of gigging and tabling as shown in the following flow diagram.



Flow Diagram of Gravity Concentration Method

Sluice Box



Jigging

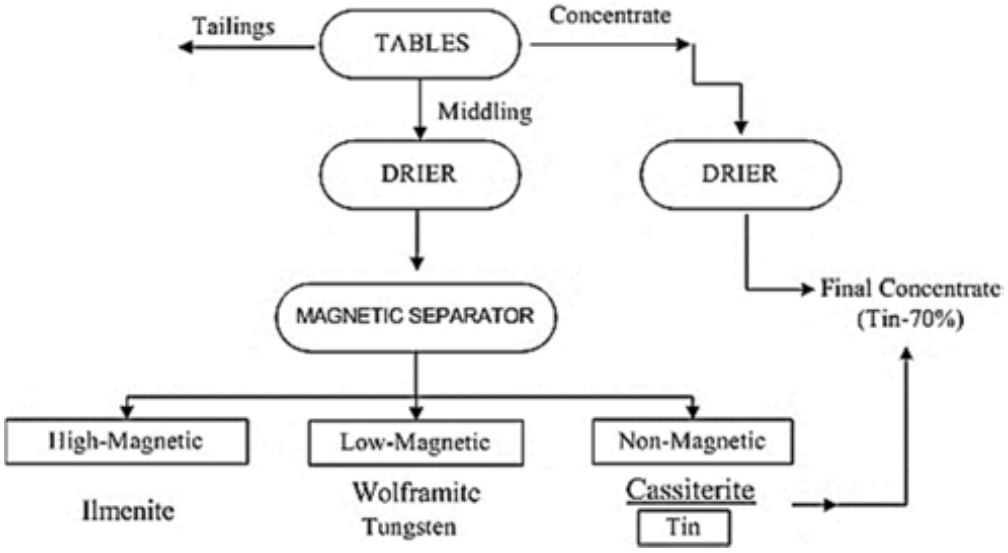
Tabling

4.5.4. Central Treatment Plant

Central Treatment Plant has been the upgrading of tin concentrates from gravity separation process. It consists of two mains steps; classification and lanchute. The classification of rough concentrates with hydrosizer by manipulating water flow and produce feed products of different sizes. Through such classification, the coarser size fraction treated in the lanchutes (short trapezoidal sluice) water action will more easily wash away other lighter but bigger mineral from the tin ore, thus facilitating the cleaning up process.

Magnetic Separator

The finer size or fine-grained cassiterite will normally report in the fraction with other bigger-grained lighter minerals and gangues. Shaking table may be added to the set-up to assist in treating the fine cassiterite. The middlings, including of tin ore and by-products mineral, from shaking tables are retreated by high-tension and magnetic separator of suitable type, design and number to cope with the feed rate desired as shown in the following figure. In treating by-product, or heavy minerals, such as wolframite, ilmenite and columbite, suitable forms of equipment as well as professional skills are considered essential for the production of concentrates of desirable and marketable grade. The final concentrate is containing about greater than 65 per cent tin and tungsten.



Typical Flow Sheet of Central Treatment Plant

5.0. PROJECT ALTERNATIVES

An analysis of reasonable alternatives for meeting the project objectives may lead to designs that are more environmentally, socio-culturally or economically sound. It is also the requirement of EIA procedure in Myanmar.

5.1. "NO-GO" Alternative

The proposed project does not proceed (the "no-go" alternative), the adverse impacts identified in this report would be avoided. The main adverse impacts are surface water due to waste water from processing plant during operation phase.

If the proposed project does not proceed, the project's benefits would be lost, diversification of the economy; increased employment for Dawei Region, and increased support of the local, regional and national economies. According to the EIA study, all of the impacts can be mitigated proper mitigation measures as proposed in this EIA report. So, no-go alternative is not suitable for current conditions of the local and national economy in Myanmar.

5.2. Alternative Analysis for Site Location

(a) Site Location

As the proposed project has been operated in Heinda mine since 1999 and mining has to be done in the exact location of abundance mineral resources. So, location alternative is not appropriate for the proposed mining project. Moreover, processing plants (Site B and Site C) are already built for a long time and there will no feasible alternative analysis for location of treatment plants.

(b) Location of Sediment Dumping Site

Although unlikely unstable tailings materials might cause soil erosion and sedimentation and poten surface water due to the entering of tailing materials into the detention. There are two communities (Heinda and Myaungphyo Villages) in the vicinity of the mine. According to the EIA Study, there will no impact to nearest communities (Heinda and Myaungphyo Villages) due to the failure of overburden and tailing materials. In the unlikely event, there might be potential to surface water in No. (2) Creek due to the unstable material from tailing material as shown in the following figure.

Present Location of Waste Dumping Site

In addition, there is also a chance of small scale subsidence events on the slopes of the rock dumps which may result in injury to employees working at the dumps. The management of waste rock and tailings will conform to the requirements of the IFC's EHS Guidelines for Mining (IFC, 2007). Furthermore, the facilities will be designed by an independent recognised global expert in tailings dam design and will be managed according to international best practice.

The present location of waste dumping site for site B is suitable because it is away from any water resources that can cause surface water pollution. But the location of waste dumping site for Site C might not enough space for further waste disposal and may cause land slide (failure of waste dumping site). However, systematic stacking of Site C disposal is being implemented to minimize the risk and regular monitoring is also being implement. Vegetation has been planted to hold the surface erosion. So, solid waste from settling ponds may be disposed at old working site as shown in the following

Proposed Location of Waste Dumping Sites

6.0. DESCRIPTION OF THE SURROUNDING ENVIRONMENT

This chapter describes the project sites baseline environmental and social conditions according to available sources of baseline information and qualitative assessments of the project site.

6.1. Meteorology and Climatology

Tanintharyi region has a tropical climate. The region has only slight changes in temperature. Dawei has temperate weather, as it is located in the low latitude zone and near the sea. The dry season of the area in which the project lies starts in February and ends in May. The rainy season starts in June and ends in September and the cold season follow with the cooler, drier months of October to January. Some important meteorological data, which are collected from Weather Station (Dawei). The project area is warm and wet season with the highest temperature (36.6˚C) and lowest temperature (21.2˚C). Yearly rainfall and temperature are as follow:

No.	Year	Rainfall		Temperature	
		Raining Days	Total Rainfall	Summer	Winter
				Maximum	Minimum
1	2011	164	223.57	36.0	15.0
2	2012	170	262.16	36.1	14.0
3	2013	156	219.94	35.1	15.8
4	2014	143	229.25	35.5	11.0
5	2015	148	193.25	35.8	21.5

Unusual Rainfall - 2016, March (9.13 inches)
Unusual Temperature – 2016, March (39.5 ˚C)

6.2. Topography

The topography of the area is determined by the type of bedrock underlying the soils, the geology of the area and the dissection of the streams flowing in the area. The regional geology of the area has given rise to considerably diverse relief, ranging from gently rolling slopes to hilly and severely incised slopes found along drainage ways and stream valleys as shown in the following figure.

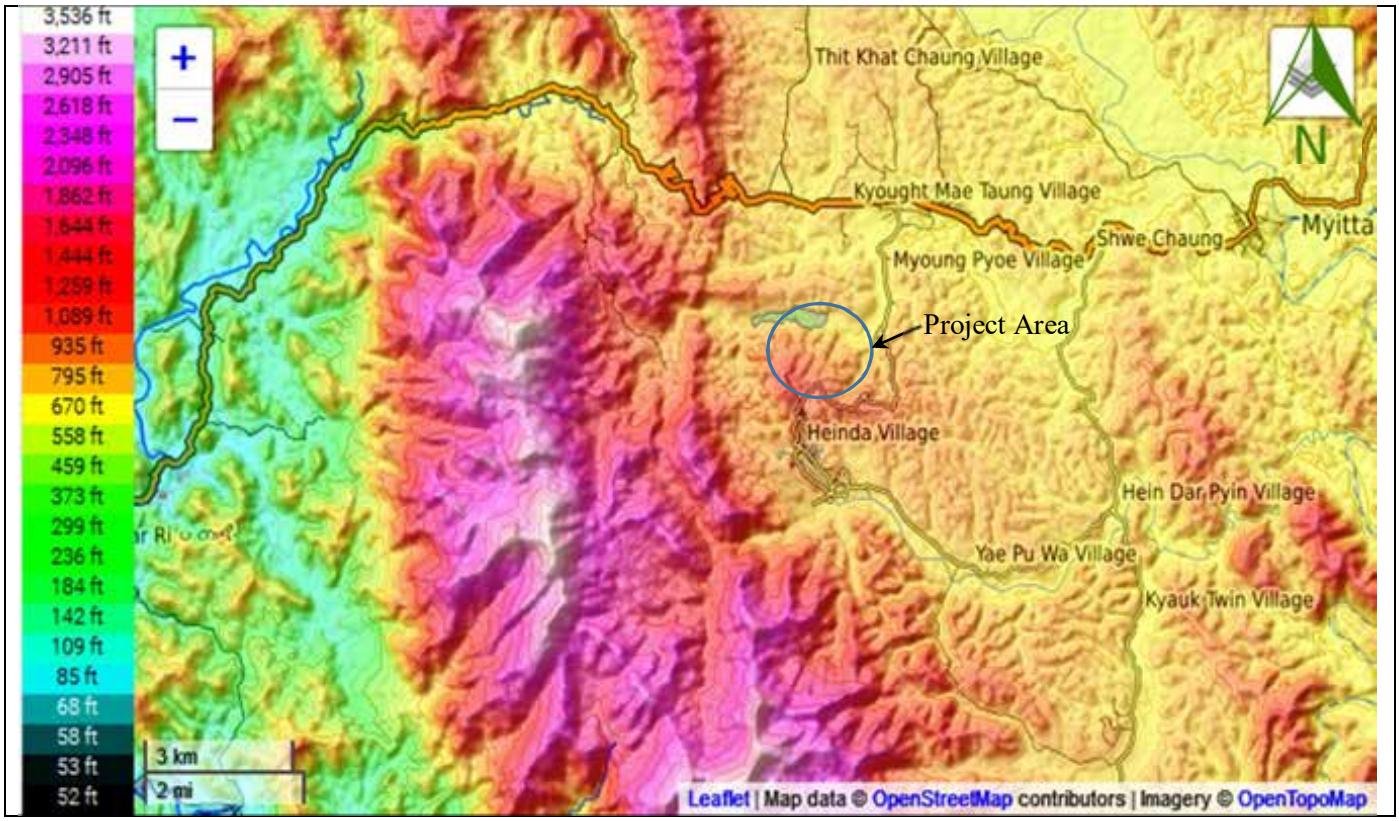


Figure- Digital Elevation Map of Project Area

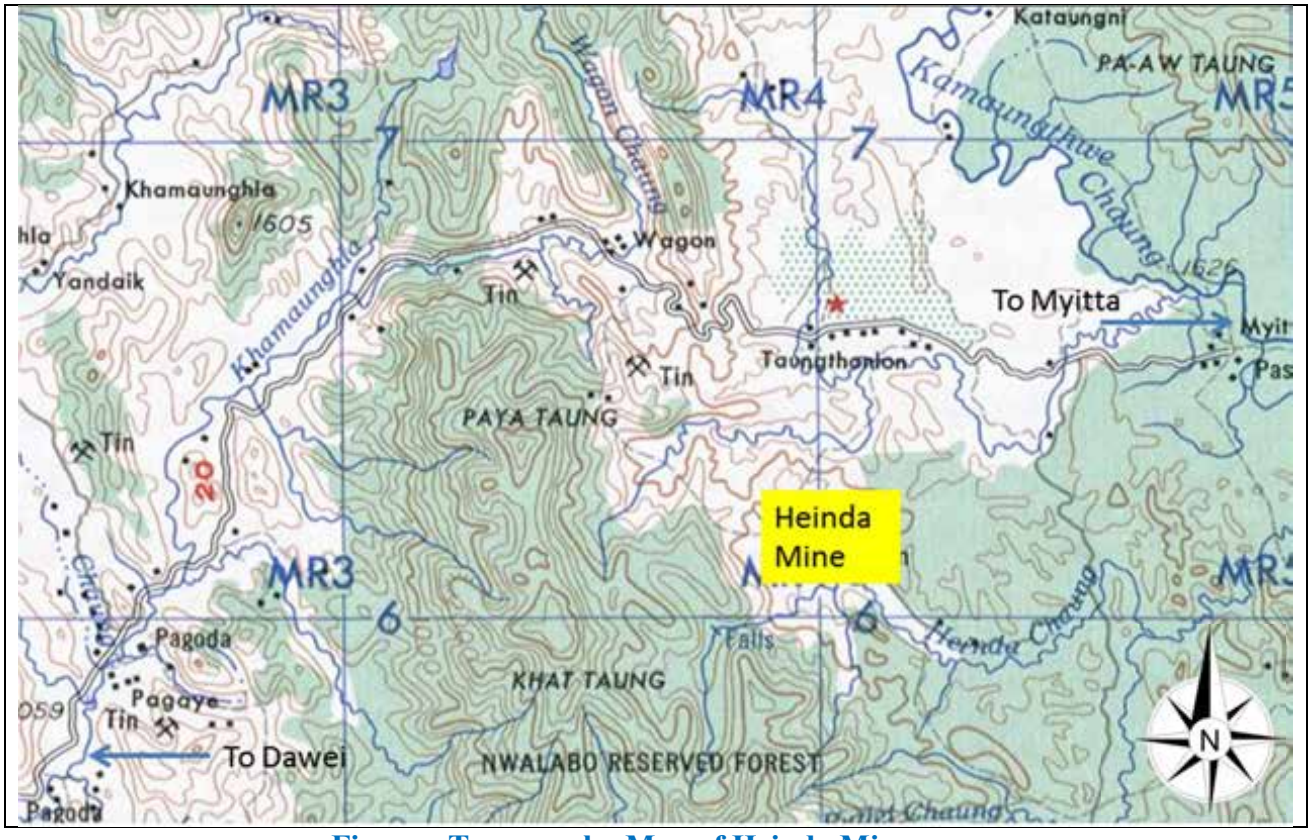


Figure - Topography Map of Heinda Mine

6.3. Geohydrology

Regionally groundwater flows from west to east but locally the high relief variations on site can give rise to variance in flow direction. Groundwater can be contaminated from many sources such as rubbish dumps, use areas, leaking fuel storage tanks, sewage effluent, seepage from improper sanitation and waste disposal.

There are no major water bodies in and around the mining area. However, there are Taung Nyo (No.2 creek) and Myaung Pyo seasonal streams in the surrounding area as shown in the following figure.

Baseline Study of the Hydrology

Figure - 3D Map of Heinda Mine Area

The drainage system in the project area can be described as dendritic consisting of gently sloping valleys from surrounding undulating hills common in Heinda mine area. The slope of land at the proposed opencast mining locations, mineral processing plant and settling ponds seems to be relatively flat to moderately gentle. Hence surface runoff in the project vicinity will consist of mainly overland flow.

Figure - Seasonal Creeks around the Heinda Mine

Resulting from observations of local topography, site geology and weather conditions, no noticeable perennial streams could be seen at site.

In addition, there were signs of localized major sedimentation of MyaungPyo creek and flooding at valley bottoms as noted from signs of sand deposition which could only occur due to impeded drainage of excess overland runoff from heavy storms that fall at nearby high ground areas. It is important that the discharge of such flood waters is carefully managed in order to minimize water logging. Water logging may drown some of access tracks, damage of agricultural land of local villages and other important installations thereby affecting efficient operation of the facility.

There are no signs of surface water runoff management facilities except for minor impounding works aimed at harvesting storm water for pastoral use. Average annual rainfall is about 220mm. The rainfall season is from May to October. Heavier rainfall occurs between and June to August and lighter rainfall in September and October, the so called long rains and short rains respectively. The months in between are hot, dry and windy.

6.4. Existing Geological Conditions

Tanintharyi Region is an administrative region of Myanmar, covering the long narrow southern part of the country on the Kra Isthmus. It borders the Andaman Sea to the west and the Tenasserim Hills, beyond which lies Thailand, to the east. To the north is the Mon State. There are many islands off the coast, the large Mergui Archipelago in the southern and central coastal areas and the smaller Moscos Islands off the northern shores.

6.4.1. General Geology

The Tanintharyi region is the southern part of the eastmost geotectonic belt of Myanmar, which is referred to either as the Shan-Tanintharyi Massif or simply as Karen- Tanintharyi Unit. Figure 2 shows the simplified geologic map of this area. Mergui Group of Carboniferous age formed as the basement and consists of thick sequence of folded argillite, greywacke and slate, with lesser amount of limestone, quartzite, agglomerate and conglomerate. The Mergui Group is later intruded by tin bearing granitic rocks of late Mesozoic age. Later, Tertiary rocks overly the Mergui Group and comprise of basal conglomerate, sandstone, claystone, mudstoneand coal. Compared with other better-known areas, it is believed that the Tertiary sediments range from Oligocene to Miocene. Younger volcanic rocks such as rhyolite and basalt are scattered throughout the islands. The name Mergui Series was given by T. Oldhemin 1856 to the unfossilliferous strata consisting of crushed shale, agglomerate, limestone and quartzite, and occurs widely in the Tanintharyi region. The Mergui Series is pre-Carboniferous in age and underlies the Moulmein limestone. The predominant rock type of the Mergui Series in Dawei district is argillite, fine grained rock of blue gray to black color at fresh, with obscure bedding and only incipient cleavage. The Carboniferous argillite is carrying small crystals of andalusite and silliminite with finely divided graphite. Similar Carboniferous shale with graphite are also found in some places in the Myeik area.

The next important rock type is dark grey or almost black "greywacke" which weathered to ashy brown color. This rock lacks bedding and composed of sub angular fragments of fine-grained rock in matrix identical with the argillites.

Much of the Tanintharyi region is underlain by strata of the Mergui Group in the eastern part and by raised marine terraces and recent alluvium in the west along the coast. Only in the northwestern and southern parts are granitoid rocks and other crystalline rocks, like those of

Kyaikhami, exposed. The stratigraphic succession of the Tanintharyi region is shown in following table.

Geological Succession of the Tanintharyi region

AGE	UNIT
QUATERNARY	Alluvium and Marine Terrace Deposits
	Unconformity
PERMIAN	Moulmein Limestone
	Unconformity
CARBONIFEROUS-PERMIAN	Mergui Group
	Unconformity
EARLY PALEOZOIC-PRECAMBRIAN?	Gneisses and Schists
Igneous Rocks	
TERTIARY	Volcanic Rocks
MESOZOIC-EARLY TERTIARY	Granitoid Rocks

6.4.2. Regional Geologic Setting

The investigated area lies on the southern part of Shan-Taninthayi massif and northern continuation of Taninthayi ranges, It is covered with Late Paleozoic rocks. The western part of the study area, which is in Taungnyo Range, are Carboniferous rock units (Taungnyo Series) arranged and systematically described (Leicester, 1930). Further up to the northwestern part, also in Mottama Range, Late Permian rocks (Martaban Beds, Pascoe, 1959) and Mesozoic granitic rocks are exposed.

Along the Tanintharyi area, quaternary deposit of gray and gray swampy soil and red brown forest soil types are present. Soil Map of Tanintharyi region is shown in following figure.

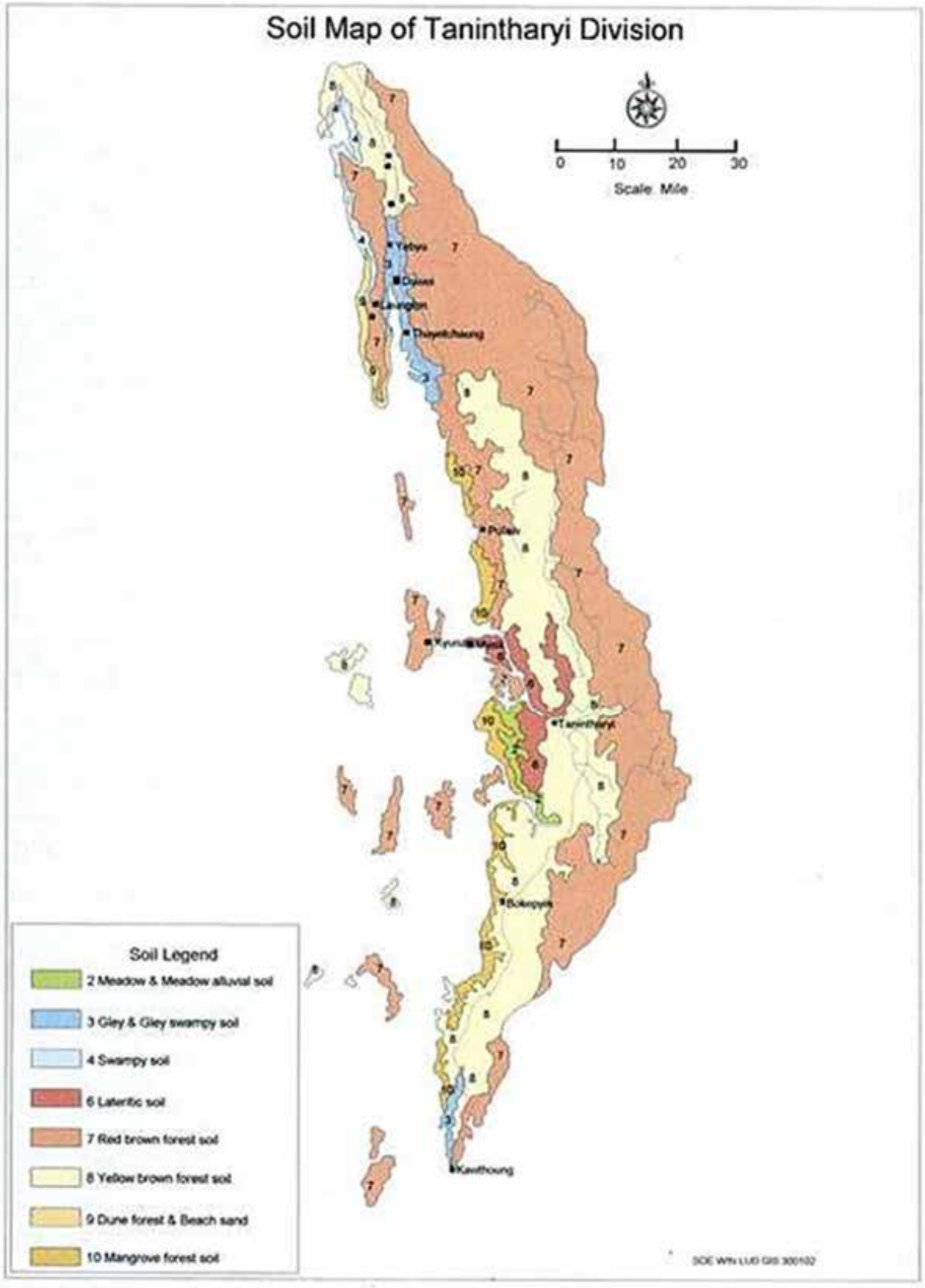
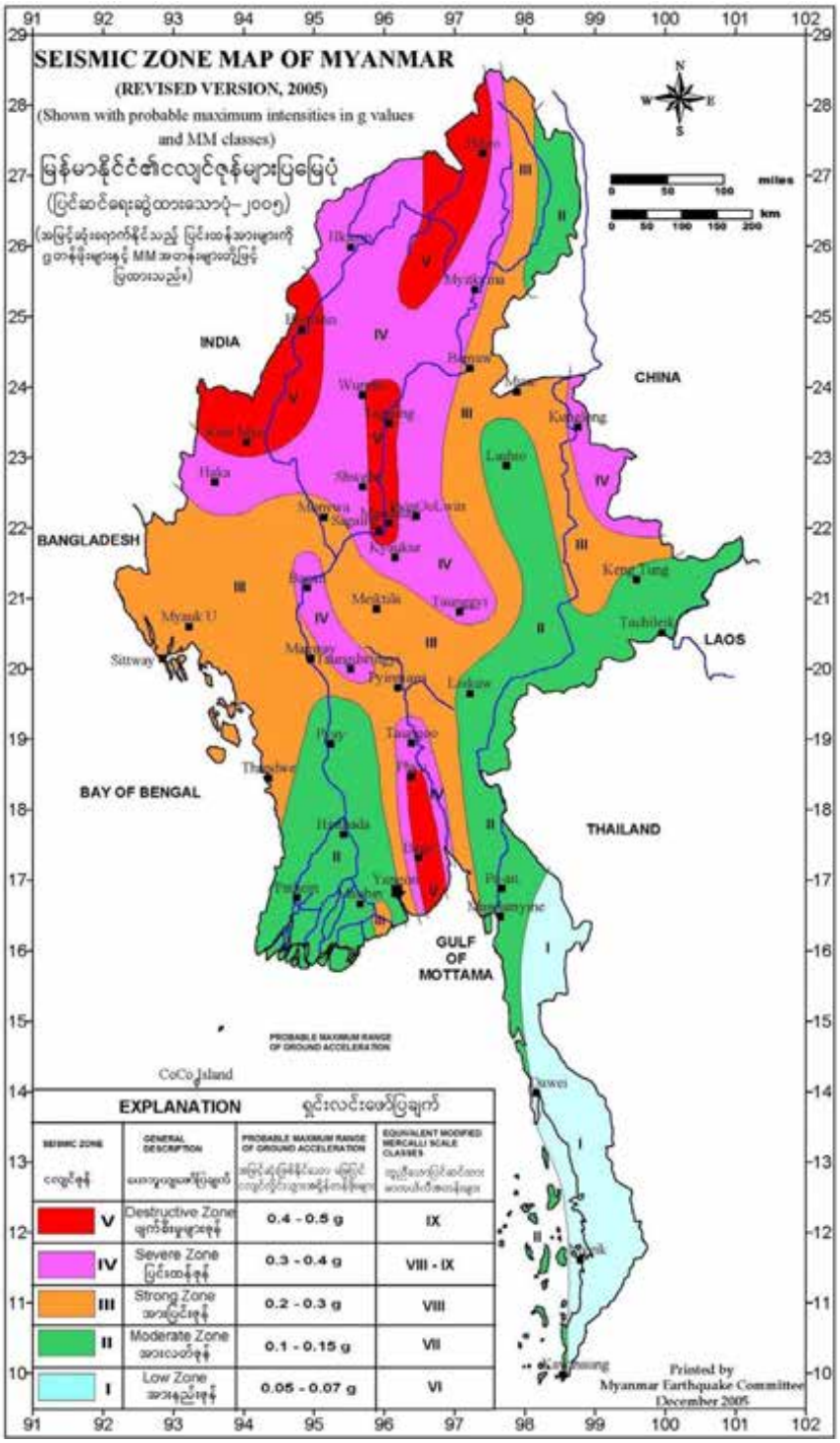


Figure - Soil Map of Tanintharyi Region

6.4.3. Seismic Information

Myanmar is an earthquake-prone country because it lies in a one of the world major earthquake belt, Alpide Belt, which extends from northern Mediterranean through Iran, Himalaya region and Myanmar. Most of the earthquake in central and delta region of Myanmar have resulted from movement of Sagaing Fault which extends from the northwest of Katha, through Sagaing, along the eastern flank of Pegu Yoma and finally into the western Gulf of Martaban for a distance of about 600 miles.

Structurally, Hpa-pon fault and Three - pagoda fault are situated at the northern and southern part of the area and their trend in nealy NW - SE direction. Dawei and Myitta area fall in low zone (zone III) of earthquake hazard, as shown in prbabilistic seismic hazard Assessment Map (PSHA Map) of Myanmar showing expected peak ground acceleration (PGA) values with 100% probability in 500 years.



Source: MIMU [Myanmar Information Management Unit]

Figure - Seismic Zone Map of Myanmar (PSHA Map, 2012)

6.5. Ambient Air Quality

Methodology

Ambient Air Quality Monitoring was conducted near the guest house (14° 07'59.16"N 98°26'01.51"E) of mine site to determine whether mining activities are affected to its surrounding. The Environmental Perimeter Air Station (EPAS) was used to detect ambient air quality for 24-hour averaging periods. The following table presented the methods and parameters covered in the 24-hour monitoring period.

Haz-Scanner EPAS Air Quality Monitoring Station

Table: Pollutants and Methodologies Covered in 24-hr Monitoring Period

No.	Parameters	Analysis Methods
1.	Sulfur dioxide (SO_2)	Electrochemical sensors
2.	Nitrogen dioxide (NO_2)	Electrochemical sensors
3.	Carbon Dioxide (CO_2)	NDIR (optional sensor)
4.	Carbon monoxide (CO)	Electrochemical sensors
5.	Hydrogen Sulfide (H_2S)	Electrochemical sensors
6.	Particulate Matter 2.5 ($PM_{2.5}$)	Infrared Light Scattering
7.	Particulate Matter 10 (PM_{10})	Infrared Light Scattering
8.	Ozone (O_3)	Gas Sensing Semiconductor- GSS technology (optional sensor)

Figure: Ambient Air Quality Monitoring during Day and Night Times

6.6. Noise Levels

Methodology

To examine the existing noise level, monitoring was conducted in four receptors locations around the mining site. Two units of TES-1353H Integrating Sound Level Meter were used for day and night times monitoring process. The detailed monitoring points and analysis method were presented in the following table and figure.

Table: Noise Monitoring Locations and Methods

Receptor Location	GPS Coordinates	Unit	Methodology
Local Residents in Heinda	98º 26'7.250"E 14º 07'48.368"N	dBA	Measured continuous Sound Pressure Level (SPL) with 0.5-inch Electret condenser microphone
Myaungpyo Village	98º 27'9.622"E 14º09'14.166"N		
Side B	98º 26' 12.741"E 14º 08'32.081"N		
Side C	98º 26' 31.902"E 14º 08'42.521"N		

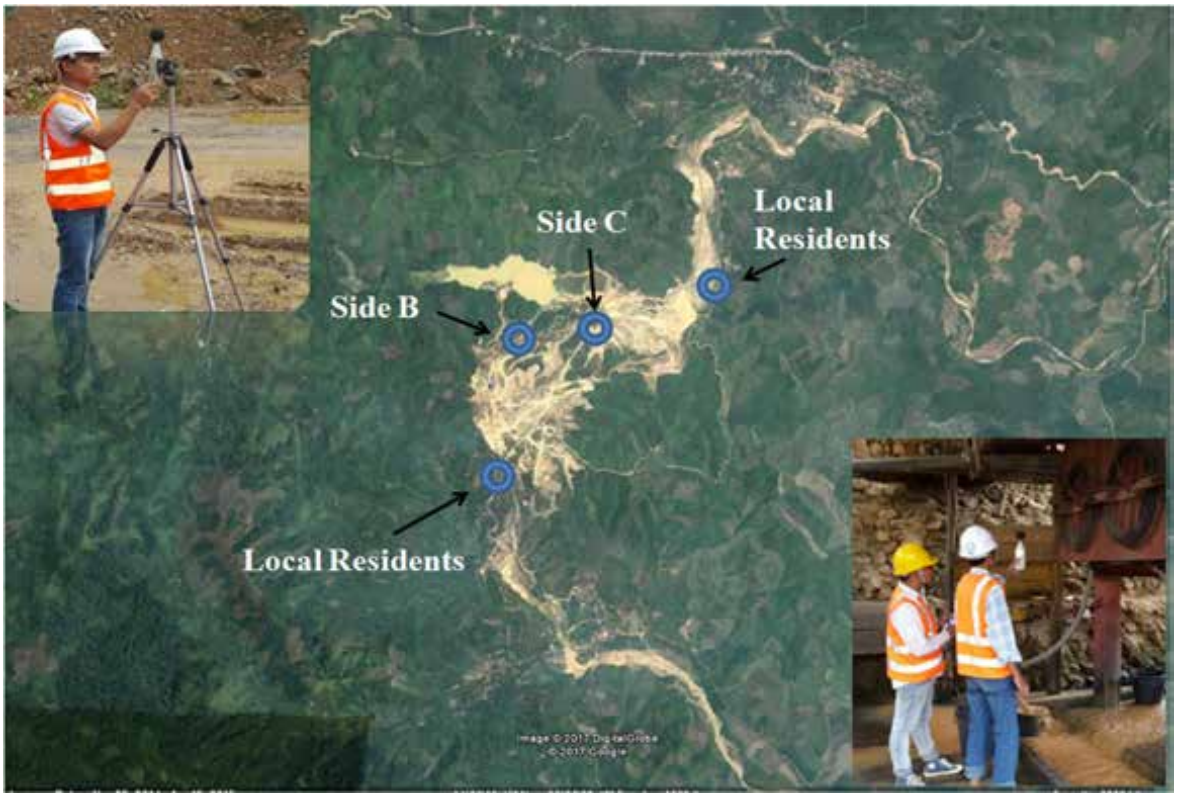


Figure - Locations of Noise Level Monitoring Stations

6.7. Surface and Process Water Quality

Methodology for Surface Water Sampling

Water samples were collected from the nearby surface water bodies at the villages such as Myaung Pyo creek, Kin Mon Chone creek, Kyauk Mae Taung monastery and drinking water at Kin Mon Chone village in term of **grab sampling methods**. The sterilized plastic bottles were used for sampling. The sample were preserved in ice to keep the temperature and sent to Myanmar Innovation and Research Department (MIARD) (Previously known as Myanmar Science and Technology Research Department- MSTRD), National Health Laboratory (NHL) within 24 hours. The laboratory analyses were conducted at the mentioned laboratories. The analysis methods were expressed in tables in results and discussions section. The physical and chemical parameters such as pH, conductivity, temperature and dissolved oxygen were measured with portable pH and EC meters in terms of in-situ measurement. The photos of water sampling and in-situ measurement were illustrated in the following figures.

Figures: Surface Water Sampling

Figures: In-situ Water Quality Measurement

To sum up, the total of 9 samples were collected from the water sources at villages around the mining area. To be more cleared; sampling points for surface and process water were presented with the google map photo.

Figure: Location of Water Sample Points

6.8. Soil Sampling

Methodology

Visual survey around the mine site was conducted prior to the actual sampling so that selection of sampling unit represents the whole area. Then surface soil samples were taken with hand auger at about 3 inches depth and collected in the bulk soil sample bag.

Figures: Soil Sampling at Mine Site

6.9. Existing Biodiversity Environment

The purpose of the biodiversity study is to describe the baseline data of flora and fauna within the area which might to be impacted upon by the proposed mining project, with reference to the flora and fauna of the area. Report investigated to the possible solution for the better management of the project in order to minimize the negative effects of the project activities on the flora and fauna of the area.

The specific objectives of the study are as follow:

- Describe the baseline information of the flora (including target plant species of roadside, villages and forest plant species) and the fauna (target groups: birds, mammals, reptiles, amphibians, some kinds of insect and fish) with their associated habitats;
- Conduct a flora and faunal habitat assessment (including habitat potentially suitable for threatened species);
- Determine the presence of threatened species or IUCN Red listed species;
- Determine key habitats and movement corridors if possible;
- Provide a recommendation and mitigation measures to be considered, during the operation of the proposed project, related to flora and fauna.

Project Area

The project area is located in Dawei District, Thanintharyi Division. The project area has approximately 2000 acres wide including three villages, one lake and two seasonal ponds. The main operation area is a mountain range with steepness slopes and is mostly bare land resulted from the extraction of target mineral resources of the tin products for a long time. There are some remaining patches of the destructive forest/secondary forest in margin and valley range inside the project area. In buffer zone, there is surrounding by a secondary forest fairly distributed (bamboo dominated). The plantations of *Areca catechu* L (Kunthi-pin) were abundantly found in the project area.

(1) Methodology (Plant Species)

(a) Data Collection of Plant Species

The flora survey of this project area has three portions in which recording the roadside plant species of site A, site B and site C of the Heinda Mining Area, recording of the plant species from the two villages (Heinda and Myaungpyo villages), and finally observation of plant species of forest areas with (10) sample plots were included.

A Global Positioning System (GPS) was used to present the sample plots and the recorded places of roadside plant species for the project area, and the two villages of Heinda and Myaungpyo. To clarify the small trees and tree species diversity and to calculate the important value index (I.V.I), (10) quadrats were randomly set up and observed. The quadrat size was 20 m x 20 m for each sample plot. In each sample plot, every plant species with diameter at breast height (DBH) ≥ 10cm was measured. Bamboo species were omitted and not included in I.V.I calculation but they were recorded through quadrat observation.

(b) Data Analysis

Species diversity of the project area was calculated by Shannon-Wiener (1963) and Simpson (1948) indices. Then relative density (R.D), relative frequency (R.F), relative dominance (R.Dm) were calculated and summed to get Importance Value Index (I.V.I). In this report, important value index (I.V.I) was calculated based on a total of 10 quadrats for the projected area. Diversity indices such as Shannon-Wiener diversity index (H), evenness index (E) values, and Simpson diversity index (D) were used in this study.

For plant identification, essential requirements such as DBH measurements (Diameter at Breast Height), plant collection, taken photographs, interviewing with local people, etc. were conducted in this field survey. After field trip, plant identification was conducted based on available literatures such as key to the families of the flowering plants, issued by Department of Botany, Yangon University (1994), Backer *et. al.*(1963), Kress *et. al.* (2003), Gardner *et al.* (2000) etc., and verification was conducted by recorded photographs from field survey and some useful internet websites. The spatial location (latitude and longitude) of each quadrat and other recorded plant species was also recorded by using a GPS (Global Positioning System).

The project area map was used through internet website of https:// itouchmap.com/ latlong. html.

Finally, threatened plant species from (10) sampling points, roadside plant species and recorded plant species of the two villages (Heinda and Myaungpyo village) were expressed in accordance with the global conservation status of plant species which are based on "The IUCN Red List of Threatened Species, 2016 (http://www.iucnredlist.org/ details/199856/0).

(c) Importance Value Index

This index is used to determine the overall importance of each species in the community structure. In calculating this index, the percentage values of the relative frequency, relative density and relative dominance are summed up together and this value is designated as the Importance Value Index or IVI of the species (Curtis, 1959).

(i) Relative density

Relative density is the study of numerical strength of a species in relation to the total number of individuals of all the species and can be calculated as:

$$\text{Relative density} = \frac{\text{Number of individual of the species}}{\text{Number of individual of all the species}} \text{ X } 100$$

(ii) Relative frequency

The degree of dispersion of individual species in an area in relation to the number of all the species occurred.

$$\text{Relative frequency} = \frac{\text{Number of occurrence of the species}}{\text{Number of occurrence of all the species}} \text{ X } 100$$

(iii) Relative dominance

Dominance of a species is determined by the value of the basal cover. Relative dominance is the coverage value of a species with respect to the sum of coverage of the rest of the species in the area.

$$\text{Relative dominance} = \frac{\text{Total basal area of the species}}{\text{Total basal area of all the species}} \text{ X } 100$$

The total basal area was calculated from the sum of the total diameter of immerging stems. In small trees and trees, the basal area was measured at breast height (1.5m).

(iv) Shannon-Wiener Index diversity

The Shannon diversity index (H) is another index that is commonly used to characterize species diversity in a community. Shannon's index accounts for both abundance and evenness of the species present. The proportion of species *i* relative to the total number of species (p_i) is calculated, and then multiplied by the natural logarithm of this proportion ($\ln p_i$). The resulting product is summed across species, and multiplied by -1:

H = -SUM [(p_i) × ln(p_i)]

E = Evenness = H/H_{max}

SUM = summation

p_i = proportion of total sample represented by species *i* /
Divide no. of individuals of species *i* by total number of samples

S = number of species, = species richness

H_{max} = ln(S) Maximum diversity possible

(v) Simpson's index diversity

Simpson's Diversity Index is a measure of diversity. In ecology, it is often used to quantify the biodiversity of a habitat. It takes into account the number of species present, as well as the abundance of each species.

Simpson's diversity index:

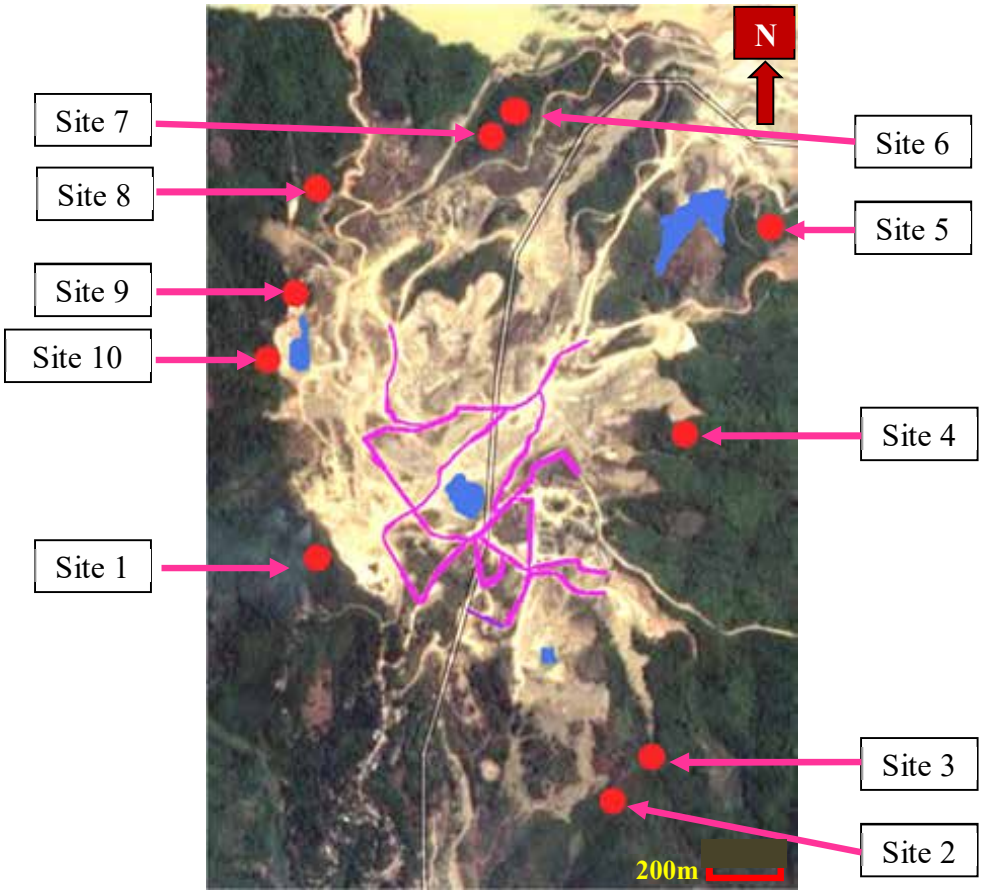
$(D) = 1- (\sum n(n-1)/N(N-1))$

Where, n = the total number of organisms of a particular species

N = the total number of organisms of all species

Representative GPS points: 12 sampling points for plants and 12 points for animals

No.	Numbers of sites of sample plot and villages	Representative GPS Points	
		Longitude	Latitude
1	Site 1(plants and animals)	98º 26' 00.844"E	14º 08'00.844"N
2	Site 2(plants and animals)	98º 26' 27.880"E	14º 07'42.210"N
3	Site 3(plants and animals)	98º 26' 31.8402"E	14º 07'47.4384"N
4	Site 4 (plants)	98º 26' 30.526"E	14º 08'13.638"N
5	Site 5(plants and animals)	98º 26' 40.336"E	14º 08'29.871"N
6	Site 6(plants)	98º 26' 18.241"E	14º 08'38.932"N
7	Site 7 (plants)	98º 26' 17.124"E	14º 08'37.896"N
8	Site 8 (plants)	98º 26' 3.3354"E	14º 08'33.7878"N
9	Site 9(plants and animals)	98º 25' 59.0088"E	14º 08'25.0512"N
10	Site 10(plants and animals)	98º 25'58.159"E	14º 08'17.458"N
11	Heinda village(plants and animals)	98º 26'7.5078"E	14º 07'48.1686"N
12	Myaungpyo village(plants and animals)	98º 27'7.4772"E	14º09'14.166"N
13	Heinda creek (animals)	98º 27'14.725"E	14º06'47.813"N
14	Heinda creek (animals)	98º 27'50.346"E	14º06'13.772"N
15	Heinda creek (animals)	98º 27'56.452"E	14º06'13.090"N
16	Heinda creek (animals)	98º 26'47.409"E	14º07'01.506"N



Index: Sample plots
Water body (ponds)
Paths of recorded roadside plant species

Index: Villages

Map of Project Area with Sample Plots and Paths of Recorded Roadside Plant Species

(2) Methodology (animal species)

(a) Data collection of animal species

The faunal assessment was conducted in cold & dry seasons of January 2017. Field survey was conducted to investigate the faunal species that may be impacted by the proposed mining activities. These species were used in order to determine the possible magnitude of the impact of the proposed activities. Night study was also carried out to search for amphibians and reptiles. The groups of species investigated were: Vegetation; Arthropoda (butterfly and dragonfly); Avifauna; Mammals; Herpetofauna (reptiles & amphibians) and Fish. Conducting the site observation is to collect necessary data and information including the formation of GIS site mapping or photographic picture. Interview survey was taken with local people to investigate fauna species richness and their relative abundance. Consultation and open discussion was also made whenever necessary for sustainable use of biodiversity.

GPS was used to navigate and mark the sampling point along the area/transit line. Direct observation method or opportunistic method (Visual Encounter Survey (VES) and Active Search) used to collect the samples. Nocturnal searching was conducted in aquatic habitats at night for amphibians. During the search, amphibians were detected and identification of species and recorded number of individuals in each species in a particular area. At the same time, attempt was also made to locate reptiles. Diurnal searching was adopted for all herpetofauna, actually it focuses primarily on reptiles. Diurnal search comprises random searches throughout key habitat types within the study area with the idea of locating basking or actively moving reptiles. Snakes and other reptiles are identified from view. Branch, 1996 and Win Maung and Win Ko Ko (2002).

Bird survey was conducted at early morning and afternoon by applicable of point count and visual identification and the calls of bird species were used to identify species. Birds were observed with binoculars and identify aided with field guide. Bird ranges were confirmed using Kyaw Nyunt Lwin (2004).

Mammal (small and large) observation was made at water edge and in the forest. Distribution and presence of mammals were examined by conducting track and sign survey.

Visual sightings and ecological indications were used to identify the small mammal inhabitants of the study area. Scats were also collected and used for identification of nocturnal small mammals. A number of reference was followed by Tun Yin (1967) and Tin than (1992) were used for identification purposes.

The sample collection of butterfly and dragonfly of the insect was untaken by use of insect net. The survey was investigated species richness and population abundance in the project area as well as within the buffer zone. Visual identification was made by Kinyon (2003) and Nair (2011).

Fish sample collection was made by use of hand cast-net and gill-net. The study investigated species richness and population abundance based on recorded species along the Heinda creek in the project area. Identification was made by FAO (2012).

(b) Data Analysis

Diversity of the species will be analyzed to measure of diversity, species richness & distribution, evenness and its relative abundance by using the Shannon Wiener Diversity, Shannon Diversity Index, Simpson's Diversity Index and DAFOR scale.

(i) Shannon Wiener Diversity

The Shannon index has been a popular diversity index in the ecological literature.

Shannon Diversity Index "H"

$$H = -\Sigma [(ni / N) \times (\ln ni / N)]$$

Where, H = Shannon Diversity Index

Ni = Number of individuals belonging to i species

N = Total number of individuals

$$E = H/H_{max}$$

Where, H_{max} = Maximum diversity possible

E = Eveness=H/H_{max}

(ii) Simpson's Index of Diversity

Simpson's Diversity Index is a measure of diversity. In ecology, it is often used to quantify the biodiversity of a habitat. It takes into account the number of species present, as well as the abundance of each species.

$$D = \frac{\Sigma n(n-1)}{N(N-1)}$$

Where, **n = the total number of organisms of a particular species**

N = the total number of organisms of all species

Simpson's index of diversity= 1-D

6.10. Social Environment

6.10.1 Regional Socio-economic Profile

Socio-economic profile of the overall Heinda and Dawei Township has been developed on the basis of available secondary data information and internet resources.

(1) Population

The project is located near the Dawei Township in Taninthayi Region. In 2017, there are about 131,000 people in Dawei Township as shown in the following Table. The percentage of urban population is about 63.8% in township.

Table - Population of Dawei Township

Township	Total(Male/Female)				Total(Urban/Rural)			Households
	Male	Female	Total	Sex Ratio	Urban	Rural	Urban Population (%)	
Daewi	62100	69826	131,026	96.3	13085	11815	63.8	24900

Source: Dawei Township Administrative Offices

(2) Ethnicity

The races residing in Dawei Township are shown in the following Table. Most of the people who live in these townships are Bamar, followed by Kayin, Indian, and Mon people. A small number of Chin and Shan live in Dawei Township.

Table- Races in Dawei Township (2015)

No.	Race	Number	%
1	Kachin	11	0.008
2	Kayar	50	0.038
3	Kayin	16880	12.883
4	Chin	2	0.002
5	Mon	341	0.109
6	Bamar	111141	84.824
7	Rakhine	29	0.022
8	Shan	2	0.002
9	China	241	0.184
10	Indian	1093	0.834
11	Pakistan	-	-
12	Bangladeshi	15	0.011
13	Others	1221	0.923
Total		131,026	100

Source: Dawei Township Administrative Offices

(3) Religion

The different kinds of religion present in Dawei Township are shown in the following Table. More than 86% of the people living in the township are Buddhists. The majority of local people are Buddhists, followed by Christian, Moslem, and Hindus. There are many religious places in the region including four historic and well-known pagodas, 104 pagodas and 263 monasteries for Buddhists. There are also churches, Hindu temples, Mosque and Chinese Buddhist Temple.

Table- Religion in Dawei Township

Township	Religion	Buddhist	Christian	Hindu	Muslim	Total
Daewi	Number	112952	16068	521	1250	131026
	(%)	86.2	12.26	0.59	0.95	100.0

Source: Dawei Township Administrative Offices

(4) Land Use

Land use in Dawei Township are shown in the following Table. Dawei Township mainly use its land for agriculture followed by grazing land area.

Table - Land Use of Dawei Township

Land Category	Dawei	
	Acre	%
Agricultural Land	62784	5.95
Forest and Natural Area	126036	11.95
Grazing land	2695	0.26
Industrial Land	46	0.004
Settlement Land	2184	0.2
Wastelands	145569	13.8
Forest wild	557588	52.87
wild land	126148	11.96
Other	31666	3.0
Total Area	1054,716	100.00

Source Dawei Township Administrative Offices

(5) Living Profile

(a) Type of housing unit

The majority of the households in Dawei Township are living in wooden houses (49.8%) followed by households in bamboo houses (16.7%). About 48.1 per cent of urban households and 52.5 per cent of rural households live in wooden houses.

Table - Conventional households by type of housing unit by urban/rural

Residence	Total	Apartment/ Condominium	Bungalow/ Brick house	Semi-pacca house	Wooden house	Bamboo house	Hut 2 - 3 years	Hut 1 year	Other
Total	24,943	5.1	12.8	13.8	49.8	16.7	0.8	0.2	0.8
Urban	15382	5.2	15.7	17.1	48.1	12.5	0.4	0.1	0.9
Rural	42,405	5.1	8.0	8.5	52.5	23.4	1.5	0.4	0.6

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census– Mandalay Region- Dawei Township Report" October 2017

(b) Water Usage

The sources of drinking water and non-drinking water in Dawei townships are shown in the following Table. In Dawei Township, 67.4 per cent of households use improved sources of drinking water (tap water/piped, tube well, borehole, protected well/spring and bottled water/water purifier). Compared to other townships in Tanintharyi Region, this household proportion belongs to the highest group in use improved sources for drinking water and it is lower than the Union average (69.5%). About 33.4 per cent of the households use water form protected well/spring and 17.4 per cent use water from unprotected well/spring. About 32.6 per cent of the households use water from unimproved sources. In rural areas, 63.8 per cent of the households use water from unimproved sources for drinking water.

Table - Source of Drinking Water in Dawei Township

Source of drinking water	Total	Urban	Rural
Tap water/ Piped	4.2	4.4	3.8
Tube well, borehole	12.5	19.7	1.0
Protected well/ Spring	33.4	36.1	29.0
Bottled water/ Water purifier	17.3	26.6	2.4
Total improved drinking water	*67.4*	*86.8*	*36.2*
Unprotected well/Spring	17.4	4.5	38.3
Pool/Pond/ Lake	0.1	*	0.2
River/stream/ canal	5.9	-	15.3
Waterfall/ Rain water	0.9	-	2.4

Other		8.2	8.7	7.6
Total unimproved drinking water		*32.6*	*13.2*	*63.8*
Total	**Per cent**	**100.0**	**100.0**	**100.0**
	Number	**24,943**	**15,382**	**9,561**

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census– Tanintharyi Region- Dawei Township Report" October 2017

(c) Lighting

In Dawei Township, 4.4 per cent of the households use electricity for lighting. This proportion belongs to the lowest group in electricity usage compared to other townships in Tanintharyi Region. The percentage of households that use electricity in Tanintharyi Region is 8.0 per cent. The use of generator (private) for lighting is the highest in the township with 71.7 per cent. In rural areas, 49.6 per cent of the households use generator (private) for lighting.

Table - Conventional households by source of lighting by urban/rural

Source of lighting		Total	Urban	Rural
Electricity		4.4	4.7	4.0
Kerosene		6.7	0.5	16.7
Candle		11.3	6.3	19.4
Battery		0.6	0.4	1.0
Generator (private)		71.	85.5	49.6
Water mill (private)		1.3	1.5	0.8
Solar system/energy		2.8	0.1	7.1
Other		1.1	1.0	1.4
Total	**Per cent**	**100.0**	**100.0**	**100.0**
	Number	**24,943**	**15,382**	**9,561**

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census– Tanintharyi Region- Dawei Township Report" October 2017

(d) Cooking fuel

In Dawei Township, households mainly use wood-related fuels for cooking with 40.8 per cent using firewood and 51.4 per cent using charcoal. Only 2.5 per cent of households use electricity for cooking. About 74.3 per cent of households in rural areas use firewood and 23.7 per cent use charcoal.

Table - Conventional households by type of cooking fuel by urban/rural

Type of cooking fuel		Total	Urban	Rural
Electricity		2.5	3.9	0.3
LPG		2.3	3.5	0.2
Kerosene		0.1	-	0.3
Bio-Gas		1.4	1.9	0.7
Firewood		40.8	19.9	74.3
Charcoal		51.4	68.6	23.7
Coal		0.8	1.1	0.4
Other		0.7	1.1	0.1
Total	**Per cent**	**100.0**	**100.0**	**100.0**
	Number	**24,943**	**15,382**	**9,561**

Source: Department of Population, Ministry of Immigration and Population "The 2014 Myanmar Population and Housing Census–Tanintharyi Region- Dawei Township Report" October 2017

(6) Occupational Patterns

Data shows (Tables) that trade is the common livelihood means of households in Dawei Township. The other main economic activities in the area are services, agriculture, arbitrary, industry, and public services. According to official statistics, Dawei has a total of 77,524 people as the township workforce and 43,783 are employed with an unemployment rate of 43.52%. Per capita income in the township is estimated to be 1445,499 Kyats in 2014-2015.

Table - Occupational patterns

Government Employee	Services	Agriculture	Livestock	Trade	Industry	Arbitrary	Others
6071	971	1219	65	1205	586	30635	2711

Table - Employment

Workforce	Employed	Unemployed	Unemployment rate
77524	43783	33741	43.52%

Table. Per Capita Income

Year	Income
2014-15	1445,499 Ks.
2015-16	-.
2016-17	-

(7) Education

Over sixteen percent of the total township population is students. For education sector, although primary school education is compulsory and fee-free, school enrollment rate of 5-year-olds is relatively full of (97.96%) in the overall township. Percentage of students passing the matriculation is 36.27%. The teacher-student ratios are 1:16 in BEPS, 1:22 in BEMS, and 1:28 in BEHS. Data on education and literacy report that literacy rate in Dawei Township was 99.96%.

Table - Educational Infrastructure

School	No. of Schools	No. of Teachers	No. of Students	Teacher/ Student Ratio
Higher Education	5	209	1652	1:8
BEHS	7	346	9541	1:28
BEMS	12	154	3326	1:22
Post (BEPS)	17	190	4236	1:22
BEPS	89	399	6581	1:16
Monastery school	5	80	571	1:7
Preschool	29	57	859	1:15

Table - Scholl Enrollment

No. of 5 yrs-old children			Enrollment			Enrollment Rate
Male	Female	Total	Male	Female	Total	
1092	1118	2210	1107	1058	2165	97.96%

Table - Matriculation Pass Rate

2015-16			2016-2017		
Sit	Pass	Pass Rate	Sit	Pass	Pass Rate
2853	1035	36.27	3256	No. Info.	No. Info.

Table - Literacy Rate

Population	above 15 years of age	Literate	Literacy Rate
131,026	89215	89185	99.96%

(8) Healthcare Profile

In public health sector, the ratios of medical service personnel and local population indicate the existing conditions of the insufficient health care facilities, especially for rural people. According to secondary data available, the most common diseases include Diarrhoea, Hepatitis, malaria, stomach ailment, and tuberculosis. It was also found out that there was substantial amount of incidence of Diarrhoea, stomach ailment and tuberculosis in the township. As also noted in the following Table, there are 200-bed township hospital, four private hospital in Dawei downtown and 100-bed military hospital in the village tract. There are also 26 rural healthcare centers and sub- centers. Infrastructures for health care services are also seemed to be insufficient especially for rural people.

Table -Healthcare Facilities

Population	No. of Doctors	Ratio	No. of Nurses	Ratio	No. of Healthcare Assistant	Ratio
132282	8	1:16535	40	1:3307	7	1:18897

Table - Hospitals

Sr. No.	Hospital	Govt./Private	Bed
1.	Township hospital (Dawei)	Govt.	200
2.	(12/100) military hospital	Govt.	100
3.	MyintMoeOo	Private	16
4.	ChanMyae	Private	16
5.	Thitagu Areyawjan	Private	50
6.	MaeDelann	Private	100

Table - Healthcare Centers

Sr. No.	Type of Healthcare Center	No. of Healthcare Center
1.	Rural Healthcare Center	4
2.	Rural Healthcare Sub-Center	22

Table - Common Diseases

Sr. No.	Disease	Incidence
1.	Malaria	84
2.	Diarrhoea	1466
3.	TB	467
4.	Stomach Ailment	606
5.	Hepatitis	649

Table - HIV/AIDS

2015-16		2016-17	
Infected	Dead	Infected	Dead
165	13	58	4

Table - Health Indices

No. of Maternal	No. of Infant	Per 1000			
		Birth Rate	Maternal Mortality Rate	Infant Mortality Rate	Abortion Rate
2623	2407	25.2	0.27	3	1

6.10.2 Cultural Heritage Associating the Project Area

In this proposed project area, cultural heritage sites and resources are identified according to the *2012 Rule & 1998 Protection and Preservation of Cultural Regions Law, 2015 Protection and Preservation of Antique Objects Law* and *Ancient Monuments Law*. As a result, no cultural heritage sites and resources are discovered in the proposed project area.

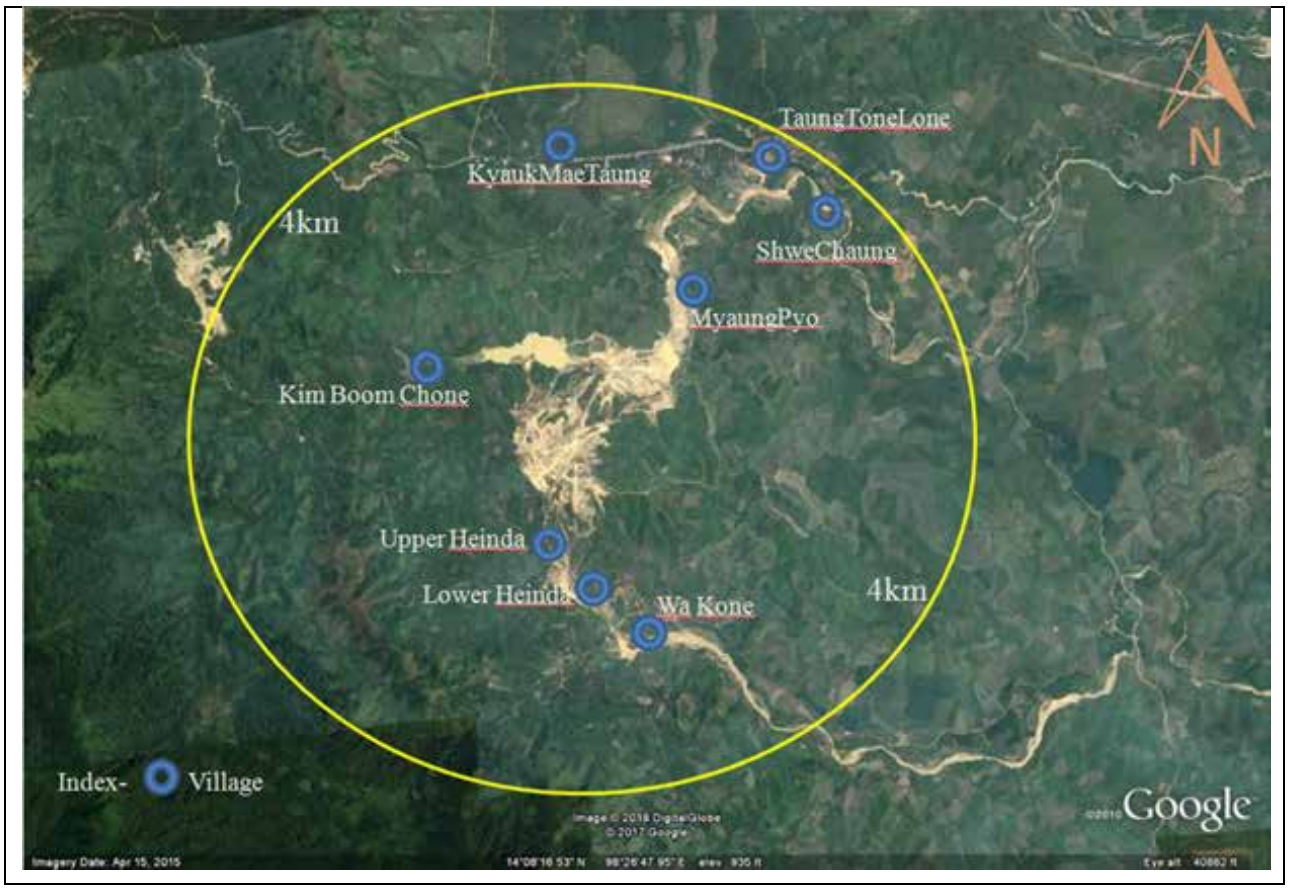
Heritage Resource Type	Observation
Places, Buildings, Structures and equipment	None were identified within the proposed project area
Places associated with oral traditions or living heritage	None were identified within the proposed project area
Landscapes	None were identified within the proposed project area
Natural features	None were identified within the proposed project area
Traditional burial places	None were identified within the proposed project area
Geological sites of scientific or cultural importance	None were identified within the proposed project area
Archaeological Sites	None were identified within the proposed project area
Historical settlements and townscapes	None were identified within the proposed project area
Public monuments and memorials	None were identified within the proposed project area
Battlefields	None were identified within the proposed project area

The field assessment provided not only above-ground evidence of prehistoric structures, buildings older than 60 years, or material of cultural significance or in situ archaeological sites within the proposed development footprint. However the cultural significance of the project area is many religious edifices in the study area. MyaungPyo pagoda has been stated for nearly 20 year old and located near the tailing ponds of mine site area and MyaungPyo creek seen figure below.

Figure: The Location of MyaungPyo Pagoda

6.10.3 The Vicinity of Project Area

The vicinity of project area is situated at Heinda village tract. The village tract is divided into 2 wards: upper Heinda and lower Heinda. For the purposes of the socio-economic assessment, the local study area was defined as villages and wards within 4 Km distance from the project site. Social survey focused on the directly affected villages of Heinda, MyaungPyo and KimBoomChone. Socio-economic field work also included household survey in Wa Kone, TaungThoneLone, KyaukMaeTaung and ShweChaung. Group discussion and stakeholder consultation were also carried out with authorities and village elders of nearby villages.



(1) Education

Data described in Table reveal that a total of 6 basic education schools are located in the study area. There is one BEHS school in Heinda village tract. The teacher/student ratio is 1:22 for this school.

Table - Schools in the Vicinity of the Project

School	No. of school
BEHS Heinda	1
BEMS TaungThoneLone	1
BEPS Heinda	1
BEPS MyaungPyo	1
BEPS ShweChaung	1
BEPS KyaukMaeTaung	1
Total	6

BEMS TaungThoneLone

BEPS MyaungPyo

BEPS KyaukMaeTaung

BEPS ShweChaung

(2)Transportation

The Dawei-Heinda road is the main transport route into the project area. Most of the inner roads are soil-based roads. Programs for self-established road construction have been implemented. Common form of transportation services in the study area is road transport via motor cycles, buses, and light trucks.

Local Truck

Local Motorcycle

Social Welfare

Social welfare societies are also established in the study area. Free funeral service, emergency healthcare transportation, and medical equipment aid are available in the study area.

Social Welfare Society's Aid

Free Funeral Service and Medical Equipment Aid

(3) Culture

There are many religious edifices in the study area. As Buddhism flourishes throughout the country, many pagodas and monasteries are built and revered in the vicinity of the project. There are also two Hindu temples in the study area. Cultural beliefs associated with 37- inner and outer spirits was found to be existed in the study area and many households revere traditional spirits and have places in the house compound for them. Traditional seasonal festivals and communal events, e.g., festival for offering yellow robes to Buddhist monks during the month of Tasaungmone (Kahtain Pwe) and ceremonies for donning the yellow robes (novitiation ceremonies) are tumultuously held in the study area every year.

Pyay Taw Aye Pagoda

Place of Traditional Spirit

Hindu Temple in Heinda

(4) Regional Health Profile

Limited infrastructures for health care services exist in the vicinity of the project. Data provided in the following Table indicate that there is only one healthcare center and one private clinic in the study area.

Table - Health Care Facilities Available in the Vicinity of the project

Village	Health Care Center	Private Clinic
Heinda	1	-
MyaungPyo	-	-
TaungThoneLone	1	1
Shwe Chaung	-	-
Wa Kone	-	-
Kim Boom Chone	-	-
Total	2	1