



**PTTEP**

**Monitoring Report of PTTEPI's Yangon Office Building  
(Construction Phase) during January - June 2019**

**PTTEP International Limited (PTTEPI)**



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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 PTTEP'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, Mayangone 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 disabled 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, PTTEP 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 January – June 2019 in construction phase with 97.8% and do not have situation with 2.2%.

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

### 4.1 Environmental Mitigation Measures Compliance Result in Construction Phase during January – June 2019

- **Air Pollution** - The project assigned staff to spray water around construction area three times a day or more, depending on the atmospheric conditions. PVC mesh sheet is provided to cover around the construction areas in order to prevent dust dispersion and reduced effect to the communities nearby the construction site and along the transportation route. The main activity during January-June 2019 of the project was foundation and structural work which generally used excavator and car drilling machine which parked at construction area and moved after the finished activities. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area as specified in measure. Moreover, the contractor provided dust masks for workers and controlled to use during working.
- **Excessive Noise and Vibration** - The contractor provided ear muffs for workers and controlled to use during working in high noise area including controlled workers to carry out the construction activities with high noise and vibration level at day time. Noise barrier (metal sheet) was installed around the construction site to reduce noise impact to nearby communities.



- **Traffic** - The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. However, there was not found the transportation of construction materials, only caterpillar drill machine which parked at construction area and moved after the finished activities. Moreover, warning signs were installed and can be clearly seen at the public road (in front of the construction area) and within 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. Random drug testing was implemented, worker who found to be positive in drug testing shall be required to undergo rehabilitations and counseling in government accredited center.
- **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 contractor provided mobile toilets within construction area and 4 toilets at PTTEP's for 70 workers. However, the contractor has to move mobile toilet out due to the limitation in construction area. The contractor installed drainage system in the construction area to hold wastewater before discharged out of the project. The contractor enforced all worker to dispose waste properly 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.
- **Public health and safety**
  - **Health** – The project strictly implemented mitigation measures as per IEE report.
  - **Safety** – 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. In addition, the training was regularly performed as per the annual SSHE Training Plan. Tool box talk was provided in daily before working by the header of contractor/safety officer. The medic was stand by at medic room for medical treatment included first aid kit and medical supplies. Warning signs were installed both in construction area and in front of the construction area which can be clearly seen at the public road. Routine inspection and preventive maintenance for all equipment were conducted as per inspection plan. Moreover, Firefighting equipment were provided in the construction area and inspected monthly. Smoking areas was provided in the west and in front of construction area.

## 4.2 Environmental Monitoring Result

The project was completely complied the environmental impact monitoring as specified in IEE, including Fugitive dust monitoring, Noise level monitoring, Grievance mechanism monitoring, Public and occupational health and safety monitoring. The details as follow;

### 1) Fugitive Dust Monitoring

Fugitive dust samples were monitored at construction site and PTTEPI Building 7 during March 8-10, 2019. House behind PTTEPI Office was monitored during March 10-12, 2019. The results of fugitive dust are summarize as follow;

#### 1.1 Construction site : North of construction fence (A1)

The result of Total Suspended Particulate (TSP) was complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed  $230 \mu\text{g}/\text{m}^3$ . While Particulate matter less than 10 Micron (PM-10) was not complied with National Environmental Quality (Emission) Guideline (NEQG) which determined that PM10 should not exceeded  $50 \mu\text{g}/\text{m}^3$  but not exceeded the Ambient Air Quality Standard of WHO and IFC which determined that PM10 should not exceeded  $150 \mu\text{g}/\text{m}^3$ .

## 1.2 PTTEP Building 7 : West of construction fence (A2)

Total Suspended Particulate (TSP) of PTTEP Building 7 : West of construction fence were not complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed  $230 \mu\text{g}/\text{m}^3$ . For Particulate matter less than 10 Micron (PM-10) results found that during March 8-9, 2019 the result was not complied with National Environmental Quality (Emission) Guideline (NEQG) and during March 9-10, 2019 the result was not complied with National Environmental Quality (Emission) Guideline (NEQG) and Ambient Air Quality Standard of WHO and IFC.

## 1.3 House behind PTTEP Office : South-east of construction fence (A5)

The result of Total Suspended Particulate (TSP) found that were not complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed  $230 \mu\text{g}/\text{m}^3$ . For Particulate matter less than 10 Micron (PM-10) results found that during March 9-10, 2019 the result was not complied with National Environmental Quality (Emission) Guideline (NEQG) and Ambient Air Quality Standard of WHO and IFC. During March 10-11, 2019 the result was not complied with National Environmental Quality (Emission) Guideline (NEQG).

From Wind statistics data for Yangon Airport based on observations taken between 01/2012 - 03/2019 daily from 7am to 7pm local time indicated that during March in Yangon the wind blew from Southwest (SW). From local wind direction during March in Yangon suggested that PTTEP Building 7: West of construction fence (A2) and House behind PTTEP Office: South-east of construction fence (A5) were upwind. Thus, Total Suspended Particulate (TSP) and particulate matter less than 10 Micron (PM-10) which not complied to the standard probability from both internal and external factor including traffic on the public road nearby project area, during sampling period was dry season can cause higher concentration of particulate matter in ambient air. In addition, air quality index data source (<https://www.airvisual.com/world-air-quality>) shown that the risk of air pollution was high and the air quality index was red during dry season in Myanmar. However, the project provided environmental mitigation measure in order to prevent and reduce the impacts on air quality from dust dispersion resulting from project activities including water spraying, PVC mesh sheets around the construction areas.

## 2) Noise Level Monitoring

Noise level monitoring was conducted at construction site and PTTEP Building 7 during March 8-10, 2019. House behind PTTEP Office was monitored during March 10-12, 2019. The result of noise level are summarized as below;

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

The  $L_{Aeq-1}$  hr daytime and nighttime ranged from 53.3-82.5 and 53.2-66.0 dB(A), respectively. Most of the result of  $L_{Aeq-1}$  hr daytime and all the result of  $L_{Aeq-1}$  hr night time has complied with NEQG, 2015 for Industrial/ Commercial Area which determined  $L_{Aeq-1}$  hr daytime and night time not more than 70 dB(A) except  $L_{Aeq-1}$  during 09.00-10.00 hr and 11.00-16.00 hr on March 8, 2019. The result of  $L_{Aeq-1}$  hr daytime which exceeded the standard might be caused by both from project activities during work hour and external factors like the traffic on the nearby road which located approximately 10 meters

away from the monitoring station. PTTEPI should be continually monitoring as specified in the measure for surveillance of environmental impact from project activities.

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

The  $L_{Aeq-1}$  hr daytime and nighttime ranged from 55.1-82.7 and 55.7-63.4 dB(A), respectively. Most of the result of  $L_{Aeq-1}$  hr daytime and all the result of  $L_{Aeq-1}$  hr night time has complied with NEQG, 2015 for Industrial/ Commercial Area which determined  $L_{Aeq-1}$  hr daytime and night time not more than 70 dB(A). except  $L_{Aeq-1}$  during 10.00-11.00 hr, 12.00-17.00 hr on March 8, 2019 and 08.00-10.00 hr on March 10, 2019. The result of  $L_{Aeq-1}$  hr daytime which exceeded the standard might be caused by both from project activities during work hour and external factors like the traffic on the nearby road which located approximately 40 meters away from the monitoring station. PTTEPI should be continually monitoring as specified in the measure for surveillance of environmental impact from project activities.

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

The  $L_{Aeq-1}$  hr daytime and nighttime ranged from 55.0-71.2 and 54.7-61.6 dB(A), respectively. Most of the result of  $L_{Aeq-1}$  hr daytime and all the result of  $L_{Aeq-1}$  hr night time has complied with NEQG, 2015 for Industrial/ Commercial Area which determined  $L_{Aeq-1}$  hr daytime and night time not more than 70 dB(A) except 09.00-10.00 hr and 14.00-15.00 hr on March 11, 2019. The activity near this monitoring station was welding so this might be the cause of  $L_{Aeq-1}$  hr daytime exceeded the NEQG, 2015 for Industrial/ Commercial Area.

However, the project provided environmental mitigation measure in order to reduce the impacts on excessive noise to disturb the nearby communities including carried out the construction activities with high noise level only at day time. PTTEPI also installed noise barrier (metal sheet) around the construction site to reduce noise impact to nearby communities. In addition, 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 during January-June 2019 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 January-May 2019. There were 10 cases of incident from project activity in the construction period including 4 cases of property damage or loss, 1 case of near miss, 3 cases of first aid case and 2 cases of non work related. Corrective actions were proposed/implemented to prevent reoccurrence.

## အစီရင်ခံစာအကျဉ်းချုပ်

စာတိစ္ဆာရ်သစ်ခြင်းနှင့် အင်ဂျင်နီယာ အကြံပေး ကုမ္ပဏီလီမိတက်(UAE)သည် PTTEPI ၏ရန်ကုန်ရုံးအတွက်တည်ဆောက်ရေးကဏ္ဍအတွက် ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုလျော့ပါးရေး နည်းလမ်းများ အကောင်အထည်ဖော်မှုနှင့်စောင့်ကြည့်စစ်ဆေးခြင်းများဆိုင်ရာ လိုက်နာမှု စစ်ဆေးခြင်းကို ဆောင်ရွက်ခဲ့ပါသည်။ သုံးသပ်အကဲဖြတ်ခြင်း၏ ရည်ရွယ်ချက်မှာ IEE အစီရင်ခံစာတွင် ဖော်ပြထားသော ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ် အကောင်အထည်ဖော်မှု၏ ထိရောက်မှု ရှိ/မရှိ ကို အကဲဖြတ်ရန်ဖြစ်ပါသည်။ ၎င်းတွင် ထိခိုက်မှုလျော့ပါးရေးဆိုင်ရာနည်းလမ်းများ နှင့် စောင့်ကြည့်စစ်ဆေးခြင်းဆိုင်ရာ နည်းလမ်းများ ပါဝင်ပါသည်။ အကဲဖြတ်လုပ်ငန်းစဉ်တွင် (၁) PTTEPI မှ ပုဂ္ဂိုလ်များနှင့် တွေ့ဆုံဆွေးနွေးခြင်း၊ (၂) လုပ်ငန်းဧရိယာကို သွားရောက်လေ့လာမှုပြုလုပ်ခြင်း နှင့် PTTEPI ၏ ကိုယ်စားလှယ်များကို မေးခွန်းများအားတွေ့ဆုံ မေးမြန်းခြင်း၊ နှင့် (၃) စာရွက်စာတမ်းများ စစ်ဆေးခြင်း တို့ ပါဝင်ပါသည်။

### ၁။ စီမံကိန်း အကြောင်းအရာ ဖော်ပြချက်

PTTEPI (ရန်ကုန်ရုံးခွဲ) ရုံး အဆောက်အအုံသည် အမှတ် (၂)၊ ဆည်မြောင်းရိပ်သာလမ်း၊ ၈ မိုင်ခွဲ၊ မရမ်းကုန်းမြို့နယ်၊ ရန်ကုန် တွင် တည်ရှိသော လက်ရှိ PTTEPI အပြည်ပြည်ဆိုင်ရာ လီမိတက် (ရန်ကုန်ရုံးခွဲ) နေရာတွင် တည်ရှိမည်ဖြစ်သည်။ စီမံကိန်း နေရာသည် ရန်ကုန်တိုင်းဒေသကြီး၊ မရမ်းကုန်းမြို့နယ်၊ ပြည်လမ်းအနောက်ဘက်နှင့် ဆည်မြောင်းရိပ်သာလမ်း၏ တောင်ဘက်တွင်တည်ရှိပြီး ဧရိယာအကျယ်အဝန်းအားဖြင့် ၂၃၇၁.၄၆ စတုရန်းမီတာ ရှိပါသည်။ ထိုစီမံကိန်းတွင် အဆောက်အအုံ ၇ ခုပါရှိပြီး (အဆောက်အအုံ အမှတ် ၁ မှ အမှတ် ၇ အထိ) ကားထားရန် နေရာပါရှိပါသည်။ အဆောက်အအုံအသစ်ကို လက်ရှိ PTTEPI၏ အဆောက်အအုံ ၄ ခု နေရာ (အဆောက်အအုံ ၁၊ ၂၊ ၄၊ ၅ တို့တွင် ကားပါကင်နေရာအပါအဝင်) အားပြန်လည်အစားထိုးတည်ဆောက်ပါမည်။ ငှားရမ်းထားသော အဆောက်အအုံ အမှတ် (၃)၊ (၆) နှင့် (၇) တို့ကို မြေပိုင်ရှင်သို့ ပြန်လည်ပေးအပ်သွားမည်ဖြစ်ပါသည်။

### ၂။ စီမံကိန်းတွင် ပါဝင်သည့် အကြောင်းအရာများ

#### ၂.၁ အဆောက်အအုံအမျိုးအစား နှင့် အတွင်းပိုင်း လုပ်ငန်းဧရိယာပြင်ဆင်မှု အစီအစဉ်

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

အဆောက်အအုံအတွင်းတွင် လုပ်ငန်းဆောင်ရွက်အသုံးပြုသည့် ဧရိယာများကို အောက်ပါအတိုင်း ခွဲခြားနိုင်ပါသည်။

- B2၊ B1 နှင့် ၁ လွှာ၊ ၂ လွှာ၊ ၃ လွှာ တို့ရှိ ကားပါကင် ဧရိယာများ
- ၃ လွှာတွင် ရှိသော အစားအသောက်စားရာ နေရာ
- ၄ လွှာ မှ ၁၁ လွှာ အထိ ရုံး ဧရိယာများ

#### ၂.၂ မသန်စွမ်းသူများအတွက် အထောက်အကူပြု အဆောက်အအုံပုံစံ

မသန်စွမ်းသူများအတွက် အဆောက်အအုံ အီဒီယံပုံစံကို Universal Design အပေါ် အခြေခံပြီး တည်ဆောက်ထားပါသည်။

- မသန်စွမ်းသူများနှင့် အသက်ကြီးသူများအတွက် Basement 1 နှင့် အပေါ်ထပ်တို့တွင် အဆောက်အအုံအတွင်းသို့ လွယ်ကူစွာ ပဝ်ရောက်နိုင်ရန်အတွက် ကားပါကင်ကို ထားရှိပေးထားပါသည်။
- မသန်စွမ်းသူများနှင့် အသက်ကြီးသူများအတွက် အသုံးပြုရန် ရေအိမ်များကိုမြေညီထပ်တွင် ထားရှိပေးထားပါသည်။

## ၂.၃ အတွင်းပိုင်းအသုံးပြုမှု နည်းစနစ်

အတွင်းပိုင်းအသုံးပြုမှု စနစ်တွင် လမ်းအသုံးပြုမှုစနစ်၊ ရေပေးဝေရေးစနစ်၊ သောက်သုံးရေပေးဝေမှုစနစ်၊ စွန့်ပစ်ရေသန့်စင်မှု စနစ်၊ မီးဖြန့်ဝေမှုစနစ်၊ အပိုင်အခဲပစ္စည်း စွန့်ပစ်မှုစနစ်၊ မီးအန္တရာယ်ကာကွယ်ရေးနှင့် သတိပေးမှုစနစ်၊ လေဝင်လေထွက်စနစ်နှင့် အအေးပေးမှုစနစ်၊ ဓါတ်လှေကားစနစ်နှင့် သောက်ကင်းလုံခြုံရေးစနစ်တို့ ပါဝင်ပါသည်။

## ၃။ လက်ရှိ လုပ်ငန်းဆောင်ရွက်မှု အခြေအနေများ

အဆောက်အဦး အဟောင်းကို ဖြိုချခဲ့ပြီး PTTEPI သည် ရုံး အဆောက်အဦးအသစ်ကို ၂၀၁၈ ခုနှစ် ဇန်နဝါရီလမှစ၍ တည်ဆောက်ခဲ့ပြီး ၂၀၂၀ တွင် ငြိမ်းမည်ဟု မန့်မှန်းထားပါသည်။

## ၄။ လိုက်နာဆောင်ရွက်မှု အခြေအနေများ

ရရှိလာသောရလဒ်များအရ စီမံကိန်းသည် တည်ဆောက်ရေးကာလအတွင်း ၂၀၁၉ ခုနှစ်၊ ဇန်နဝါရီ မှ ဇွန်လတွင် ထိခိုက်မှုလျော့ပါးရေးလျော့နည်းစေသောဆောင်ရွက်မှုများနှင့် ပတ်သက်၍ ၉၇.၈ ရာခိုင်နှုန်း လိုက်နာမှု ရှိပြီး လိုအပ်ချက် ၂.၂ ရာခိုင်နှုန်းရှိကြောင်းတွေ့ရှိရပါသည်။

PTTEPI သည် ကနဦးစမ်းသပ်စစ်ဆေးမှု အစီရင်ခံစာ (IEE) တွင် ဖော်ပြထားသော ထိခိုက်မှုလျော့ပါးရေး နည်းလမ်းများနှင့် ကိုက်ညီမှုရှိပါသည်။ အဓိက အကြောင်းအရာများကို အောက်တွင် အကျဉ်းချုပ်ဖော်ပြထားပါသည်။

## ၄.၁ ၂၀၁၉ ခုနှစ် ဇန်နဝါရီမှ ဇွန်လအထိ ဆောက်လုပ်ရေးကာလအတွင်း ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုလျော့ပါးရေး နည်းလမ်းများနှင့် ပတ်သက်၍ လိုက်နာမှုစာရင်းစစ်ဆေးချက် ရလဒ်

- **လေထုညစ်ညမ်းမှု** - စီမံကိန်းတွင် ဆောက်လုပ်ရေးဧရိယာ တစ်ဝိုက်ကို တစ်နေ့လျှင် ၃ ကြိမ် (သို့မဟုတ်) ၃ ကြိမ်ထက်ပို၍ လေထုအခြေအနေများကိုလိုက်၍ ရေဖြန်းရန် ဝန်ထမ်းရှိပါသည်။ အမှန်အသားများ ပျံ့လွင့်ခြင်း နှင့် ဆောက်လုပ်ရေးဧရိယာဝန်းကျင် နှင့် သယ်ယူပို့ဆောင်ရေးလမ်းကြောင်းတစ်လျှောက်ရှိ လူထုအပေါ် ထိခိုက်မှု များကို လျော့ချရန်အတွက် PVC mesh sheet များ ကာရံပေးထားပါသည်။ ၂၀၁၉ ခုနှစ်၊ ဇန်နဝါရီလမှ ဇွန်လ အထိ အဓိက ဆောက်လုပ်ရေးလုပ်ငန်းမှာ အောက်ခြေပိုင်း (foundation) နှင့်အဆောက်အဦးကိုယ် ထည်ပုံ ဖော်ရေး လုပ်ငန်းများဖြစ်ပြီး ၎င်းတို့တွင် မြေတူးစက် (excavator)နှင့် မြေတူးကား (car drilling machine) များအသုံးပြုမှုရှိပါသည်။ ထိုယန္တရားများကို တည်ဆောက်ရေး ဧရိယာတွင်ထားရှိပြီး လုပ်ငန်းများ လုပ်ဆောင် ပြီးချိန်တွင် ထွက်ခွာစေပါသည်။ သို့သော်လည်း ဆောက်လုပ်ရေးဆိုင်ရာ ပစ္စည်းများကို သယ်ယူပို့ဆောင်ရာ တွင် ထရပ်ကာကြီးများကို အဖုံးများဖြင့်ပုံစံအုပ်၍ သယ်ယူမှု ပြုပါသည်။ ထို့အပြင် ကန်ထရိုက်တာမှ နေ၍ ဖုန်မှုန့်ကာမျက်နှာဖုံးများကို ဆောင်လုပ်ရေးဝန်ထမ်းများ အလုပ်လုပ် နေစဉ်အတွင်း ဖုန်မှုန့်များ ကာကွယ်နိုင်ရန်အ တွက်ထောက်ပံ့ပေးခဲ့ပါသည်။
- **အလွန်အကျွံဆူညံသံများနှင့် တုန်ခါမှုများ** - ကန်ထရိုက်တာသည် အလုပ်သမားများကို နားကာပစ္စည်း (ear muffs) များကိုအသုံးပြုစေခြင်းအားဖြင့် နေပိုင်းတွင်ဆောက်လုပ်ရေးလုပ်ငန်းလုပ်ဆောင်နေစဉ်အတွင်း ဆူညံ သံမြင့်မားမှုနှင့် တုန်ခါမှုနည်းမြင့်မားမှုကို ထိန်းချုပ်ထားပါသည်။ လူနေရပ်ကွက်အနီးတွင် ဆူညံသံများ လျော့ချနိုင် ရန်အတွက် ဆောက်လုပ်ရေးလုပ်ငန်းခွင်နှင့် အနီးပတ်ဝန်းကျင်တွင် သတ္တုပြားများဖြင့်ကာရံထားပါသည်။
- **ယာဉ်အသွားအလာ** - ကန်ထရိုက်တာသည် ဒေသခံပြည်သူများကို ဆောက်လုပ်ရေးအစီအစဉ် နှင့် ဆောက်လုပ်ရေးပစ္စည်းများ နှင့် စက်ယန္တရားကြီးများ သွားလာမှုလမ်းကြောင်းကို အသိပေးထားပါသည်။ သို့သော် ဆောက်လုပ်ရေးပစ္စည်းများ သယ်ယူပို့ဆောင်ခြင်းကို မတွေ့ရဘဲ caterpillar drill machine ကိုသာ ဆောက်လုပ်ရေး ဧရိယာတွင် တွေ့ရှိရပြီး လုပ်ငန်းများပြီးဆုံးချိန်တွင် ပြန်လည်ထွက်ခွာသည်ကိုတွေ့ရပါသည်။

ရှိရပါသည်။ ထို့အပြင် အများပြည်သူဆိုင်ရာ လမ်းမ (ဆောက်လုပ်ရေး ဧရိယာအရှေ့ဘက်ရှိ) တွင်သတိပေးဆိုင်သုတ်များ ကိုထင်ထင်ရှားရှား ပြသထားပါသည်။ လုံခြုံရေး နှင့်အချက်ပြဝန်ထမ်းမှလည်း စီမံကိန်းဧရိယာမှ ယာဉ်အဝင်အထွက်ကို အမြဲတမ်း ပြသပေးသည်။ စက်ယန္တရားများအားလုံးကို စစ်ဆေးရေးနှင့် ပြုပြင်ထိန်းသိမ်းရေး လုပ်ငန်းများကို စစ်ဆေးရေးအစီအစဉ်တွင် ပါရှိသည့်အတိုင်း ဆောင်ရွက်ပါသည်။ ထရပ်ကားများဖြင့် သယ်ယူပို့ဆောင်ရာတွင် ဖုံးအုပ်ခြင်းပြုလုပ်ရန် နှင့် ပစ္စည်းအလွန်အကျွံ တင်ဆောင်ခြင်းမပြုရန် ကန်ထရိုက်တာမှ ထိန်းချုပ်ပါသည်။ ဆောက်လုပ်ရေး ဧရိယာ အရှေ့ဘက်ရှိ ပြည်သူပိုင်လမ်းမှာ ကောင်းမွန်သော အခြေအနေတွင်ရှိပြီး အနီးနားဝန်းကျင်ရှိ ပြည်သူလူထုထံမှ တိုင်ကြားခြင်းများမရှိပါ။ ခရီးအသွားအလာ စီမံခန့်ခွဲမှု နှင့် သယ်ယူပို့ဆောင်ရေး ဘေးကင်းလုံခြုံမှု အစီအစဉ်ကို ပြုစုထားပြီး အလုပ်သမားများကို လိုက်နာစေသည်။ အရေးပေါ်တုံ့ပြန်မှုအစီအစဉ်ကို လည်းပြုစုထားပြီး ၎င်းတွင် ထိခိုက်မှု၊ မီးအန္တရာယ်၊ နှင့် ရှေးဦးသုန္ဒရီ စသည့် အကြောင်းအရာများ ပါဝင်သည်။ ကန်ထရိုက်တာသည် မူးယစ်ဆေးဝါး နှင့် အရက်သုံးစွဲခြင်း ထိန်းချုပ်မှု မူဝါဒကို ပြုစုထားပြီး အလုပ်သမားများကို လိုက်နာစေသည်။ အရက်သောက်ထားခြင်း ရှိ/မရှိကို လုပ်ငန်းမစီမံတွင် နေထိုင် စစ်ဆေးပါသည်။ သုညရာခိုင်နှုန်းထက်ကျော် လွန်သော အရက်ပမာဏကို တွေ့ပါက အလုပ်သမားကို အလုပ်လုပ်ခြင်းမှ ချက်ချင်းရပ်နားစေမည်။ မူးယစ်ဆေးဝါးသုံးစွဲမှု စမ်းသပ်ခြင်းပြုလုပ်ရာတွင် အလုပ်သမားများကို ရွေးချယ်၍ စစ်ဆေးမှုများ ပြုလုပ်ခဲ့သည်။ မူးယစ်ဆေးဝါးသုံးစွဲမှု ရွေးချယ်စမ်းသပ်ခြင်းကို ပြုလုပ်ခဲ့ပါသည်။ စမ်းသပ်မှုပြုလုပ်ရာတွင် သုံးစွဲထားသည့် ဟုတွေ့ရှိပါက ထိုအလုပ်သမားအား အစိုးရအသိအမှတ်ပြုဌာနတွင် ပြန်လည်ထူထောင်ရေးများ နှင့်အကြံပြုဆွေးနွေးခြင်း တို့ကို ဆောင်ရွက်စေပါသည်။

• **အစီအစဉ် စွန့်ပစ်ပစ္စည်း**

- **အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း** - ကန်ထရိုက်တာသည် ဆောက်လုပ်ရေးပစ္စည်းများ သိုလှောင်ရန် အတွက်နေရာထားရှိပေးပါသည်။ စွန့်ပစ်ပစ္စည်း စွန့်ပစ်ရာပုံများတွင် အဖုံးအကာများရှိပြီး အောက်ပါအတိုင်း ပုံအမျိုးအစား (၅) မျိုးရှိပါသည်။ ၎င်းတို့မှာ အထွေထွေ စွန့်ပစ်ပစ္စည်း (အပြာရောင်)၊ ပြန်လည်အသုံးပြုနိုင်သော စွန့်ပစ်ပစ္စည်း (အစိရောင်)၊ အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း (အနီရောင်)၊ အောက်နစ် စွန့်ပစ်ပစ္စည်း (အစိမ်းရောင်)နှင့် ဇီဝဆိုင်ရာ အန္တရာယ်ရှိသည့် စွန့်ပစ်ပစ္စည်း တို့ဖြစ်ပါသည်။ ထွက်ရှိသည့် စွန့်ပစ်ပစ္စည်းပမာဏကို မှတ်တမ်းထားရှိပါသည်။ ကန်ထရိုက်တာသည် စွန့်ပစ်ပစ္စည်း စုဆောင်းစွန့်ပစ်ရန်အတွက် ရန်ကုန်မြို့တော်စည်ပင်သာယာရေးကော်မတီ (YCDC) နှင့် ပူးပေါင်းဆောင်ရွက်၍ ဆောက်လုပ်ရေးဧရိယာထဲတွင် အကြွင်းအကျန်များ မကျန်ရှိအောင် ပြုလုပ်ပါသည်။ ထို့အပြင် ကန်ထရိုက်တာမှ ဆောက်လုပ်ရေးဧရိယာအတွင်းတွင် ဝန်ထမ်းများမှ မည်သည့်စွန့်ပစ်ပစ္စည်းကိုမှ မီးရှို့ခြင်းမပြုရန် တားမြစ်ထားပါသည်။
- **အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း** - အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်းများထည့်သည့်ပုံး(အနီရောင်) ကိုဆောက်လုပ်ရေးဧရိယာတွင် ထားရှိပေးထားပါသည်။ သို့သော် လက်ရှိအခြေအနေအထိ အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း ထွက်ရှိမှုမရှိပါ။ အကယ်၍ အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း ထွက်ရှိမှုရှိပါက ၎င်းတို့ကို စုဆောင်း၍ စွန့်ပစ်ရန် လိုင်စင်ရ လုပ်ငန်း (သို့မဟုတ်) အစိုးရအသိအမှတ်ပြုဌာနနှင့် ပူးပေါင်းဆောင်ရွက်ပါမည်။
- **စွန့်ပစ်ရေ** - ကန်ထရိုက်တာသည် ဆောက်လုပ်ရေးဧရိယာအတွင်းတွင် ရွေ့လျားအိမ်သာများထားရှိပြီး PTTEPတွင် ဝန်ထမ်းဂျပံ အတွက် အိမ်သာ ၄ လုံး ထားရှိပေးထားပါသည်။ သို့သော် ဆောက်လုပ်ရေးဧရိယာအတွင်း အကန့်အသတ်ရှိသောကြောင့် ကန်ထရိုက်တာအနေဖြင့် ရွေ့လျားအိမ်သာကို ပြင်ပသို့ ရွှေ့ရပါသည်။ စီမံကိန်းဧရိယာမှ ရေစွန့်ပစ်မှုမပြုလုပ်ခင်တွင် စွန့်ပစ်ရေကို ထိန်းထားရန်အတွက် ဆောက်လုပ်ရေးဧရိယာအတွင်းတွင် ရေဆင်းစနစ်တစ်ခုကို ထားရှိပါသည်။ ဝန်ထမ်းများအားလုံးကို စွန့်ပစ်ပစ္စည်းများကို သင့်လျော်စွာ စနစ်တကျ စွန့်ပစ်စေပြီး ရေစီးဆင်းပိတ်ဆို့မှုကို ကာကွယ်ရန် အတွက် ရေဆင်းများအနီးတွင် အမှိုက်များမစွန့်ပစ်ရန် တားမြစ်ခြင်းလည်း ပါဝင်သည်။
- **လူမှုပတ်ဝန်းကျင်** - ကန်ထရိုက်တာသည် လူသစ်စုဆောင်းမှုလုပ်ငန်းစဉ်အရ သတင်းထုတ်ပြန်၍ အလုပ်သမားအားလုံးအား ရန်ကုန်မှ ငှားရမ်းရန် ထည့်သွင်းစဉ်းစားခဲ့ပါသည်။ အလုပ်သမားများ နှင့် အနီးဝန်းကျင်ရှိ

လူထုအကြား ပဋိပက္ခဖြစ်စေရန် လုပ်ငန်းစဉ်များစဉ်းကမ်းများကို အလုပ်သမားများအား ပေးထားပြီး ထိုစဉ်းကမ်းစဉ်းကမ်းအတိုင်းလိုက်နာစေပါသည်။ ကန်ထရိုက်တာသည် အနီးဝန်းကျင်ရှိ လူထုအား ဆောက်လုပ်ရေးအစီအစဉ် နှင့် ဆောက်လုပ်ရေးပစ္စည်းများ သယ်ယူပို့ဆောင်ရေး နှင့် စက်ယန္တရားကြီးများ သွားရာလမ်းကြောင်း အခြေအနေများကို အသိပေးထားပါသည်။ မြို့ပြအင်ဂျင်နီယာ နှင့် ဘေးအန္တရာယ် လုံခြုံရေးဆိုင်ရာ ဝန်ထမ်းများကို စစ်ဆေးမှုများ ပြုလုပ်ရန်အတွက် ဆောက်လုပ်ရေး ကာလတစ်လျှောက် တွင်ထားရှိထားပါသည်။ PTTEPI သည် သက်ဆိုင်သူများထံမှ တိုင်တန်းချက်များကို လက်ခံထားရှိရန် မကျေနပ်ချက်၊ နှစ်နာချက်များ ကိုင်တွယ်ဖြေရှင်းပေးပါသည်။ စီမံကိန်းဆိုင်ရာဘက်ကို ဆောက်လုပ်ရေး ဧရိယာအရှေ့ တွင်စိုက်ထူပြသထားပြီး ၎င်းတွင် စီမံကိန်းအသေးစိတ်အချက်အလက်များဖြစ်သော စီမံကိန်းအမည်၊ ပိုင်ရှင်၊ အကြံပေး၊ ကန်ထရိုက်တာ၊ ဆောက်လုပ်ရေးကာလ နှင့် အရေးပေါ် ဖုန်းနံပါတ်တို့ကို ဖော်ပြထားပါသည်။

• လူထု ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းမှု

- **ကျန်းမာရေး** - စီမံကိန်းတွင် ကနဦးစမ်းသပ်စစ်ဆေးခြင်း အစီရင်ခံစာ (IEE) တွင် ပါရှိသည့်ထိခိုက် မှုလျော့ပါးရေးနည်းများ ကို တိကျသောချာစွာ အကောင်အထည်ဖော်ပါသည်။
- **ဘေးအန္တရာယ်ကင်းရှင်းမှု** - အမြင့်တွင် အလုပ်လုပ်ခြင်း၊ ညဘက်အလုပ်လုပ်ခြင်း ၊ လျှပ်စစ်ဆိုင်ရာ လုပ်ငန်းများ နှင့် ဘိုးပိုင် စိုက်ထူခြင်းများကဲ့သို့သော လုပ်ငန်းများအတွက် အလုပ်လုပ်ခွင့် စနစ် (Work Permit System)ကို အကောင်အထည်ဖော်ဆောင်ရွက်ထားရှိပါသည်။ အလုပ်သမားများအားလုံးကို သင့်လျော်သော အကာအကွယ်ပစ္စည်းများ (PPE) ထောက်ပံ့ပေးထားပြီး အလုပ်လုပ်ချိန်တွင် လိုက်နာအသုံးပြုစေသည်။ ထို့အပြင် နှစ်စဉ် SSHE သင်တန်းအစီအစဉ် ပါ အချက်အလက်များအတိုင်း သင်တန်းပေးခြင်း ရှိပါသည်။ ကန်ထရိုက်တာ/ဘေးအန္တရာယ် ကင်းရှင်းရေးဆိုင်ရာအရာရှိမှနေ၍ အလုပ်သမားများကို Tool box talk ကိုလုပ်ငန်းခွင်မဝင်ခင် နေ့စဉ် ပြုလုပ်ပြောပြပေးပါသည်။ ဆေးပညာ တတ်ကျွမ်းသည့်သူတစ်ယောက် ဆေးခန်းတွင် အမြဲတမ်းရှိပြီး ဆေးဘက်ဆိုင်ရာ ကုသမှုများ၊ ရှေးဦးသူနာပြုစုပေးခြင်းများ ပြုလုပ်ပေးပါသည်။ ဆောက်လုပ်ရေး ဧရိယာအတွင်းနှင့် အရှေ့ဘက် တွင် သတိပေး ဆိုင်းဘုတ်များကို အများဆိုင်လမ်းတွင် ရှင်းရှင်းလင်းလင်းပြသပေးထားသည်။ စစ်ဆေး ရေးအစီအစဉ်အတိုင်း စက်ပစ္စည်းကိရိယာများကို ပုံမှန်စစ်ဆေး၍ ပြုပြင်ထိန်းသိမ်းမှုများ ပြုလုပ်ခဲ့ပါသည်။ ထို့အပြင် ဆောက်လုပ်ရေး ဧရိယာတွင် မီးသတ်ကိရိယာများကို ထားရှိပေးထားပြီး လစဉ်စစ် ဆေးမှုများပြုလုပ်ပါသည်။ ဆေးလိပ်သောက်ခြင်းကို ဆောက်လုပ်ရေးဧရိယာ၏ အရှေ့ဘက် နှင့် အနောက်ဘက် တို့တွင် ထားရှိပေးထားပါသည်။

၄.၂ ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြည့်စစ်ဆေးခြင်း ရလဒ်

ဤစီမံကိန်းသည် ကနဦးပတ်ဝန်းကျင်ဆိုင်ရာ ဆန်းစစ်ချက် (IEE) တွင်ဖော်ပြထားသော ပတ်ဝန်းကျင်ဆိုင်ရာထိခိုက်မှု စောင့်ကြည့်စစ်ဆေးခြင်းကို အပြည့်အဝ လိုက်နာဆောင်ရွက်ခြင်းရှိပါသည်။ ၎င်းတို့တွင် အမှန်အမှားစောင့်ကြည့်စစ်ဆေးခြင်း၊ ဆူညံသံ အဆင့်အတန်း စောင့်ကြည့်စစ်ဆေးခြင်း၊ တိုင်ကြားချက် ကိုင်တွယ်ဖြေရှင်း မှုစနစ်အား စောင့်ကြည့်စစ်ဆေးခြင်း၊ လူထုနှင့် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းမှုစောင့်ကြည့် စစ်ဆေးခြင်း တို့ပါဝင်ပါသည်။ အသေးစိတ်ကို အောက်တွင် ဖော်ပြထားပါသည်။

(၁) ဖုန်မှုန့် ပြန့်လွှင့်မှု စောင့်ကြည့်စစ်ဆေးခြင်း

ဆောက်လုပ်ရေး ဧရိယာ နှင့် PTTEPI အဆောက်အဦးအမှတ် (၇) တို့တွင် ဖုန်မှုန့်ထုတ်လွှတ်မှု စောင့်ကြည့် လေ့လာခြင်းကို ၂၀၁၉ ခုနှစ် မတ်လ ၁၀ မှ ၁၂ ရက်နေ့အထိ ဆောင်ရွက်ခဲ့ပါသည်။ PTTEPI ရုံး နောက်ဘက်ရှိ အိမ်ကို ၂၀၁၉



ခုနှစ် မတ်လ ၁၀ ရက်နေ့မှ ၁၂ ရက်နေ့အထိ စောင့်ကြည့်လေ့လာခဲ့ပါသည်။ ထိုကဲ့သို့ စောင့်ကြည့်လေ့လာခြင်းများမှ တွေ့ရှိရသော ရလဒ်များကို အောက်တွင် အကျဉ်းချုပ်၍ ဖော်ပြထားပါသည်။

### ၁.၁ ဆောက်လုပ်ရေး ဧရိယာ - ဆောက်လုပ်ရေး ဧရိယာ ဖြတ်ညှိရိုး ခြောက်ဘက် (A1)

Total Suspended Particulate (TSP) ရလဒ်သည် ကမ္ဘာ့ဘဏ်အုပ်စု (WORLD BANK GROUP) ၏စံနှုန်း သတ်မှတ်ချက်ဖြစ်သော ၂၄ နာရီအတွင်းတွင်  $230 \mu\text{g}/\text{m}^3$  အောက်တွင် ရှိရမည်ဆိုသော သတ်မှတ်ချက်နှင့် ကိုက်ညီပါသည်။ 10 Micron အောက်ငယ်သော Particulate Matter (PM-10) ရလဒ်သည် အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) ၏ သတ်မှတ်ချက်ဖြစ်သော  $50 \mu\text{g}/\text{m}^3$  နှင့်လိုက် လျော့ညီထွေမှု မရှိသော်လည်း WHO နှင့် IFC မှ ထုတ်ပြန်ထားသော ထိတွေ့ဝန်းကျင်ဆိုင်ရာ လေထုအရည် အသွေးစံနှုန်းဖြစ်သည့် "PM10 မဟာကသည်  $150 \mu\text{g}/\text{m}^3$  ထက် ကျော်လွန်ခြင်းမရှိစေရ" ဟူသည့် သတ်မှတ်ချက်နှင့်မူ ကိုက်ညီမှု ရှိပါသည်။

### ၁.၂ PTTEPI အဆောက်အအုံအမှတ် (၇) - ဆောက်လုပ်ရေး ဧရိယာ ဖြတ်ညှိရိုး အနောက်ဘက် (A2)

PTTEPI အဆောက်အအုံအမှတ် (၇) - ဆောက်လုပ်ရေး ဧရိယာ ဖြတ်ညှိရိုး အနောက်ဘက် (A2) ၏ Total Suspended Particulate (TSP) ရလဒ် သည် ကမ္ဘာ့ဘဏ်အုပ်စု (WORLD BANK GROUP) ၏စံနှုန်းသတ်မှတ်ချက်ဖြစ်သော ၂၄ နာရီအတွင်းတွင်  $230 \mu\text{g}/\text{m}^3$  အောက်တွင် ရှိရမည်ဆိုသော သတ်မှတ်ချက်နှင့် ကိုက်ညီမှုမရှိပါ။ ၂၀၁၉ ခုနှစ် မတ်လ ၈-၉ ရက်နေ့များအတွင်း တိုင်းတာရရှိသော 10 Micron အောက်ငယ်သော Particulate Matter (PM-10) ရလဒ်သည် အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (NEQG) နှင့် ၂၀၁၉ ခုနှစ် မတ်လ ၉-၁၀ ရက်နေ့များအတွင်း တွင်မူ WHO နှင့် IFC မှ ထုတ်ပြန်ထားသော ထိတွေ့ဝန်းကျင်ဆိုင်ရာ လေထုအရည်အသွေးစံနှုန်း တို့ နှင့် လိုက်လျောညီထွေမှုမရှိပါ။

### ၁.၃ PTTEPI ရုံး နောက်ဘက်ရှိအိမ် - ဆောက်လုပ်ရေး ဧရိယာ ဖြတ်ညှိရိုး အရှေ့တောင်ဘက် (A5)

Total Suspended Particulate (TSP) ရလဒ် သည် ကမ္ဘာ့ဘဏ်အုပ်စု (WORLD BANK GROUP) ၏ စံနှုန်းသတ်မှတ်ချက်ဖြစ်သော ၂၄ နာရီအတွင်းတွင်  $230 \mu\text{g}/\text{m}^3$  အောက်တွင် ရှိရမည်ဆိုသော သတ်မှတ်ချက်နှင့် ကိုက်ညီမှုမရှိပါ။ ၂၀၁၉ ခုနှစ် မတ်လ ၉-၁၀ ရက်နေ့များအတွင်း တိုင်းတာရရှိသော 10 Micron အောက်ငယ်သော Particulate Matter (PM-10) ရလဒ်သည် အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (NEQG) နှင့် WHO နှင့် IFC မှ ထုတ်ပြန်ထားသော ထိတွေ့ဝန်းကျင်ဆိုင်ရာ လေထုအရည်အသွေးစံနှုန်း တို့ နှင့် လိုက်လျောညီထွေမှုမရှိပါ။ ၂၀၁၉ ခုနှစ် မတ်လ ၁၀-၁၁ ရက်နေ့များအတွင်း ရရှိသော ရလဒ်သည် အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (NEQG) နှင့် WHO နှင့် IFC မှ ထုတ်ပြန်ထားသော ထိတွေ့ဝန်းကျင်ဆိုင်ရာ လေထုအရည်အသွေးစံနှုန်း တို့နှင့် လိုက်လျောညီထွေမှုမရှိပါ။

01/2012 မှ 03/2019 အထိ နေ့စဉ် နံနက် ၇ နာရီမှ ည ၇ နာရီ အထိ ရန်ကုန်လေဆိပ်တွင် လေ့လာတွေ့ရှိသော လေထုဆိုင်ရာအချက်အလက်များအရ ရန်ကုန် တွင် မတ်လအတွင်းတွင် လေသည် အနောက်တောင်ဘက် မှ တိုက်ခတ်သည်ကို တွေ့ရှိရပါသည်။ ရန်ကုန်တွင် မတ်လအတွင်း "PTTEPI အဆောက်အအုံအမှတ် (၇) - ဆောက်လုပ်ရေးဧရိယာ ဖြတ်ညှိရိုး အနောက်ဘက် (A2) " နှင့် "PTTEPI ရုံး - ဆောက်လုပ်ရေးဧရိယာ အရှေ့တောင်ဘက် (A5)" တို့၌လေသည် အပေါ်ဘက်သို့ တိုက်ခတ်ပါသည်။ ထို့ကြောင့် စံချိန်စံညွှန်းများ နှင့် ကိုက်ညီမှုမရှိသော Total Suspended Particulate (TSP) နှင့် 10 Micron အောက်ငယ်သော particulate matter (PM-10) တို့သည် စီမံကိန်း အတွင်းပိုင်း နှင့် အပြင်ပိုင်း မူလပင်နန်းများကြောင့်ဖြစ်ပါသည်။ ထိုလုပ်ငန်းများတွင် လေ့လာသောကာလသည် ခြောက်သွေ့ရာသီဖြစ်ပြီး ယာဉ်အသွားအလာရှိမှု တို့လည်း ပါဝင်ပါသည်။ ထို့အပြင် လေထုအရည်အသွေး ညွှန်းကိန်း အချက်အလက် အရင်းအမြစ် (<https://www.airvisual.com/world-air-quality>) တွင် မြန်မာနိုင်ငံအတွင်း ခြောက်သွေ့ရာသီ၌လေထုညစ်ညမ်းမှုအန္တရာယ်များပြားပြီး လေထုအရည်အသွေးညွှန်းကိန်းကို အနီရောင်ပြထားသည်ကို တွေ့ရှိရပါသည်။ သို့သော် ဤစီမံကိန်းတွင် ပတ်ဝန်းကျင်ထိခိုက်မှု လျော့ပါးရေး အစီအစဉ်များဖြစ်သော ချေခြန်းခြင်းနှင့် ဆောက်လုပ်ရေး ဧရိယာ

ပတ်လည်တွင် PVC mesh sheet များ ကာရံခြင်း တို့ပြုလုပ်ကာ ပတ်ဝန်းကျင်လေထုအပေါ် ထိခိုက်နိုင်သည့် ဖုန်မှုန့်များ ထုတ်လွှတ်ခြင်းမှ ကာကွယ်ရန် နှင့် လျှော့ချရန် စီမံထားရှိပါသည်။

## ၂။ ဆူညံသံ level စောင့်ကြည့်စစ်ဆေးခြင်း

ဆူညံသံ level စောင့်ကြည့်လေ့လာခြင်းကို ဆောက်လုပ်ရေး ဧရိယာ နှင့် PTTEPI Building 7 တို့တွင် ၂၀၁၉ ခုနှစ် မတ်လ ၈ ရက်နေ့မှ ၁၀ ရက်နေ့အထိ ပြုလုပ်ခဲ့ပါသည်။ PTTEPI ရုံး အနောက်ဘက်ရှိအိမ် ကို ၂၀၁၉ ခုနှစ် မတ်လ ၁၀ ရက်နေ့မှ ၁၂ ရက်နေ့အထိတိုင်းတာမှုများ ပြုလုပ်ခဲ့ပါသည်။ လေ့လာတွေ့ရှိရသော ဆူညံသံ အဆင့်အတန်း သတ်မှတ်မှု ရလဒ်အကျဉ်းချုပ်မှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

### ၂.၁ ဆောက်လုပ်ရေး ဧရိယာ - ဆောက်လုပ်ရေး ဧရိယာ မြောက်ဘက် (N1)

နေ့အချိန် နှင့် ညအချိန်  $L_{Aeq-1}$  hr တန်ဖိုးသည် 53.3-82.5 နှင့် 53.2-66.0 dB(A) အတိုင်းအတာနယ်ပယ်အတွင်းတွင် အသီးသီးရှိပါသည်။ နေ့ဘက်  $L_{Aeq-1}$  hr ရလဒ်အများစု နှင့် ညဘက်  $L_{Aeq-1}$  hr ရလဒ်အားလုံးတို့သည် အမျိုးသား ပတ်ဝန်းကျင်အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် (၂၀၁၅) တွင်ပါရှိသော စက်မှု/စီးပွား ဆိုင်ရာ ဧရိယာများ အတွက်စံနှုန်းဖြစ်သည့် 70 dB(A) ထက်၊ ၂၀၁၉ ခုနှစ်၊ မတ်လ ၈ ရက်နေ့ 09.00-10.00 အချိန် နှင့် 11.00-16.00 တို့မှလွဲ၍ အခြားအချိန်များတွင် ကျော်လွန်မှုမရှိပါ။ သတ်မှတ်စံနှုန်းထက်ကျော်လွန်နေသော နေ့ဘက်  $L_{Aeq-1}$  hr ရလဒ်သည် အလုပ်အချိန်အတွင်း စီမံကိန်းဆိုင်ရာ လုပ်ငန်းများကြောင့် သော်လည်းကောင်း ပြင်ပအကြောင်းအရာဖြစ်သည့် စောင့်ကြည့်စစ်ဆေးရာနေရာမှ (၁၀) မီတာခန့်အကွာတွင်ရှိသော အနီးဝန်းကျင်ရှိလမ်းတွင် ယာဉ်အသွား အလာရှိမှု ကြောင့် သော်လည်းကောင်း ဖြစ်နိုင်ပါသည်။ PTTEPI သည် စဉ်ဆက်မပြတ် စောင့်ကြည့် လေ့လာခြင်းကို စီမံကိန်းလုပ်ငန်းများ ဆိုင်ရာ ပတ်ဝန်းကျင်ထိခိုက်မှုစောင့်ကြည့်ခြင်း အစီအမံတွင်ပါရှိသည့်အတိုင်း ဆက်လက်စောင့်ကြည့်စစ်ဆေးမှုများပြုလုပ်သင့်ပါသည်။

### ၂.၂ PTTEPI အဆောက်အအုံအမှတ် (၇) - ဆောက်လုပ်ရေးမြို့စည်ရိုး အနောက်ဘက် (N2)

နေ့အချိန် နှင့် ညအချိန်  $L_{Aeq-1}$  hr တန်ဖိုးသည် 55.1-82.7 နှင့် 55.7-63.4dB(A)အတိုင်းအတာနယ်ပယ်အတွင်းတွင် အသီးသီးရှိပါသည်။ နေ့ဘက်  $L_{Aeq-1}$  hr ရလဒ်အများစု နှင့် ညဘက်  $L_{Aeq-1}$  hr ရလဒ်အားလုံးတို့သည် အမျိုးသား ပတ်ဝန်းကျင်အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် (၂၀၁၅) တွင်ပါရှိသော စက်မှု/စီးပွား ဆိုင်ရာဧရိယာများ အတွက် စံနှုန်းဖြစ်သည့် 70 dB(A) နှင့် ၂၀၁၉ ခုနှစ်၊ မတ်လ ၈ ရက်နေ့ 10.00-11.00 အချိန် နှင့် 12.00-17.00 နှင့် မတ်လ ၁၀ ရက်နေ့ 08.00-10.00 အချိန်တို့မှလွဲ၍ အခြားအချိန်များတွင် သတ်မှတ်စံနှုန်းနှင့် ကိုက်ညီမှုရှိပါသည်။ သတ်မှတ်စံနှုန်းထက်ကျော်လွန်နေသော နေ့ဘက်  $L_{Aeq-1}$  hr ရလဒ်သည် အလုပ်အချိန်အတွင်း စီမံကိန်းဆိုင်ရာ လုပ်ငန်းများကြောင့်သော်လည်းကောင်း ပြင်ပအကြောင်းအရာဖြစ်သည့် စောင့်ကြည့်စစ်ဆေးရာနေရာမှ (၄၀) မီတာခန့်အကွာတွင်ရှိသော အနီးဝန်းကျင်ရှိလမ်းတွင် ယာဉ်အသွားအလာရှိမှုကြောင့်သော်လည်းကောင်း ဖြစ်နိုင်ပါသည်။ PTTEPI သည် စဉ်ဆက်မပြတ် စောင့်ကြည့်လေ့လာခြင်းကို စီမံကိန်း လုပ်ငန်းများဆိုင်ရာ ပတ်ဝန်းကျင်ထိခိုက်မှု စောင့်ကြည့်ခြင်း အစီအမံတွင်ပါရှိသည့်အတိုင်း ဆက်လက်စောင့်ကြည့်စစ်ဆေးမှုများ ပြုလုပ်သင့်ပါသည်။

### ၂.၃ PTTEPI ရုံးအနောက်ဘက်ရှိ အိမ် - ဆောက်လုပ်ရေး ဧရိယာ ခြံစည်ရိုး၏ အရှေ့တောင်ဘက် (N5)

နေ့အချိန် နှင့် ညအချိန်  $L_{Aeq-1}$  hr တန်ဖိုးသည် 55.0-71.2 နှင့် 54.7-61.6 dB(A) အတိုင်းအတာနယ်ပယ်အတွင်းတွင် အသီးသီးရှိပါသည်။ နေ့ဘက်  $L_{Aeq-1}$  hr ရလဒ်အများစု နှင့် ညဘက်  $L_{Aeq-1}$  hr ရလဒ်အားလုံးတို့သည် အမျိုးသား ပတ်ဝန်းကျင်အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက် (၂၀၁၅) တွင်ပါရှိသော စက်မှု/စီးပွားဆိုင်ရာ ဧရိယာများ အတွက် စံနှုန်းဖြစ်သည့် 70 dB(A) နှင့် ၂၀၁၉ ခုနှစ်၊ မတ်လ ၁၁ ရက်နေ့ 09.00-10.00 အချိန် နှင့် 14.00-15.00 အချိန်တို့မှလွဲ၍ အခြားအချိန်များတွင် သတ်မှတ်စံနှုန်းနှင့် ကိုက်ညီမှုရှိပါသည်။ စောင့်ကြည့်စစ်ဆေးမှု ပြုလုပ်ရာ နေရာ အနီးဝန်းကျင်တွင် ဂဟေဆော်ခြင်းလုပ်ငန်းလုပ်ကိုင်နေခြင်းကြောင့် သတ်မှတ်စံနှုန်းထက်ကျော်လွန်ခြင်း ဖြစ်နိုင်ပါသည်။ သို့သော်လည်း နေ့ဘက်ဆောက်လုပ်ရေးလုပ်ငန်းများလုပ်ကိုင်ရာမှ ဆိုးရွားစွာအသံဆူညံမှု ထွက်ပေါ်ကုန်သည့်အသံ အလွန်အကျွံအသံဆူညံခြင်းကြောင့် အနီးနားဝန်းကျင်ရှိလူထုအား ထိခိုက်မှုမရှိစေရန် စီမံကိန်းအနေဖြင့် ပတ်ဝန်းကျင်

ဆိုင်ရာ ထိခိုက်မှုလျော့ပါးရေးနည်းလမ်းများကို ပြုစုထားပါသည်။ PTTEPI သည် ဆောက်လုပ်ရေးဧရိယာပတ်လည်တွင် အနီးရှိလူထုအား အသံကြောင့်ထိခိုက်မှုမရှိစေရန်အတွက် အသံကာပစ္စည်းများ (သတ္တုပြား) များကိုတပ်ဆင်ထားပါသည်။ ထို့အပြင် PTTEPI သည် စောင့်ကြည့်စစ်ဆေးမှုပြုလုပ်ခြင်းကို ၁ နှစ်လျှင် ၂ ကြိမ် ပြုလုပ်ပါသည်။

**၃။ မကျေနပ်ချက်ဖြေရှင်းခြင်းစနစ်အား စောင့်ကြည့်စစ်ဆေးခြင်း**

PTTEPI (ရန်ကုန်) ရုံးအတွက် မကျေနပ်ချက် ဖြေရှင်းခြင်းစနစ် စောင့်ကြည့်လေ့လာခြင်းကို PTTEPI က ၂၀၁၉ ခုနှစ် ဇန်နဝါရီ-ဇွန် လများအတွင်း ဆောင်ရွက်ခဲ့ပါသည်။ ဆောက်လုပ်ရေးကာလတစ်လျှောက်တွင် မည်သို့သော မကျေနပ်ချက်ထုတ်ဖော်ခြင်းမျိုးမှ မရှိပါ။

**၄။ လူထု နှင့် လုပ်ငန်းခွင် ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းမှု စောင့်ကြည့်စစ်ဆေးခြင်း**

PTTEPI (ရန်ကုန်) ရုံး အဆောက်အဦး ၏ ဆောက်လုပ်ရေးကာလအတွက် လူထု နှင့် လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းမှု စောင့်ကြည့်စစ်ဆေးခြင်း များကို ၂၀၁၉ ခုနှစ် ဇန်နဝါရီ-မေ လများအတွင်း ကန့်သတ်ချက်တကျ ဆောင်ရွက်ခဲ့ပါသည်။ ဆောက်လုပ်ရေးကာလအတွင်းတွင် မတော်တဆဖြစ်မှု ၁၀ ခုရှိခဲ့ပါသည်။ ၎င်းတို့မှာ ပစ္စည်းကိရိယာ ပျက်စီးဆုံးရှုံးမှု ၄ ခု၊ near miss ဖြစ်ရပ် ၁ ခု၊ ရှေးဦးသူနာပြုဆိုင်ရာဖြစ်ရပ် ၃ ခု၊ လုပ်ငန်းကိစ္စနှင့် ဆက်စပ်မှုမရှိခြင်းမှု ဖြစ်သော ဖြစ်ရပ် ၂ ခု တို့ဖြစ်ပါသည်။ အလားတူဖြစ်ရပ်များ ပြန်လည်ဖြစ်ပေါ်ခြင်းကို ကာကွယ်ရန် ပြုပြင်ရေးလုပ်ဆောင်မှုများကို ဆောင်ရွက်ရန် အဆိုပြုထားပါသည်။

*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.

This report is the monitoring report of PTTEPI's Yangon Office Building (Construction Phase) during January – June 2019.

#### 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<br>Construction Phase                       |
| 2) <u>Project Location:</u>       | No. (2), Sei-Myaung Yeiktha Street, 8 ½ Mile, Mayangone Township,<br>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.

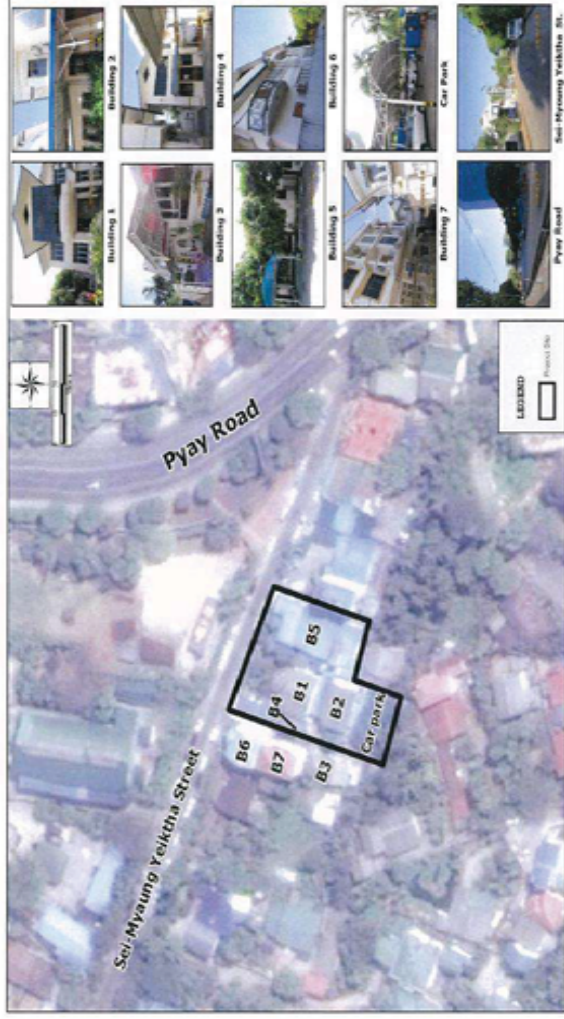
## 1.5 Site Description

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 Yangon 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 during January – June 2019

## 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 area, 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.

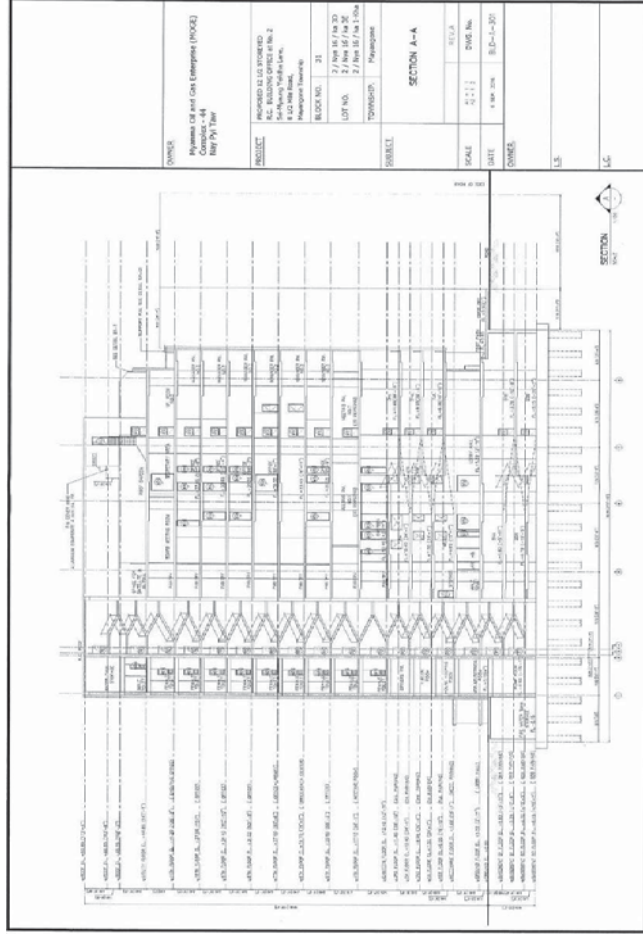


Figure 1-4 Height of PTTEPI's Yangon Office Building

## 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 composing 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 consists 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 waste 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 March 5, 2019 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 March 5, 2019 (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 Yangoon 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 effects 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	✓	The project assigned staff to spray water around construction area three times a day or more, depending on the atmospheric conditions.	-	Appendix J
		<ul style="list-style-type: none"> <li>Polyester/ PVC mesh sheet should be covered around the construction areas</li> </ul>				The Project provided PVC mesh sheets around the construction areas in order to prevent dust dispersion and reduced effects to the communities nearby the construction site and along the transportation route.		Figure 2-2
		<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 main activity during January-June 2019 of the project was foundation and structural work which generally used excavator and car drilling machine which parked at construction area and moved after the finished activities. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area as specified in measure.		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
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>Restore, resurface, and rehabilitate the disturbed areas as soon as practicable after completion of construction or disturbance</li> <li>Dust masks should be provided (where applicable) to specified construction workers.</li> </ul>	Project Site	Construction Phase	NA	The project will rehabilitate the disturbed areas after completion of construction.	-	-
		<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 dust masks for workers and controlled to use during working.	-	Figure 2-3
		<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 provided ear muffs for workers and controlled to use during working in high noise area.	-	Figure 2-3
		<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>			✓	The contractor controlled workers to carried out the construction activities with high noise and vibration level at day time in order to reduce noise and vibration impact to nearby communities.	-	-
					✓	Noise barrier (metal sheet) was installed around the construction site to reduce noise impact to nearby communities.	-	Figure 2-4

**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
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> <li>Increased number of heavy truck and trailer might cause damage along the construction transportation route.</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. However, The main activity during January-June 2019 of the project was foundation and structural work which generally used excavator and car drilling machine which parked at construction area and moved after the finished activities.	-	Figure 2-5 and 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
		<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 within construction area.	-	Figure 2-6
		<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

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

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
		<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 signal in and out of vehicle from project area.	-	Figure 2-7 and Figure 2-8
		<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 2-9
		<ul style="list-style-type: none"> <li>Cover construction materials by tarpaulin during transportation to prevent falling and spreading of materials.</li> </ul>			✓	The main activity during January-June 2019 of the project was foundation and structural work which generally used excavator and car drilling machine which parked at construction area and moved after the finished activities. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area as specified in measure.	-	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
		<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, the project provided muster point opposite the construction area in case of accident.	-	Figure 2-10 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. Random drug testing was implemented, worker who found to be positive in drug testing shall be required to undergo rehabilitations and counseling in government accredited center.		
Solid waste	<ul style="list-style-type: none"> <li>Improper management of construction waste will caused the adverse effect to the environmental.</li> </ul>	<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.	-	Figure 2-11

**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>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 2-12 and Appendix G-2
		<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 2-12



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

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
		<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.	-	Appendix G-1
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 contractor provided mobile toilets within construction area and 4 toilets at PTTEP's for 70 workers. However, the contractor has to moved mobile toilet out due to the limitation in construction area.	-	Figure 2-13
		<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.	-	Figure 2-14 and Appendix G-3
		<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 enforced all worker to dispose waste properly including prohibited all workers to throw and dispose waste demolition close to drainage system in order to prevent obstruct the water flow.	-	Appendix C

**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
Social and economic	Positive Impact	<ul style="list-style-type: none"> <li>The project employment would boost up the local economy.</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>Generate income in nearby communities by related business.</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.	-	Appendix J
		<ul style="list-style-type: none"> <li>An employment opportunity for the locals.</li> </ul>			✓	The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people.	-	Appendix D-2
	Negative Impact	<ul style="list-style-type: none"> <li>Fugitive dust, excess noise, soil erosion and transportation of materials during construction will cause inconveniences to the livelihood of the residents living nearby the construction site.</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 2-15

**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>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 2-16 and Appendix D-1
		<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 2-16

**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
Public health and safety	<p><b>On Local People nearby Project Site</b></p> <p>Unsuitable management during construction may have impact on local people health due to pollution and accident. They are:</p> <ul style="list-style-type: none"> <li>Dust diffusion, increased noise level, and waste unsuitable management during construction activities; and</li> <li>Accident from construction materials, heavy equipment, and worker transportation to construction area.</li> </ul>	<p><b>Health</b></p> <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
		<p><b>Safety</b></p> <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 2-3
		<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
		<p><b>On Workers</b></p> <ul style="list-style-type: none"> <li>Increased pollution in working zone of project site such as dust diffusion, excess noise.</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

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

Aspects	Potential Impacts	Mitigation Measures	Location	Period/ Frequency	Status	Details	Recommendation	Remarks/ Reference
	<ul style="list-style-type: none"> <li>Carelessness of workers may cause fire, injuries and death.</li> </ul>	<ul style="list-style-type: none"> <li>Install appropriate warning signs, markings and safety signs.</li> </ul>			✓	Warning signs were installed both in construction area and in front of the construction area which can be clearly seen at the public road.	-	Figure 2-6
		<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 2-18
		<ul style="list-style-type: none"> <li>Provide smoking area in the construction zone.</li> </ul>			✓	Smoking areas was provided in the west and in front of construction area.	-	Figure 2-19



Figure 2-2 PVC mesh sheet



Figure 2-3 Personal protective equipment (PPE)



Figure 2-4 Noise barrier



Figure 2-5 Machine in construction area



Figure 2-6 Warning sign



Figure 2-7 Security guard



Figure 2-8 Signal man



Figure 2-9 Public road (in front of the construction area)



Figure 2-10 Muster point



Figure 2-11 Storage area



Figure 2-12 Waste containers



Figure 2-13 Toilets and Mobile toilets





Figure 2-14 Temporary drainage system



Figure 2-15 Civil engineer and safety staff



Figure 2-16 Signboard in front of the construction area



Figure 2-17 Medic room



Figure 2-17 (Cont.) Medic room



Figure 2-18 Firefighting equipment



Figure 2-19 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 PTTEP's Yangon Office Building during construction phase, the detail is presented as follow;

#### **3.1 Environmental Monitoring Plan**

Environmental monitoring for PTTEP'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 in Construction Phase during January – June 2019**

Environmental Quality	Parameter	Duration/Frequency of Monitoring	Location	Implemented	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>	<u>Duration</u> 2 consecutive days during construction period including weekday and weekend <u>Frequency</u> Twice a year during construction period	<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 March 8-10, 2019. The result as shown in Content 3.2.1.</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>	<u>Duration</u> 2 consecutive days during construction period including weekday and weekend <u>Frequency</u> Twice a year during construction period	<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 March 8-10, 2019. The result as shown in Content 3.3.4.</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 3.4.2.</li></ul>	-

**Table 3-1 Environmental Monitoring Plan of PTTEP's Yangon Office Building in Construction Phase during January – June 2019**

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 3.5.3.</li> </ul>	-

## 3.2 Fugitive Dust Monitoring

Fugitive dust monitoring was conducted by REM-UAE Laboratory and Consultant Company Limited on March 8-10, 2019 and March 10-12, 2019. 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> </ul>	March 8-10, 2019
		<ul style="list-style-type: none"> <li>2 stations at buildings nearby construction site, comprising:                             <ul style="list-style-type: none"> <li>1) PTTEPI Building 7 : West of construction fence (A2)</li> <li>2) House behind PTTEPI Office : South-east of construction fence (A5)</li> </ul> </li> </ul>	March 8-10, 2019
			March 10-12, 2019

### 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	195164.54	1867478.46
2. PTTEPI Building 7 : West of construction fence (A2)	47Q	195154.37	1867467.01
3. House behind PTTEPI Office : South-east of construction fence (A5)	47Q	195173.26	1867446.36



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 and PTTEPI Building 7 during March 8-10, 2019. House behind PTTEPI Office was monitored during March 10-12, 2019 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**

### 3.2.4 Fugitive Dust Monitoring Result

Referring to analysis number T19AD591-0001, T19AD591-0004, T19AD591-0007, T19AD591-0010, T19AD591-0013 and T19AD591-0016 fugitive dust samples were conducted during March 8-10, 2019 and March 10-12, 2019 in construction phase. Fugitive dust monitoring results are shown in Table 3-5.

#### 1) Construction site : North of construction fence (A1)

The result of Total Suspended Particulate (TSP) was complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed  $230 \mu\text{g}/\text{m}^3$ . While Particulate matter less than 10 Micron (PM-10) was not complied with National Environmental Quality (Emission) Guideline (NEQG) which determined that PM10 should not exceeded  $50 \mu\text{g}/\text{m}^3$  but not exceeded the Ambient Air Quality Standard of WHO and IFC which determined that PM10 should not exceeded  $150 \mu\text{g}/\text{m}^3$ .

#### 2) PTTEPI Building 7 : West of construction fence (A2)

Total Suspended Particulate (TSP) of PTTEPI Building 7 : West of construction fence were not complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed  $230 \mu\text{g}/\text{m}^3$ . For Particulate matter less than 10 Micron (PM-10) results found that during March 8-9, 2019 the result was not complied with with National Environmental Quality (Emission) Guideline (NEQG) and during March 9-10, 2019 the result was not complied with National Environmental Quality (Emission) Guideline (NEQG) and Ambient Air Quality Standard of WHO and IFC.

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

The result of Total Suspended Particulate (TSP) found that were not complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed  $230 \mu\text{g}/\text{m}^3$ . For Particulate matter less than 10 Micron (PM-10) results found that during March 9-10, 2019 the result was not complied with with National Environmental Quality (Emission) Guideline (NEQG) and Ambient Air Quality Standard of WHO and IFC. During March 10-11, 2019 the result was not complied with with National Environmental Quality (Emission) Guideline (NEQG).

From Wind statistics data for Yangon Airport based on observations taken between 01/2012 - 03/2019 daily from 7am to 7pm local time indicated that during March in Yangon the wind blew from Southwest (SW). From local wind direction during March in Yangon suggested that PTTEPI Building 7 : West of construction fence (A2) and House behind PTTEPI Office : South-east of construction fence (A5) were upwind. Thus, Total Suspended Particulate (TSP) and particulate matter less than 10 Micron (PM-10) which not complied to the standard probability from both internal and external factor including traffic on the public road nearby project area, during sampling period was dry season can cause higher concentration of particulate matter in ambient air. In addition, air quality index data source (<https://www.airvisual.com/world-air-quality>) shown that the risk of air pollution was high and the air quality index was red during dry season in Myanmar (Figure 3-3) .

However, the project provided environmental mitigation measure in order to prevent and reduce the impacts on air quality from dust dispersion resulting from project activities including water spraying, PVC mesh sheets around the construction areas.

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)	March 8-9, 2019	202	94
	March 9-10, 2019	208	111
2. PTTEP Building 7 : West of construction fence (A2)	March 8-9, 2019	252	122
	March 9-10, 2019	317	152
3. House behind PTTEP Office : South-east of construction fence (A5)	March 10-11, 2019	470	153
	March 11-12, 2019	392	140
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.



**Figure 3-3 Live AQI on April 10, 2019**

### 3.2.5 Comparison of Fugitive Dust Monitoring Result

Comparison of fugitive dust monitoring results in construction phase 2019 were compared with the previous data found that the results of Total Suspended Particulate (TSP) and Particulate matter less than 10 Micron (PM-10) tended to increase at all stations.

However, most 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 2018-2019**

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
	March 8-9, 2019	<b>202</b>	<b>94</b>
	March 9-10, 2019	<b>208</b>	<b>111</b>
2. PTTEP 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
	March 8-9, 2019	<b>252</b>	<b>122</b>
	March 9-10, 2019	<b>317</b>	<b>152</b>
3. House behind PTTEP 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
	March 10-11, 2019	<b>470</b>	<b>153</b>
	March 11-12, 2019	<b>392</b>	<b>140</b>
National Environmental Quality (Emission) Guideline (NEQG) <sup>2/</sup>		-	<b>50</b>
Ambient Air Quality Standard of WHO and IFC <sup>3/</sup>		-	<b>150</b>
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> Baseline data from Initial Environmental Examination (IEE) for PTTEP's Yangon Office Building Construction

<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>	March 8-10, 2019  March 8-10, 2019  March 10-12, 2019

#### 3.3.1 Noise Level Monitoring Station

The detail and coordinate of noise level monitoring station as shown in Table 3-8 and Figure 3-4.

**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	195165.75	1867495.53
2. PTTEPI Building 7 : West of construction fence (N2)	47Q	195149.18	1867456.39
3. House behind PTTEPI Office : South-east of construction fence (N5)	47Q	195173.79	1867432.79

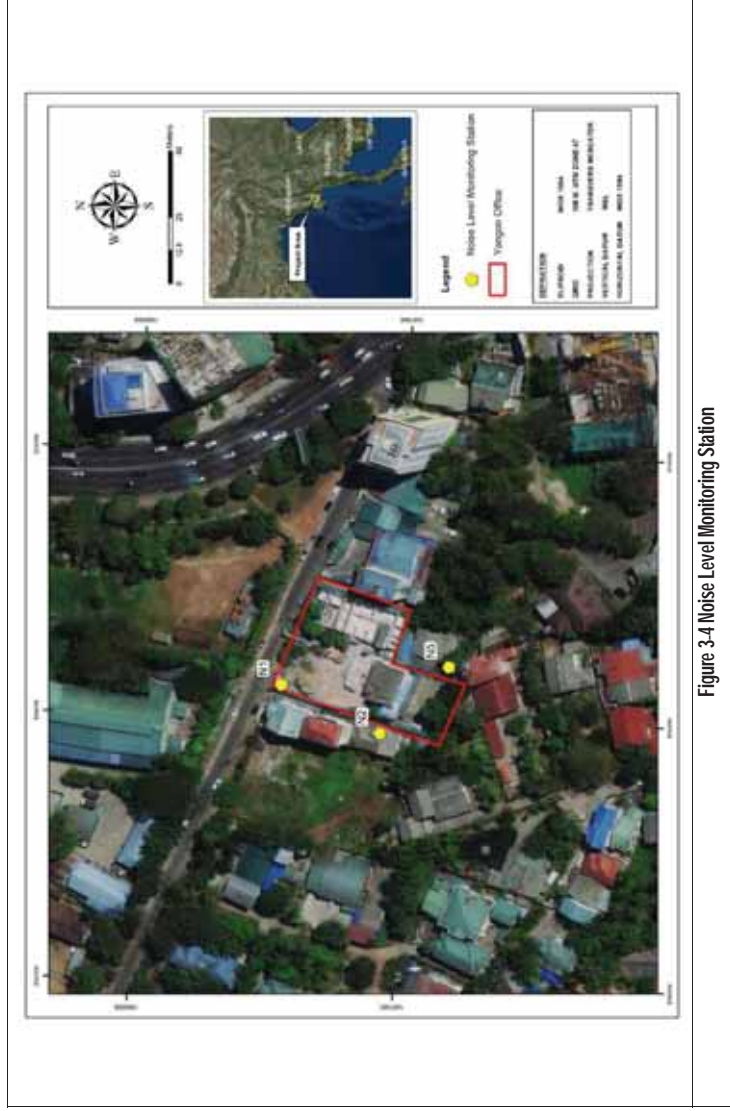


Figure 3-4 Noise Level Monitoring Station

### 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-1}</math> hr (day time)</li> <li><math>L_{Aeq-1}</math> hr (nighttime)</li> </ul>	<p>Integrated Sound</p> <p>Level Meter</p>	<p>Integrated Sound</p> <p>Level Meter</p>	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 and PTTEPI Building 7 during March 8-10, 2019. House behind PTTEPI Office was monitored during March 10-12, 2019 as shown in Figure 3-5.



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 3-5 Noise Level Monitoring**

### 3.3.4 Noise Level Monitoring Results

Referring to analysis number T19AD592-0005, T19AD592-0010, T19AD592-0015, T19AD592-0020, T19AD592-0025, T19AD592-0030 noise level monitoring during March 8-10, 2019 and March 10-12, 2019 in 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 53.3-82.5 and 53.2-66.0 dB(A), respectively. Most of the result of  $L_{Aeq}$ -1 hr daytime and all the result of  $L_{Aeq}$ -1 hr night time has complied with NEQG, 2015 for Industrial/ Commercial Area which determined  $L_{Aeq}$ -1 hr daytime and night time not more than 70 dB(A) except  $L_{Aeq}$ -1 during 09.00-10.00 hr and 11.00-16.00 hr on March 8, 2019. The result of  $L_{Aeq}$ -1 hr daytime which exceeded the standard might be caused by both from project activities during work hour and external factors like the traffic on the nearby road which located approximately 10 meters away from the monitoring station. PTTEPI should be continually monitoring as specified in the measure for surveillance of environmental impact from project activities.

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

The  $L_{Aeq}$ -1 hr daytime and nighttime ranged from 55.1-82.7 and 55.7-63.4 dB(A), respectively. Most of the result of  $L_{Aeq}$ -1 hr daytime and all the result of  $L_{Aeq}$ -1 hr night time has complied with NEQG, 2015 for Industrial/ Commercial Area which determined  $L_{Aeq}$ -1 hr daytime and night time not more than 70 dB(A). except  $L_{Aeq}$ -1 during 10.00-11.00 hr, 12.00-17.00 hr on March 8, 2019 and 08.00-10.00 hr on March 10, 2019. The result of  $L_{Aeq}$ -1 hr daytime which exceeded the standard might be caused by both from project activities during work hour and external factors like the traffic on the nearby road which located approximately 40 meters away from the monitoring station. PTTEPI should be continually monitoring as specified in the measure for surveillance of environmental impact from project activities.

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

The  $L_{Aeq}$ -1 hr daytime and nighttime ranged from 55.0-71.2 and 54.7-61.6 dB(A), respectively respectively. Most of the result of  $L_{Aeq}$ -1 hr daytime and all the result of  $L_{Aeq}$ -1 hr night time has complied with NEQG, 2015 for Industrial/ Commercial Area which determined  $L_{Aeq}$ -1 hr daytime and night time not more than 70 dB(A) except 09.00-10.00 hr and 14.00-15.00 hr on March 11, 2019. The activity near this monitoring station was welding so this might be the cause of  $L_{Aeq}$ -1 hr daytime exceeded the NEQG, 2015 for Industrial/ Commercial Area.

However, the project provided environmental mitigation measure in order to reduced the impacts on excessive noise to disturb the nearby communities including carried out the construction activities with high noise level only at day time. PTTEPI also installed noise barrier (metal sheet) around the construction site to reduce noise impact to nearby communities. In addition, 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 <sub>Aeq</sub> -1 hr (day time) 07.00-22.00	L <sub>Aeq</sub> -1 hr (night time) 22.00-07.00
1. Construction site : North of construction fence (N1)	March 8-9, 2019	56.7- <b>82.5</b>	53.2-58.8
	March 9-10, 2019	53.3-66.4	54.1-66.0
2. PTTEPI Building 7 : West of construction fence (N2)	March 8-9, 2019	57.2- <b>82.7</b>	55.7-60.5
	March 9-10, 2019	55.1- <b>77.1</b>	56.1-63.4
3. House behind PTTEPI Office : South-east of construction fence (N5)	March 10-11, 2019	60.1- <b>70.1</b>	59.4-61.6
	March 11-12, 2019	55.0- <b>71.2</b>	54.7-59.8
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 2019 were compared with the previous activity in 2018 data found that L<sub>Aeq</sub>-1 hr daytime tended to increase at construction site: North of construction fence (N1) and PTTEPI Building 7: West of construction fence (N2). For L<sub>Aeq</sub>-1 hr nighttime, the comparison results found that the values tended to decrease at Construction site: North of construction fence (N1) and House behind PTTEPI Office: South-east of construction fence (N5) whereas there was increase 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 during 2018-2019**

Stations	Date	Result <sup>1/</sup>	
		L <sub>Aeq</sub> -1 hr (day time) 07.00-22.00	L <sub>Aeq</sub> -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
	March 8-9, 2019	56.7-82.5	53.2-58.8
	March 9-10, 2019	53.3-66.4	54.1-66.0
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
	March 8-9, 2019	57.2-82.7	55.7-60.5
	March 9-10, 2019	55.1-77.1	56.1-63.4
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
	March 10-11, 2019	60.1-70.1	59.4-61.6
	March 11-12, 2019	55.0-71.2	54.7-59.8
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> Baseline data from 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 during January – June 2019 in construction phase 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>Compliants' 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 3-6.



Figure 3-6 Grievance Handling Process

### 3.4.2 Grievance Mechanism Monitoring Result

Grievance mechanism monitoring results for construction phase of PTTEPI's Yangon Office Building during January – May 2019 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 during January – May 2019 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>	<ul style="list-style-type: none"> <li>Construction site and working areas</li> <li>House nearby construction site</li> </ul>	Throughout construction period

### 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 PTTEP's Yangon Office Building were done by the contractor during January-May 2019. There were 10 cases of incident from project activity in the construction period including 4 cases of property damage or loss, 1 case of near miss, 3 cases of first aid case and 2 cases of non work related. The details as shown in **Error! Reference source not found.** and Appendix E-7. Corrective actions were proposed/implemented to prevent reoccurrence.

**Table 3-14 Summarization of Incident Cases**

No.	Activity/ Package	Incident date & time	Root Case	Preventance action	Incident one-line summary
1	Property damage or loss	16.01.2019/ 08:17 AM	Skipping of lifting procedure, and not follow labor law	Refresh training to involved persons	Rebar cage Contact
2	Property damage or loss	14.02.2019/ 02:10 AM	Maximum over load	Repaired back and PE calculated again	H-beam Damage
3	First-aid	23.02.2019/ 02:37 PM	No provide related PPE	Before start work related PPE are provided.	Finger Injury by Binding Wire
4	First Aid	07.03.2019/ 03:20 PM	Slip & trip hazard	Refresh training to scaffold supervisor	Fall from unsecure scaffold support
5	Near miss	08.03.2019/ 09:10 AM	No provided steel plates	More provide steel plates for heavy vehicles parking area	Concrete pump truck stuck at the work site
6	Non work related Property damage	10.03.2019/ 23:25 PM	Human behaviour	Refresh training to security for communicate to people	(Site entrance door was damaged)

**Table 3-14 Summarization of Incident Cases**

No.	Activity/ Package	Incident date & time	Root Case	Preventance action	Incident one-line summary
7	H-beam contacted to brick wall Property damage	30, March 2019 (23:05)	JMP Producer not follow	Refresh training to driver for communicate to people	(Site entrance Brick wall was cracked)
8	Aircon Safeguard Electrical Cable Burning Property damage	14, May, 2019 09:05AM	By pass cable termination	Refresh Electrical hazard training to M&E Staff	(Aircon Safeguard Electrical Cable Burning )
9	Worker get hypoglycemia First aid	20, May, 2019 08:07AM	Lack of Supervision	Before work check Blood pressure and alcohol test	First aid (suddenly faint down to floor)
10	Found A Bomb During Excavation By Excavator Non work related	24, May, 2019 11:45AM	Closing Supervise future soil excavation	Lesson Learn	Non work related Immediately report and remove to Government Authority.

*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

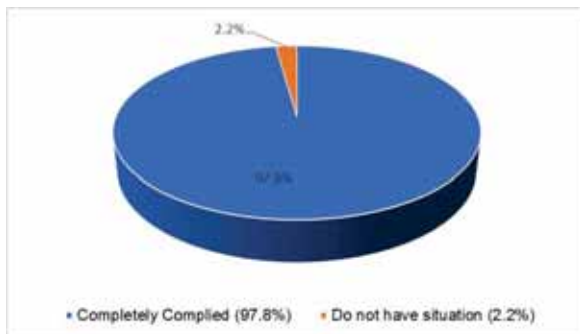
Environmental Mitigation Measures Implementation Compliance audit was carried out by REM-UAE Laboratory and Consultant Company Limited together with representatives from PTTEPI. The audit conducted against the mitigation measures specified in Environmental Management Plan.

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 January – June 2019 in construction phase with 97.8% and do not have situation with 2.2%. The results are shown in Figure 4-1.



**Figure 4-1 The Results of Environmental Mitigation Measures Compliance in Construction Phase during January – June 2019**

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

- Air Pollution** - The project assigned staff to spray water around construction area three time a day or more, depending on the atmospheric conditions. PVC mesh sheet is provided to cover around the construction areas in order to prevent dust dispersion and reduced effected to the communities nearby the construction site and along the transportation route. The main activity during January-June 2019 of the project was foundation and structural work which generally used excavator and car drilling machine which parked at construction area and moved after the finished activities. However, in case of the project has activity about construction materials transportation, the truck was covered during transport material to the construction area as specified in measure. Moreover, the contractor provided dust masks for workers and controlled to use during working.
- Excessive Noise and Vibration** - The contractor provided ear muffs for workers and controlled to use during working in high noise area including controlled workers to carried out the construction activities with high noise and vibration level at day time. Noise barrier (metal sheet) was installed around the construction site to reduce noise impact to nearby communities.
- Traffic** - The contractor informed about construction plan and transportation route for construction materials and heavy vehicles to local people. However, there was not found the transportation of construction materials, only caterpillar drill machine which parked at construction area and moved after the finished activities. Moreover, warning signs were installed and can be clearly seen at the public road (in front of the construction area) and within 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. Random drug testing was implemented, worker who found to be positive in drug testing shall be required to undergo rehabilitations and counseling in government accredited center.

- **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 contractor provided mobile toilets within construction area and 4 toilets at PTTEPI's for 70 workers. However, the contractor has to moved mobile toilet out due to the limitation in construction area. The contractor installed drainage system in the construction area to hold wastewater before discharged out of the project. The contractor enforced all worker to dispose waste properly 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.

- **Public health and safety**

- **Health** – The project strictly implemented mitigation measures as per IEE report.
- **Safety** - 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. In addition, the training was regularly

performed as per the annual SSHE Training Plan. Tool box talk was provided in daily before working by the header of contractor/safety officer. The medic was stand by at medic room for medical treatment included first aid kit and medical supplies. Warning signs were installed both in construction area and in front of the construction area which can be clearly seen at the public road. Routine inspection and preventive maintenance for all equipment were conducted as per inspection plan. Moreover, Firefighting equipment were provided in the construction area and inspected monthly. Smoking areas was provided in the west and in front of construction area.

## 4.2 Environmental Monitoring Result Conclusion

The project was completely complied the environmental impact monitoring as specified in IEE, including Fugitive dust monitoring, Noise level monitoring, Grievance mechanism monitoring, Public and occupational health and safety monitoring as shown in Figure 4-2.

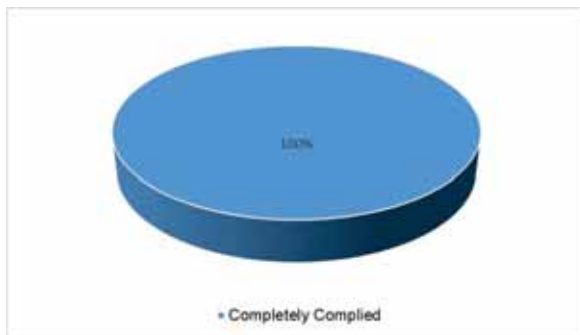


Figure 4-2 The Results of Environmental Monitoring in Construction Phase during January – June 2019

### 4.2.1 Fugitive Dust Monitoring

Fugitive dust samples were monitored at construction site and PTTEPI Building 7 during March 8-10, 2019. House behind PTTEPI Office was monitored during March 10-12, 2019. The results of fugitive dust are summarize as follow;

#### 1) Construction site : North of construction fence (A1)

The result of Total Suspended Particulate (TSP) was complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed  $230 \mu\text{g}/\text{m}^3$ . While Particulate matter less than 10 Micron (PM-10) was not complied with National Environmental Quality (Emission) Guideline (NEQG) which determined that PM10 should not exceeded  $50 \mu\text{g}/\text{m}^3$  but not exceeded the Ambient Air Quality Standard of WHO and IFC which determined that PM10 should not exceeded  $150 \mu\text{g}/\text{m}^3$ .

## 2) PTTEPI Building 7 : West of construction fence (A2)

Total Suspended Particulate (TSP) of PTTEPI Building 7 : West of construction fence were not complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed  $230 \mu\text{g}/\text{m}^3$ . For Particulate matter less than 10 Micron (PM-10) results found that during March 8-10, 2019 the result was not complied with National Environmental Quality (Emission) Guideline (NEQG) and during March 9-10, 2019 the result was not complied with National Environmental Quality (Emission) Guideline (NEQG) and Ambient Air Quality Standard of WHO and IFC.

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

The result of Total Suspended Particulate (TSP) found that were not complied with Ambient Air Quality of WORLD BANK GROUP which determined that Average 24 hours TSP should not exceed  $230 \mu\text{g}/\text{m}^3$ . For Particulate matter less than 10 Micron (PM-10) results found that during March 9-10, 2019 the result was not complied with National Environmental Quality (Emission) Guideline (NEQG) and Ambient Air Quality Standard of WHO and IFC. During March 10-11, 2019 the result was not complied with National Environmental Quality (Emission) Guideline (NEQG).

From Wind statistics data for Yangon Airport based on observations taken between 01/2012 - 03/2019 daily from 7am to 7pm local time indicated that during March in Yangon the wind blew from Southwest (SW). From local wind direction during March in Yangon suggested that PTTEPI Building 7: West of construction fence (A2) and House behind PTTEPI Office: South-east of construction fence (A5) were upwind. Thus, Total Suspended Particulate (TSP) and particulate matter less than 10 Micron (PM-10) which not complied to the standard probability from both internal and external factor including traffic on the public road nearby project area, during sampling period was dry season can cause higher concentration of particulate matter in ambient air. In addition, air quality index data source (<https://www.airvisual.com/world-air-quality>) shown that the risk of air pollution was high and the air quality index was red during dry season in Myanmar. However, the project provided environmental mitigation measure in order to prevent and reduce the impacts on air quality from dust dispersion resulting from project activities including water spraying, PVC mesh sheets around the construction areas.

## 4.2.2 Noise Level Monitoring

Noise level monitoring was conducted at construction site and PTTEPI Building 7 during March 8-10, 2019. House behind PTTEPI Office was monitored during March 10-12, 2019. The result of noise level are summarized as below;

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

The  $L_{Aeq}$ -1 hr daytime and nighttime ranged from 53.3-82.5 and 53.2-66.0 dB(A), respectively. Most of the result of  $L_{Aeq}$ -1 hr daytime and all the result of  $L_{Aeq}$ -1 hr night time has complied with NEQG, 2015 for Industrial/ Commercial Area which determined  $L_{Aeq}$ -1 hr daytime and night time not more than 70 dB(A) except  $L_{Aeq}$ -1 during 09.00-10.00 hr and 11.00-16.00 hr on March 8, 2019. The result of  $L_{Aeq}$ -1 hr daytime which exceeded the standard might be caused by both from project activities during work hour and external factors like the traffic on the nearby road which located approximately 10 meters away from the monitoring station. PTTEPI should be continually monitoring as specified in the measure for surveillance of environmental impact from project activities.

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

The  $L_{Aeq}$ -1 hr daytime and nighttime ranged from 55.1-82.7 and 55.7-63.4 dB(A), respectively. Most of the result of  $L_{Aeq}$ -1 hr daytime and all the result of  $L_{Aeq}$ -1 hr night time has complied with NEQG, 2015 for Industrial/ Commercial Area which determined  $L_{Aeq}$ -1 hr daytime and night time not more than 70 dB(A) except  $L_{Aeq}$ -1 during 10.00-11.00 hr, 12.00-17.00 hr on March 8, 2019 and 08.00-10.00 hr on March 10, 2019. The result of  $L_{Aeq}$ -1 hr daytime which exceeded the standard might be caused by both from project activities during work hour and external factors like the traffic on the nearby road which located approximately 40 meters away from the monitoring station. PTTEPI should be continually monitoring as specified in the measure for surveillance of environmental impact from project activities.

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

The  $L_{Aeq}$ -1 hr daytime and nighttime ranged from 55.0-71.2 and 54.7-61.6 dB(A), respectively. Most of the result of  $L_{Aeq}$ -1 hr daytime and all the result of  $L_{Aeq}$ -1 hr night time has complied with NEQG, 2015 for Industrial/ Commercial Area which determined  $L_{Aeq}$ -1 hr daytime and night time not more than 70 dB(A) except 09.00-10.00 hr and 14.00-15.00 hr on March 11, 2019. The activity near this monitoring station was welding so this might be the cause of  $L_{Aeq}$ -1 hr daytime exceeded the NEQG, 2015 for Industrial/ Commercial Area.

However, the project provided environmental mitigation measure in order to reduce the impacts on excessive noise to disturb the nearby communities including carried out the construction activities with high noise level only at day time. PTTEPI also installed noise barrier (metal sheet) around the construction site to reduce noise impact to nearby communities. In addition, PTTEPI will also keep continue the monitoring to check the noise level as bi-annually basis.

## **4.2.3 Grievance Mechanism Monitoring**

Grievance mechanism monitoring results for construction phase of PTTEPI's Yangon Office Building during January-June 2019 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 January-May 2019. There were 10 cases of incident from project activity in the construction period including 4 cases of property damage or loss, 1 case of near miss, 3 cases of first aid case and 2 cases of non work related. Corrective actions were proposed/implemented to prevent reoccurrence.