



# PTTEP

## Monitoring Report of PTTEPI's Yangon Office Building (Construction Phase) in 2018

PTTEP International Limited (PTTEPI)



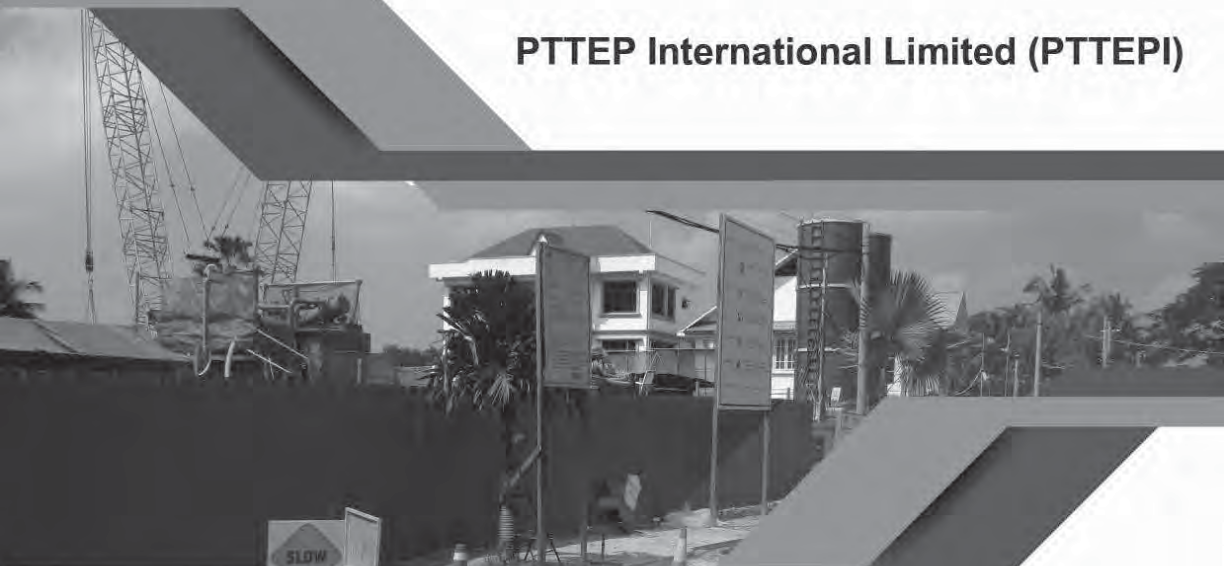
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PTTEP International Limited (PTTEPI)



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## *Executive Summary*

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## Executive Summary

United Analyst and Engineering Consultant Co., Ltd. conducted compliance audit of implementation of environmental mitigation measures and monitoring program for construction phase of PTTEPI's Yangon Office.

The objective of the review was to evaluate the effectiveness of implementation of the Environmental Management Plan, including both mitigation and monitoring measures, defined in the IEE report. Reporting of observed problems, obstacles and recommendations for issued identified during the review were provided in order to improve the effectiveness of the existing environmental mitigation and monitoring measures.

The evaluation process includes (1) meeting with PTTEPI personnel, (2) site observation and interview with PTTEPI' representatives, and (3) document review.

### 1. Project Description

The PTTEPI's Yangon Office Building will replace the existing building of PTTEP International Limited (Yangon Branch) which is located at No. 2, Sei-Myaung Yeiktha Street, 8 ½ Mile, Mayangone Township, Yangon. The project site is located on the south of the Sei-Myaung Yeiktha Street and the west of the Pyay Road, Mayangon Township, Yangon, covering 2,371.46 sq.m. There are 7 PTTEPI Buildings (Building 1 to Building 7) with car park space. The new building will be constructed to replace the 4 existing PTTEPI Buildings i.e. Building 1, Building 2, Building 4, Building 5 including car park space. The rented area of existing Building 3, Building 6 and Building 7 will be returned to the landowner.

### 2. Project Components

#### 2.1 Type of Building and Internal Function Area Arrangement

The project is a 12 ½ storey office building of PTTEP International Limited (Yangon Branch) with total height of 52.85 meters, function area of 18,760.0 sq.m. and internal parking area for 110 cars.

The function area within the building can be divided as follows:-

- Parking areas are on B2, B1 and floor 1, 2, 3;
- Canteen is on floor 3; and
- Office areas are on floors 4-11

#### 2.2 Design of Facilities for the Disabled

The design of facilities for the disable of this office building has been based on Universal Design concept.



- Car parking lots for the disabled and elders are provided on Basement 1 and Mezzanine to facilitate convenient accessibility into the building.
- Toilets for the disabled and elders are provided on the ground floor.

## 2.3 Internal Utilities System

Internal utilities system is comprised of traffic system, water supply system and water for domestic use, wastewater treatment, electricity system, solid waste management, fire protection and warning system, ventilation and air condition system, lift system, and safety.

## 3. Status of Current Operation

Once the demolition of old building finished, PTTEPI started the construction of new office building since January 2018 and expected to complete in 2020.

## 4. Compliance Status

The results determined that the project completely complied on the Mitigation Measures during construction phase with 98% and do not have situation with 2%.

PTTEPI complied with most of the mitigation measures prescribed in the IEE. Main issues are summarized below.

### 4.1 Environmental Mitigation Measures Compliance Result in Production Phase

- **Air Pollution** - Water spraying was provided three times per day at and around the construction areas. Spraying had not conducted in the rainy day due to wet soil conditions made suspended particulate value was low level. PVC mesh sheet is provided to cover around the construction areas in order to prevent dust dispersion and effect to nearby communities. The truck was covered during transport material to the construction area. Moreover, dust masks were provided for workers and controlled to use during working.
- **Excessive Noise and Vibration** - The contractor provided ear plugs for workers and controlled to use during working with high noise activities including controlled workers to carried out the construction activities with high noise and vibration level at day time. Noise barrier was installed by metal sheet around the construction site to reduce noise impact nearby communities.
- **Traffic** - The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people including avoiding transportation of materials and equipment at day time. Warning signs were installed and can be clearly seen at the public road (in front of the construction area) and at construction area. Security guard and signal man always give the sign in and out of vehicle from project area. Routine inspection and preventive maintenance for all vehicles were conducted as per inspection plan. The contractor controlled the truck to cover during transport and not to over loading. The public road (in front of the construction area) was in good condition and there was no complaint from nearby communities.

Journey management and transportation safety procedure was prepared for enjoin workers to follow. The emergency response procedure was set up including incident, fire action, first aid action. The contractor prepared drug and alcohol abuse policy and enforced all workers to follow. Alcohol testing was conducted before working every day. Worker will immediately stop working if alcohol is found more than 0%. For drug testing, workers were random tested at hospital.

- **Solid Waste**

- Non-Hazardous Waste - The contractor provided storage area for construction materials. Waste containers with cover are provided for 5 types; general waste (blue), recycle waste (yellow), hazardous waste (red), organic waste (green) and biohazardous infectious waste. The quantity of waste was recorded by contractor. The contractor cooperated with YCDC to collect and dispose of waste in order to prevent residual waste in construction area. Moreover, the constructor enforced all workers not to burn any wastes in the construction area.
- Hazardous Waste - Hazardous waste container (red) was provided at the construction area. However, there was no hazardous waste generated at present. If there are occurred, the contractor will cooperate with licensed contractor or authorities to collect and dispose.

- **Wastewater** - The toilets were provided at PTTEPI's office for 4 rooms/40 workers. The contractor installed drainage system in the construction area to hold wastewater before discharged out of the project including prohibited all workers to throw and dispose waste demolition close to drainage system in order to prevent obstruct the water flow.

- **Social and Economic** - The contractor considered to hire all workers in Yangon as per recruitment procedure and announcement. Work regulations were provided and enforced all workers to follow in order to prevent the conflict between workers and nearby communities. The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. Civil engineer and safety staff were provided to closely inspect construction activities throughout the construction period. PTTEPI provided grievance handling guideline to receive any complaints from the stakeholder and resolve the complaint in the immediate. Project's signboard was installed in front of the construction area to inform the project details such as project name, owner, consultant, contractor, period of construction and emergency contact number. Work permit system was implemented for specific work such as working at height, night work, electrical work and piling. The contractor provided suitable PPE and sufficiently for all workers and controlled to use PPE during working.

The medic was stand by at medic room for medical treatment included first aid kit and medical supplies. Firefighting equipment were provided in the construction area and inspected monthly. Smoking areas were provided in front and in the west of the construction area.

## 4.2 Environmental Monitoring Result

The results of Environmental Impact Monitoring determined that the project completely complied with 100%.

## 1) Fugitive Dust Monitoring

Fugitive dust monitoring was conducted by REM-UAE Laboratory and Consultant Company Limited on October 22-24, 2018 at construction site, PTTEPI Building 7 and House behind PTTEPI Office. The result found that Total Suspended Particulate (TSP) complied with Ambient Air Quality of WORLD BANK GROUP and Particulate matter less than 10 Micron (PM-10) complied with NEQG and, Ambient Air Quality Standard of WHO and IFC at all stations.

The results of Total Suspended Particulate (TSP) when compare with previous data tended to decrease at PTTEPI Building 7 and House behind PTTEPI Office whereas the result of Construction site was increase. The results of Particulate matter less than 10 Micron (PM-10) tended to decrease at all stations.

## 2) Noise Level Monitoring

Noise level monitoring was conducted at construction site, PTTEPI Building 7 and House behind PTTEPI Office on October 22-24, 2018. Most results of LAeq-1 hr daytime and nighttime at Construction site and PTTEPI Building 7 exceeding the limit set by NEQG, 2015 for Industrial/ Commercial Area of 70 and 70 dB(A), respectively, except LAeq-1 hr nighttime at PTTEPI Building 7. For House behind PTTEPI Office, the LAeq-1 hr daytime and nighttime exceeding the limit set by NEQG, 2015 for Residential/ Institutional/ Educational Area of 55 and 45 dB(A), respectively. These might be caused by the construction activities and traffic vehicle on the nearby road.

L<sub>Aeq</sub>-1 hr daytime tended to increase at all monitoring stations when compare with previous data. For L<sub>Aeq</sub>-1 hr nighttime found that the values tended to increase at Construction site and House behind PTTEPI Office whereas there was decrease at PTTEPI Building 7. PTTEPI will also keep continue the monitoring to check the noise level as bi-annually basis.

## 3) Grievance Mechanism Monitoring

Grievance mechanism monitoring results for construction phase of PTTEPI's Yangon Office Building in 2018 were done by PTTEPI. There was no any complaint from the community throughout the construction period.

## 4) Public and Occupational Health and Safety Monitoring

Public and occupational health and safety monitoring results for construction phase of PTTEPI's Yangon Office Building were done by the contractor during January 2, 2018 to present. There were 4 cases of incident from project activity during the construction period. Corrective actions were proposed/implemented to prevent reoccurrence.

## အစီရင်ခံစာအကျဉ်းချုပ်

ဓာတ်ခွဲစမ်းသပ်ခြင်းနှင့် အင်ဂျင်နီယာ အကြံပေး ကုမ္ပဏီ လီမိတက် (UAE) သည် PTTEPI ၏ ရန်ကုန်ရုံးအတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆိုင်ရာ လျော့ချနိုင်သော ဆောင်ရွက်မှုများနှင့် စောင့်ကြည့်လေ့လာမှုအတွက် ဥပဒေအတိုင်း လိုက်နာဆောင်ရွက်မှု ရှိပါသည်။ မရှိ အား အကဲဖြတ် စစ်ဆေးမှုလုပ်ငန်းကို ဆောင်ရွက်ခဲ့ပါသည်။

အစီရင်ခံစာ၏ ရည်ရွယ်ချက်မှာ လျော့နည်းစေသော ဆောင်ရွက်မှုများ နှင့် စောင့်ကြည့်လေ့လာခြင်းလုပ်ငန်းများပါဝင်သော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို IEE အစီရင်ခံစာတွင်သတ်မှတ်ထားသည့်အတိုင်း ထိထိရောက်ရောက် ပြည့်ဝစွာ အကောင်အထည်ဖော်ခြင်း ရှိပါသည်။ မရှိ အား အကဲဖြတ်ရန်ဖြစ်ပါသည်။ အစီရင်ခံစာတွင် ပြန်လည်ဆန်းစစ်စဉ်အတောအတွင်း ခွဲခြားလေ့လာရန် သတ်မှတ်ထားသော ပြဿနာများအတွက် တွေ့ရှိချက်များ၊ အခက်အခဲများနှင့် အကြံပြုချက်များကို အစီရင်ခံစာပြခြင်းအားဖြင့် လက်ရှိ ပတ်ဝန်းကျင် ထိခိုက်မှုလျော့ချရေးနှင့် စောင့်ကြည့်လေ့လာရေးအစီအစဉ်များကို ပိုမို ကောင်းမွန်အကျိုးရှိစေရန် အလို့ငှာ ထည့်သွင်းထားပါသည်။

အကဲဖြတ်ခြင်း လုပ်ငန်းစဉ်တွင် (၁) PTTEPI မှ ပုဂ္ဂိုလ်များနှင့် တွေ့ဆုံဆွေးနွေးခြင်း၊ (၂) ကွင်းဆင်းလေ့လာခြင်းနှင့် PTTEPI မှ ကိုယ်စားလှယ်များအား တွေ့ဆုံမေးမြန်းခြင်း နှင့် (၃) အထောက်အထား စာရွက်စာတမ်း မှတ်တမ်းများကို ပြန်လည်ဆန်းစစ်ခြင်း စသည့် လုပ်ငန်းများ ပါဝင်ပါသည်။

### ၁။ စီမံကိန်းအကြောင်းအရာ ဖော်ပြချက်

PTTEP International Limited ၏ (ရန်ကုန်ရုံးခွဲ) ကို အမှတ် ၂၊ ဆည်မြောင်းရိပ်သာလမ်း၊ စပိုင်ခွဲ၊ မရမ်းကုန်းမြို့နယ်၊ ရန်ကုန်တွင် တည်ဆောက်ဖွင့်လှစ်ပါမည်။ စီမံကိန်းသည် ရန်ကုန်တိုင်းဒေသကြီး ၊ မရမ်းကုန်းမြို့နယ် ၊ ပြည်လမ်းအနောက်ဖက် နှင့် ဆည်မြောင်းရိပ်သာလမ်း၏ တောင်ဖက်တွင်တည်ရှိပြီး ဧရိယာအကျယ်အဝန်းအားဖြင့် ၂၃၇၁.၄၆ စတုရန်းမီတာ ရှိပါသည်။ ထိုစီမံကိန်းတွင် အဆောက်အအုံအား ၇၃ ပါရှိပြီး (အဆောက်အအုံအား ၁ မှ ၇ အထိ) ကားထားရန်နေရာပါရှိပါမည်။ အဆောက်အအုံအသစ်များကို ယခုလက်ရှိ PTTEPI ၏ အဆောက်အအုံအား ၄၃ နေရာ (အဆောက်အအုံအား ၁၊ ၂၊ ၄၊ နှင့် ၅ တို့တွင် ကားပါကင်နေရာအပါအဝင်) အား ပြန်လည် အစားထိုးတည်ဆောက်ပါမည်။ ငှားရမ်းထားသော အဆောက်အအုံအား ၃၊ ၆ နှင့် ၇ တို့တည်ရှိရာ မြေနေရာကို မြေပိုင်ရှင်သို့ ပြန်လည်ပေးအပ်ပါမည်။

### ၂။ စီမံကိန်း အစိတ်အပိုင်းများ

#### ၂.၁. အဆောက်အအုံအမျိုးအစားနှင့် အတွင်းပိုင်းလုပ်ငန်းဧရိယာပြင်ဆင်မှု အစီအစဉ်

PTTEP အင်တာနေရှင်နယ် လီမိတက် (ရန်ကုန်ရုံးခွဲ) ၏ အဆောက်အအုံသည် ၁၂ ထပ်ခွဲရှိပြီး၊ စုစုပေါင်းအမြင့် ၅၂.၈၅ မီတာ၊ လုပ်ငန်းဆောင်ရွက်အသုံးချမှု အကျယ်အဝန်းမှာ ၁၈၇၆၀.၀ စတုရန်းမီတာ နှင့် ကားအစင်းပေါင်း ၁၁၀ အတွက် အတွင်းပိုင်း ကားထားရန်နေရာ ပါရှိပါသည်။

အဆောက်အအုံအတွင်းတွင် လုပ်ငန်းဆောင်ရွက်အသုံးချသည့် ဧရိယာများကို အောက်ပါအတိုင်းပိုင်းခြားထားပါသည်။

- B1, B2 နှင့် အထပ် ၁၊ ၂၊ ၃ တွင်ကားပါကင် ဧရိယာရှိပါသည်။
- ၃လွှာတွင် ကန်တင်းတည်ရှိပါသည်။
- ၄ထပ်မှ ၁၁ ထပ်အထိ ရုံးခန်းဧရိယာဖြစ်ပါသည်။

## ၂.၂ မသန်စွမ်းသူများအတွက် အဆောက်အအုံအကျဉ်း အဆောက်အအုံပုံစံ

မသန်စွမ်းသူများအတွက် အဆောက်အအုံအပိုင်း ဒီဇိုင်းပုံစံကို Universal Design ကိုအခြေခံပြီးတည်ဆောက်ထားပါသည်။

- မသန်စွမ်းသူများနှင့် အသက်ကြီးသူများအတွက် Basement 1 နှင့် အပေါ်ထပ်တို့တွင် အဆောက်အအုံအပိုင်းအတွင်းသို့ လွယ်ကူစွာ ဝင်ရောက်နိုင်စေရန်အတွက် ကားပါကင်ကို ထားရှိပေးထားပါသည်။
- မသန်စွမ်းသူများနှင့် အသက်ကြီးသူများအတွက် အသုံးပြုရန် ရေအိမ်များကိုမြေညီထပ်တွင် ထားရှိပေးထားပါသည်။

## ၂.၃ အတွင်းပိုင်းအသုံးပြုမှု နည်းစနစ်

အတွင်းပိုင်းအသုံးပြုမှု စနစ်တွင် လမ်းအသုံးပြုမှုစနစ်၊ ရေပေးပေးမှုစနစ်၊ သောက်သုံးရေပေးပေးမှုစနစ်၊ စွန့်ပစ်ရေ သန့်စင်မှုစနစ်၊ မီးဖြန့်ဝေမှုစနစ်၊ အပိုင်အခဲပစ္စည်းစွန့်ပစ်မှုစနစ်၊ မီးကာကွယ်စောင့်ရှောက်မှုနှင့်သတိပေးစနစ်၊ လေဝင်လေထွက် စနစ် နှင့် အအေးပေးမှု စနစ်၊ ဓါတ်လျှော့ကားစနစ်နှင့် ဘေးကင်းလုံခြုံရေး စနစ် တို့ပါဝင်ပါသည်။

## ၃. လက်ရှိလုပ်ဆောင်မှု အခြေအနေများ

အဆောက်အအုံအဟောင်းကိုဖြိုချခဲ့ပြီး PTTEPI သည် အဆောက်အအုံအသစ်ကို ၂၀၁၈ ခုနှစ် ဇန်နဝါရီလတွင် စတင်တည်ဆောက်ခဲ့ပြီး ၂၀၂၀ တွင်ပြီးစီးမည်ဟု ခန့်မှန်းထားပါသည်။

## ၁. လိုက်နာမှု အခြေအနေများ

ရရှိလာသောရလဒ်များအရ ဆောက်လုပ်နေစဉ်အတွင်း လျော့နည်းစေသောဆောင်ရွက်မှုများကို ၉၈% လိုက်နာပြီး ၂% ကို လိုက်နာမှုမရှိကြောင်းတွေ့ရပါသည်။

IEE အတွက် သတ်မှတ်ထားသော လျော့ချရေးအစီအမံများနှင့် အတူ PTTEPIသည် လိုက်နာဆောင်ရွက်ကြောင်းတွေ့ရှိရပါသည်။ အဓိကစုံစမ်းစစ်ဆေးတွေ့ရှိမှုများကို အောက်တွင်ဖော်ပြထားပါသည်။

## ၄.၁ ထုတ်လုပ်ရေးအချိန် ပတ်ဝန်းကျင်ဆိုင်ရာ ဆိုးကျိုးများကို လျော့နည်းစေမည့် ဆောက်လုပ်မှုများကို လိုက်နာမှု စာရင်းစစ်ဆေးချက် ရလဒ်

- **လေထုညစ်ညမ်းခြင်း။** ။ တည်ဆောက်ရေးလုပ်ငန်းပတ်ဝန်းကျင်တိုက်ကို တစ်နေ့သုံးကြိမ် ရေများဖြန်းပက်ပေးပါသည်။ မိုးရာသီတွင် မြေဆီလွှာများသည် စိုစွတ်မှုကြောင့် ဖုန်မှုန့်ဖြစ်ပေါ်မှုမရှိသလောက် နည်းပါးသောကြောင့် ရေဖြန်းပက်မှု မပြုလုပ်ခဲ့ပါ။ ဆောက်လုပ်ရေး ဧရိယာတစ်ဝိုက်နှင့် လူနေမှုပတ်ဝန်းကျင်အနီးတစ်ဝိုက်ကို ဖုန်မှုန့်ပျံ့နှံ့မှု ကာကွယ်ထားဆီးခြင်း အလို့ငှာ PVC mesh sheet များဖြင့် ကာကွယ်ထားပါသည်။ ဆောက်လုပ်ရေးလုပ်ငန်းခွင်သို့ ကုန်တင်ကားများဖြင့် ပို့ဆောင်သော ပစ္စည်းများကို အဖုံးများဖြင့် ဖုံးအုပ်ပြီး ပို့ဆောင်ပါသည်။ ထို့အပြင် ဖုန်မှုန့်ကာ မျက်နှာဖုံးများကို ဆောက်လုပ်ရေးလုပ်ငန်းစဉ်အတွင်း အလုပ်လုပ်နေစဉ်အတွင်း ဖုန်မှုန့်များ ကာကွယ်နိုင်ရန်အတွက် ထောက်ပံ့ပေးခဲ့ပါသည်။
- **အလွန်အကျွံဆူညံသံများနှင့် တုန်ခါမှုများ။** ။ ဆောက်လုပ်ရေး ကန်ထရိုက်တာမှ ပန်ထမ်းများအတွက် နားပိတ်ကိရိယာများကိုအသုံးပြုစေခြင်းအားဖြင့် နေ့ပိုင်းတွင် ဆောက်လုပ်ရေးလုပ်ငန်းလုပ်ဆောင်နေစဉ်အတွင်း ဆူညံသံမြင့်မားမှုနှင့် တုန်ခါမှုနှုန်းမြင့်မားမှုကို ထိန်းချုပ်ထားပါသည်။ လူနေရပ်ကွက်အနီးတွင် ဆူညံသံများ လျော့ချနိုင်ရန်အတွက် ဆောက်လုပ်ရေးလုပ်ငန်းခွင်နှင့်အနီးပတ်ဝန်းကျင်တွင် သတ္တုပြားများဖြင့်ကာရံထားပါသည်။

- **လမ်းအသုံးပြုမှု။** ။ ဆောက်လုပ်ရေးအစီအစဉ်များနှင့် ဆောက်လုပ်ရေးအတွက်လိုအပ်သောပစ္စည်းများ ကို မော်တော်ယာဉ်ကြီးများဖြင့် သယ်ယူပို့ဆောင်မည့် လမ်းကြောင်းများအား ဒေသခံပြည်သူများသို့ အသိပေး အကြောင်းကြားထားမည်ဖြစ်ပြီး နေ့ပိုင်းတွင် ပစ္စည်းများနှင့်ကိရိယာများကိုသယ်ယူပို့ဆောင်ခြင်းအား ရှောင်ရှား ပါသည်။ ဆောက်လုပ်ရေးဧရိယာ၌ သတိပေးဆိုင်းဘုတ်များကို အများပြည်သူသုံး လမ်းများတွင် (ဆောက်လုပ် ရေးလုပ်ငန်းခွင်အရှေ့) ရှင်းလင်းထင်ရှားစွာ တပ်ဆင်ထားပါသည်။ လုံခြုံရေးဝန်ထမ်းများနှင့် အချက်ပြဝန် ထမ်းများက ကုန်တင်ယာဉ် အဝင်အထွက်များကို အမြဲ လမ်းညွှန်ပြသပေးပါသည်။ ယာဉ်အားလုံးတို့ကို လုပ်ရိုးလုပ်စဉ်အတိုင်း စစ်ဆေးခြင်းနှင့် ကြိုတင်ကာကွယ်ခြင်းကို ကြည့်ရှုစစ်ဆေးမှု အစီအစဉ်အတိုင်း ပြုလုပ်ခဲ့ ပါသည်။ ကန်ထရိုက်တာများက ကုန်တင်ယာဉ်များဖြင့် သယ်ယူပို့ဆောင်စဉ်အတွင်း အစိုးရများ ဖုံးအုပ်ခြင်းနှင့် အပိုဝန်တင်ဆောင်မှုများမရှိစေရန် ထိန်းချုပ်ထားပါသည်။ အများပြည်သူသုံးလမ်းမှာ (ဆောက်လုပ်ရေးလုပ်ငန်း ခွင်အရှေ့) ကောင်းမွန်သောအခြေအနေတွင်ရှိပြီး ပတ်ဝန်းကျင်တွင် နေထိုင်သူ ပြည်သူလူထုမှ တိုင်ကြားမှုများ မရှိခဲ့ပါ။

ဝန်ထမ်းများ ခရီးသွားလာမှုစီမံခန့်ခွဲရေးနှင့် ပို့ဆောင်ရေးတွင် လုံခြုံစိတ်ချမှုရှိစေရန် ချမှတ်ထားသော စည်းကမ်း များအတိုင်း လိုက်နာမှုရှိစေရန် စီစဉ်ထားပါသည်။ အရေးပေါ်တုံ့ပြန်မှု အစီအစဉ်များတွင် မီးဘေးကာကွယ်မှု ၊ ရှေးဦးသူနာပြု အစီအစဉ်များ ပါဝင်ပါသည်။ ကန်ထရိုက်တာများက ဝန်ထမ်းများ မူးယစ်ဆေးဝါးနှင့် အရက်သေ စာ သောက်စားမှုမရှိစေရန် စည်းကမ်းချမှတ်ထားပါသည်။ နေ့စဉ် ငန်းခွင်မဝင်မီ အရက်သေစာ သောက်စား ထားမှုရှိမရှိကို Alcohol Testing ဖြင့် စစ်ဆေးပါသည်။ ဝန်ထမ်းများအား အရက်သေစာ သောက်စားထားမှုရှိ မရှိစစ်ဆေးချက်ရလဒ်မှာ 0% ထက်ကျော်လွန်ပါက အလုပ်ကို ချက်ချင်းရပ်ဆိုင်းပါသည်။ မူးယစ်ဆေးသုံးစွဲမှု စစ်ဆေးရန်အတွက် အလုပ်သမားများကို အလျင်းသင့်သလို ဆေးရုံသို့ ပို့ဆောင်ကာ စစ်ဆေးမှု ခံယူစေပါ သည်။

- **အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း**

- အန္တရာယ်မရှိသော စွန့်ပစ်ပစ္စည်း-ဆောက်လုပ်ရေးလုပ်ငန်းအတွက် စွန့်ပစ်ပစ္စည်း ထားရာနေရာကို ကန်ထရိုက်တာမှ ထောက်ပံ့ပေးထားပါ သည်။ စွန့်ပစ်ပစ္စည်းများကိုထည့်ရန်အတွက် အမှိုက်ပုံး အမျိုးအစား ၅မျိုးခွဲခြားထားပါသည် - အထွေထွေ စွန့်ပစ်ပစ္စည်းအတွက် အပြာရောင် ၊ ပြန်လည်အသုံးပြုနိုင်သော စွန့် ပစ္စည်းအတွက် အဝါရောင် ၊အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်းအတွက် အနီရောင် ၊ အော်ဂဲနစ် နှစ်စွန့် ပစ် ပစ္စည်းအတွက် အစိမ်းရောင် နှင့် ကူးစက် နိုင်သော စွန့်ပစ်ပစ္စည်း စသည်ဖြင့်ခွဲခြားစွန့်ပစ်ပါသည်။ ကန်ထ ရိုက်တာမှ စွန့်ပစ်ပစ္စည်းအရေအတွက်ကို မှတ်တမ်းတင်ထားပါသည်။ ကန်ထရိုက်တာမှ ဆောက် လုပ်ရေး လုပ်ငန်းခွင်အတွင်း၌ ကြွင်းကျန်နေသော စွန့်ပစ်ပစ္စည်းများကို စွန့်ပစ်ရန်အတွက် YCDC နှင့် ပူး ပေါင်း ဆောင်ရွက်ပြီး စွန့်ပစ်ပါသည်။ ထို့အပြင် ကန်ထရိုက်တာမှ ဆောက်လုပ်ရေး ဧရိယာအတွင်း တွင် ဝန်ထမ်း များမှ မည်သည့်စွန့်ပစ်ပစ္စည်းကိုမှ မီးရှို့ ခြင်း မပြုရန် တားမြစ်ထားပါသည်။

- **အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်း** - ဆောက်လုပ်ရေးဧရိယာအတွင်းတွင် အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်းများကို အနီရောင်သတ်မှတ်ထားသော ကွန်တိန်နာတွင် စွန့်ပစ်ပါသည်။ သို့သော် အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း ယနေ့ထိတိုင်မရှိသေးပါ။ အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်းများကို တွေ့ရှိခဲ့လျှင် ကန်ထရိုက်တာမှ လိုင်စင်ရ စွန့်ပစ်ပစ္စည်း ကန်ထရိုက်တာများနှင့် ပူးပေါင်းဆောင်ရွက်၍ စွန့်ပစ်ပါသည်။

- **စွန့်ပစ်ရေ။** ။ PTTEPI ရုံးသည် ဝန်ထမ်း ၄၀ အတွက် ရေလောင်းအိမ်သာ ၄ ခုကိုထောက်ပံ့ပေးထားပါသည်။ ကန်ထရိုက်တာသည် ဆောက်လုပ်ရေးဧရိယာ အတွင်း၌ ရေနုတ်မြောင်းစနစ်ကို ဆောက်လုပ်ထားရှိပြီး စီမံကိန်း ဧရိယာပြင်ပသို့ မစွန့်ပစ်ခင် ရေဆိုးများကို ထိန်းသိမ်းထားပြီး ဝန်ထမ်းအားလုံးအားလည်း ရေနုတ်မြောင်းထဲသို့ အမှိုက်များ မစွန့်ပစ်ရန် နှင့် ရေစီးဆင်းမှုကို ဟန့်တားပိတ်ဆို့စေသည့် အမှိုက်များစုပုံစေခြင်း မပြုလုပ်စေရန် တားမြစ်ခြင်းအားဖြင့် ရေစီးရေလာပိတ်ဆို့မှု မဖြစ်ပေါ်စေရန် စီစဉ်ဆောင်ရွက်ထားပါသည်။

- **လူမှုရေးနှင့် စီးပွားရေး။** ။ကန်ထရိုက်တာသည် လူသစ်စုဆောင်းမှုလုပ်ငန်းစဉ်အရ သတင်းထုတ်ပြန်၍ အလုပ်သမားအားလုံးအား ရန်ကုန်မှ ငှားရမ်းရန် ထည့်သွင်းစဉ်းစားခဲ့ပါသည်။ အလုပ်သမားများနှင့် အနီးအနားရှိသောနေထိုင်သူများအကြား ပဋိပက္ခဖြစ်ခြင်းမှကာကွယ်ရန် အလုပ်ခွင်စည်းမျဉ်းများကို အလုပ်သမားများအားလုံး လိုက်နာစေရန် တင်းတင်းကျပ်ကျပ် သတ်မှတ်ပြဋ္ဌာန်းခဲ့ပါသည်။ ကန်ထရိုက်တာမှ တည်ဆောက်ရေးလုပ်ငန်းစဉ်နှင့် ဆောက်လုပ်ရေး ပစ္စည်းများနှင့် ဝန်ချီစက်ကြီးများ အတွက် သယ်ယူပို့ဆောင်ရေးလမ်းကြောင်းကို ဒေသခံပြည်သူများအား အသိပေးပြောကြားခဲ့ပါသည်။ ဆောက်လုပ်ရေး ကာလတလျှောက် ဆောက်လုပ်ရေးလုပ်ငန်းများကို အနီးကပ်စစ်ဆေးနိုင်ရန် မြို့ပြအင်ဂျင်နီယာနှင့် လုံခြုံရေး ဝန်ထမ်းများကို စီစဉ်ထားပေးခဲ့ပါသည်။ PTTEPI သည် သက်ဆိုင်သူများထံမှ တိုင်တန်းချက်များကို လက်ခံထားရှိရန် မကျေနပ်ချက်၊ နှစ်နာချက်များ ကိုင်တွယ်ဖြေရှင်းရေး လမ်းညွှန်ချက်ကို သတ်မှတ်ထားခဲ့ပြီး တိုင်ကြားချက်များကို ချက်ချင်း ကိုင်တွယ်ဖြေရှင်းပေးခဲ့ပါသည်။ စီမံကိန်းအမည်၊ ပိုင်ရှင်၊ အကြံပေးသူ၊ ကန်ထရိုက်တာ၊ တည်ဆောက်ရေးကာလနှင့် အရေးပေါ်ဆက်သွယ်ရန်ဖုန်းနံပါတ်စသည့် စီမံကိန်းအသေးစိတ်အချက်အလက်များကို အသိပေး ရန် ဆောက်လုပ်ရေး area အရှေ့တွင် စီမံကိန်းဆိုင်းဘုတ်ကို တပ်ဆင်ထားခဲ့ပါသည်။ အလုပ်လုပ်ပိုင်ခွင့် စနစ် (work permit system) ကို ဖော်ဆောင်ထားခဲ့ပါသည်။ အမြင့်တွင်အလုပ်လုပ်ခြင်း၊ ညအလုပ်ခွင်၊ လျှပ်စစ်နှင့် ဆိုင်သော အလုပ်ခွင် နှင့် ပိုင်ရှိခြင်းလုပ်ငန်း ကဲ့သို့ အရေးကြီးသည့်လုပ်ငန်းများအတွက် work permit system ကို အကောင်အထည်ဖော်ဆောင်ရွက်ထားခဲ့ပါသည်။ ကန်ထရိုက်တာမှ အလုပ်သမားများအားလုံးအတွက် သင့်တော်သောတကိုယ်ရေသုံး ကာကွယ်ရေးပစ္စည်းများ (PPE) ကို လုံလုံလောက်လောက် ထောက်ပံ့ပေးထားခဲ့ပြီး အလုပ်လုပ်နေစဉ်အတွင်း PPE များကို အသုံးပြုဝတ်ဆင်စေခဲ့ပါသည်။ ဆေးကုသမှုအတွက် အရေးပေါ်သုံးဆေးပစ္စည်းများနှင့် ဆေးဝါးအပြည့်အစုံပါရှိသည့် ဆေးခန်းတွင် ဆရာဝန်ကို အရန်သင့်ထားရှိပေးခဲ့ပါသည်။ ဆောက်လုပ်ရေးarea အတွင်းတွင် မီးငြိမ်းသတ်ရေး ကရိယာများကို ထောက်ပံ့ပေးထားခဲ့ပြီး လစဉ် စစ်ဆေးခဲ့ပါသည်။ ဆောက်လုပ်ရေး area ၏ အရှေ့နှင့်အနောက်ဘက်တွင် ဆေးလိပ်သောက်ရန် နေရာကိုသတ်မှတ်ပေးထားခဲ့ပါသည်။

## ၄.၂ ပတ်ဝန်းကျင်စောင့်ကြည့်စစ်ဆေးခြင်းရလဒ်

ပတ်ဝန်းကျင်အကျိုးသက်ရောက်မှု စောင့်ကြည့်လေ့လာရေးရလဒ်များအရ စီမံကိန်းမှ ရာနှုန်းပြည့် ပြည့်စုံစွာ လိုက်နာကြောင်း စစ်ဆေးတွေ့ရှိရပါသည်။

### ၁) ဖုန်မှုန့်ပြန့်လွှင့်မှု စောင့်ကြည့်လေ့လာခြင်း။

၂၀၁၈၊ အောက်တိုဘာလ၊ ၂၂ ရက်နေ့မှ ၂၄ ရက်အထိ REM-UAE Laboratory and Consultant Company Limited သည် ဆောက်လုပ်ရေးလုပ်ငန်းခွင်၊ PTTEPI ရှိ အဆောက်အဦး ၇ နှင့် နေအိမ်အနောက်ဘက်ရှိ PTTEPI ရုံးခန်း တွင် ဖုန်မှုန့်ထုတ်လွှတ်မှု စောင့်ကြည့်လေ့လာခြင်းကို လုပ်ကိုင်ဆောင်ရွက်ခဲ့ပါသည်။ ရလဒ်များအရ Total Suspended Particulate (TSP) သည် World Bank Group ၏ Ambient Air Quality နှင့် အညီ လိုက်နာထားပြီး PM 10 သည် NEQ၊ WHO နှင့် IFC တို့၏ Ambient Air Quality စံနှုန်းများအတိုင်း လိုက်နာထားကြောင်း station အားလုံး တွင် စစ်ဆေးတွေ့ရှိရပါသည်။

Total Suspended Particulate (TSP) ရလဒ်သည် ယခင်အချက်အလက်များနှင့် နှိုင်းယှဉ်လျှင် PTTEPI အဆောက်အဦး ၇ တွင်လျော့ကျသွားပြီး၊ နေအိမ်အနောက်ဘက်ရှိ PTTEPI ၏ ရုံးခန်းနေရာတွင် တိုးမြင့်သွားခဲ့ပါသည်။ PM<sub>10</sub> ၏ ရလဒ်မှာ stations အားလုံးတွင် လျော့ကျသွားခဲ့ပါသည်။

## ၂) ဆူညံသံ level စောင့်ကြည့်လေ့လာခြင်း။

၂၀၁၈၊ အောက်တိုဘာလ၊ ၂၂ ရက်နေ့မှ ၂၄ ရက်အထိ ဆောက်လုပ်ရေး လုပ်ငန်းခွင်၊ PTTEPI ရှိ အဆောက်အဦး ၇ နှင့် နေအိမ်အနောက်ဘက်ရှိ PTTEPI ရုံးခန်းတို့တွင် ဆူညံသံ level စောင့်ကြည့်လေ့လာခြင်းကို လုပ်ဆောင်ထားခဲ့ပါ သည်။ PTTEPI ရှိ အဆောက်အဦး ၇ ၏ ညဖက် LAeq-1 hr မှလွဲ၍ ဆောက်လုပ်ရေး လုပ်ငန်းခွင် နှင့် PTTEPI ရှိ အဆောက်အဦး ၇ တို့၏ နေ့ဖက်နှင့် ညဖက် LAeq-1 hr ရလဒ်များသည် NEQG (2015) ချမှတ်ထားသော သတ်မှတ်ချက် (စက်မှု/စီးပွားရေးဧရိယာ၏ နေ့ဖက် နှင့် ညဖက် အတွက် 70 နှင့် 70 dB(A)အသီးသီး) ထက် ကျော်လွန်နေပါသည်။ နေအိမ်အနောက်ဘက်ရှိ PTTEPI ရုံးခန်း၏ နေ့ဖက်နှင့် ညဖက် LAeq-1 hr ရလဒ်များသည် NEQG (2015) ချမှတ်ထားသောသတ်မှတ်ချက်(လူနေရပ်ကွက်၊ အဖွဲ့အစည်း၊ ပညာရေး ဧရိယာ၏ နေ့ဖက်နှင့် ညဖက် အတွက် 55 နှင့် 45 dB(A) အသီးသီး) ထက်ကျော်လွန်နေပါသည်။ ထိုသို့ဖြစ်ခြင်း မှာ ဆောက်လုပ်ရေးလုပ်ငန်းများနှင့်အနီးအနားရှိ လမ်းမပေါ်၌ ယာဉ်သွားလာမှုများကြောင့် ဖြစ်နိုင်ပါသည်။ စောင့်ကြည့်လေ့လာသည့် station များအားလုံး၏ နေ့ဖက်  $L_{Aeq-1}$  hr ရလဒ် သည် ယခင်အချက်အလက်များနှင့် နှိုင်းယှဉ်လျှင် မြင့်တက်သွား ပါသည်။ ဆောက်လုပ်ရေးလုပ်ငန်းခွင် နှင့် အိမ်အနောက်ဘက်ရှိ PTTEPI ရုံးခန်းရှိ ညဖက်  $L_{Aeq-1}$  hr တန်ဖိုးများသည် မြင့်တက်သွားခဲ့သော်လည်း PTTEPI ရှိ အဆောက်အဦး ၇ တွင် လျော့ကျသွားခဲ့ပါသည်။ တစ်နှစ် ၂ ကြိမ် သတ်မှတ်ချက်အရ ဆူညံမှု Level ကို စစ်ဆေးရန် PTTEPI သည် ဆက်လက် စောင့်ကြည့်လေ့လာမည်ဖြစ်သည်။

## ၃) မကျေနပ်ချက်၊ နှစ်နာချက် လုပ်ထုံးလုပ်နည်း/ကိုင်တွယ်ဖြေရှင်းရေး စောင့်ကြည့်လေ့လာခြင်း။

၂၀၁၈ခုနှစ် PTTEPI ရန်ကုန်ရုံးခန်း အဆောက်အဦး၏ ဆောက်လုပ်ရေးကာလ မကျေနပ်ချက်၊ နှစ်နာချက် လုပ်ထုံးလုပ်နည်း/ကိုင်တွယ်ဖြေရှင်းရေး စောင့်ကြည့်လေ့လာခြင်း ရလဒ်များကို PTTEPI မှ လုပ်ဆောင်ခဲ့ပါသည်။ တည်ဆောက်ရေးကာလတလျှောက် ရပ်ကွက်ပြည်သူများထံမှ တစ်စုံတစ်ရာ တိုင်ကြားချက် ရရှိခဲ့ခြင်း မရှိပါ။

## လူထု နှင့် အလုပ်ခွင် ကျန်းမာရေး နှင့် ဘေးကင်းလုံခြုံရေး စောင့်ကြည့်လေ့လာခြင်း။

PTTEPI ရန်ကုန်ရုံးခန်း အဆောက်အဦး၏ ဆောက်လုပ်ရေးကာလ ပြည်သူလူထု နှင့် လုပ်ငန်းခွင် ကျန်းမာရေး ၊ ဘေးကင်းလုံခြုံရေးအတွက်စောင့်ကြည့်လေ့လာခြင်း ရလဒ်များကို ကန့်သတ်ချက်တာမှ ၂၀၁၈ ခုနှစ်ဇန်နဝါရီလ ၂ ရက်နေ့မှ ယခုလက်ရှိအချိန်ထိ ရေးမှတ်ထားခဲ့ပါသည်။ တည်ဆောက်ရေးကာလအတွင်း ဆောက်လုပ်ရေးလုပ်ငန်းခွင်တွင် မတော်တဆမှု ၄ခု ဖြစ်ပွားခဲ့ပါသည်။ ထိုကဲ့သို့ နောက်ထပ်မဖြစ်ပွားစေရန် အမှားပြင်ဆင်ချက်များ ကို အဆိုပြု/ အကောင်အထည်ဖော်ဆောင်ရွက်ခဲ့ပါသည်။



*Chapter 1*  
*Introduction*

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# Chapter 1

## Introduction

### 1.1 Introduction

PTTEP International Limited (PTTEPI) plans to construct new office building in Yangon in order to support the expansion of company's E&P business in Myanmar. The new office building will replace the existing office building located at No. (2), Sei-Myaung Yeiktha Street, 8 ½ Mile, Mayangone Township, Yangon. Regarding the determination about PTTEPI's new office building construction project, Initial Environmental Examination (IEE) shall be required in accordance with Myanmar EIA Procedure, 2015. The IEE Report for PTTEPI's Yangon Office Building was submitted and approved by Environmental Conservation Department (ECD) of Ministry of Natural Resources and Environment Conservation (MONREC) on November 25<sup>th</sup>, 2017, according to the letter no. (Forest) 3(2)/16(D) (3423/2017) (Appendix A). As per commitment in IEE Report, PTTEPI has the responsibility to follow the environmental mitigation and monitoring measures including submits the monitoring report to ECD. Therefore, PTTEPI, as the project owner, has assigned a qualified third party, REM-UAE Laboratory and Consultant Company Limited to perform compliance audit of the mitigation measures and perform the monitoring at frequency specified in the IEE's environmental management plan and report the results to ECD as prescribing in IEE.

### 1.2 Objective

The main objectives of this report are:

- To evaluate the effectiveness of implementation of the Environmental Management Plan, including both mitigation and monitoring measures, defined in the IEE report; and
- To report any potential problems or obstacles and propose recommendation for improvement in order to ensure the effectiveness of the prevention and mitigation measures.

### 1.3 Briefly Information of the Project

#### 1.3.1 General Information and Background

1) <u>Project Name:</u>	PTTEPI's Yangon Office Building Construction Phase
2) <u>Project Location:</u>	No. (2), Sei-Myaung Yeiktha Street, 8 ½ Mile, Mayangone Township, Yangon
3) <u>Project Owner:</u>	PTTEP International Limited (Yangon Branch)
4) <u>Report Preparation:</u>	REM-UAE Laboratory and Consultant Company Limited
5) <u>Period of Construction:</u>	Tentatively 29 Months (2018 – 2020)

## 1.4 Project Location

The PTTEPI's Yangon Office Building will replace the existing building of PTTEP International Limited (Yangon Branch) which is located at No. 2, Sei-Myaung Yeiktha Street, 8 ½ Mile, Mayangone Township, Yangon. The project site is located on the south of the Sei-Myaung Yeiktha Street and the west of the Pyay Road, Mayangon Township, Yangon. An Aerial view of project location is presented in Figure 1-1.

## 1.5 Site Description

The project site is located in the area of the existing PTTEPI's Yangon Office Building (so-called existing Building), covering 2,371.46 sq.m. There are 7 PTTEPI Buildings (Building 1 to Building 7) with car park space. The new building will be constructed to replace the 4 existing PTTEPI Buildings i.e. Building 1, Building 2, Building 4, Building 5 including car park space (Figure 1-2). The rented area of existing Building 3, Building 6 and Building 7 will be returned to the landowner.

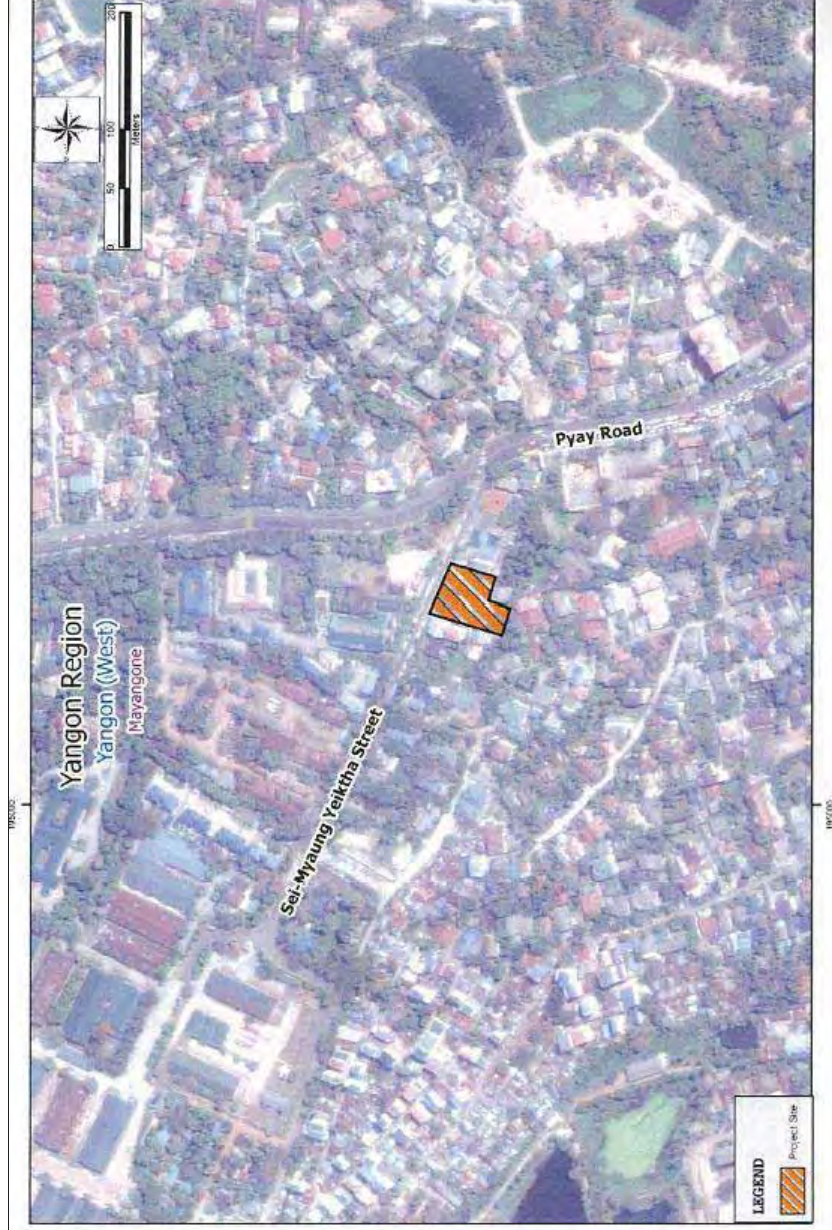


Figure 1-1 Project Location

Reference: Initial Environmental Examination (IEE) for PTTEP's Yangon Office Building Construction, May 2017

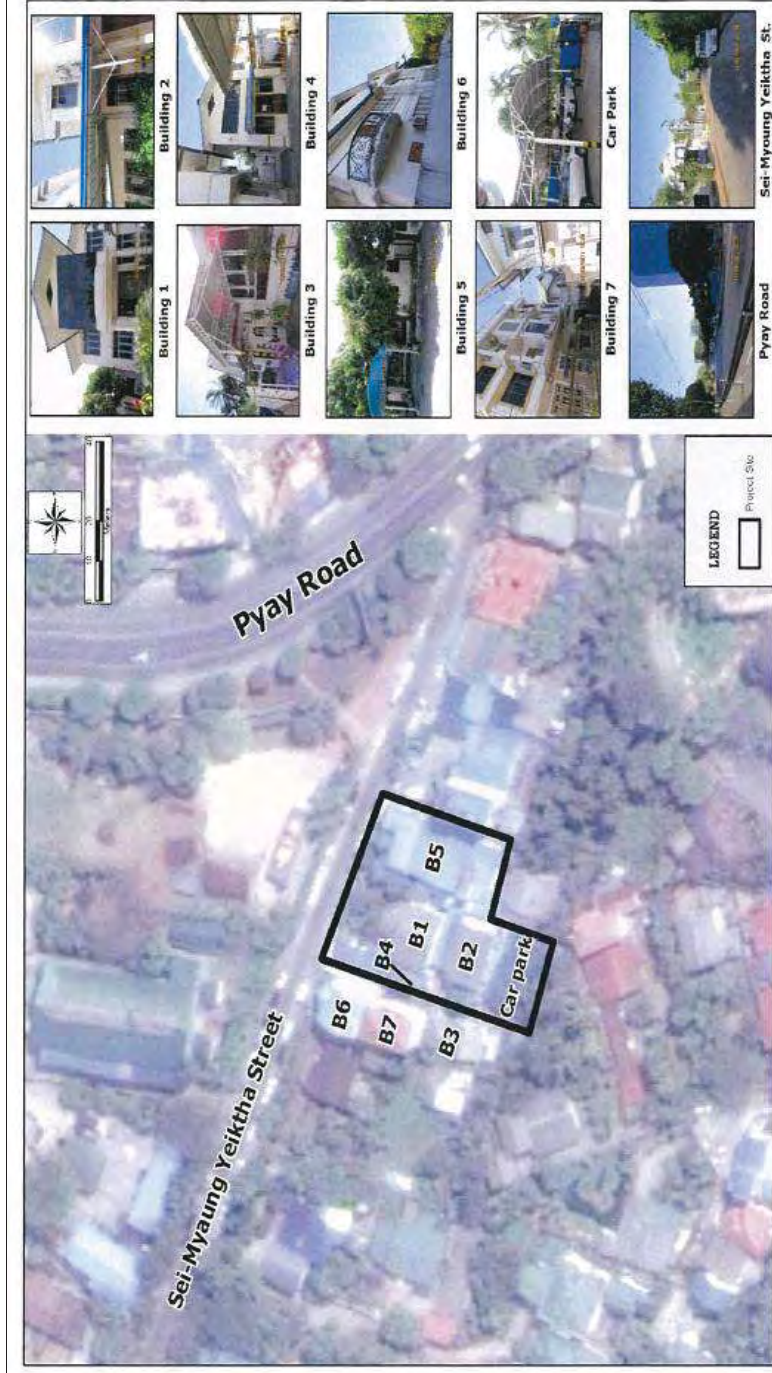


Figure 1-2 Site Condition

Reference: Initial Environmental Examination (IEE) for PTTEP's Yagon Office Building Construction, May 2017



## 1.6 Status of Current Operation

Once the demolition of old building finished, PTTEPI started the construction of new office building since January 2018 and expected to complete in 2020. The example for construction activity as shown in Figure 1-3.



Figure 1-3 PTTEPI's Yangon Office Building in construction phase

## 1.7 Compounds nearby the Project Site

There are a number of buildings, houses and utilized areas nearby the project site. Information about buildings, houses, roads and office adjacent to project site is present in Table 1-1.

The existing land use around 500 meters adjacent to the project site is the mix of residential, religious and commercial areas; i.e. restaurant, house, temple, hotel and offices.

Table 1-1 Built-up Area Adjacent to the Project Site

Geographic Location	Name	Nature
North	- Ministry of Agriculture, Livestock and Irrigation	Government Office
	- Bamboo Threat Make Buddha Statue (Phra Inn San Temple)	Religious place
	- Sei-Myaung Yeiktha Street	Street
East	- Yangon Yoma Hotel	Hotel
	- Lucky Seven Restaurant	Restaurant
	- Basic Education Primary School (B.E.P.S.), Mayangone Township	School
	- Pyay Road	Road
South	- House (1 Storey) near car park of PTTEPI Building	Local Residence
	- House (2 Storeys) near car park of PTTEPI Building	Local Residence
	- Road Transportation Administration Department	Government Office
	- Kyaik Waing Pagoda Road	Road
West	- House (2 Storeys) near car park of PTTEPI Building 6	Local Residence
	- Bealanga Myanmar Pte Ltd.	Office
	- House (1 storey)	Local Residence

## 1.8 Project Components

### 1.8.1 Type of Building and Internal Function Area Arrangement

The project is a 12 ½ storey office building of PTTEP International Limited (Yangon Branch) with total height of 52.85 meters (Figure 1-4), function area of 18,760.0 sq.m. or 190,700 sq.ft.; and internal parking area for 110 cars.

The project building is located on Sei-Myaung Yeiktha Street. The street's width is 7.0 meters. It branches off from the main road namely Pyay road. The project building has been designed with the total height complying with legal setback requirement from Sei-Myaung Yeiktha Street. The highest point of the building is at an altitude of 73.5 meters from Mean Sea Level while the highest point of Shwedagon Pagoda is at an altitude of 127.10 meters from Mean Sea Level. According to YCDC's regulations concerning visual impact, the height of building to be constructed in the vicinity of important cultural site has to be controlled to avoid visual obstruction and decrease of aesthetic quality of the cultural site.

The building has been designed with consideration on seismic risk and safety. Moreover, the design is modern, easy for maintenance, compatible with surrounding physical context and environmental friendly. All facilities and utility systems have been provided for servicing working staff and clients.

The function area within the building can be divided as follows:-

- Parking areas are on B2, B1 and floors 1, 2, 3
- Canteen is on floor 3
- Office areas are on floors 4-11

Central area/facilities such as corridor, stair, toilet, mechanical room, lift, etc. are provided on every floor. The details of function areas on each floor of the building can be summarized as follows:-

- Basement 2 (B2) consists of stair, lift, corridor, mechanical room and parking lots with total function area of 1,330.50 sq.m.
- Basement 1 (B1) consists of stair, lift, corridor, mechanical room and parking lots with total function area of 1,203.50 sq.m.
- Ground floor consists of stair, lift, corridor, lobby and information, mechanical room, toilet, janitor room, mail room, telephone, operator room, cashier room, entrance, drop-off and ramp parking with toilet function area of 1,518.00 sq.m.
- Mezzanine floor consists of stair, lift, corridor, lobby, mechanical room, security, house keeping, toilet, storage room and car parking lots with total function area of 542.00 sq.m.
- The 1<sup>st</sup> floor consists of stair, lift, corridor, lobby, mechanical room, G&G Server room, infrastructure room, IT & Communication room, and car parking lots with total function area of 1,154.00 sq.m.
- The 2<sup>nd</sup> floor consists of stair, lift, corridor, lobby, mechanical room, driver room, quiet driver room, storage room, and car parking lots with total function area of 1,157.00 sq.m.

- The 3<sup>rd</sup> floor consists of stair, lift, corridor, lobby, mechanical room, canteen & pantry, cooking room, toilet, etc. with total function area of 1,163.00 sq.m.
- The 4<sup>th</sup> floor consists of stair, lift, corridor, lobby, mechanical room, meeting area, mail & photocopy room, pantry & maid room, toilet, etc. with total function area of 1,059.00 sq.m.
- The 5<sup>th</sup> floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, pantry & maid room, toilet, etc. with total function area of 1,062.00 sq.m.
- The 6<sup>th</sup> floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, pantry & maid room, toilet, library room, etc. with total function area of 1,161.00 sq.m.
- The 7<sup>th</sup> floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, pantry & maid room, toilet, library room, etc. with total function area of 1,161.00 sq.m.
- The 8<sup>th</sup> floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, pantry & maid room, toilet, etc. with total function area of 1,062.00 sq.m.
- The 9<sup>th</sup> floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, pantry & maid room, toilet, etc. with total function area of 1,062.00 sq.m.
- The 10<sup>th</sup> floor consists of stair, lift, corridor, lobby, mechanical room, office space area, mail & photocopy room, emergency response room, pantry & maid room, toilet, etc. with total function area of 1,447.00 sq.m.
- The 11<sup>th</sup> floor consists of stair, lift, corridor, lobby, mechanical room, executive office space are, pantry & maid room, toilet, roof garden, etc. with total function area of 1,161.00 sq.m.
- The 12<sup>th</sup> and 12 ½ floor consists of stair, lift, corridor, lobby, mechanical room, pantry, toilet, roof slab etc. with total function area of 1,417.00 sq.m.



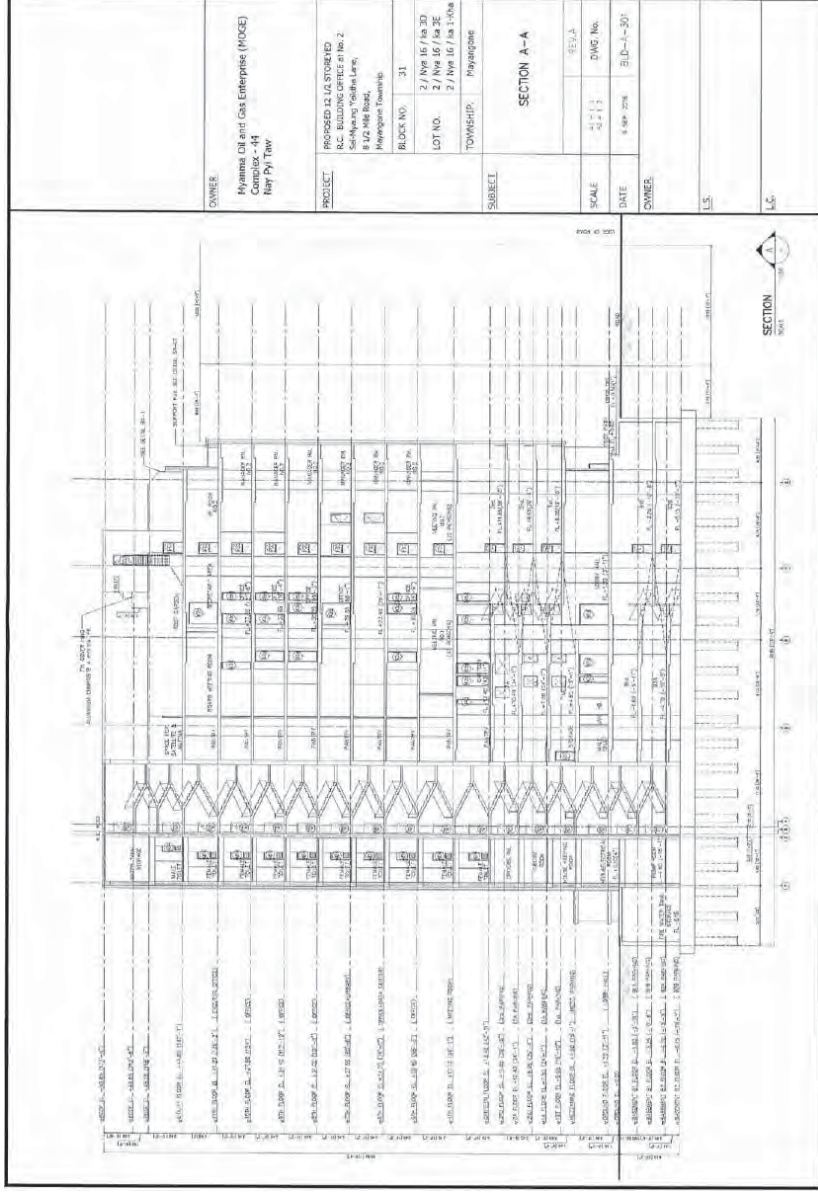


Figure 1-4 Height of PTTEP's Yangon Office Building

## 1.8.2 Design of Facilities for the Disabled

The design of facilities for the disabled of this office building has been based on Universal Design concept.

- 1) Car parking lots for the disabled and elders are provided on Basement 1 (B1) and Mezzanine to facilitate convenient accessibility into the building.
- 2) Toilets for the disabled and elders are provided on the ground floor.

## 1.8.3 Internal Utilities System

The project has provided facilities and utilities system as follow:-

### 1) Traffic System

#### (1) Entrance, Exit and Internal Road

Entrance and exit have been designed with total width of 4.5 meters and 6.0 meter, respectively to join with Sei-Myaung Yeiktha Street on the North of the building. Sei-Myaung Yeiktha Street is a public road with width of 7.0 meters branching off from the main road namely Pyay road on the East of the building.

#### (2) Parking Lots

According to YCDC prescription, area required for car parking is 1 lot / 200 sq.m. of floor area of the building (106 parking lots). Therefore, the project has provided 110 parking lots comprising 108 lots for PTTEP staff and clients on B2, B1, Mezzanine, floor 1, floor 2, and floor 3 and 2 lots for the disabled on B1 and Mezzanine.

### 2) Water Supply System and Water for Domestic Use

#### (1) Water Source

The project would use groundwater for domestic use and fire fighting. The groundwater would be stored in the 3 storage tanks on B2 comprising 1 raw water storage tank with capacity of 30,000 UK gallons, 1 fire water storage tank with capacity of 30,000 UK gallons, and 1 cold water storage tank with capacity of 30,000 UK gallons, there is a filter system for production of tap water for domestic use within the building.

#### (2) Quantity of Water Demand

In operation period the water demand for domestic use will be 22,884 UK gallon/day while water demand for fire fighting will be 22,300 UK gallon for 60 minutes.

#### (3) Water Distribution System

The project has 2 separated water distribution systems comprising domestic use system and fire water system.

- Domestic Use System

Groundwater will be contained in storage tank with capacity of 30,000 UK gallon. There is a float valve in the storage tank to control automatic function of water pump. Groundwater will be pumped to be stored in the tank with 15,000 UK gallons capacity on the roof floor and then water will be distributed to each floor via pipes by gravity. Since there would be problem on decreased pressure

of pump for water distribution, the project has Provided Booster Pumps (PBS) to increase pressure for water distribution on floor 7 to Roof Floor.

- **Fire Water Distribution System**

Groundwater will be pumped to storage tank with capacity of 10,000 UK gallon at roof floor. Fire water will be distributed via main type to distribute water for fire fighting equipment i.e. Fire Hose Cabinet: FHC, Sprinkler System on every floor by fire water pump with capacity of 833 UK gallon/minute.

### 3) Wastewater Treatment

#### (1) Total Volume of Wastewater

During operation period, total volume of wastewater to be generated from activities in the building has been estimated at 20,596 UK gallons/day.

#### (2) Wastewater and Sewage Collection System within the Building

All type of sewage drained from toilet, bathroom and other areas in which there is water usage would be collected into main wastewater collection pipes for further sending to the project wastewater treatment system.

#### (3) Wastewater Treatment System

The project wastewater treatment system is of Activated Sludge Treatment Process: A/S type installed on floor B1 with capacity of 21,000 UK gallons/day. This capacity could accommodate wastewater volume to be generated in the project (20,596 UK gallons/day). BOD of wastewater would be 250 mg/l; the efficiency of the treatment plant is 92%, therefore BOD of the treated wastewater would be less than 20 mg/l. The treated wastewater shall be discharged into public drain in front of the project site.

### 4) Electricity System

The project would receive electric power via main transmission line of EPC 2 sets of Oil Type Transformer with capacity of 2,000 KVA will be installed to distribute to several parts of the building. The total electric power demand of the project is 1,800 KVA.

Moreover, the project would provide 2 sets of supporting Generator with capacity of 1,000 KVA which could automatically function in case EPC Electric Supply System fail. The supporting generators would be able to generate electric power for at least 8 hours.

### 5) Water Drainage and Flood Protection

#### (1) Internal Drainage System

- **Waste Pipe**

Within the building, there will be wastewater drainage pipe with 4-inch diameter to collect wastewater to send to the project wastewater treatment system.

- **Soil Pipe**

Within the Building there will be soil pipe with 6-inch diameter to drain sewage.

- **Wastewater Pipes from Kitchen and Dish Washing Sink**

Within the building there will be drainage pipe with 4-inch diameter to drain wastewater from cooking in kitchen area into the project wastewater treatment system.

## (2) Rain Water Drainage System

Internal rain water drainage system consist of drainage pipes with diameter of 0.3 m., 0.4 m. and slope of 1:1,000 to collect rain water in the project area to drain into 5 manholes in front part of the project area prior to discharge outside.

## (3) Flood Protection

The project site is located on Sei-Myaung Yeiktha Street. This area has never been suffered from flood problems. However, the project has already provided internal rainwater drainage system in connection with public drainage system outside the project area to prevent flood problem.

## 6) Solid Waste Volume

### (1) Solid Waste Volume

Solid waste to be generated within the building consist of wet solid waste, e.g. food debris, dry solid waster e.g. paper, plastic bag, hazardous waste e.g. fluorescent tube, battery. Solid waste generates from 300 staff will be 135 kg/day.

### (2) Solid Waste Management

Waste bins will be provided on each floor to receive wet solid waste, dry solid waste, hazardous waste and recycle waste. Each of waste bin will be lined with black plastic waste bag.

Cleaning staff will be assigned to collect solid waste from waste bins on each floor and transport via emergency lift to be stored in solid waste storage area out side the building to wait for solid waste truck of YCDC to get for further disposal every day.

## 7) Fire Protection and Warning System

The project has provided fire protection and fire warning system.

## 8) Ventilation and Air Condition System

### (1) Ventilation System

The project ventilation systems consist of natural ventilation system and mechanical ventilation system.

The mechanical ventilation system is provided in stair, toilet, canteen, kitchen, lift area, and car parking.

### (2) Air Condition System

The project air condition system is Chilled Water System using Air Cooled Liquid Chiller with total capacity of 489 ton. The system is provided in meeting room, canteen, etc.

## 9) Lift System

There are 3 lifts comprising 2 passengers lifts with loading capacity of 1,350 kg/for 18 passengers and speed of 1.75 m/second and 1 fire fighting lift normally used for passengers but during fire incident fireman can use this lift. The fire fighting lift has loading capacity of 750 kg for 12 passengers and speed of 1.00 m/second.

## 10) Safety

There would be security guards within the building and to facilitate entry/exit of PTTEPI staff and clients for 24 hours. Moreover, there would be close-circuit television system, entrance and exit control system and security room in the front part of the building. In case of emergency, the building control staff and security guards would promptly be informed.

## 1.9 Environmental Monitoring and Mitigation Measure Implementation Compliance

According to IEE, the environmental mitigation measures implementation audit which considered environmental issues and essential impacts that may occur were conducted in the construction phase of PTTEPI's Yangon Office Building on October 18, 2018 by REM- UAE, as the environmental consultant of the project together with the representation from PTTEPI. The results are described in Chapter 2. The results of environmental monitoring measures are presented in Chapter 3 and the conclusion is summarized in Chapter 4.

*Chapter 2*  
*Environmental Mitigation Measures*  
*Implementation Compliance Audit*

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## Chapter 2

### Environmental Mitigation Measures Implementation Compliance Audit

Environmental Mitigation Measures Implementation Compliance audit was carried out by REM- UAE Laboratory and Consultant Company Limited together with representatives from PTTEPI. The audit conducted against the mitigation measures specified in Initial Environmental Examination (IEE) as detailed in Appendix B.

Audit of construction phase was performed at PTTEPI's Yangon Office Building on October 18, 2018 (Figure 2-1) and document checking by setting 4 levels of evaluation as follows;

- Completely complied on the Mitigation Measures (✓) refers the project can complete comply with the measure without any barriers.
- Mostly complied on the Mitigation Measures (✓) refers the project can mostly comply with the measure without any barriers.
- Do not complied on the Mitigation Measures (✗) refers the project cannot comply with the measure because of some barriers.
- Do not have situation follows the Mitigation Measures (NA) refers during the project operations do not have any of situation follow the Mitigation Measures.



Figure 2-1 Mitigation Measures Compliance Audit

In case found that project does not comply with the mitigation measures, REM- UAE Laboratory and Consultant Company Limited will identify the cause of problems, barriers and solutions ways. The details are shown in Table 2-1 as followed;

Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEP's Yangon Office Building

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
<b>Environmental Mitigation Measures</b>								
Air Pollution	<ul style="list-style-type: none"> <li>Impacts on air quality from dust dispersion resulting from foundation and structural work cause adverse effected to the communities nearby the construction site and along the transportation route.</li> </ul>	<ul style="list-style-type: none"> <li>Water spraying twice a day at and around the construction areas</li> </ul>	Project Site	Construction Phase	✓	Water spraying was provided three times per day at and around the construction areas. However, spraying had not conducted in the rainy day due to wet soil conditions made suspended particulate value was low level. The contractor always records the weather condition and cleans the truck's wheels before go out the construction area to reduce dust dispersion.	-	Figure 2-2 and Appendix J
		<ul style="list-style-type: none"> <li>Polyester/ PVC mesh sheet should be covered around the construction areas</li> </ul>			✓	PVC mesh sheet is provided to cover around the construction areas in order to prevent dust dispersion and effect to nearby communities.	-	Figure 2-3
		<ul style="list-style-type: none"> <li>Cover construction materials by tarpaulin during transportation, materials should be dampened, if necessary, before transportation</li> </ul>			✓	The truck was covered during transport material to the construction area.	-	Figure 2-4 and Appendix J
		<ul style="list-style-type: none"> <li>Restore, resurface, and rehabilitate the disturbed areas as soon as practicable after completion of construction or disturbance</li> </ul>			NA	The project will rehabilitate the disturbed areas after completion of construction.	-	-



Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEP's Yangon Office Building

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
Excessive Noise and Vibration	Impacts on excessive noise and vibration from foundation and structural work to disturb the nearby communities.	<ul style="list-style-type: none"> <li>Dust masks should be provided (where applicable) to specified construction workers.</li> </ul>	Project Site	Construction Phase	✓	The contractor provided dust masks for workers and controlled to use during working.	-	Figure 2-5
		<ul style="list-style-type: none"> <li>Provide noise protection equipment such as ear muff, ear plugs to the construction workers working in the area</li> </ul>			✓	The contractor provided ear plugs for workers and controlled to use during working with high noise activities..	-	Figure 2-5
		<ul style="list-style-type: none"> <li>Try to carry out construction activities with high noise and vibration level at day time, some activities need to be carried out in the nighttime.</li> </ul>			✓	The contractor controlled workers to carried out the construction activities with high noise and vibration level at day time in order to reduce noise impact nearby communities.	-	-
		<ul style="list-style-type: none"> <li>Install metal sheet as temporary noise barrier at construction site to reduce noise impact nearby communities</li> </ul>			✓	Noise barrier was installed by metal sheet around the construction site to reduce noise impact nearby communities.	-	Figure 2-6
Traffic	<ul style="list-style-type: none"> <li>The increasing number of vehicle especially heavy truck and trailer for construction materials and heavy equipment at day time might cause traffic congestion.</li> </ul>	<ul style="list-style-type: none"> <li>Inform concerned authorities and local people about the construction plan with transportation route for construction materials and heavy vehicles.</li> </ul>	Project Site	Construction Phase	✓	The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people.	-	Appendix D-2
		<ul style="list-style-type: none"> <li>All Project drivers and transportation activities have to follow the laws related to transportation of Myanmar and follow PTTEP's driving Policy which include vehicle safety rules and journey management.</li> </ul>			✓	The contractor prepared journey management and transportation safety procedure and enjoined workers to follow regulation.	-	Appendix F-1

Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEP's Yangon Office Building

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
		<ul style="list-style-type: none"> <li>Install warning signs that can be clearly seen to show the access road and construction area.</li> </ul>			✓	Warning signs were installed and can be clearly seen at the public road (in front of the construction area) and at construction area.	-	Figure 2-7
		<ul style="list-style-type: none"> <li>Avoiding/lessening mobilization of material and equipment at day time.</li> </ul>			✓	The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. Moreover, avoiding transportation of materials and equipment at day time.	-	Appendix D-2
		<ul style="list-style-type: none"> <li>Prepare security guard and signal man at guard house close to access road to give the sign in and out of vehicle from project area.</li> </ul>			✓	Security guard and signal man always give the sign in and out of vehicle from project area.	-	Figure 2-8 and Figure 2-9
		<ul style="list-style-type: none"> <li>Carry out regular, routine check and maintenance of vehicles following safety instruction.</li> </ul>			✓	Routine inspection and preventive maintenance for all vehicles were conducted as per inspection plan.	-	Appendix E-4
		<ul style="list-style-type: none"> <li>Strictly control on over loading of heavy truck to prevent damage on road surface.</li> </ul>			✓	The contractor controlled the truck not to over loading to prevent damage on road surface. Moreover, the public road (in front of the construction area) was in good condition and there was no complaint from nearby communities.	-	Figure 2-10

Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEP's Yangon Office Building

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
		<ul style="list-style-type: none"> <li>Cover construction materials by tarpaulin during transportation to prevent falling and spreading of materials.</li> </ul>			✓	The truck was covered during transport material to the construction area.	-	Figure 2-4
		<ul style="list-style-type: none"> <li>In case of accident, the concerned sections must be promptly follow the emergency response plan.</li> </ul>			✓	The emergency response procedure was set up including incident, fire action, first aid action. Moreover, muster point is provided opposite the construction area in case of accident.	-	Figure 2-11 and Appendix E-3
		<ul style="list-style-type: none"> <li>Test alcohol and drug on drivers before transportation.</li> </ul>			✓	The contractor prepared drug and alcohol abuse policy and enforced all workers to follow. Alcohol testing was conducted before working every day. Worker will immediately stop working if alcohol is found more than 0%. For drug testing, workers were random tested at hospital.	-	Figure 2-12 and Appendix H
		<b>Non-Hazardous Waste</b> <ul style="list-style-type: none"> <li>Provide storage area for construction materials.</li> </ul>	Project Site	Construction Phase	✓	The contractor provided storage area for construction materials.	-	-
Solid waste	<ul style="list-style-type: none"> <li>Improper management of construction waste will caused the adverse effect to the environmental.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare proper waste bins or containers covered with garbage bag for waste collection at the construction site.</li> </ul>			✓	Waste containers with cover are provided at the construction area for 5 types; general waste (blue), recycle waste (yellow), hazardous waste (red), organic waste (green) and biohazard infectious waste. The quantity of waste was recorded by contractor.	-	Figure 2-13 and Appendix G-2

Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEP's Yangon Office Building

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
		<ul style="list-style-type: none"> <li>Inform concerned authorities (YCDC) to collect and dispose of waste every day.</li> </ul>			✓	The contractor cooperated with YCDC to collect and dispose of waste in order to prevent residual waste in construction area.	-	Appendix G-1
		<ul style="list-style-type: none"> <li>If possible, reuse construction residues such as wood scrap and steel, or inform concerned authorities to collect and dispose.</li> </ul>			✓	The contractor cooperated with YCDC to collect and dispose of waste in order to prevent residual waste in construction area.	-	Appendix G-1
		<ul style="list-style-type: none"> <li>Prohibit burning waste in construction area.</li> </ul>			✓	The constructor enforced all workers not to burn any wastes in the construction area.	-	Appendix J
		<b>Hazardous Waste</b> <ul style="list-style-type: none"> <li>Separate hazardous waste from solid waste and store the specific containers with clear label.</li> </ul>			✓	Separated waste containers with cover are provided for waste collection at the construction area. However, there are no hazardous waste during construction phase.	-	Figure 2-13
		<ul style="list-style-type: none"> <li>Hazardous waste will be disposed by licensed contractor or authorities</li> </ul>			✓	Hazardous waste container (red) was provided at the construction area. However, there was no hazardous waste generated at present. If there are occurred, the contractor will cooperate with licensed contractor or authorities to collect and dispose.	-	-

Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEP's Yangon Office Building

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
Wastewater	<ul style="list-style-type: none"> <li>Improper management of sanitary system within the site will caused the adverse effect to the environmental</li> </ul>	<b>1) Wastewater from workers</b> <ul style="list-style-type: none"> <li>Provide appropriate sanitary facilities in construction site and properly maintained for construction workers.</li> </ul>			✓	The toilets were provided at PTTEP's office for 4 rooms/40 workers.	-	Figure 2-14
		<b>2) Surface runoff</b> <ul style="list-style-type: none"> <li>Provide temporary drainage system to hold wastewater before being discharged out of the project.</li> </ul>				The contractor installed drainage system in the construction area to hold wastewater before discharged out of the project.		
		<ul style="list-style-type: none"> <li>Prohibit to throw and dispose of waste from demolition close to drainage system to obstruct the flow of surface runoff.</li> </ul>				The contractor prohibited all workers to throw and dispose waste demolition close to drainage system in order to prevent obstruct the water flow.		
Social and economic	<b>Positive Impact</b> <ul style="list-style-type: none"> <li>The project would boost up the local economy.</li> <li>Generate income in nearby communities by related business.</li> <li>An employment opportunity for the locals.</li> </ul>	<ul style="list-style-type: none"> <li>Consider to recruit the qualified person in Yangon.</li> </ul>	Project Site/ House nearby construction site	Throughout operation period	✓	The contractor considered to hire all workers in Yangon as per recruitment procedure and announcement.	-	Appendix I
		<ul style="list-style-type: none"> <li>Inform the workers about regulations during construction period in order to prevent the conflict between workers and nearby communities.</li> </ul>				The contractor provided work regulation and enforced all workers to follow in order to prevent the conflict between workers and nearby communities. Moreover, tool box talk was provided in daily before working by the header of contractor/safety officer.		

Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEP's Yangon Office Building

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
	<b>Negative impact</b> <ul style="list-style-type: none"> <li>Fugitive dust, excess noise, soil erosion and transportation materials during construction will cause inconveniences to the livelihood of the residents living nearby the construction site.</li> <li>There might be problem arising from conflicts between the host and the workers.</li> </ul>	<ul style="list-style-type: none"> <li>Promote relationship between the project and nearby communities.</li> </ul>			✓	The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people.	-	Appendix D-2
		<ul style="list-style-type: none"> <li>Distribute project information to people for their better understanding and positive attitude towards the project</li> </ul>			✓	The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people.	-	Appendix D-2
		<ul style="list-style-type: none"> <li>Implement all measures to mitigate dust, excess noise, waste management and transportation.</li> </ul>			✓	The project strictly implemented mitigation measures as per IEE report.	-	Appendix B
		<ul style="list-style-type: none"> <li>Provide skillful and experienced engineers to closely inspect construction activities and duty permanently during the entire construction period.</li> </ul>			✓	The contractor provided civil engineer and safety staff to closely inspect construction activities throughout the construction period.	-	Figure 2-16
		<ul style="list-style-type: none"> <li>Assign project staff with 24/7 available telephone number to handle any complaint/ issue from surrounding. In case of any damage by project activities PTTEPI will investigate and solve the problem.</li> </ul>			✓	PTTEPI provided grievance handling guideline to receive any complaints from the stakeholder and resolve the complaint in the immediate. Moreover, project's signboard was installed in front of the construction area to inform the project details such as project name, owner, consultant, contractor, period of construction and emergency contact number.	-	Figure 2-17 and Appendix D-1

Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEP's Yangon Office Building

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
		<ul style="list-style-type: none"> <li>Install signboard in front of the Project site in order to inform about construction area with the name of the Project, Contractor company, permission license, PTTEP representative name and telephone number etc.</li> </ul>			✓	Project's signboard was installed in front of the construction area to inform the project details such as project name, owner, consultant, contractor, period of construction and emergency contact number.	-	Figure 2-17
Public health and safety	<b>On Local People nearby Project Site</b> Unsuitable management during construction may have impact on local people health due to pollution and accident. They are: <ul style="list-style-type: none"> <li>Dust diffusion, increased noise level, and unsuitable waste management during construction activities; and</li> <li>Accident from construction materials, heavy equipment, and worker transportation to construction area.</li> </ul>	<b>Health</b> <ul style="list-style-type: none"> <li>Strictly implement mitigation measures for Air Quality, Noise, Waste Management, and Transportation during construction phase</li> </ul>	Project Site/ House nearby construction site	Construction Phase	✓	The project strictly implemented mitigation measures as per IEE report.	-	Appendix B
		<b>Safety</b> <ul style="list-style-type: none"> <li>Implement work permit system for specific work</li> </ul>			✓	Work permit system was implemented for specific work such as working at height, night work, electrical work and piling.	-	Appendix E-6
		<ul style="list-style-type: none"> <li>Provide all concerned staff with Personal Protective Equipment (PPE) such as helmets, safety shoes, glasses, gloves, etc. during construction phase.</li> </ul>			✓	The contractor provided PPE sufficiently for all workers and controlled to use PPE suitably with work.	-	Figure 2-5
		<ul style="list-style-type: none"> <li>Provide safety training for workers.</li> </ul>			✓	The training was regularly performed as per the annual SSHE Training Plan. Moreover, tool box talk was provided in daily before working by the header of contractor/safety officer.	-	Appendix E-5 and Appendix J

Table 2-1 Environmental Mitigation Measure Implementation Compliance Result Summary in Construction Phase of PTTEP's Yangon Office Building

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
	<b>On Workers</b> <ul style="list-style-type: none"> <li>Increased pollution in working zone of project site such as dust diffusion, excess noise.</li> <li>Carelessness of workers may cause fire, injuries and death.</li> </ul>	<ul style="list-style-type: none"> <li>Provide sufficient first aid kits at the construction area and coordinate with nearby hospital for admission in case of accidents.</li> </ul>			✓	The medic was stand by at medic room for medical treatment included first aid kit and medical supplies. Moreover, emergency respond procedure and training were provided to respond in emergency case..	-	Figure 2-18
		<ul style="list-style-type: none"> <li>Install appropriate warning signs, markings and safety signs.</li> </ul>			✓	Warning signs were installed and can be clearly seen at the public road (in front of the construction area) and at construction area.	-	Figure 2-7
		<ul style="list-style-type: none"> <li>Regular checking all equipment to ensure it can be used without defect.</li> </ul>			✓	Routine inspection and preventive maintenance for all equipment were conducted as per inspection plan.	-	Appendix E-4
		<ul style="list-style-type: none"> <li>Firefighting equipment and portable fire extinguishers shall be properly provided in construction area.</li> </ul>			✓	Firefighting equipment were provided in the construction area and inspected monthly.	-	Figure 2-19
		<ul style="list-style-type: none"> <li>Provide smoking area in the construction zone.</li> </ul>			✓	Smoking areas were provided 2 points; in front and in the west of the construction area.	-	Figure 2-20





Figure 2-2 Truck's wheels cleaning



Figure 2-3 PVC mesh sheet



Figure 2-4 Project's truck



Figure 2-5 Personal protective equipment (PPE)



Figure 2-6 Noise barrier



Figure 2-7 Warning sign



Figure 2-8 Security guard



Figure 2-9 Signal man



Figure 2-10 Public road (in front of the construction area)



Figure 2-11 Muster point



Figure 2-12 Alcohol test



Figure 2-13 Waste containers



Figure 2-14 Toilets



Figure 2-15 Drainage system



Figure 2-16 Civil engineer and safety staff



Figure 2-17 Signboard in front of the construction area





Figure 2-18 Medic room



Figure 2-19 Firefighting equipment



In front of the construction area



West of the construction area

Figure 2-20 Smoking area

*Chapter 3*  
*Environmental Monitoring Results*

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## Chapter 3

### Environmental Monitoring Results

Environmental monitoring was conducted as specified in IEE which the project has assigned REM-UAE Laboratory and Consultant Company Limited to performed the environmental monitoring. This chapter presents the environmental monitoring results of PTTEPI's Yangon Office Building during construction phase, the detail is presented as follow;

#### 3.1 Environmental Monitoring Plan

Environmental monitoring for PTTEPI's Yangon Office Building during construction phase is shown in Table 3-1.

Table 3-1 Environmental Monitoring Plan of PTTEPI's Yangan Office Building during Construction Phase

Environmental Quality	Parameter	Duration/Frequency of Monitoring	Location	Implemented	
				Complied	Not complied
1. Environmental Issues					
1.1 Fugitive Dust	<ul style="list-style-type: none"><li>Total Suspended Particulate (TSP)</li><li>Particulate Matter less than 10 micron (PM10)</li></ul>	<p><u>Duration</u> 2 consecutive days during construction period including weekday and weekend</p> <p><u>Frequency</u> Twice a year during construction period</p>	<ul style="list-style-type: none"><li>1 station at construction site : North of construction fence (A1)</li><li>2 stations at buildings nearby construction site, comprising: 1) PTTEPI Building 7 : West of construction fence (A2) 2) House behind PTTEPI Office : South- east of construction fence (A5)</li></ul>	<ul style="list-style-type: none"><li>Monitored by REM- UAE Laboratory and Consultant Co., Ltd. on October 22-24, 2018. The result as shown in Content 3.2.5.</li></ul>	-
1.2 Noise	<ul style="list-style-type: none"><li>LAeq-1 hr (day time)</li><li>LAeq-1 hr (nighttime)</li></ul>	<p><u>Duration</u> 2 consecutive days during construction period including weekday and weekend</p> <p><u>Frequency</u> Twice a year during construction period</p>	<ul style="list-style-type: none"><li>1 station at construction site : North of construction fence (N1)</li><li>2 stations at buildings nearby construction site, comprising: 1) PTTEPI Building 7 : West of construction fence (N2) 2) House behind PTTEPI Office : South- east of construction fence (N5)</li></ul>	<ul style="list-style-type: none"><li>Monitored by REM- UAE Laboratory and Consultant Co., Ltd. on October 22-24, 2018. The result as shown in Content 3.3.5.</li></ul>	-
2. Social Issues					
2.1 Grievance Mechanism	<ul style="list-style-type: none"><li>Complaints from stakeholders/neighbors</li><li>Complaints' resolution is undertaken in a timely manner</li></ul>	Throughout construction period	<ul style="list-style-type: none"><li>House nearby construction site</li></ul>	<ul style="list-style-type: none"><li>Monitored by PTTEPI throughout construction phase. The result as shown in Content 3.4.</li></ul>	-



Table 3-1 Environmental Monitoring Plan of PTTEP's Yangon Office Building during Construction Phase

Environmental Quality	Parameter	Duration/Frequency of Monitoring	Location	Implemented	
				Complied	Not complied
2.2 Public and occupational health and safety	<ul style="list-style-type: none"><li>Incident/accident records</li></ul>	Throughout construction period	<ul style="list-style-type: none"><li>Construction site and working areas</li><li>House nearby construction site</li></ul>	<ul style="list-style-type: none"><li>Monitored by PTTEPI throughout construction phase. The result as shown in Content 3.5.</li></ul>	-

## 3.2 Fugitive Dust Monitoring

Fugitive dust monitoring was conducted by REM-UAE Laboratory and Consultant Company Limited on October 22-24, 2018. The detail as shown in Table 3-2.

Table 3-2 Fugitive Dust Quality Monitoring Plan

Environmental Quality	Parameter	Location	Period
Fugitive Dust	<ul style="list-style-type: none"> <li>Total Suspended Particulate (TSP)</li> <li>Particulate Matter less than 10 Micron (PM10)</li> </ul>	<ul style="list-style-type: none"> <li>1 station at construction site : North of construction fence (A1)</li> <li>2 stations at buildings nearby construction site, comprising:               <ol style="list-style-type: none"> <li>PTTEPI Building 7 : West of construction fence (A2)</li> <li>House behind PTTEPI Office : South-east of construction fence (A5)</li> </ol> </li> </ul>	October 22-24, 2018

### 3.2.1 Fugitive Dust Monitoring Station

The detail and coordinate of fugitive dust monitoring station as shown in Table 3-3 and Figure 3-1.

Table 3-3 Fugitive Dust Monitoring Stations in Construction Phase

Monitoring Station	Coordinate (UTM Datum WGS 84)		
	Zone	East (X)	North (Y)
1. Construction site : North of construction fence (A1)	47Q	195175	1867490
2. PTTEPI Building 7 : West of construction fence (A2)	47Q	195153	1867474
3. House behind PTTEPI Office : South-east of construction fence (A5)	47Q	195171	1867430

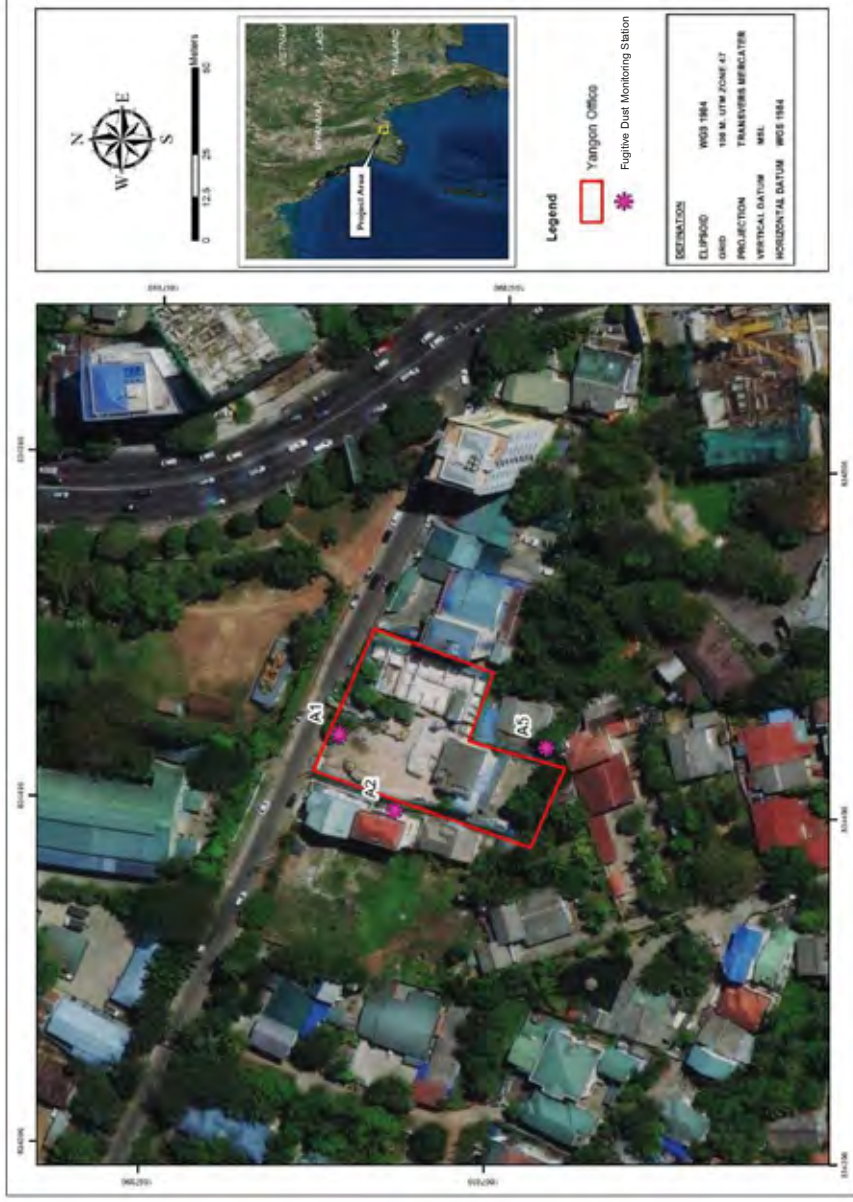


Figure 3-1 Fugitive Dust Monitoring Station

### 3.2.2 Fugitive Dust Analysis Method

Details of fugitive dust monitoring including parameters and analysis methods are shown in Table 3-4.

Table 3-4 Sampling Method, Analysis Method and Standard Methods for Fugitive Dust Monitoring

Parameters	Sampling Method	Analysis Method	Standard Methods
1. Total Suspended Particulate (TSP)	High Volume Air Sampler	Gravimetric Method	40 CFR-Chapter I-Part 50, Appendix B
2. Particulate matter less than 10 Micron (PM-10)	High Volume PM-10 Air Sampler	Gravimetric Method	40 CFR-Chapter I-Part 50, Appendix J

### 3.2.3 Fugitive Dust Monitoring of PTTEPI's Yangon Office Building

Fugitive dust samples were monitored at construction site, PTTEPI Building 7 and House behind PTTEPI Office on October 22-24, 2018 as shown in Figure 3-2.



Construction site : North of construction fence (A1) PTTEPI Building 7 : West of construction fence (A2)



House behind PTTEPI Office : South-east of construction fence (A5)

Figure 3-2 Fugitive Dust Monitoring on October 22-24, 2018

### 3.2.4 Fugitive Dust Monitoring Result

Referring to analysis number T18AG272-0004 to T18AG272-0006, fugitive dust samples were conducted on October 22-24, 2018 during construction phase. The result found that Total Suspended Particulate (TSP) complied with Ambient Air Quality of WORLD BANK GROUP and Particulate matter less than 10 Micron (PM-10) complied with National Environmental Quality (Emission) Guideline (NEQG) and, Ambient Air Quality Standard of WHO and IFC at all stations. Fugitive dust monitoring results are shown in Table 3-5.

The analysis results, certificate for laboratory instrument and approval registration certificate of laboratory are shown in Appendix K, L and M.

Table 3-5 Results of Fugitive Dust

Stations	Date	Result	
		Total Suspended Particulate (TSP)	Particulate matter less than 10 Micron (PM-10)
1. Construction site : North of construction fence (A1)	October 22-23, 2018	99.0	23.0
2. PTTEPI Building 7 : West of construction fence (A2)	October 23-24, 2018	33.0	18.0
3. House behind PTTEPI Office : South-east of construction fence (A5)	October 22-23, 2018	33.0	17.0
National Environmental Quality (Emission) Guideline (NEQG) <sup>1/</sup>		-	50
Ambient Air Quality Standard of WHO and IFC <sup>2/</sup>		-	150
Ambient Air Quality of WORLD BANK GROUP <sup>3/</sup>		230	-
Unit		µg/m <sup>3</sup>	µg/m <sup>3</sup>

Remark: <sup>1/</sup> National Environmental Quality (Emission) Guideline (NEQG)

<sup>2/</sup> WHO Ambient Air Quality Guideline Stated on Environmental, Health, and Safety Guideline: Environmental Air Emissions and Ambient Quality of International Finance Corporation, 2007

<sup>3/</sup> Pollution Prevention and Abatement Handbook (WORLD BANK GROUP) Effective July 1998.

### 3.2.5 Comparison of Fugitive Dust Monitoring Result

Comparison of fugitive dust monitoring results in construction phase 2018 were compared with the previous data found that the results of Total Suspended Particulate (TSP) tended to decrease at PTTEPI Building 7: West of construction fence (A2) and House behind PTTEPI Office: South-east of construction fence (A5) whereas at Construction site: North of construction fence (A1) was increase. For Particulate matter less than 10 Micron (PM-10), the results tended to decrease at all stations.

However, all of results complied with National Environmental Quality (Emission) Guideline (NEQG), Ambient Air Quality Standard of WHO and IFC, and Ambient Air Quality of WORLD BANK GROUP.

The comparison of fugitive dust monitoring results were summarized as Table 3-6.

**Table 3-6 Comparison of Fugitive Dust Monitoring Results during Baseline (in 2017) and Construction Phase in 2018**

Stations	Date	Result	
		Total Suspended Particulate (TSP)	Particulate matter less than 10 Micron (PM-10)
1. Construction site : North of construction fence (A1)	March 12-13, 2017 <sup>1/</sup>	58.4	26.6
	March 13-14, 2017 <sup>1/</sup>	74.3	37.3
	October 22-23, 2018	99.0	23.0
2. PTTEPI Building 7 : West of construction fence (A2)	March 12-13, 2017 <sup>1/</sup>	45.2	30.1
	March 13-14, 2017 <sup>1/</sup>	62.5	39.2
	October 23-24, 2018	33.0	18.0
3. House behind PTTEPI Office : South-east of construction fence (A5)	March 10-11, 2017 <sup>1/</sup>	40.3	20.2
	March 11-12, 2017 <sup>1/</sup>	43.7	24.4
	October 22-23, 2018	33.0	17.0
National Environmental Quality (Emission) Guideline (NEQG) <sup>2/</sup>		-	50
Ambient Air Quality Standard of WHO and IFC <sup>3/</sup>		-	150
Ambient Air Quality of WORLD BANK GROUP <sup>4/</sup>		230	-
Unit		µg/m <sup>3</sup>	µg/m <sup>3</sup>

Remark: <sup>1/</sup> National Environmental Quality (Emission) Guideline (NEQG)

<sup>2/</sup> National Environmental Quality (Emission) Guideline Myanmar, 2015

<sup>3/</sup> WHO Ambient Air Quality Guideline Stated on Environmental, Health, and Safety Guideline: Environmental Air Emissions and Ambient Quality of International Finance Corporation, 2007

<sup>4/</sup> Pollution Prevention and Abatement Handbook (WORLD BANK GROUP) Effective July 1998.

### 3.3 Noise Level Monitoring

Noise monitoring of PTTEPI's Yangon Office Building as per specified in IEE was conducted by REM-UAE Laboratory and Consultant Company Limited in construction phase. The detail as shown in Table 3-7.

**Table 3-7 Noise Level Monitoring Plan**

Environmental Quality	Parameter	Location	Period
Noise	<ul style="list-style-type: none"> <li>• LAeq-1 hr (day time)</li> <li>• LAeq-1 hr (nighttime)</li> </ul>	<ul style="list-style-type: none"> <li>• 1 station at construction site : North of construction fence (N1)</li> <li>• 2 stations at buildings nearby construction site, comprising:               <ol style="list-style-type: none"> <li>1) PTTEPI Building 7 : West of construction fence (N2)</li> <li>2) House behind PTTEPI Office : South-east of construction fence (N5)</li> </ol> </li> </ul>	October 22-24, 2018

### 3.3.1 Noise Level Monitoring Station

The detail and coordinate of noise level monitoring station as shown in Table 3-8 and Figure 3-3.

Table 3-8 Noise Level Monitoring Stations in Construction Phase

Monitoring Station	Coordinate (UTM Datum WGS 84)		
	Zone	East (X)	North (Y)
1. Construction site : North of construction fence (N1)	47Q	195165	1867494
2. PTTEPI Building 7 : West of construction fence (N2)	47Q	195150	1867464
3. House behind PTTEPI Office : South-east of construction fence (N5)	47Q	195171	1867442



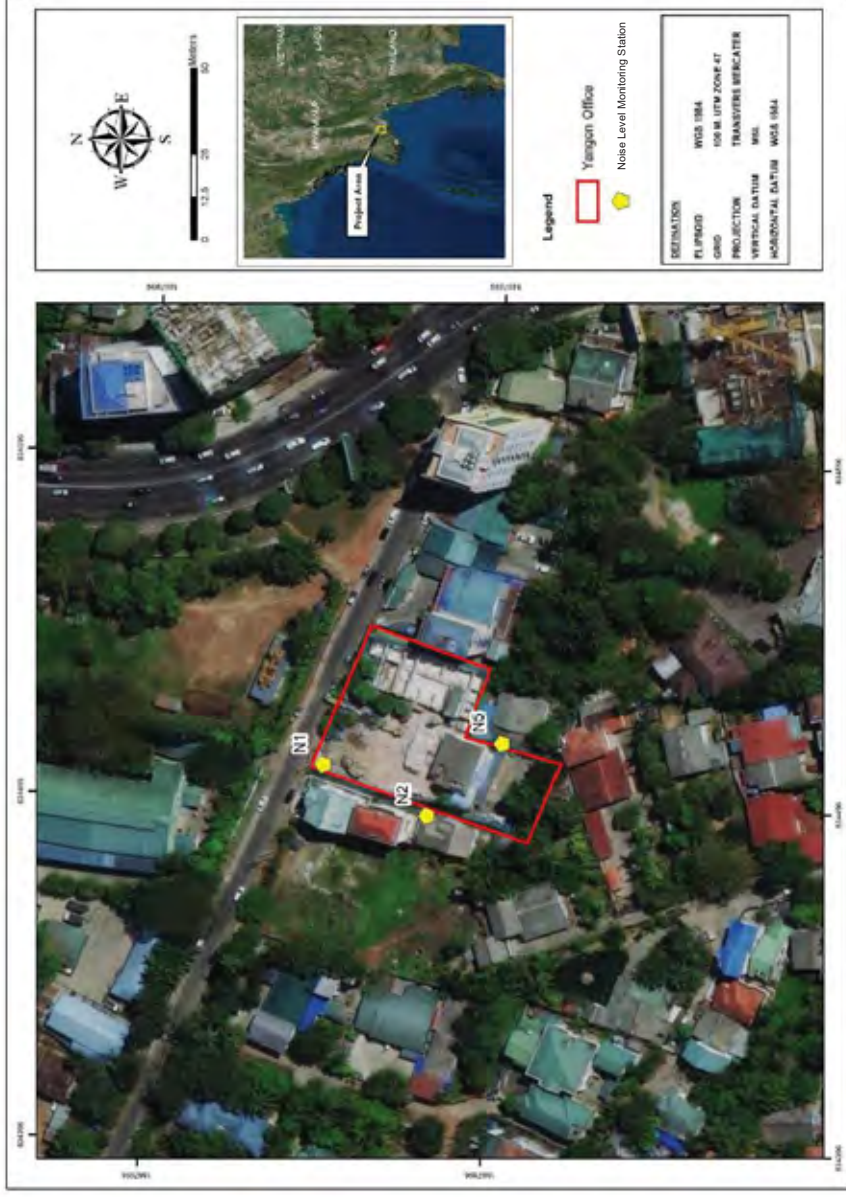


Figure 3-3 Noise Level Monitoring Station



### 3.3.2 Noise Level Analysis Method

Details of noise level monitoring including parameters and analysis methods are shown in Table 3-9.

Table 3-9 Parameters and Analyses Methods for Noise Level Monitoring

Parameters	Sampling Method	Analysis Methods	Standard Methods
<ul style="list-style-type: none"> <li><math>L_{Aeq}</math>-1 hr (day time)</li> <li><math>L_{Aeq}</math>-1 hr (nighttime)</li> </ul>	Integrated Sound Level Meter	Integrated Sound Level Meter	ISO 1996/1

### 3.3.3 Noise Level Monitoring of PTTEPI's Yangon Office Building

Noise level monitoring of PTTEPI's Yangon Office Building was conducted at construction site, PTTEPI Building 7 and House behind PTTEPI Office on October 22-24, 2018 as shown in Figure 3-4.



Construction site : North of construction fence (N1) PTTEPI Building 7 : West of construction fence (N2)



House behind PTTEPI Office : South-east of construction fence (N5)

Figure 3-4 Noise Level Monitoring on October 22-24, 2018

### 3.3.4 Noise Level Results

Referring to analysis number T18AG273-0004 to T18AG273-0006, noise level monitoring on October 22-24, 2018 during construction phase. The result of noise level are summarized in Table 3-10.

#### 1) Construction site : North of construction fence (N1)

The  $L_{Aeq}$ -1 hr daytime and nighttime ranged from 64.2-75.5 and 57.1-73.6 dB(A) exceeding the limit set by NEQG, 2015 for Industrial/Commercial Area of 70 and 70 dB(A) for  $L_{Aeq}$ -1 hr daytime and nighttime, respectively. These might be caused by the traffic vehicle on the nearby road which located about 10 m. away from the monitoring station. PTTEPI will also keep continue the monitoring to check the noise level as bi-annually basis.

#### 2) PTTEPI Building 7 : West of construction fence (N2)

The  $L_{Aeq}$ -1 hr daytime ranged from 57.8-70.3 dB(A) exceeding the limit set by NEQG, 2015 for Industrial/Commercial Area of 70 dB(A) for  $L_{Aeq}$ -1 hr daytime. These might be caused by the traffic vehicle on the nearby road which located about 40 m. away from the monitoring station.

The  $L_{Aeq}$ -1 hr nighttime ranged from 57.1-58.6 dB(A) complied with the limit set by NEQG, 2015 for Industrial/Commercial Area of 70 dB(A) for  $L_{Aeq}$ -1 hr nighttime. PTTEPI will also keep continue the monitoring to check the noise level as bi-annually basis.

#### 3) House behind PTTEPI Office : South-east of construction fence (N5)

The  $L_{Aeq}$ -1 hr daytime and nighttime ranged from 60.7-74.0 and 50.1-68.5 dB(A) exceeding the limit set by NEQG, 2015 for Residential/ Institutional/ Educational Area of 55 and 45 dB(A) for  $L_{Aeq}$ -1 hr daytime and nighttime, respectively. These might be caused by the traffic vehicle on the nearby road which located about 55 m. away from the monitoring station. PTTEPI will also keep continue the monitoring to check the noise level as bi-annually basis.

The analysis results, certificate for laboratory instrument and approval registration certificate of laboratory are shown in Appendix K, L and M.

Table 3-10 Results of Noise Level Monitoring

Stations	Date	Result <sup>1/</sup>	
		$L_{Aeq}$ -1 hr (day time) 07.00-22.00	$L_{Aeq}$ -1 hr (night time) 22.00-07.00
1. Construction site : North of construction fence (N1)	October 22-23, 2018	64.2-75.5	57.1-73.6
2. PTTEPI Building 7 : West of construction fence (N2)	October 23-24, 2018	57.8-70.3	57.1-58.6
3. House behind PTTEPI Office : South-east of construction fence (N5)	October 22-23, 2018	60.7-74.0	50.1-68.5
National Environmental Quality (Emission) Guideline of Myanmar for Residential/Institution/Education Area <sup>1/</sup>		55.0	45.0
National Environmental Quality (Emission) Guideline of Myanmar for Industrial/Commercial Area <sup>1/</sup>		70.0	70.0
Unit		dB(A)	dB(A)

Remark: <sup>1/</sup> National Environmental Quality (Emission) Guideline of Myanmar, 2015

### 3.3.5 Comparison of Noise Level Monitoring Results

Comparison of noise level monitoring results in construction phase 2018 were compared with the previous data found that  $L_{Aeq}$ -1 hr daytime tended to increase at all monitoring stations. For  $L_{Aeq}$ -1 hr nighttime, the comparison results found that the values tended to increase at Construction site: North of construction fence (N1) and House behind PTTEPI Office: South-east of construction fence (N5) whereas there was decrease at PTTEPI Building 7: West of construction fence (N2). Therefore, the project has continually monitoring, as specified in the measure for surveillance of environmental impact from project construction.

The comparison of noise level monitoring results were summarized as Table 3-11.

**Table 3-11 Comparison of Noise Level Monitoring Results between Baseline (in 2017) and Construction Phase in 2018**

Stations	Date	Result <sup>1/</sup>	
		$L_{Aeq}$ -1 hr (day time) 07.00-22.00	$L_{Aeq}$ -1 hr (night time) 22.00-07.00
1. Construction site : North of construction fence (N1)	March 12-13, 2017 <sup>1/</sup>	55.0-63.2	53.0-59.7
	March 13-14, 2017 <sup>1/</sup>	55.9-61.2	51.8-62.5
	October 22-23, 2018	64.2-75.5	57.1-73.6
2. PTTEPI Building 7 : West of construction fence (N2)	March 12-13, 2017 <sup>1/</sup>	61.2-63.2	61.6-62.8
	March 13-14, 2017 <sup>1/</sup>	60.9-63.5	62.4-64.8
	October 23-24, 2018	57.8-70.3	57.1-58.6
3. House behind PTTEPI Office : South-east of construction fence (N5)	March 10-11, 2017 <sup>1/</sup>	51.5-58.0	51.1-55.8
	March 11-12, 2017 <sup>1/</sup>	50.9-57.0	52.2-56.1
	October 22-23, 2018	60.7-74.0	50.1-68.5
National Environmental Quality (Emission) Guideline of Myanmar for Residential/Institution/Education Area <sup>2/</sup>		55.0	45.0
National Environmental Quality (Emission) Guideline of Myanmar for Industrial/Commercial Area <sup>2/</sup>		70.0	70.0
Unit		dB(A)	dB(A)

Remark: <sup>1/</sup> Initial Environmental Examination (IEE) for PTTEPI's Yangon Office Building Construction

<sup>2/</sup> National Environmental Quality (Emission) Guideline of Myanmar, 2015

### 3.4 Grievance Mechanism Monitoring

Grievance mechanism monitoring was conducted for construction phase of PTTEPI's Yangon Building in 2018 by PTTEPI. The detail as shown in Table 3-12.

**Table 3-12 Grievance Mechanism Monitoring Plan**

Environmental Quality	Parameter	Location	Period
Social	<ul style="list-style-type: none"> <li>Complaint from stakeholders/ neighbors</li> <li>Complainants' resolution is undertaken in a timely manner</li> </ul>	- House nearby construction site	Throughout construction period

### 3.4.1 Grievance Mechanism Monitoring Methods

Grievance mechanism monitoring is the investigation of complaints from the community. PTTEPI provided grievance handling guideline to receive any complaints from the stakeholder and resolve the complaint in the immediate (Appendix D-1). If any damage occurs, PTTEPI will be responsible to solve and track them. In addition, problem's cause will be analyzed to prevent same problem occurring again. Grievance handling process is shown in Figure 3-5.

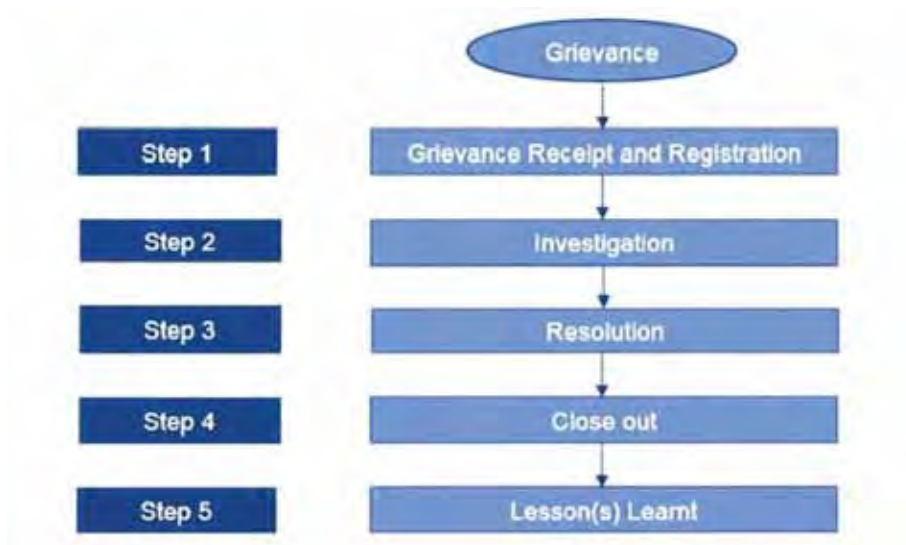


Figure 3-5 Grievance Handling Process

### 3.4.2 Grievance Mechanism Monitoring Result

Grievance mechanism monitoring results for construction phase of PTTEPI's Yangon Office Building in 2018 were done by PTTEPI. There was no any complaint from the community throughout the construction period.

### 3.5 Public and Occupational Health and Safety Monitoring

Public and occupational health and safety monitoring was conducted for construction phase of PTTEPI's Yangon Office Building in 2018 by the contractor. The detail as shown in Table 3-13.

Table 3-13 Public and Occupational Health and Safety monitoring Plan

Environmental Quality	Parameter	Location	Period
Public and Occupational Health and Safety	<ul style="list-style-type: none"> <li>Incident/ accident records</li> </ul>	- Construction site and working areas	Throughout construction period
		- House nearby construction site	

### 3.5.1 Public and Occupational Health and Safety Monitoring Method

Emergency Response Plan and training program on Safety, Health and Environment and other concerned safety standards have been provided to the contractor for follow. Public and occupational health and safety monitoring was conducted by recording the incident and accident during working time; including causes, accident level, and performed mitigation measures. Monitoring program and report were conducted throughout construction period following the specified measures in IEE report.

### 3.5.2 Public and Occupational Health and Safety Monitoring Results

Public and occupational health and safety monitoring results for construction phase of PTTEPI's Yangon Office Building were done by the contractor during January 2018 to present. There were 4 cases of incident from project activity during the construction period as shown in Table 3- 14 and Appendix E- 7. Corrective actions were proposed/implemented to prevent reoccurrence.

Table 3-14 Summarization of Incident Cases

Date	Detail of Incident	Corrective Actions
June 27, 2018	The concrete casting work finished when the plywood is curved. And then concrete leaked outside.	<ul style="list-style-type: none"> <li>- Need to check before concreting work.</li> <li>- Already reminded the operation team to inform the site authority in daily toolbox meeting. Need to check all condition before work. Closely supervise. After formwork installation must be check formwork condition.</li> </ul>
June 30, 2018	A labor is covering in sand storage area using by rebar. Tried to hit the rebar into the ground, then rebar hit the underground water pipe system and water leaked.	<ul style="list-style-type: none"> <li>- Need to check underground pipe lines.</li> <li>- Already reminded the optation team to inform the site authority in daily toolbox meeting. Need to check all condition before work. Closely supervise. Need to check all underground service line.</li> </ul>
August 17, 2018	Excavator harshly running and not so good behavior.	<ul style="list-style-type: none"> <li>- Already termination from PTTEPI new office construction site.</li> <li>- Already reminded the SEAFCO PROJECT ENGINEER. If happen again KST management taken action to sub-contractor requirement.</li> </ul>
November 26, 2018	SEAFCO appointed two operators for the cranes to run 24 hours. In the previous time, they had been operating as per working schedule. But on November 26, 2018, they started to make the agreement between them to work one day ON and one day OFF without informing SEAFCO. Issue is due to they lived in suburb of Yangon that is quite far from site and as per working schedule, they have to take the	<ul style="list-style-type: none"> <li>- Explain Myanmar Labour Law.</li> <li>- Warn the sub-contractor PM and operators not to be happened again.</li> <li>- Instruct sub-contractor PM to arrange proper accommodation and transportation arrangement.</li> <li>- KST safety supervisor to check the daily Site In/ Out list and do the head account in every Toolbox Meeting.</li> </ul>

Table 3-14 Summarization of Incident Cases

Date	Detail of Incident	Corrective Actions
	more hours for their return ways. According to the site operating condition, they get the intermission because there is not working in 24 hours and total working time per day is only 12 hours for them. So they started to agreed on November 26, 2018 and practiced this.	

*Chapter 4*  
*Environmental Mitigation Measures Compliance*  
*Audit and Environmental Monitoring Conclusion*

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## Chapter 4

### Environmental Mitigation Measures Compliance Audit and Environmental Monitoring Conclusion

From the implementation of Environmental Mitigation Measures Compliance Audit and Environmental Monitoring in construction phase of PTTEPI's Yangon Office Building, it was found that the project has implemented the measures as specified in IEE and the results are summarized as following details:

#### 4.1 Environmental Mitigation Measures Compliance Audit and Environmental Monitoring Conclusion

Environmental Mitigation Measures Implementation Compliance audit was carried out by REM-UAE Laboratory and Consultant Company Limited together with representatives from PTTEPI. The audit conducted against the mitigation measures specified in Environmental Management Plan.

Audit and document checking by setting 4 levels of evaluation as follows;

- Completely complied on the Mitigation Measures (✓) refers the project can complete comply with the measure without any barriers.
- Mostly complied on the Mitigation Measures (✓) refers the project can mostly comply with the measure without any barriers.
- Do not complied on the Mitigation Measures (✗) refers the project cannot comply with the measure because of some barriers.
- Do not have situation follows the Mitigation Measures (NA) refers during the project operations do not have any of situation follow the Mitigation Measures

In case found that the project does not comply with the mitigation measures, REM-UAE Laboratory and Consultant Company Limited will identify the cause of problems, barriers and solutions ways.

The results determined that the project completely complied on the Mitigation Measures during construction phase with 98% and do not have situation with 2%. The results are shown in Figure 4-1.



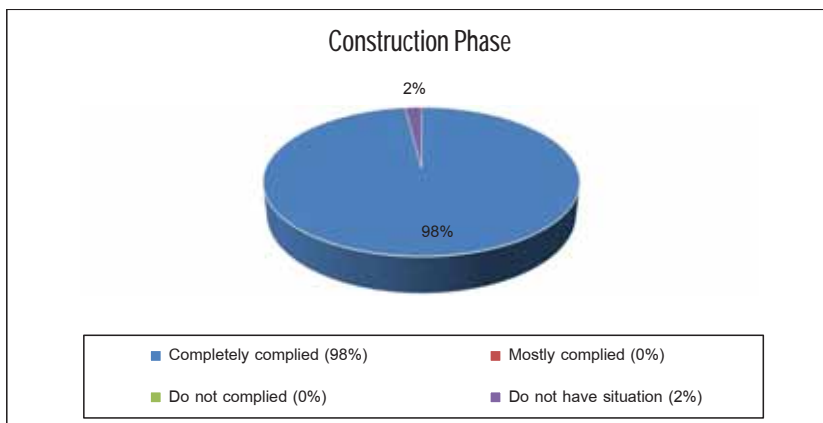


Figure 4-1 The Results of Environmental Mitigation Measures Compliance during Construction Phase

#### 4.1.1 Environmental Mitigation Measures Compliance Result in Construction Phase

- Air Pollution** - Water spraying was provided three times per day at and around the construction areas. Spraying had not conducted in the rainy day due to wet soil conditions made suspended particulate value was low level. PVC mesh sheet is provided to cover around the construction areas in order to prevent dust dispersion and effect to nearby communities. The truck was covered during transport material to the construction area. Moreover, dust masks were provided for workers and controlled to use during working.
  - Excessive Noise and Vibration** - The contractor provided ear plugs for workers and controlled to use during working with high noise activities including controlled workers to carried out the construction activities with high noise and vibration level at day time. Noise barrier was installed by metal sheet around the construction site to reduce noise impact nearby communities.
  - Traffic** - The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people including avoiding transportation of materials and equipment at day time. Warning signs were installed and can be clearly seen at the public road (in front of the construction area) and at construction area. Security guard and signal man always give the sign in and out of vehicle from project area. Routine inspection and preventive maintenance for all vehicles were conducted as per inspection plan. The contractor controlled the truck to cover during transport and not to over loading. The public road (in front of the construction area) was in good condition and there was no complaint from nearby communities.
- Journey management and transportation safety procedure was prepared for enjoin workers to follow. The emergency response procedure was set up including incident, fire action, first aid action. The contractor prepared drug and alcohol abuse policy and enforced all workers to follow. Alcohol testing was conducted before working every day. Worker will immediately stop working if alcohol is found more than 0%. For drug testing, workers were random tested at hospital.

- **Solid Waste**

- **Non-Hazardous Waste** - The contractor provided storage area for construction materials. Waste containers with cover are provided for 5 types; general waste (blue), recycle waste (yellow), hazardous waste (red), organic waste (green) and biohazard infectious waste. The quantity of waste was recorded by contractor. The contractor cooperated with YCDC to collect and dispose of waste in order to prevent residual waste in construction area. Moreover, the constructor enforced all workers not to burn any wastes in the construction area.
- **Hazardous Waste** - Hazardous waste container (red) was provided at the construction area. However, there was no hazardous waste generated at present. If there are occurred, the contractor will cooperate with licensed contractor or authorities to collect and dispose.

- **Wastewater** - The toilets were provided at PTTEPI's office for 4 rooms/ 40 workers. The contractor installed drainage system in the construction area to hold wastewater before discharged out of the project including prohibited all workers to throw and dispose waste demolition close to drainage system in order to prevent obstruct the water flow.

- **Social and Economic** - The contractor considered to hire all workers in Yangon as per recruitment procedure and announcement. Work regulations were provided and enforced all workers to follow in order to prevent the conflict between workers and nearby communities. The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. Civil engineer and safety staff were provided to closely inspect construction activities throughout the construction period. PTTEPI provided grievance handling guideline to receive any complaints from the stakeholder and resolve the complaint in the immediate. Project's signboard was installed in front of the construction area to inform the project details such as project name, owner, consultant, contractor, period of construction and emergency contact number. Work permit system was implemented for specific work such as working at height, night work, electrical work and piling. The contractor provided suitable PPE and sufficiently for all workers and controlled to use PPE during working.

The medic was stand by at medic room for medical treatment included first aid kit and medical supplies. Firefighting equipment were provided in the construction area and inspected monthly. Smoking areas were provided in front and in the west of the construction area.

## 4.2 Environmental Monitoring Conclusion

The results of Environmental Impact Monitoring determined that the project completely complied with 100% as shown in Figure 4-2.

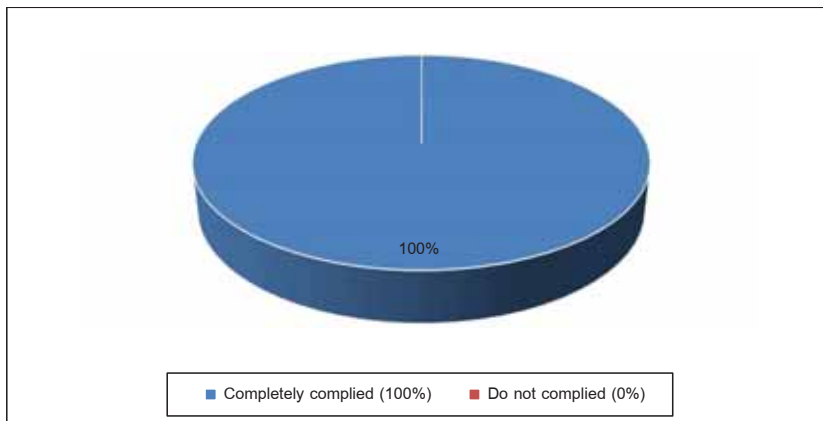


Figure 4-2 The Results of Environmental Monitoring

#### 4.2.1 Fugitive Dust Monitoring

Fugitive dust monitoring was conducted by REM-UAE Laboratory and Consultant Company Limited on October 22-24, 2018 at construction site, PTTEPI Building 7 and House behind PTTEPI Office. The result found that Total Suspended Particulate (TSP) complied with Ambient Air Quality of WORLD BANK GROUP and Particulate matter less than 10 Micron (PM-10) complied with NEQG and, Ambient Air Quality Standard of WHO and IFC at all stations.

#### 4.2.2 Noise Level Monitoring

Noise level monitoring was conducted at construction site, PTTEPI Building 7 and House behind PTTEPI Office on October 22-24, 2018. Most results of  $L_{Aeq-1}$  hr daytime and nighttime at Construction site and PTTEPI Building 7 exceeding the limit set by NEQG, 2015 for Industrial/Commercial Area of 70 and 70 dB(A), respectively, except  $L_{Aeq-1}$  hr nighttime at PTTEPI Building 7. For House behind PTTEPI Office, the  $L_{Aeq-1}$  hr daytime and nighttime exceeding the limit set by NEQG, 2015 for Residential/Institutional/Educational Area of 55 and 45 dB(A), respectively. These might be caused by the construction activities and traffic vehicle on the nearby road.

#### 4.2.3 Grievance Mechanism Monitoring

Grievance mechanism monitoring results for construction phase of PTTEPI's Yangon Office Building in 2018 were done by PTTEPI. There was no any complaint from the community throughout the construction period.

#### 4.2.4 Public and Occupational Health and Safety Monitoring

Public and occupational health and safety monitoring results for construction phase of PTTEPI's Yangon Office Building were done by the contractor during January 2018 to present. There were 4 cases of incident from project activity during the construction period. Corrective actions were proposed/implemented to prevent reoccurrence.