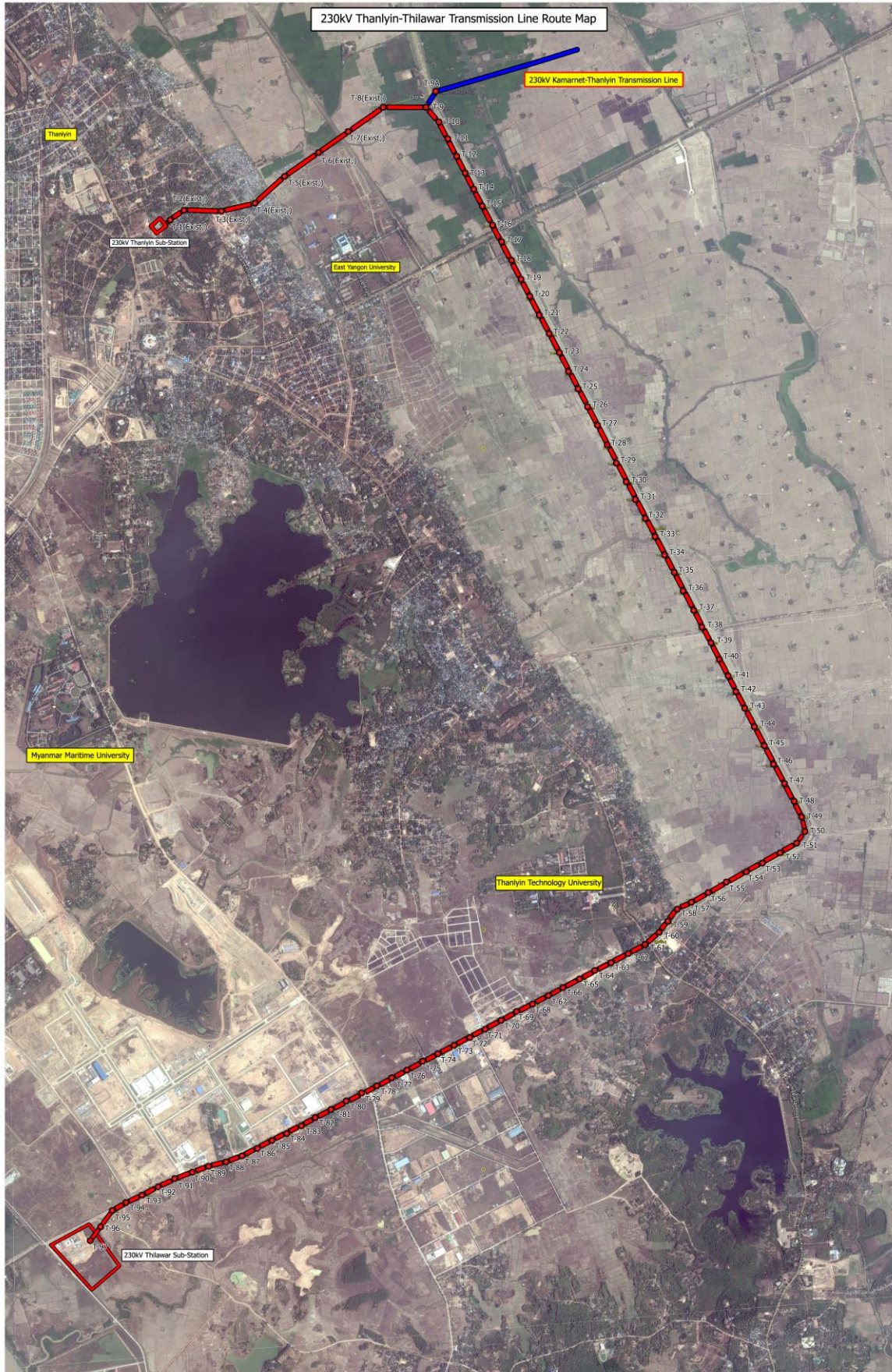


**230 kV TRANSMISSION LINE AND SUBSTATION
FOR
SUB-PROJECT FOR ELECTRIC POWER
DEVELOPMENT IN THILAWA AREA**

**INITIAL ENVIRONMENTAL EXAMINATION
REPORT**

16 August, 2024

**Department of Power Transmission and System
Control
Ministry of Electric Power**



Source: TOENEC Corporation

Location Map of Transmission Line & Substation Development Project

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LIST OF ABBREVIATIONS

ADB	Asia Development Bank
AIDS	Acquired Immune Deficiency Syndrome
As	Arsenic
B	Boron
Ba	Barium
BOD	Biological Oxygen Demand
Cd	Cadmium
COD	Chemical Oxygen Demand
Cu	Copper
CN	Cyanide
Cr	Chromium
Cr(VI)	Hexavalent Chromium
°C	Degree Centigrade
dB(A)	A weighted decibel (Unit of Noise Level Measurement)
DMH	Department of Meteorology and Hydrology
DMS	Detailed Measurement Survey
DO	Dissolved Oxygen
DPTSC	Department of Power Transmission and System Control
ECL	Environmental Conservation Law
ECRs	Environmental Conservation Rules
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EC	Electrical conductivity
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
ERA	Emergency Risk Assessments
EU	European Union
Fe	Iron
FNU	Turbidity
GAD	General Administrative Department
GIS	Gas Insulated Switchgear
GPS	Global Positioning System
GRS	Gas Regulation Station
GT	Gas Turbine
GTC	Government Technological University
Ha	Hectare (Unit of land area)
Hg	Mercury
HIA	Health Impact Assessment

HIV	Human Immunodeficiency Virus
H ₂ S	Hydrogen Sulfide
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IMG	International Management Group
ISO	International Organization for Standardization
JICA	Japan International Cooperation Agency
kV	Kilo Volt
Leq	Equivalent sound level
LAeq	A-weighted loudness equivalent
MEPE	Myanma Electric Power Enterprise
MKI	Myanmar Koei International Co., Ltd
Mn	Manganese
MMU	Myanmar Maritime University
MOC	Ministry of Construction
MOE	Ministry of Energy
MOEE	Ministry of Electricity and Energy
MOECAP	Ministry of Environmental Conservation and Forestry
MOEP	Ministry of Electric Power
MOGE	Myanma Oil and Gas Enterprise
MONREC	Ministry of Natural Resources and Environmental Conservation
MOT	Ministry of Transport
MSWRR	Ministry of Social Welfare, Relief and Resettlement
MW	Mega Watt
MVA	Mega Volt Ampere
NEQEG	National Environmental Quality (Emission) Guidelines
Ni	Nickel
NK	Nippon Koei Co., Ltd
No.	Number
NO ₂ -N	Nitrite-nitrogen
NO ₃ -N	Nitrate-nitrogen
NH ₄ -N	Ammonium Nitrogen
OHS	Occupational Health and Safety
ORP	Oxidation-Reduction Potential
PAL	Project Affected Land
PAP	Project Affected People
Pb	Lead
PCM	Public Consultation Meeting
pH	potential of Hydrogen
PO ₄ -P	Phosphorous Phosphate
REM	Resource and Environment Myanmar Ltd.

ROW	Right of Way
Se	Selenium
SEZ	Special Economic Zone
SHM	Stakeholder Meeting
SIA	Social Impact Assessment
SS	Suspended Solid
TDS	Total Dissolved Solids
Cr	Total Chromium
T- N	Total Nitrogen
T-P	Total Phosphorous
TOR	Terms of Reference
Cr (III)	Trivalent Chromium
TSMC	Thilawa SEZ Management Committee
US EPA	United States Environmental Protection Agency
UMFCCI	Union of Myanmar Federation of Chambers of Commerce and Industry
UN	United Nations
WHO	World Health Organization
YCDC	Yangon City Development Committee
Zn	Zinc

EXECUTIVE SUMMARY

1. Project Proponent/ Owner

Power Transmission Projects (PTP) under the Department of Power Transmission and System Control (DPTSC) in the Ministry of Electric Power (MOEP)

Address: Building No. 27, Naypyitaw, Myanmar

2. Type of Project and IEE/ EIA Requirement

- 1) Type of Project: Construction of 230 kV Transmission Line and a Substation
- 2) IEE/EIA Requirement: IEE is required. (construction of 10 miles long 230 kV Electrical Power Transmission Line and High voltage 230 kV Transformers Substation)

3. Implementation Organizations of IEE

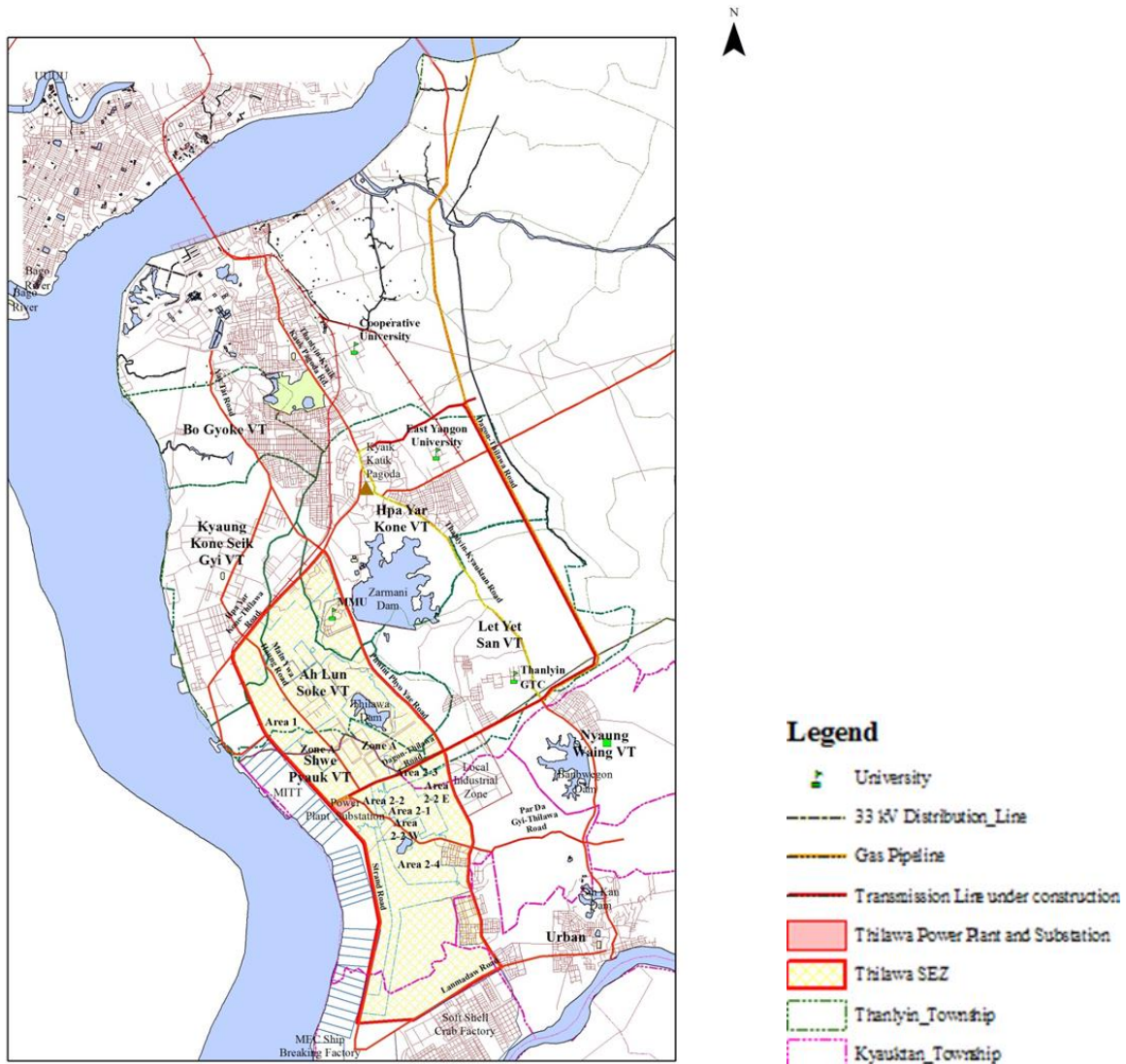
There are three organizations to implement IEE as follows;

- 1) Leading organization: Nippon Koei Co., Ltd. (NK), overall management of IEE study
Address: 4, 5-chome, Chiyoda-ku Tokyo, Japan.
- 2) Second organization: Myanmar Koei International Co., Ltd., (MKI) coordination of IEE study
Address: No. 36A, 1F, Grand Pho Sein Condominium, Pho Sein Rd, Tamwe Township, Yangon, Myanmar.
- 3) Third organization: Resource and Environment Myanmar Ltd., (REM), conducting environmental and social survey
Address: Address: 702 Delta Plaza, Shwegondaing Road, Bahan Township, Yangon, Myanmar.

4. Project Outline

The Government of Myanmar has received a loan from the Japan International Cooperation Agency (JICA) to finance the Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I). The Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I) includes

- i) construction of 33 kV distribution line which can feed 25 MW to Thilawa for power supply in a short period in the initial stage, (from September, 2014 to March 2015)
- ii) construction of 50 MW dual fuel Gas Turbine (GT) power plant, (March, 2015 to May, 2017)
- iii) 230 kV Transmission Line and Substation as an additional power supply facilities before the power demand for the SEZ exceeds 25 MW to meet increasing power demand in Thilawa area and (June, 2016 to September, 2017)
- iv) construction of Gas Pipeline having 20 inches diameter from South Dagon valve house to GT in Thilawa and construction of Gas Regulation Station (GRS) at about 17.6 ft (3.2 km) away from dual fuel GT Thilawa powerplant in 2015. (March, 2015- February, 2016). The location of each package is shown in Figure 1.



Source: IEE Study Team

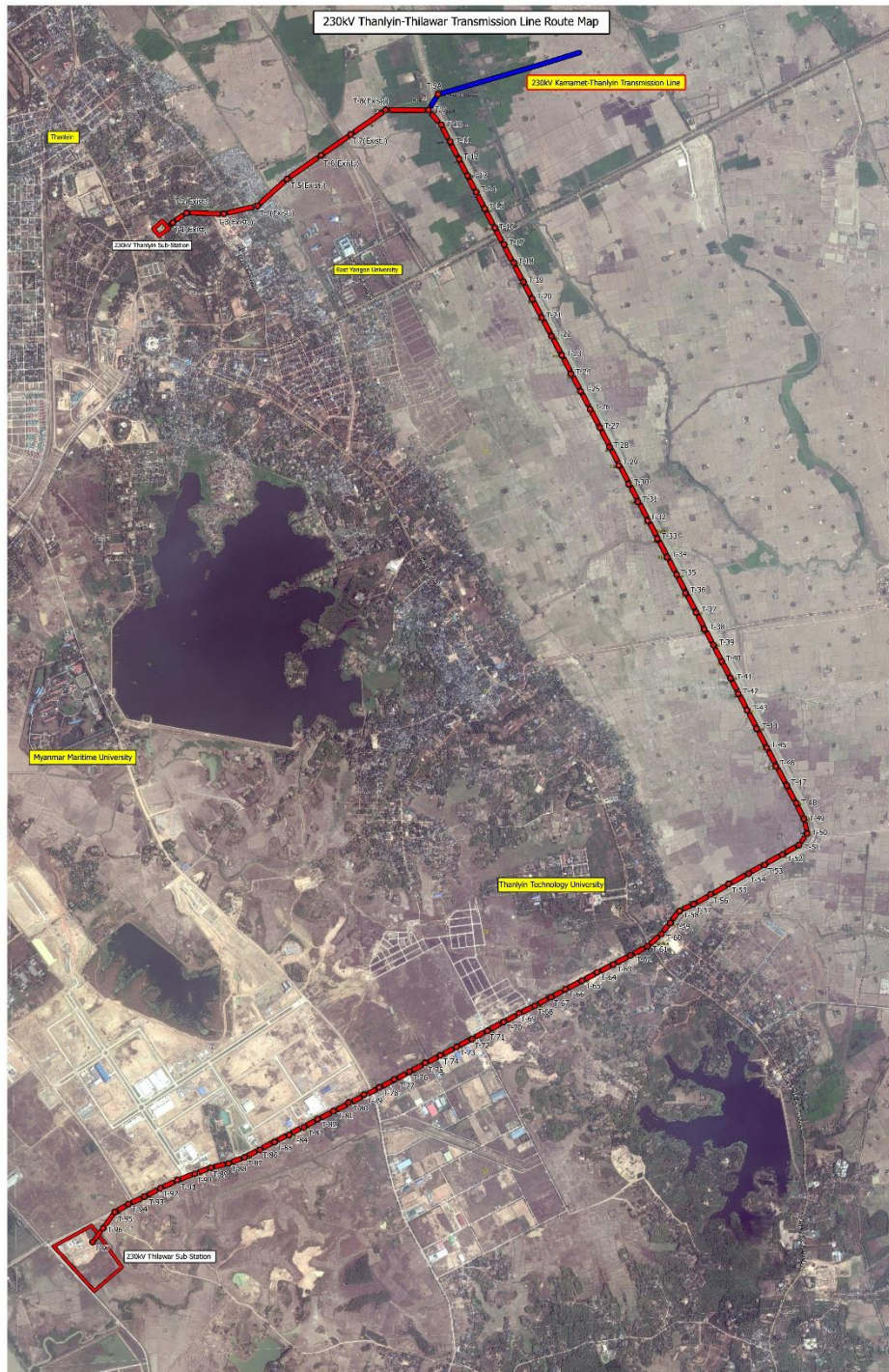
Figure 1 Location of Thilawa Power Plant and Substation, Line route of 33 kV Distribution Line, 230 kV Transmission Line and Gas Pipeline

230 kV Transmission Line and Substation Project (the Project) is one of the Packages of the Sub-project which is to secure the power supply not only to the Thilawa Special Economic Zone (SEZ) but also to the surrounding area including the ports and to promote investment in Thilawa SEZ and in Thilawa area. As of August, 2017, 27 numbers of factories are under operation and 35 numbers of factories are under construction in 400 ha wide Thilawa SEZ (Zone A). 101 ha wide Thilawa SEZ (Zone B (Phase 1) is under preparing of infrastructure and it is expected to complete in the middle of 2018.

5. Project Description

(1) Proposed alignment 230 kV Transmission Line

10 miles long 230 kV double circuit Transmission Line is proposed to construct from Thanlyin substation to Thilawa substation by connecting existing Kamarnet-Thanlyin 230 kV Transmission Line. A new Thanlyin-Thilawa 230 kV Transmission Line route is shown in Figure 2.

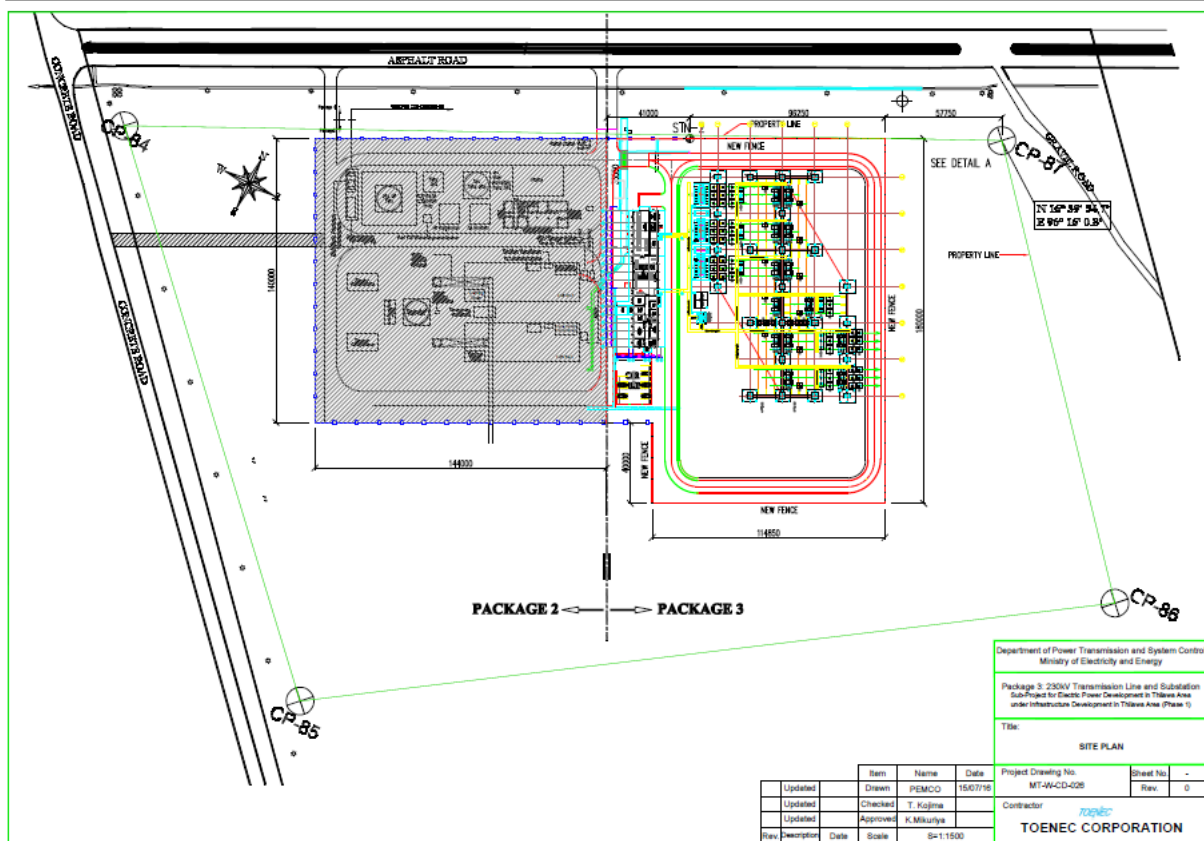


Source: TOENEC Corporation

Figure 2 Proposed Alignment of Transmission Line

(2) Layout plan of Thilawa Substation

A new 230 kV substation is to be constructed in Thilawa. The location of a new substation in Thilawa is in the same premises with dual fuel gas turbines. The total premise of dual fuel gas turbines and a substation is 10 ha wide and the new substation requires 2 ha of land. Layout plant of Thilawa is shown in Figure 3.



Source: IEE Study Team

Figure 3 Layout of Thilawa substation

6. Result of Environmental Impact Assessment (EIA)

Environmental and social impacts of the Project are predicted and evaluated based on the Project description, results of baseline survey, and set target level. The below table shows the summary of environmental and social impacts on the Project before/ during construction and operation phases.

Table 1 Results of Environmental and Social Impact Assessment
(Before/ During Construction and Operation Phases)

Category	Scoping Item	Scoping		Evaluation		Reason for Evaluation
		BC/DC	OS	BC/D C	OS	
EIA (Pollution, Natural Environment)	Air Quality	B-	D	B-	D	DC: Impact on air quality will be limited, because sand dust/emission gas by construction work to affect surrounding area is site specific and temporary event.
	Water Quality	B-	D	B-	D	DC: Impact on water quality by construction work will be limited, because this is a temporary event.
	Solid Waste	B-	D	B-	D	DC: Construction soil and waste will be generated, and they will be reused, recycled, and disposed.
	Noise and Vibration	B-	B-	B-	B-	DC: Impact of noise and vibration by construction machineries will be limited, because noise and vibration from construction work which affect surrounding area are site specific and temporary. OS: Noise and vibration is anticipated from the operation of substation facilities such as transformers and machines in the control panel. However, impacts of noise and vibration from substation facilities on religious facilities and residences will be limited. This is because enough distance is planned to keep between substation and receptors.
	Electric and Magnetic Field	D	D	D	D	OS: According to the publication about Electric and Magnetic Fields and Your Health, edited by the Ministry of Health in New Zealand, electric and

Category	Scoping Item	Scoping		Evaluation		Reason for Evaluation
		BC/DC	OS	BC/D C	OS	
						magnetic field at 132 ft (40 m) distance from high voltage transmission line is estimated as 0.01–0.1 kV/m (one thirtieth at source) and 0.1–0.7 μT (one fifth at source) which is the same as the value exists above an electric blanket. Both electric and magnetic fields decrease rapidly with distance. The impact of transmission line is not anticipated as the height of transmission line is 112 ft (37 m). The impact of substation is not anticipated due to enough distance approx. 825 ft (250 m) between the boundary of substation and residential area. Thus the impact of electric and magnetic field is negligible.
	Hazardous material	D	D	D	D	DC/OS: Transformers which are manufactured recently and free from hazardous materials such as insulating oil of Polychlorinated Biphenyls (PCB) will be installed.
	Transformer's insulating oil and fuel	D	B-	D	B-	OS: Spill or leakage of insulating oil from transformers is anticipated. Prevention of contamination of surrounding environment from spill or leakage of insulating oil from Transformer such as construction of a central oil storage underground concrete tank which collect spill or leakage of oil from all transformers.
SIA	Relocation and Land Acquisition	B-	D	B-	D	DC: Land acquisition for construction of the transmission tower is expected. However, impact of land acquisition will be minimized because most of the transmission line route will be installed within ROW of the existing road which belongs to the Ministry of Construction (MOC). Only two places of agricultural land having 39.3 ft × 39.3 ft (12 m × 12 m) each will be acquired for each number of lattice tower. 100 ft × 100 ft (30.3 m × 30.3 m) wide land area is necessary for construction of each lattice tower.
HIA	Occupational Health and Safety (including accident)	B-	B-	B-	B-	DC: It is necessary to consider occupational health and safety during construction such as accidents, working environment, fire risk, health risk, and use of machineries, chemical, etc... according to Occupational Health and Safety Law (Draft, 2017) in Myanmar, IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guideline and EHS Guidelines for Electric Power Transmission and Distribution. OS: During operation of substation and Transmission Line, occupational health and safety system shall comply with Occupational Health and Safety Law (Draft, 2017) in Myanmar, IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guideline and EHS Guidelines for Electric Power Transmission and Distribution.
	Community Health and Safety (including accident)	B-	B-	B-	B-	DC: It is necessary to avoid impact such as air pollution, water pollution, shortage of natural resources for example ground water, natural noise, vibration, traffic accidents due to construction and many more on local community during construction work according to IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines and IFC EHS Guidelines for Electric Power Transmission and Distribution. OS: During operation phase, community health and safety especially potential exposure to operational accidents and/or natural hazards shall be monitored and evaluated according to IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines, EHS Guidelines for Electric Power Transmission and Distribution.
	Risks of Infectious Disease such as AIDS/HIV	B-	D	B-	D	DC: Risks of infectious diseases such as AIDS/HIV should be checked before the construction phase and awareness training of communicable disease. OS: During operation phase, there is no factor that may

Category	Scoping Item	Scoping		Evaluation		Reason for Evaluation
		BC/DC	OS	BC/D C	OS	
						increase the risk of infectious diseases.
ERA	Flood risk	B-	B-	B-	B-	DC/BC: Flood risk due to heavy rain and cyclone is expected to be little because proper elevation level will be set.
	Risks of Fire	B-	B-	B-	B-	DC/OS: It is necessary to prepare emergency management plan to reduce the risk of fire due to electric leakage and operational accident.

Evaluation: A-: Significant Negative Impact

A+: Significant Positive Impact

B-: Some Negative Impact

B+: Some Positive Impact

C: Impacts are not clear, need more investigation

D: No Impacts or Impacts are negligible, no further study required

Note: BC: Before Construction, DC: During Construction, OS: Operation Stage

Source: IEE Study Team

Table 2 shows results of pollution, national environment, social environment, health and safety, emergency risks, and climate change in closing, termination, and after termination phases.

**Table 2 Results of Environmental and Social Impact Assessment
(Closing, Termination, and after Termination)**

Category	Item	Scoping		Evaluation		Reason for Evaluation
		CL	TM/ ATM	CL	TM/ ATM	
Pollution	Air	B-	D	B-	D	CL: Impact on air quality will be limited, because dust emission by construction work, which affects surrounding area is site specific and temporary event.
	Water	B-	D	B-	D	CL: Impact on water quality by construction work will be limited, because this is a temporary event.
	Solid Waste	B-	D	B-	D	CL: Demolished waste will be generated, and they will be reused, recycled, and disposed.
	Soil	D	D	D	D	CL: Based on the baseline survey result, soil contamination including nature-derived inside project area was not confirmed. Thus, soil contamination by demolishing work will be not occurred.
	Noise and Vibration	B-	D	B-	D	CL: Impact of noise and vibration by construction machineries will be limited, because noise and vibration by construction work, which affects surrounding area is site specific and temporary.
	Subsidence	D	D	D	D	Any activities causing subsidence such as intake water from underground are not anticipated.
	Offensive Odor	D	D	D	D	Any activities causing offensive odor is not anticipated.
	Sedimentation	D	D	D	D	Any activities causing sedimentation condition are not anticipated.
	Natural Preserve	D	D	D	D	No natural preserve area exists in and around the project site.
	Flora, Fauna, and Ecosystem	D	D	D	D	No addition impacts on flora, fauna, and ecosystem are anticipated.
	Hydrology	D	D	D	D	Any activities causing change of hydrology are not anticipated.
	Topography / Geography	D	D	D	D	Large scale of excavation work is not assumed. Thus impact on topography and geography is not anticipated.
	Global warming	D	D	D	D	No significant impact to climate change.
	Hazardous material	D	D	D	D	No significant impact due to hazardous material.
Health and Safety	Transformer's insulating oil and fuel	B-	D	B-	D	CL: When demolishing a substation, contamination of soil from oil storage tank is anticipated and it shall be managed properly with enough care.
	Occupational health and safety (including accident)	B-	D	B-	D	CL: Impact on occupational health and safety is anticipated during closing stage. Working condition, health and safety when closing shall be considered based on Occupational Health and Safety Law (Draft, 2017) in Myanmar, IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guideline and EHS Guidelines for Electric Power Transmission and Distribution.
	Community health and safety	B-	D	B-	D	CL: Impact on community health and safety is anticipated during closing stage. Community health and safety shall be considered according to IFC

Table 4 Mitigation Measures during Construction Stage

Category	Item	Mitigation and Consideration Measures
EIA	Air quality	<ul style="list-style-type: none"> - Sprinkling water around preservation area such as residence - Prohibition of idling will be implemented. - Intensive operating of the construction machinery will be avoided. - Construction equipment, machines and vehicle will be inspected and maintained regularly - Machines, construction equipment and construction waste will be stored at the designated storage area.
	Water quality	<ul style="list-style-type: none"> - Settling ponds or simple turbid water treatment will be installed as necessary. - Simple wastewater treatment facility will be set up in construction site as necessary.
	Solid Waste	<ul style="list-style-type: none"> - Re-utilization of construction soil. - Appropriate disposal of construction waste and solid waste. - Usage of hazardous and chemical substance will be recorded and updated regularly. - Hazardous and chemical substance, which are to be disposed, will be stored at the designated storage area and entrusted to dispose by Kyauktan Township or Thanlyin Township Development Committee or other proper organizations.
	Noise/ Vibration	<ul style="list-style-type: none"> - Installation of soundproof sheet at the places where it is neighbor to preservation area such as residence and pagoda as necessary. - Obey maximum driving speed. - Advanced notice of operations and prohibited time near preservation area.
SIA	Land Acquisition	<ul style="list-style-type: none"> - Crop Compensation will be paid for the land acquisition of transmission towers during construction.
HIA	Occupational Health and Safety	<ul style="list-style-type: none"> - Working condition during construction will be managed by DPTSC based on Occupational Health and Safety Law (Draft, 2017) in Myanmar, IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guideline and EHS Guidelines for Electric Power Transmission and Distribution as follow. * Provision of adequate healthcare facilities (first aid) within construction sites. * Conducting training for all construction workers about basic sanitation and healthcare issues, general health and safety matters, and specific hazards at their work. * Providing personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, spectacles and ear protection. * Providing clean drinking water for all workers. * Providing adequate protection to the general public, including safety barriers and marking of hazardous areas. * Safe access across the construction site. * Adequate drainage throughout the construction site to ensure that disease vectors cannot live in stagnant water bodies and in puddles. * Septic tank and garbage bins will be set up at construction site and they will be regularly cleared by the contractors to prevent outbreak of diseases. * The contractor will arrange the temporary integration of waste collection from work sites into existing waste collection systems and disposal facilities of nearby communities. * Precaution of confined spaces * Precaution of Electrocution.
	Community Health and Safety	<ul style="list-style-type: none"> - Community health and safety will be managed by DPTSC based on IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines, EHS Guidelines for Electric Power Transmission and Distribution as follows; * Protecting the community from physical, chemical, or other hazards associated with sites under construction and decommissioning. * Avoid contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction, or excavations and structures which may pose falling and entrapment hazards * The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and

Category	Item	Mitigation and Consideration Measures
		awareness-raising training. * Ensuring safety to the community due to various kinds of construction machineries.
	Risks for Infectious Disease such as AIDS/HIV	- The following measures due to infectious disease will be implemented as necessary. * Prevention of infectious disease from spreading. * Conducting training for workers. * Communication with local resident through meeting and dialogue.
	Accident	- Same as mitigation measures for Occupational and Community Health and Safety. - The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness-raising training.
ERA	Flood risks	- All construction activities will be stopped and area of evacuation for workers will be secured when weather forecast alerts flood risks such as heavy rain and cyclone.
	Risks of Fire	- Prevention of electric leakage, overheat to electric machineries and equipment - Periodical training to worker for firefighting will be organized.

Source: IEE Study Team

Table 5 Mitigation Measures during Operation Stage

Category	Item	Mitigation and Consideration Measures
EIA	Noise and Vibration	- Enough distance shall be kept between the substation and receptors.
	Insulating oil and fuel	- Transformer oil storage underground concrete tank shall be provided to prevent contamination of soil from it.
HIA	Occupational Health and Safety (including accident)	- Consideration of maintenance work will be implemented based on Occupational Health and Safety Law (Draft, 2017) in Myanmar, EHS General Guidelines and EHS Guidelines for Electric Power Transmission and Distribution by IFC.
	Community Health and Safety (including accident)	- Consideration of community health and safety will be implemented based on IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines, EHS Guidelines for Electric Power Transmission and Distribution.
ERA	Flood risks	- Proper elevation level will be set to avoid flood risks due to heavy rain and cyclone.
	Risks of Fire	- Appropriate management of maintenance work to reduce the risk of electric leakage and overheat to electric machineries and equipment.

Source: IEE Study Team

Table 6 Mitigation and Consideration Measures for Closing Phase

Category	Item	Mitigation and Consideration Measures
EIA	Air quality	- Sprinkling water around preservation area such as residence. - Prohibition of idling will be implemented. - Intensive operating of the construction machinery will be avoided. - Construction equipment, machines and vehicle will be inspected and maintained regularly - Machines, construction equipment and construction waste will be stored at the designated storage area.
	Water quality	- Settling ponds or simple turbid water treatment will be installed as necessary - Septic tank will be set up in construction site. - Simple wastewater treatment facility from cement producing activity will be set up in construction site as necessary. - Monitoring water quality for discharge water will be implemented.
	Solid Waste	- Re-utilization of construction soil at the site - Appropriate disposal of construction waste - Usage of hazardous and chemical substance will be recorded and updated regularly. - Hazardous and chemical substance, which is to be disposed, will be stored at the designated storage area and is entrusted to dispose by Yangon City Development

Category	Item	Mitigation and Consideration Measures
		Committee (YCDC) or other proper organizations.
	Noise/ Vibration	- Installation of soundproof sheet especially at the places which is neighbor to preservation area such as residence and pagoda as necessary - Obey maximum driving speed - Advanced notice of operations and prohibited time near preservation area
	Insulating oil and fuel	- Oil storage underground concrete tank shall be handled with proper care to prevent contamination of surrounding environment from it.
HIA	Occupational Health and Safety (including accident)	- Working condition during demolition works will be managed by contractor based on Occupational Health and Safety Law (Draft, 2017) in Myanmar, EHS General Guidelines and EHS Guidelines for Electric Power Transmission and Distribution by IFC.
	Community Health and Safety (including accident)	- Community health and safety will be managed by the contractor based on IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines, EHS Guidelines for Electric Power Transmission and Distribution.

Source: IEE Study Team

(2) Environmental Monitoring Plan

Environmental monitoring plan including monitoring items and location before/during construction phases, operation phase, closing phases are shown in Table 7 to Table 10.

Regarding the entire monitoring process, the Project Proponent is committed that monitoring report will be submitted to ECD every six months according to article (108) of Environmental Impact Assessment Procedure for the operation stage.

Table 7 Environmental Monitoring Plan (Before Construction Phase)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of planning for mitigation measures for construction phase	Project site	Once	DPTSC/ Contractor
Land Acquisition	- Record of payment for compensation of land acquisition of transmission tower.	Construction site	As occasion arises	DPTSC

Source: IEE Study Team

Table 8 Environmental Monitoring Plan (During Construction Phase)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures shown in Table 4.	-	Once/month	Contractor
Air Quality	- NO ₂ , PM ₁₀ , PM _{2.5} , SO ₂	Construction site	2 times per year (dry and rainy season)	Contractor
Water Quality	- Water temperature, pH, SS, DO, BOD, COD, coliform count, oil and grease, Total Nitrogen, Total Phosphorous	Small stream near the construction site of a substation	1 time (dry season)	Contractor
	- Water temperature, pH, Turbidity	Small stream near the construction site of a substation	1 time (rainy seasons)	Contractor
	- Record of installation of sheet to prevent muddy water and rainfall	Near rivers and channels	Once/3months	Contractor
Waste	- Recording amount of solid waste - Recording of management of construction waste - Recording of hazardous and chemical substance management	Construction site	Once/month	Contractor
Flora and Fauna	- Number of cut trees and its species	Construction site	Once/month	Contractor

Category	Item	Location	Frequency	Responsible Organizations
Noise and Vibration	- Noise and vibration level	at the nearest receptor location off-site	24 hrs (peak period)	Contractor
Risks for infectious disease such as AIDS/HIV	- Status of measures of infectious disease	Construction site	Once/month	Contractor
Occupational health and safety	- Status of condition of occupational health and safety	Construction site	Once/month	Contractor
Community health and safety	- Status of condition of community health and safety	Construction site and surrounding area	As occasion arises	Contractor

Source: IEE Study Team

Table 9 Environmental Monitoring Plan (During Operation Phase)

Survey item	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures	Project site	Quarterly (3 years after operation) Yearly (after 3years operation)	DPTSC
Occupational Health and Safety	- Status of measures for occupational safety and health - Record of working accident	Project site	Quarterly	DPTSC
Community Health and Safety	- Status of measures for community safety and health - Record of accident related to construction activity	Vehicle route	Once/month	DPTSC
Flood risk	- Record of flood and its response	Project site	As occasion arises	DPTSC
Risk for fire	- Record of fire and its response	Project site	As occasion arises	DPTSC

Source: IEE Study Team

Table 10 Environmental Monitoring Plan (Closing Phase)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures	-	Once/month	Contractor
Air Quality	- NO ₂ , PM ₁₀ , PM _{2.5} , SO ₂	Construction site (1 point)	1 week /3 month (Peak time)	Contractor
Water Quality	- Water temperature, pH, SS, DO, BOD, COD, coliform count, oil and grease, chromium	Outlet of septic tank (1 point)	Once/2 month	Contractor
Solid Waste	- Amount of solid waste - Recording of management of construction waste - Recoding of hazardous and chemical substance management	Construction site	Once/month	Contractor
Noise and Vibration	- Noise and vibration level	Sensitive area such as residence around the proposed construction site (1 point)	24 hrs/3 months (peak period)	Contractor
		Sensitive area such as residence along the route for	24hrs (peak period)	Contractor

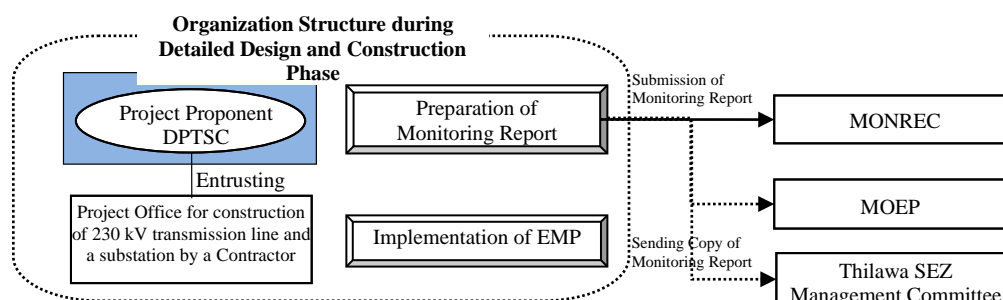
Category	Item	Location	Frequency	Responsible Organizations
		on-site vehicles (1 point)		
Risks for infectious disease such as AIDS/HIV	- Status of measures of infectious disease	Construction site	Once/month	Contractor
Occupational health and safety	- Status of condition of occupational health and safety	Construction site	Once/month	Contractor
Community health and safety	- Status of condition of community health and safety	Construction site and surrounding area	As occasion arises	Contractor

Source: IEE Study Team

Above monitoring plan will be carried out with environmental and social monitoring form for construction of a substation and that of 230 kV Transmission Line as Appendix-4.

8. Institutional Arrangement

The organization structure at detailed design and construction phases for construction of the transmission line and substation project is proposed as shown in Figure 4. The Project proponent is entrusting a contractor to implement detailed design and construction work. The entrusted contractor will establish a project office for construction of 230 kV transmission line and substation to have a function as implementation of detailed design, management of construction work, and supervision of construction work, environmental and social consideration, and so on. The Project proponent will summarize monitoring report based on results of implementation of EMP including monitoring. Accordingly, the Project proponent will submit the monitoring report to MONREC and send the copy of the monitoring report to Ministry of Electric Power (MOEP) and Thilawa SEZ Management Committee (TSEZMC) periodically.



Source: IEE Study Team

Figure 4 Proposed Organization Structure for Transmission Line and Substation Project at Detailed Design and Construction Phases

The project office for construction of 230 kV transmission line and a substation will establish Social and Environmental Division will be responsible for dealing with social and environmental issues arisen before construction and during construction phases. In addition, the division should undertake any preparations for environment control at operation of the substation. Major tasks of the section are listed as follows.

- 1) Monitoring construction work according to EMP;
- 2) Technical support of the Project Proponent to coordinate with relevant government organizations regarding environmental and social issues;
- 3) Resolving other environmental and social issues arisen before construction and during construction phases;
- 4) Preparation for environment control during operation of the transmission line and substation such as making environment control manual; and
- 5) Submitting monitoring reports to MONREC, MOEP and other relevant authorities.

The organization structure at operation phase for the transmission line and substation is proposed as shown in Figure 5. Establishment of an independent substation to operate and manage the substation is proposed. The substation will execute duties and responsibilities on behalf of the Project proponent. The substation will summarize monitoring report based on results of implementation of EMP. Accordingly the Project proponent will submit the monitoring report to MONREC and send the copy of the monitoring report to MOEP and Thilawa SEZ management committee periodically.

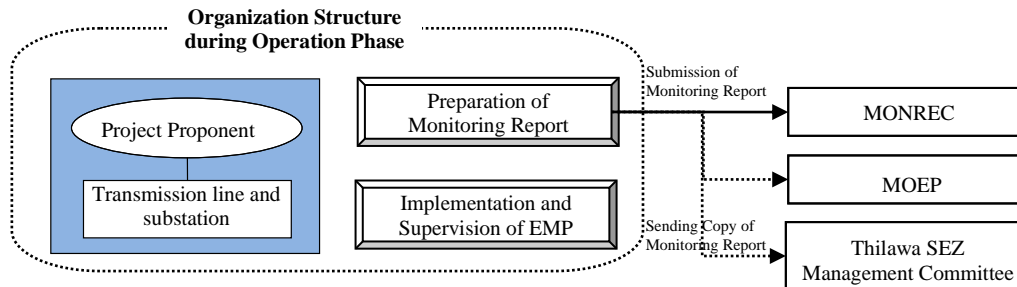


Figure 5 Proposed Organization Structure for 230 kV Transmission Line and Substation Project during Operation Phase

အစီရင်ခံစာအကျဉ်းချုပ်

၁။ စီမံကိန်းအကောင်အထည်ဖော်သူနှင့်ပိုင်ရှင်

လျှပ်စစ်ဓာတ်အားပို့လွှတ်ရေးနှင့်ကွပ်ကဲရေးဦးစီးဌာန(DPTSC)၊ လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန (MOEP)။
လိပ်စာ - ရုံးအမှတ် (၂၇)၊ နေပြည်တော်၊ မြန်မာ။

၂။ စီမံကိန်းအမျိုးအစားနှင့် ကနဦးပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း၊ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လိုအပ်ချက်များ

၁) စီမံကိန်းအမျိုးအစား။ ၂၃၀ကေဗီဓာတ်အားပို့လွှတ်ရေးလှိုင်းနှင့်ပင်မဓာတ်အားခွဲရုံ တည်ဆောက်ခြင်းလုပ်ငန်း။

၂) ကနဦးပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း(သို့) ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလိုအပ်ချက်။
ကနဦးပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ဆောင်ရန်လိုအပ်ပါသည်။ (၁၀ မိုင် ရှည်သော ၂၃၀ ကေဗီ လျှပ်စစ်ဓာတ်အားပို့လွှတ်ရေးလှိုင်း နှင့် ၂၃၀ ကေဗီ ပင်မဓာတ်အားခွဲရုံတည်ဆောက်ခြင်းစီမံကိန်း။)

၃။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းအကောင်အထည်ဖော်မည့် အဖွဲ့အစည်းများ

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်အား အကောင်အထည်ဖော်ဆောင်ရွက်မည့် အဖွဲ့အစည်း (၃) ခု ရှိပါသည်။

၁) ဦးဆောင်အဖွဲ့အစည်း နိပွန်ကိုးအဲ ကုမ္ပဏီလီမိတက် (Nippon Koei Co., Ltd. (NK)) ၊ ကနဦးပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (IEE) လေ့လာမှုလုပ်ငန်းစဉ်အားလုံးအတွက် ဦးစီးဆောင်ရွက်ပါသည်။
လိပ်စာ။ 4,5-chome, Chiyoda-ku Tokyo, Japan

၂) ဒုတိယအဖွဲ့အစည်း မြန်မာကိုးအဲ အပြည်ပြည်ဆိုင်ရာ လီမိတက် (Myanmar Koei International Ltd. (MKI)) ၊ EIA လေ့လာမှုလုပ်ငန်းစဉ်တွင် ပူးပေါင်း ဆောင်ရွက်ပါသည်။
လိပ်စာ။ အမှတ် ၃၆(က)၊ ပထမထပ်၊ Grand Pho Sein ကွန်ဒို၊ ဖိုးစိန်လမ်း၊ တာမွေမြို့နယ်၊ ရန်ကုန်။

၃) တတိယအဖွဲ့အစည်း မြန်မာ့သယံဇာတနှင့်ပတ်ဝန်းကျင် ကုမ္ပဏီ၊ Resource and Environment Myanmar Ltd. (REM)။
သဘာဝပတ်ဝန်းကျင်တိုင်းတာခြင်းနှင့်လူမှု-စီးပွားစစ်တမ်းကောက်ယူမှုလုပ်ငန်းစဉ်တွင် ပူးပေါင်း ပါဝင်ဆောင်ရွက်ပါသည်။
လိပ်စာ။ အမှတ်(၇၀၂)၊ Delta Plaza၊ ရွှေဂုံတိုင်လမ်း၊ ဗဟန်းမြို့နယ်၊ ရန်ကုန်။

၄။ စီမံကိန်းအချက်အလက်များ

မြန်မာအစိုးရသည် သီလဝါဒေသ၏အခြေခံအဆောက်အအုံများဖွံ့ဖြိုးရေးစီမံကိန်း(အပိုင်းက) ၏ စီမံကိန်းခွဲတစ်ခု ဖြစ်သော သီလဝါဒေသ လျှပ်စစ်ဓာတ်အားဖွံ့ဖြိုးတိုးတက်ရေးစီမံကိန်းအား အကောင်အထည်ဖော်ဆောင်ရွက်ရန် အတွက် ဂျပန်နိုင်ငံတကာပူးပေါင်းဆောင်ရွက်ရေးအေဂျင်စီ (JICA) ထံမှ ချေးငွေ လက်ခံရရှိခဲ့ပါသည်။

သီလဝါဒေသ၏ အခြေခံအဆောက်အအုံများဖွံ့ဖြိုးရေးစီမံကိန်း(အပိုင်းက)၏ စီမံကိန်းခွဲတစ်ခုဖြစ်သော သီလဝါဒေသ လျှပ်စစ်ဓာတ်အားဖွံ့ဖြိုးတိုးတက်ရေးစီမံကိန်းတွင်အောက်ပါလုပ်ငန်းများပါဝင်ပါသည်။

- (၁) သီလဝါ၏ ကနဦးခါတ်အားလိုအပ်ချက်ဖြည့်တင်းပေးနိုင်ရန်အတွက် ၂၅ MW ဖြန့်ဖြူးပေးနိုင်သော ၃၃ ကေဗွီ ခါတ်အားဖြန့်ဖြူးရေးလှိုင်းတည်ဆောက်သောစီမံကိန်း (၂၀၁၄ ခုနှစ်၊ စက်တင်ဘာလ မှ ၂၀၁၅ ခုနှစ်၊ မတ်လအထိ)
- (၂) 50 MW ထုတ်လုပ်ပေးနိုင်သောလောင်စာနှစ်မျိုးသုံး လျှပ်စစ်ခါတ်အားထုတ်လုပ်သော စက်ရုံ တည်ဆောက်သော စီမံကိန်း (၂၀၁၅ ခုနှစ်၊ မတ်လ မှ ၂၀၁၇ ခုနှစ်၊ မေလ အထိ)
- (၃) သီလဝါဒေသ၏ တိုးတက်လိုအပ်လျက်ရှိသော ခါတ်အားလိုအပ်ချက်သည် ၂၅ MWထက် မများလာခင် ထပ်တိုးခါတ်အားဖြည့်ဆည်းပေးနိုင်ရန် အတွက် ၂၃၀ ကေဗွီခါတ်အားပို့လွှတ်ရေးလှိုင်းနှင့် ပင်မ ခါတ်အားခွဲရုံတည်ဆောက်ရေးစီမံကိန်း (၂၀၁၆ ခုနှစ်၊ ဇွန်လ မှ ၂၀၁၇ ခုနှစ်၊ စက်တင်ဘာလအထိ)
- (၄) အချင်း (၂၀) လက်မရှိသောသဘာဝခါတ်ငွေ့ပို့လွှတ်ရေးလှိုင်းအား တောင်ဒဂုံဘားရုံမှ လောင်စာနှစ်မျိုးသုံး သီလဝါ ခါတ်အားထုတ်လုပ်ရေးစက်ရုံအထိ တည်ဆောက်ခြင်းနှင့် လောင်စာနှစ်မျိုးသုံး ခါတ်အား ထုတ်လုပ်ရေးစက်ရုံမှ ၁၇.၆ ပေ (၃.၂ ကီလိုမီတာ) အကွာတွင် ခါတ်ငွေ့ထိန်းချုပ်စခန်းတည်ဆောက်ခြင်း (၂၀၁၅ ခုနှစ်၊ မတ်လ မှ ၂၀၁၆ ခုနှစ်၊ ဖေဖော်ဝါရီလအထိ)

လုပ်ငန်းအသီးသီး၏တည်နေရာများကို ပုံ ၁တွင်ဖော်ပြထားပါသည်။

၂၃၀ ကေဗွီ ခါတ်အားပို့လွှတ်ရေးလှိုင်းနှင့် ပင်မခါတ်အားခွဲရုံတည်ဆောက်ခြင်း လုပ်ငန်းသည် အဆိုပါစီမံကိန်း၏ အပိုင်းတစ်ပိုင်းဖြစ်ပြီး သီလဝါအထူးစီးပွားရေးဇုန်သာမက ဆိပ်ကမ်းများအပါအဝင် သီလဝါ ပတ်ဝန်းကျင်အား ခါတ်အားပိုမိုထောက်ပံ့ပေးရန်ဖြစ်ပါသည်။ ၂၀၁၇ခုနှစ်၊ ဩဂုတ်လစာရင်းအရ ဟက်တာ ၄၀၀ ကျယ်သော သီလဝါအထူးစီးပွားရေးဇုန် (အပိုင်း က) တွင် လုပ်ငန်းလည်ပတ်နေသော စက်ရုံ ၂၇ ရုံနှင့် ဆောက်လုပ်ဆဲစက်ရုံ ၃၅ ရုံရှိသည်။ ၁၀၀ ဟက်တာကျယ်သော သီလဝါအထူးစီးပွားရေးဇုန် (အပိုင်း ခ ၏ ပထမအဆင့်) သည် အခြေခံအဆောက်အဦများစတင်ဆောက်လုပ်နေပြီး ၂၀၁၈ ခုနှစ် အလယ်တွင် ပြီးစီးရန်မျှော်လင့်ပါသည်။



ကိုးကား။ IEE Study Team

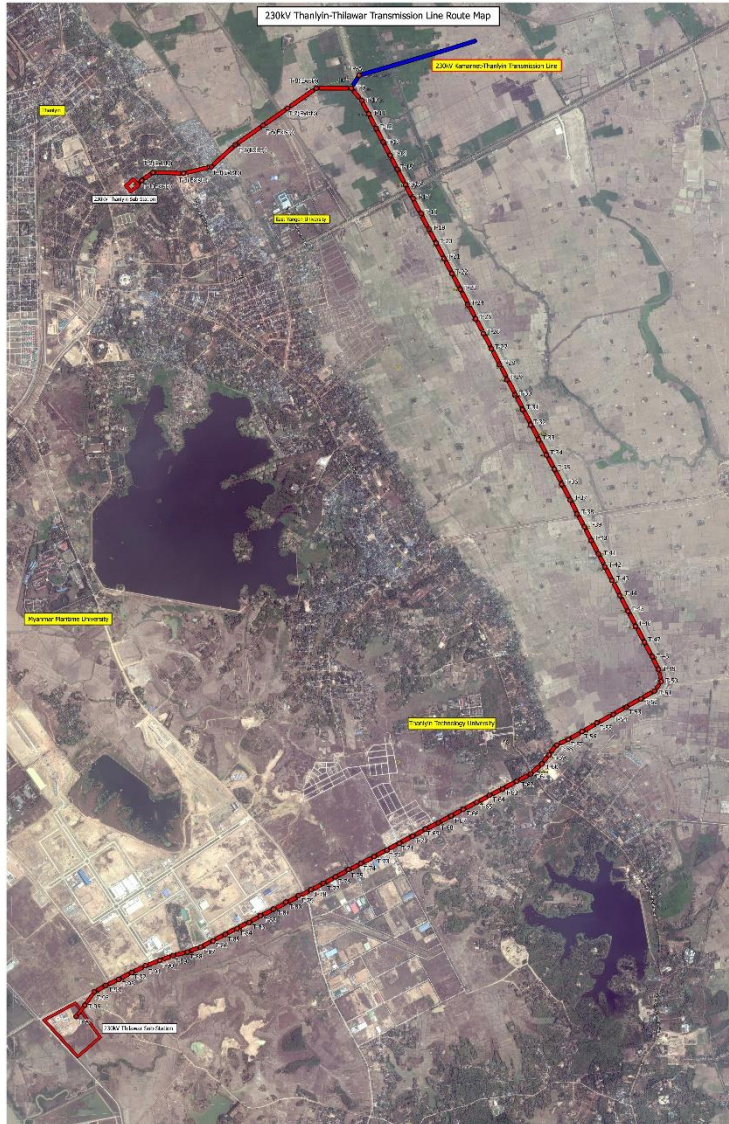
ပုံ၁။ သဘာဝဓါတ်ငွေ့ဓါတ်အားပေးစက်ရုံနှင့် ဓါတ်အားခွဲရုံတည်နေရာနှင့် ၃၃ကေဗီဓါတ်အားဖြန့်ဖြူးရေးလိုင်း၊
၂၃၀ကေဗီဓါတ်အားပို့လွှတ်ရေးလိုင်းနှင့် သဘာဝဓါတ်ငွေ့ပိုက်လိုင်းလမ်းကြောင်းပြပုံ

၅။ စီမံကိန်းအကြောင်းအရာ

(၁) ၂၃၀ ကေဗီ ဓါတ်အားပို့လွှတ်ရေးလိုင်း၏ အဆိုပြုလမ်းကြောင်း

၁၀မိုင်အရှည်ရှိသောသန်လျင်-သီလဝါ၂၃၀ကေဗီဆားကစ်နှစ်ခုပါဝင်သော(Double Circuit) ဓါတ်အား
ပို့လွှတ်ရေး လိုင်းအသစ်အား သန်လျင်ပင်မဓါတ်အားပေးခွဲရုံမှစတင်၍ သီလဝါပင်မ ဓါတ်အားပေးခွဲရုံ
အထိလက်ရှိဆက်သွယ်ထားသော ကမာနက်-သန်လျင် ၂၃၀ ကေဗီ ဓါတ်အားပို့လွှတ်ရေးလိုင်းနှင့်

ဆက်သွယ်၍ တည်ဆောက်ရန် အဆိုပြုထားပါသည်။ ၂၃၀ ကေဗီ ဓာတ်အားပို့လွှတ်ရေးလိုင်းလမ်းကြောင်းကို ပုံ ၂ တွင် ဖော်ပြထားပါသည်။

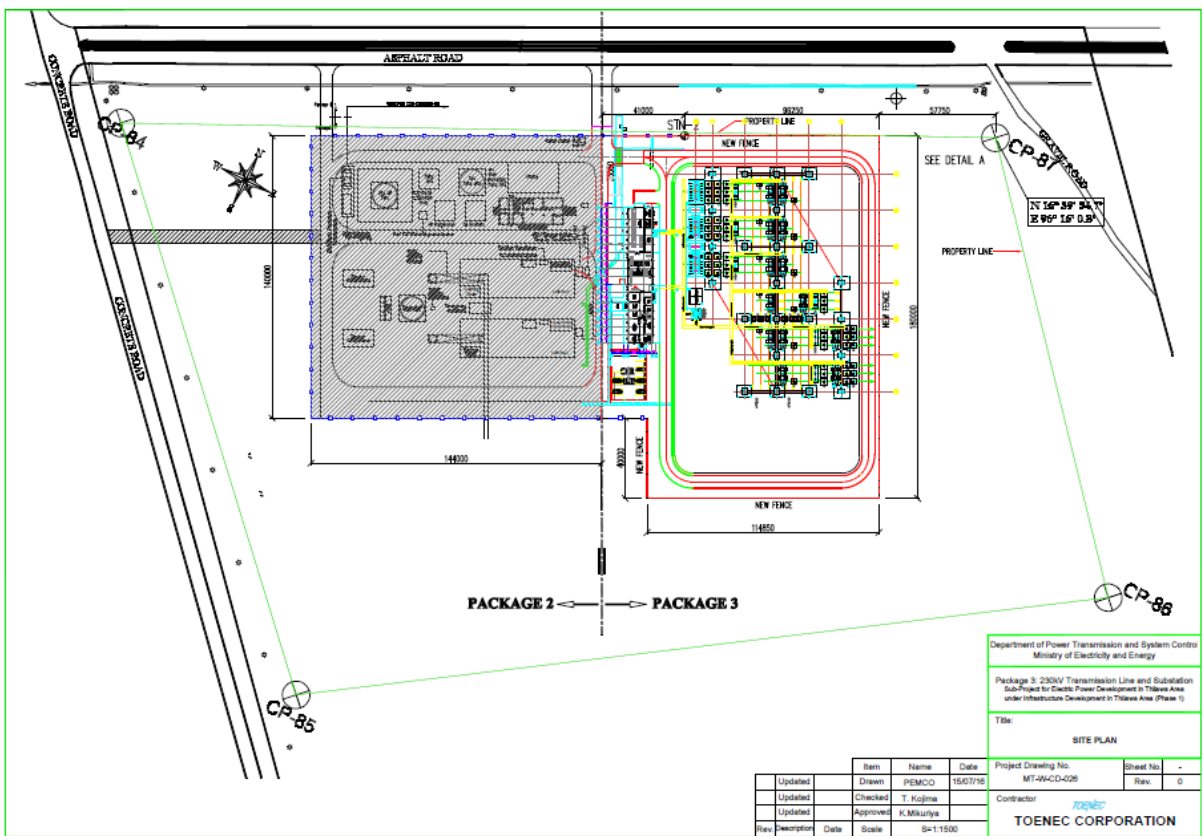


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ပုံ ၂။ ဓာတ်အားပို့လွှတ်ရေးလိုင်းအဆိုပြုလမ်းကြောင်း

(၂) သီလဝါပင်မဓာတ်အားခွဲရုံ နေရာချထားမှုအစီအစဉ်

သီလဝါတွင် ၂၃၀ ကေဗီ ပင်မဓာတ်အားခွဲရုံအသစ် တစ်ခုတည်ဆောက်မည်ဖြစ်သည်။ သီလဝါ ပင်မဓာတ်အားခွဲရုံ အသစ်၏တည်နေရာမှာ ဓာတ်ငွေ့နှစ်မျိုးသုံးခါတ်အား ထုတ်လုပ်ရေးစက်ရုံ တည်ရှိသော ခြံဝန်းအတွင်းတွင် တည်ဆောက်မည်ဖြစ်ပါသည်။ လောင်စာဓာတ်ငွေ့နှစ်မျိုးသုံး ခါတ်အားထုတ်လုပ်ရေး စက်ရုံနှင့် ပင်မဓာတ်အားခွဲရုံတည်ရှိသော ခြံဝန်း၏ စုစုပေါင်းအကျယ်သည် ၁၀ ဟက်တာရှိပြီး ပင်မဓာတ်အားခွဲရုံအသစ်အတွက် ၂ ဟက်တာ အသုံးပြုမည်ဖြစ်ပါသည်။ သီလဝါပင်မဓာတ်အားခွဲရုံ၏ အပေါ်စီးပုံကို ပုံ ၃ တွင်ဖော်ပြထားပါသည်။



ကိုးကား။ IEE Study Team

ပုံ ၃။ သီလဝါပင်မဓာတ်အားခွဲရုံ၏အပေါ်စီးပုံ

၆။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းရလဒ်များ

စီမံကိန်းကြောင့်ပတ်ဝန်းကျင်နှင့်လူမှုရေးဆိုင်ရာထိခိုက်နိုင်မှုများအား စီမံကိန်းအချက်အလက်၊ ကွင်းဆင်းလေ့လာမှု ရလဒ်များအပေါ် အခြေခံ၍ ကြိုတင်တွက်ချက်ပြီး အကဲဖြတ်ထားပါသည်။ မတည်ဆောက်မီနှင့် တည်ဆောက်ဆဲအချိန်၊ လုပ်ငန်းလည်ပတ်နေချိန်ကာလများအတွင်း ပတ်ဝန်းကျင်နှင့်လူမှုရေး ထိခိုက်နိုင်မှုများအား ဇယား ၁ တွင်ဖော်ပြ ထားပါသည်။

ဇယား ၁။ ပတ်ဝန်းကျင်နှင့် လူမှုရေးရာထိခိုက်မှုဆန်းစစ်ခြင်းရလဒ်များ
(မတည်ဆောက်မီနှင့် တည်ဆောက်နေချိန်၊ လုပ်ငန်းလည်ပတ်နေချိန်)

အမျိုးအစား	အချက်အလက်	နယ်ပယ်အတိုင်း အတာသတ်မှတ်ရာတွင်အကဲဖြတ်ခြင်း		ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ရာတွင်အကဲဖြတ်ခြင်း		အကဲဖြတ်ရသည့် အကြောင်းပြချက်
		မတည်ဆောက်မီ/ဆောက်လုပ်ဆဲကာလ	လုပ်ငန်းလည်ပတ်သည့်ကာလ	မတည်ဆောက်မီ/ဆောက်လုပ်ဆဲကာလ	လုပ်ငန်းလည်ပတ်သည့်ကာလ	
EIA (ညစ်ညမ်းမှု၊ သဘာဝပတ်ဝန်းကျင်)	လေထုအရည်အသွေး	ခ-	ဃ	ခ-	ဃ	ဆောက်လုပ်ဆဲကာလ။ ဆောက်လုပ်ရေးလုပ်ငန်းခွင်မှထွက်ရှိသောဖုန်မှုန့်၊ သဲမှုန့်များကြောင့် ပတ်ဝန်းကျင်သို့ လေထုညစ်ညမ်းမှု ဖြစ်ပေါ်စေမည်ဟု ခန့်မှန်းပါသည်။ သို့သော် သတ်မှတ်ထားသောနေရာတွင် ဆောက်လုပ်မှုမှာ ယာယီသာဖြစ်သောကြောင့် ထိခိုက်မှုမှာ အနည်းငယ်သာ ဖြစ်မည်ဟု ခန့်မှန်းပါသည်။

အမျိုးအစား	အချက်အလက်	နယ်ပယ်အတိုင်း အတာသတ်မှတ်ရာ တွင်အကဲဖြတ်ခြင်း		ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်း စစ်ရာတွင် အကဲဖြတ်ခြင်း		အကဲဖြတ်ရသည့် အကြောင်းပြချက်
		မတည် ဆောက် မီ/ ဆောက် လုပ်ဆဲ ကာလ	လုပ်ငန်း လည် ပတ် သည့် ကာလ	မတည် ဆောက် မီ/ ဆောက် လုပ်ဆဲ ကာလ	လုပ်ငန်း လည် ပတ် သည့် ကာလ	
	ရေထု အရည် အသွေး	ခ-	ဃ	ခ-	ဃ	ဆောက်လုပ်ဆဲကာလ။ ဆောက်လုပ်မှုမှာ ယာယီသာ ဖြစ်သောကြောင့် ထိခိုက်မှုမှာ အနည်းငယ်သာ ဖြစ်မည်ဟု ခန့်မှန်းပါသည်။
	အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း	ခ-	ဃ	ခ-	ဃ	ဆောက်လုပ်ဆဲကာလ။ ဆောက်လုပ်ရေးမှ ထွက်ရှိသော မြေသားများနှင့် စွန့်ပစ်ပစ္စည်းများကို ပြန်လည်အသုံးပြုခြင်း၊ ပြန်လည်ပြုပြင် ထုတ်လုပ်ခြင်းနှင့် စွန့်ပစ်ခြင်းများ ပြုလုပ်ပါမည်။
	ဆူညံသံ/ တုန်ခါမှု	ခ-	ဃ	ခ-	ဃ	ဆောက်လုပ်ဆဲကာလ။ သတ်မှတ်ထားသော နေရာတွင် ဆောက်လုပ်ရေးကာလမှာ ယာယီသာဖြစ်သောကြောင့် ဆောက်လုပ်ရေး စက်ယန္တရားကြီးများမှ ဆူညံသံနှင့် တုန်ခါမှု များမှဆူညံသံနှင့် တုန်ခါမှုများသည် ပတ်ဝန်းကျင်ဧရိယာကို ထိခိုက်မှုမှာ အနည်းငယ်သာ ဖြစ်မည်ဟု ခန့်မှန်းပါသည်။ လုပ်ငန်းလည်ပတ်စဉ်ကာလ။ ပင်မဓာတ်အားခွဲရုံ၏ စက်ပစ္စည်းများဖြစ်သော ထရန်စဖော်မာနှင့် ထိန်းချုပ်နယ်မှ စက်များ လည်ပတ်ရာမှ ဆူညံမှုနှင့် တုန်ခါမှုများ ထွက်ရှိနိုင် ပါသည်။ သို့သော် ပင်မဓာတ်အားခွဲရုံနှင့် ပြည်သူလူထုများ အကြားတွင် လုံလောက်သော အကွာအဝေး ထားရှိခြင်းကြောင့် ဘာသာရေးအဆောက်အအုံနှင့် လူနေထိုင်ရာ နေရာများအပေါ်သို့ ပင်မဓာတ်အားခွဲရုံမှ ဆူညံမှုနှင့် တုန်ခါမှုများနှင့် ပတ်သက်ထိခိုက်မှုမှာ အနည်းငယ်သာ ဖြစ်မည်ဟု ခန့်မှန်း ပါသည်။
	လျှပ်စစ်နှင့်သံ လိုက်စက်ကွင်း	ဃ	ဃ	ဃ	ဃ	လုပ်ငန်းလည်ပတ်စဉ်ကာလ။ ကျန်းမာရေးဝန်ကြီးဌာန၊ နယူးဇီလန်၏ လျှပ်စစ်နှင့် သံလိုက်စက် ကွင်းထုတ်ဝေချက် အရ ဗို့အားမြင့်သော ဓာတ်အားပို့လွှတ်ရေးလိုင်းမှ အကွာ အဝေး ၄၀မီတာတွင်ရှိနိုင်သော လျှပ်စစ်နှင့် သံလိုက်စက် ကွင်းတန်ဖိုးမှာ ၀.၀၁-၀.၁ kV/m (မူရင်း၏အပုံတစ်ပုံ) နှင့် ၀.၁-၀.၇μT (မူရင်း၏အပုံတစ်ပုံ) အသီးသီး ဖြစ်ပါသည်။ ယင်းတန်ဖိုးများသည် လျှပ်စစ်စောင်တွင် ရှိသော တန်ဖိုးနှင့် အတူတူဖြစ်ပါသည်။လျှပ်စစ်နှင့် သံလိုက်စက်ကွင်း နှစ်မျိုးလုံးသည် အကွာအဝေးဖြင့် လျင်မြန်စွာ လျော့ကျနိုင်ပါ သည်။ ဓာတ်အားပို့လွှတ်ရေးလိုင်း၏ အမြင့်သည် ၁၁၂ပေ (၃၇ မီတာ) မြင့်သောကြောင့် ဓာတ်အားပို့လွှတ်ရေး လိုင်းကြောင့် ထိခိုက်မှု မရှိနိုင်ဟု ခန့်မှန်းရပါသည်။ ထို့အပြင် ပင်မ ဓာတ်အားခွဲရုံ၏ နယ်နိမိတ်နှင့် နေထိုင်သူများအကြား လုံလောက်သော အကွာအဝေး ၈၂၅ပေ (၂၅၀မီတာခန့်) ရှိခြင်း ကြောင့် ပင်မဓာတ်အားခွဲရုံကြောင့် ထိခိုက်မှု မရှိနိုင်ဟု ခန့်မှန်းရပါသည်။ ထို့ကြောင့် လျှပ်စစ်နှင့် သံလိုက်စက်ကွင်း၏ ထိခိုက်မှုမှာ မရှိသလောက်ဖြစ်ပါသည်။
	အန္တရာယ်ရှိ သောပစ္စည်း များ	ဃ	ဃ	ဃ	ဃ	ဆောက်လုပ်ဆဲကာလနှင့်လုပ်ငန်းလည်ပတ်စဉ်ကာလ။ ထရန်စဖော်မာများမှာ ယခုနှစ်ပိုင်းတွင် ထုတ်လုပ်ထားသော အပူကာဆီ Polychlorinated Biphenyls (PCB) ကဲ့သို့ အန္တရာယ်ရှိသော ပစ္စည်းများ မပါဝင်သော ထရန်စဖော်မာများကိုသာ တပ်ဆင် အသုံးပြုပါမည်။
	ထရန်စဖော်မာ	ဃ	ခ-	ဃ	ခ-	လုပ်ငန်းလည်ပတ်စဉ်ကာလ။ ထရန်စဖော်မာများမှ

အမျိုးအစား	အချက်အလက်	နယ်ပယ်အတိုင်း အတာသတ်မှတ်ရာ တွင်အကဲဖြတ်ခြင်း		ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်း စစ်ရာတွင် အကဲဖြတ်ခြင်း		အကဲဖြတ်ရသည့် အကြောင်းပြချက်
		မတည် ဆောက် မီ/ ဆောက် လုပ်ဆဲ ကာလ	လုပ်ငန်း လည် ပတ် သည့် ကာလ	မတည် ဆောက် မီ/ ဆောက် လုပ်ဆဲ ကာလ	လုပ်ငန်း လည် ပတ် သည့် ကာလ	
	ဆီနှင့် လောင်စာ					အပူကာဆီဖိတ်စင်ခြင်း၊ ယိုခြင်းများ ဖြစ်နိုင်ပါသည်။ ထရန်စဖော်မာများမှ ယိုဖိတ်သော ဆီများကြောင့် ပတ်ဝန်းကျင်ညစ်ညမ်းမှု မဖြစ်ပေါ်စေရန် ထရန်စဖော်မာများ အားလုံးမှ ဖိတ်ဆင်သော ဆီများကိုသို့ လှောင်သိမ်းဆည်းပေး နိုင်သော ကွန်ကရစ်ဖြင့် တည်ဆောက်ထားသော ပင်မ မြေအောက်ဆီ သိုလှောင်ကန်ကို တည်ဆောက်သင့်ပါသည်။
လူမှုရေးရာ ဝန်းကျင်	ပြန်လည်နေရာ ချထားခြင်းနှင့် မြေယာသိမ်း ဆည်းခြင်း	ခ-	ဃ	ခ-	ဃ	ဆောက်လုပ်ဆဲကာလ။ ဓာတ်အားပို့လွှတ်ရေး တာဝါ ဆောက်လုပ်ရေးအတွက် မြေယာသိမ်းဆည်းခြင်းများ ရှိနိုင်ပါသည်။ သို့သော် ဆောက်လုပ်ရေးဝန်ကြီးဌာနပိုင် လမ်းနယ်နမိတ်အတွင်း၌ ဓာတ်အားပို့လွှတ်ရေး လိုင်းအား တပ်ဆင်မည်ဖြစ်သောကြောင့် မြေယာသိမ်းဆည်းခြင်း ကြောင့် ဖြစ်ပေါ်သော ထိခိုက်မှုများကို လျော့ကျစေမည် ဖြစ်ပါသည်။ ၃၉.၃ ပေ x ၃၉.၃ ပေ (၁၂ မီတာ x ၁၂ မီတာ) အသီးသီးရှိသော စိုက်ပျိုးမြေနှစ်ခုသာလျှင် Lattice တာဝါ တိုင် တည်ဆောက်ရန်အတွက် မြေယာရယူရန် လိုအပ်မည် ဖြစ်ပါသည်။ ဆောက်လုပ်ရေးကာလတွင် အသုံးပြုရန် လိုအပ်သော မြေဧရိယာမှာ ၁၀၀ ပေ x ၁၀၀ ပေ (၃၀.၃ မီတာ x ၃၀.၃ မီတာ) ဖြစ်ပါသည်။
ကျန်းမာရေး နှင့် လုံခြုံရေး	လုပ်ငန်းခွင် ကျန်းမာရေး နှင့်လုံခြုံရေး (မတော်တဆမှု အပါအဝင်)	ခ-	ခ-	ခ-	ခ-	ဆောက်လုပ်ဆဲကာလ။ မြန်မာနိုင်ငံ၏ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် လုံခြုံရေး ဥပဒေ မူကြမ်း ၂၀၁၇၊ IFC ၏အထွေထွေ EHS လမ်းညွှန်ချက်များနှင့် IFC၏ လျှပ်စစ်စွမ်းအား ပို့လွှတ်ရေးနှင့် ဖြန့်ဖြူးရေး အတွက် EHS လမ်းညွှန်ချက်များအရ ဆောက်လုပ်ဆဲကာလတွင် မတော်တဆမှုများ၊ လုပ်ငန်းခွင် မီးဘေးအန္တရာယ် ကျန်းမာ ရေးနှင့် စက်ယန္တရားများ၊ ဓာတုဗေဒပစ္စည်းများ အသုံးပြုခြင်း စသည်တို့အတွက် လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေးကို ထည့်သွင်းစဉ်းစားရန် လိုအပ်မည်ဖြစ်ပါသည်။ လုပ်ငန်းလည်ပတ်စဉ်ကာလ။ ပင်မဓါတ်အားခွဲရုံနှင့် ဓါတ်အားပို့လွှတ်ရေးလိုင်း လုပ်ငန်း လည်ပတ်စဉ်အတွင်း လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် လုံခြုံရေး စနစ်သည် မြန်မာနိုင်ငံ၏ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေး ဥပဒေမူကြမ်း ၂၀၁၇၊ IFC ၏အထွေထွေ EHS လမ်းညွှန်ချက်များနှင့် IFC ၏ လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေး နှင့်ဖြန့်ဖြူးရေးအတွက် EHS လမ်းညွှန် ချက်များအား လိုက်နာ သင့်ပါသည်။
						လုပ်ငန်းလည်ပတ်စဉ်ကာလ။ ပင်မဓါတ်အားခွဲရုံနှင့် ဓါတ်အားပို့လွှတ်ရေးလိုင်း လုပ်ငန်း လည်ပတ်စဉ်အတွင်း လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေး စနစ်သည် မြန်မာနိုင်ငံ၏ လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် လုံခြုံရေး ဥပဒေမူကြမ်း ၂၀၁၇၊ IFC၏အထွေထွေ EHS လမ်းညွှန်ချက်များနှင့် IFC၏ လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ဖြန့်ဖြူးရေးအတွက် EHS လမ်းညွှန်ချက်များအား လိုက်နာသင့်ပါသည်။

အမျိုးအစား	အချက်အလက်	နယ်ပယ်အတိုင်း အတာသတ်မှတ်ရာ တွင်အကဲဖြတ်ခြင်း		ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်း စစ်ရာတွင် အကဲဖြတ်ခြင်း		အကဲဖြတ်ရသည့် အကြောင်းပြချက်
		မတည် ဆောက် မီ/ ဆောက် လုပ်ဆဲ ကာလ	လုပ်ငန်း လည် ပတ် သည့် ကာလ	မတည် ဆောက် မီ/ ဆောက် လုပ်ဆဲ ကာလ	လုပ်ငန်း လည် ပတ် သည့် ကာလ	
	ဒေသတွင်း လူထုကျန်းမာ ရေး နှင့်လုံခြုံရေး (မတော်တဆမှု အပါအဝင်)	ခ-	ခ-	ခ-	ခ-	ဆောက်လုပ်ဆဲကာလ။ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင် ထိန်းသိမ်းရေးအပေါ် IFC လုပ်ဆောင်ချက် စံချိန်စံညွှန်းများ၊ IFC ၏အထွေထွေ EHS လမ်းညွှန်ချက်များနှင့် IFC ၏ လျှပ်စစ်စွမ်းအား ပိုလျှောက်ရေးနှင့် ဖြန့်ဖြူးရေးအတွက် EHS လမ်းညွှန်ချက်များ အရ လေထု ညစ်ညမ်းခြင်း၊ သဘာဝသယံဇာတရှားပါးမှု ဥပမာ မြေအောက်ရေ သဘာဝ ဆူညံသံ၊ တုန်ခါမှု၊ ဆောက်လုပ်ရေး ကြောင့် ယာဉ်မတော်တဆမှုများနှင့် ဆောက်လုပ်ရေးကာလ အတွင်း ဒေသခံအသိုင်းအဝိုင်းများအပေါ် သက်ရောက်မှု များအား ရှောင်ရှားရန် လိုအပ်ပါသည်။ လုပ်ငန်းလည်ပတ်စဉ်ကာလ။ လုပ်ငန်းလည်ပတ်စဉ် ကာလအတွင်း သဘာဝပတ်ဝန်းကျင် နှင့် လူမှုဝန်းကျင်ထိန်းသိမ်းရေး အပေါ် IFC ၏ လုပ်ဆောင်ချက် စံချိန်စံညွှန်းများ၊ IFC ၏ အထွေထွေ EHS လမ်းညွှန်ချက်များနှင့် IFC ၏ လျှပ်စစ်ဓါတ်အား ပိုလျှောက်ရေးနှင့် ဖြန့်ဖြူးရေးအတွက် EHS လမ်းညွှန်ချက်များ အရ ဒေသအတွင်း လူထုကျန်းမာရေးနှင့် လုံခြုံရေးအတွက် အထူးသဖြင့် ဖြစ်ပေါ်ရန် အလားအလာရှိသော လုပ်ငန်း လည်ပတ်စဉ် မတော်တဆမှု နှင့်/သို့ သဘာဝ ဘေးအန္တရာယ် များအား စောင့်ကြည့်ခြင်းနှင့် အကဲဖြတ်ခြင်းများ ပြုလုပ်သင့် ပါသည်။
	AIDS/HIV စသည့် ကူးစက် ရောဂါများ အန္တရာယ်	ခ-	ဃ	ခ-	ဃ	ဆောက်လုပ်ဆဲကာလ။ ဆောက်လုပ်ရေးကာလ မတိုင်မီ AIDS/HIV ကဲ့သို့ ကူးစက်ရောဂါများအား စစ်ဆေးခြင်းနှင့် ကူးစက်ရောဂါ အသိပညာပေး သင်တန်းများ ပြုလုပ်သင့်သည်။ လုပ်ငန်းလည်ပတ်စဉ်ကာလ။ လုပ်ငန်းလည်ပတ်စဉ်ကာလအတွင်း ကူးစက်ရောဂါ အန္တရာယ်များ ဖြစ်ပေါ်နိုင်ချေ မရှိပါ။
အရေးပေါ် ဘေး အန္တရာယ်	ရေကြီးမှု အန္တရာယ်	ခ-	ခ-	ခ-	ခ-	ဆောက်လုပ်ဆဲကာလ/ဆောက်လုပ်ရေးမတိုင်မီကာလ။ သင့်တော်သော မြေပြင်အမြင့်တွင် ဆောက်လုပ်မည် ဖြစ်သောကြောင့် မိုးသည်းထန်စွာရွာသွန်းခြင်း၊ ဆိုင်ကလွန်း မုန်တိုင်းကဲ့သို့သော ရေကြီးခြင်း ဘေးအန္တရာယ်များ အနည်းငယ်သာ ဖြစ်ပေါ်နိုင်ပါသည်။
	မီးဘေး အန္တရာယ်	ခ-	ခ-	ခ-	ခ-	ဆောက်လုပ်ဆဲကာလ/ လုပ်ငန်းလည်ပတ်စဉ်ကာလ။ လျှပ်စစ်ဓါတ်အားယိုစိမ့်ခြင်းနှင့် လုပ်ငန်းလည်ပတ်စဉ် မတော်တဆမှုကြောင့် မီးဘေးအန္တရာယ်ဖြစ်ပွားခြင်းကို လျော့ချရန် အရေးပေါ်စီမံခန့်ခွဲရေး အစီအစဉ်ကို ပြင်ဆင်ရန် လိုအပ်ပါသည်။

အကဲဖြတ်မှု-

က-: သိသာသောဆိုးကျိုးသက်ရောက်မှုရှိ က+: သိသာသောကောင်းကျိုးသက်ရောက်မှုရှိ

ခ-: ဆိုးကျိုးသက်ရောက်မှုအချို့ရှိ ခ+: ကောင်းကျိုးသက်ရောက်မှုအချို့ရှိ

ဂ: အကျိုးသက်ရောက်မှု မရှင်းလင်းသဖြင့် ထပ်မံလေ့လာသင့်သည်

ဃ: အကျိုးသက်ရောက်မှု မရှိသလောက်ဖြစ်၊ ထပ်မံလေ့လာရန်မလို

ဇယား ၂ တွင် လုပ်ငန်းပိတ်သိမ်းချိန်၊ လုပ်ငန်းရပ်စဲချိန်နှင့် လုပ်ငန်းရပ်စဲပြီးကာလများရှိ သဘာဝပတ်ဝန်းကျင်ညစ်ညမ်းမှု၊ သဘာဝပတ်ဝန်းကျင်၊ လူမှုပတ်ဝန်းကျင်၊ ကျန်းမာရေးနှင့် ဘေးကင်းလုံခြုံရေး၊ အရေးပေါ်အန္တရာယ်နှင့်ရာသီဥတုပြောင်းလဲမှုများကို ဖော်ပြထားပါသည်

ဇယား ၂။ ပတ်ဝန်းကျင်နှင့် လူမှုရေးထိခိုက်မှုဆန်းစစ်ခြင်းရလဒ်များ
(လုပ်ငန်းပိတ်သိမ်းချိန်၊ လုပ်ငန်းရပ်စဲချိန်နှင့် လုပ်ငန်းရပ်စဲပြီးကာလများ)

အမျိုးအစား	အချက်အလက်	နယ်ပယ်အတိုင်း အတာသတ်မှတ်ရာ တွင်အကဲဖြတ်ခြင်း		အကဲဖြတ်ခြင်း		အကဲဖြတ်ရသည့် အကြောင်းပြချက်
		ပိတ်သိမ်းကာလ	(ရပ်စဲ/ရပ်စဲပြီးကာလ)	ပိတ်သိမ်းကာလ	(ရပ်စဲ/ရပ်စဲပြီးကာလ)	
မညစ်ညမ်းမှု	လေထု	ခ-	ဃ	ခ-	ဃ	ပိတ်သိမ်းကာလ။ ဆောက်လုပ်ရေး လုပ်ငန်းခွင်မှ ထွက်ရှိသော ဖုန်မှုန့်၊ သံမှုန့်များကြောင့် ပတ်ဝန်းကျင်သို့ လေထုညစ်ညမ်းမှု ဖြစ်ပေါ်စေမည်ဟု ခန့်မှန်းပါသည်။ သို့သော် သတ်မှတ်ထားသောနေရာတွင် ဆောက်လုပ်မှုမှာ ယာယီသတ်မှတ်သောကြောင့် ထိခိုက်မှုမှာ အနည်းငယ်သာ ဖြစ်မည်ဟု ခန့်မှန်းပါသည်။
	ရေထု	ခ-	ဃ	ခ-	ဃ	ပိတ်သိမ်းကာလ။ ဆောက်လုပ်မှုမှာ ယာယီသတ်မှတ်သောကြောင့် ထိခိုက်မှုမှာ အနည်းငယ်သာ ဖြစ်မည်ဟု ခန့်မှန်းပါသည်။
	အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း	ခ-	ဃ	ခ-	ဃ	ပိတ်သိမ်းကာလ။ အဆောက်အအုံများ ဖျက်သိမ်းရာမှ အစိုင်အခဲ စွန့်ပစ်ပစ္စည်းများကို ပြန်လည်အသုံးပြုခြင်း၊ ပြန်လည်ပြုပြင် ထုတ်လုပ်ခြင်းနှင့် စွန့်ပစ်ခြင်းများ ပြုလုပ်ပါမည်။
	မြေကြီး	ဂ	ဃ	ဃ	ဃ	မြေကြီးစမ်းသပ်မှု ရလဒ်များအရ စီမံကိန်းဧရိယာအတွင်း သဘာဝကြောင့် အပါအဝင် မြေဆီလွှာညစ်ညမ်းမှု မရှိပါ။ ထို့ကြောင့် ဖျက်သိမ်းခြင်းလုပ်ငန်းကြောင့် မြေကြီးအား သက်ရောက်မှု လုံးဝမရှိပါ။
	ဆူညံသံ/ တုန်ခါမှု	ခ-	ဃ	ခ-	ဃ	ပိတ်သိမ်းကာလ။ သတ်မှတ်ထားသောနေရာတွင် ဆောက်လုပ်ရေးကာလမှာ ယာယီသတ်မှတ်သောကြောင့် ဆောက်လုပ်ရေး စက်ယန္တရားကြီးများမှ ဆူညံသံနှင့် တုန်ခါမှုများမှ ဆူညံသံနှင့် တုန်ခါမှုများသည် ပတ်ဝန်းကျင်ဧရိယာကို ထိခိုက်မှုမှာ အနည်းငယ်သာ ဖြစ်မည်ဟု ခန့်မှန်းပါသည်။
	မြေပြင် နိမ့်ကျခြင်း	ဃ	ဃ	ဃ	ဃ	မြေပြင်နိမ့်ကျခြင်း ဖြစ်စေသော လုပ်ရပ်များ ဥပမာ မြေအောက်ရေ သုံးစွဲခြင်းစသည်တို့ မရှိနိုင်ဟု ခန့်မှန်းပါသည်။
	မကောင်းသော အနံ့	ဃ	ဃ	ဃ	ဃ	မကောင်းသော အနံ့ထွက်စေသော လုပ်ငန်းများ မရှိနိုင်ပါဟု ခန့်မှန်းပါသည်။
	အနည်ကျခြင်း	ဃ	ဃ	ဃ	ဃ	အနည်ကျခြင်းကို ဖြစ်စေသော လုပ်ငန်းများ မရှိနိုင်ပါဟု ခန့်မှန်းပါသည်။
	သဘာဝ ထိန်းသိမ်းထားသောနေရာ	ဃ	ဃ	ဃ	ဃ	စီမံကိန်းဧရိယာ အနီးတွင် သဘာဝအားဖြင့် ထိန်းသိမ်းထားသောနေရာများ မတည်ရှိပါ။
	အပင်၊ သတ္တဝါနှင့် ဂေဟစနစ်	ဃ	ဃ	ဃ	ဃ	အပင်၊ သတ္တဝါနှင့် ဂေဟစနစ်ကို ထိခိုက်စေမှုများ မရှိနိုင်ပါ။
	ရေကြောင်းဆိုင်ရာ	ဃ	ဃ	ဃ	ဃ	ရေကြောင်းဆိုင်ရာ ပြောင်းလဲမှုများကို ဖြစ်ပေါ်စေနိုင်သော လုပ်ငန်းများမရှိနိုင်ပါဟု ခန့်မှန်းပါသည်။
	မြေမျက်နှာ သွင်ပြင်နှင့် ပထဝီဝင်	ဃ	ဃ	ဃ	ဃ	ကြီးမားသော မြေတူးခြင်းများ မရှိပါ။ မြေမျက်နှာ သွင်ပြင်နှင့် ပထဝီဝင်ကို ထိခိုက်နိုင်ပါဟု ခန့်မှန်းပါသည်။
	ကမ္ဘာကြီး	ဃ	ဃ	ဃ	ဃ	ကမ္ဘာရာသီဥတုကို သက်ရောက်မှု ကြီးကြီးမားမား မရှိပါ။

အမျိုးအစား	အချက်အလက်	နယ်ပယ်အတိုင်း အတာသတ်မှတ်ရာ တွင်အကဲဖြတ်ခြင်း		အကဲဖြတ်ခြင်း		အကဲဖြတ်ရသည့် အကြောင်းပြချက်
		ပိတ်သိမ်း ကာလ	(ရပ်စဲ/ ရပ်စဲပြီး ကာလ)	ပိတ်သိမ်း ကာလ	(ရပ်စဲ/ ရပ်စဲပြီး ကာလ)	
	ပူနွေးမှု					
	အန္တရာယ်ရှိ သော ပစ္စည်းများ	ဃ	ဃ	ဃ	ဃ	အန္တရာယ်ရှိသော ပစ္စည်းများကြောင့် သက်ရောက်မှု မရှိပါ။
	ထရန်စဖော်မာ ဆီနှင့် လောင်စာ	ခ-	ဃ	ခ-	ဃ	ဖျက်သိမ်းသောလုပ်ငန်းများ လုပ်ဆောင်ရာတွင် ထရန် စဖော်မာမှ ထွက်သော စွန့်ပစ်ဆီများကို သိုလှောင်ကန်မှ ဆီများသည် မြေဆီလွှာညစ်ညမ်းမှု ဖြစ်ပေါ်စေနိုင်ပါ သည်။ စွန့်ပစ်ဆီကန်အား သတိကြီးစွာထား၍ ကိုင်တွယ် စီမံသင့်ပါသည်။
ကျန်းမာရေး နှင့် လုံခြုံရေး	လုပ်ငန်းခွင် ကျန်းမာရေး နှင့် လုံခြုံရေး (မတော်တဆမှု အပါအဝင်)	ခ-	ဃ	ခ-	ဃ	ပိတ်သိမ်းကာလ။ လုပ်ငန်းပိတ်သိမ်းစဉ် ကာလတွင် လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေးအတွက် ထိခိုက်မှု အနည်းငယ်ရှိမည်ဟု မျှော်လင့်ပါသည်။ မြန်မာနိုင်ငံ၏ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေးဥပဒေမူကြမ်း ၂၀၁၇၊ IFC ၏ အထွေထွေ EHS လမ်းညွှန်ချက်များ နှင့် လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ဖြန့်ဖြူးရေး အတွက် IFC ၏ EHS လမ်းညွှန်ချက်များအပေါ် အခြေခံ၍ ပိတ်သိမ်းကာလ လုပ်ငန်းခွင်အခြေအနေ၊ ကျန်းမာရေးနှင့် လုံခြုံရေးအားထည့်သွင်းစဉ်းစားသင့် ပါသည်။
	ဒေသတွင်း လူထုကျန်းမာ ရေးနှင့် လုံခြုံရေး (မတော်တဆမှု အပါအဝင်)	ခ-	ဃ	ခ-	ဃ	ပိတ်သိမ်းကာလ။ လုပ်ငန်းပိတ်သိမ်းစဉ် ကာလတွင်ဒေသတွင်း လူထု ကျန်းမာရေးနှင့် လုံခြုံရေးအတွက် ထိခိုက်မှု အနည်းငယ် ရှိမည်ဟုမျှော် လင့်ပါသည်။ သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်ထိန်းသိမ်းရေး အပေါ် IFC လုပ်ဆောင်ချက် စံချိန်စံညွှန်းများ၊ IFC ၏ အထွေထွေ EHS လမ်းညွှန် ချက်များနှင့် လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ဖြန့်ဖြူးရေးအတွက် IFC ၏ EHS လမ်းညွှန်ချက်များအရ ဒေသတွင်း လူထုကျန်းမာရေးနှင့် လုံခြုံရေးအား ထည့်သွင်း စဉ်းစားသင့်ပါသည်။
	AIDS/HIV စသည့် ကူးစက် ရောဂါများ အန္တရာယ်	ခ-	ဃ	ခ-	ဃ	ပိတ်သိမ်းကာလ။ ကူးစက်ရောဂါအန္တရာယ်များအား အနည်းငယ်ရှိမည်ဟု မျှော်လင့်ပါသည်။ ကူးစက်ရောဂါကာကွယ်ရေးနည်းလမ်း များကို ထည့်သွင်းစဉ်းစားသင့်ပါသည်။

အကဲဖြတ်မှု-

က-: သိသာသောဆိုးကျိုးသက်ရောက်မှုရှိ

က+: သိသာသောကောင်းကျိုးသက်ရောက်မှုရှိ

ခ-: ဆိုးကျိုးသက်ရောက်မှုအချို့ရှိ

ခ+: ကောင်းကျိုးသက်ရောက်မှုအချို့ရှိ

ဂ: အကျိုးသက်ရောက်မှုမရှင်းလင်းသဖြင့်ထပ်မံလေ့လာသင့်သည်

ဃ: အကျိုးသက်ရောက်မှုမရှိသလောက်ဖြစ်ထပ်မံလေ့လာရန်မလို

၇။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်တွင် လုပ်ငန်းစဉ် ၂ ပိုင်းပါရှိပါသည်။ ၁) စီမံကိန်းအကြောင်းအရာများနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းရလဒ်များ အပေါ်အခြေခံရေးဆွဲထားသောသက်ရောက်မှုလျော့နည်းစေရန် နည်းလမ်းများနှင့် ထည့်သွင်းစဉ်းစားမှုများ၊ ၂) ဆောက်လုပ်ရေးလုပ်ငန်းများဆောင်ရွက်စဉ်နှင့် လုပ်ငန်း

လည်ပတ်ဆောင်ရွက်စဉ်ကာလများတွင် သက်ရောက်မှုလျော့နည်းစေရန် နည်းလမ်းများနှင့် ထည့်သွင်းစဉ်းစားမှုများ ကောင်းမွန်စွာဆောင်ရွက်နေကြောင်း အတည်ပြုရန်နှင့် သတ်မှတ်ထားသော ပတ်ဝန်းကျင် အဆင့်အတန်းများရှိကြောင်း အတည်ပြုရန် ပတ်ဝန်းကျင်ဆိုင်ရာ တိုင်းတာခြင်း နည်းလမ်းများကို အသုံးပြု၍ ပတ်ဝန်းကျင်ထိန်းသိမ်းမှုအားစောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်တို့ ဖြစ်ပါသည်။

(၁) သက်ရောက်မှုလျော့နည်းစေရန်နည်းလမ်းများနှင့် ထည့်သွင်းစဉ်းစားမှုများ

မတည်ဆောက်မီကာလ၊ တည်ဆောက်ဆဲကာလ၊ လုပ်ငန်းလည်ပတ်စဉ်ကာလ၊ လုပ်ငန်းပိတ်သိမ်းကာလ၊ လုပ်ငန်း ရပ်စဲခြင်းနှင့်ရပ်စဲပြီးကာလများအတွင်း သက်ရောက်မှုလျော့နည်းစေရန်နည်းလမ်းများအား ဇယား ၃ မှ ၆ တွင်ဖော်ပြ ထားပါသည်။

ဇယား ၃။ မတည်ဆောက်မီကာလ သက်ရောက်မှုလျော့နည်းစေရန် နည်းလမ်းများ

အမျိုးအစား	အချက်အလက်	သက်ရောက်မှုလျော့နည်းစေရန်နည်းလမ်းများ
လူမှုဝန်းကျင်	ဒေသတွင်း စီးပွားရေး (အလုပ်အကိုင်နှင့် အသက်မွေးမှု)	<ul style="list-style-type: none"> - လျော်ကြေးပေးရေးကော်မတီသည် ဓါတ်အားပို့လွှတ်ရေး တာဝါဆောက်လုပ်ရေးမှ ယာယီမြေ အသုံးချထားမှုအတွက် လျော်ကြေးပေးလျော်ပါမည်။ - ထိခိုက်သူများအား လုပ်ငန်းလုပ်ဆောင်မည့် အချိန်နှင့် တားမြစ်ထားသော လုပ်ငန်းချိန်အား ကြိုတင် အသိပေးပါမည်။
ကျန်းမာရေး နှင့် လုံခြုံရေး	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေး	- လုပ်ငန်းခွင် အခြေအနေများအား မြန်မာနိုင်ငံ၏ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေးဥပဒေ(မူကြမ်း ၂၀၁၇)၊ IFC ၏ EHS အထွေထွေလမ်းညွှန်ချက်များနှင့် လျှပ်စစ်ဓါတ်အားပို့ လွှတ်ရေးနှင့် ဖြန့်ဖြူးရေးအတွက် IFC ၏ EHS လမ်းညွှန်ချက်များအပေါ် အခြေခံ၍ စီစဉ်ရပါမည်။
	ဒေသတွင်းလူထု ကျန်းမာရေးနှင့် လုံခြုံရေး	- သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင် ထိန်းသိမ်းရေးအပေါ် IFC လုပ်ဆောင်ချက် စံချိန်စံညွှန်းများ၊ IFC ၏ EHS အထွေထွေလမ်းညွှန်ချက်များနှင့် လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေး နှင့် ဖြန့်ဖြူးရေးအတွက် IFC ၏ EHS လမ်းညွှန်ချက်များအပေါ် အခြေခံ၍ ဒေသအတွင်း လူထုကျန်းမာရေး နှင့် လုံခြုံရေးအား ထည့်သွင်းစဉ်းစားခြင်းများ စီစဉ်ရပါမည်။
	AIDS/HIVစသည့် ကူးစက်ရောဂါများ အန္တရာယ်	<ul style="list-style-type: none"> - ကူးစက်ရောဂါ ကာကွယ်ခြင်းအား အောက်ပါအတိုင်း စီစဉ်ထားပါမည်။ - ကူးစက်ရောဂါပျံ့နှံ့မှု ကာကွယ်ခြင်း။ - အလုပ်သမားများအား လေ့ကျင့်သင်ကြားခြင်း။
အရေးပေါ် ဘေးအန္တရာယ်	ရေကြီးမှုအန္တရာယ်	- မိုးသည်းထန်စွာရွာသွန်းခြင်း၊ ဆိုင်ကလုန်းမုန်တိုင်းတို့ကဲ့သို့သော ရေကြီးခြင်း ဘေးအန္တရာယ်များ မရှိစေရန် သင့်တော်သောအမြင့်တွင် ဆောက်လုပ်ရ မည်ဖြစ်ပါသည်။
	မီးဘေးအန္တရာယ်	- အမျိုးမျိုးသော အကြောင်းအရာများကြောင့် အထူးသဖြင့် လျှပ်စစ်ဓါတ်အား ယိုစိမ့်ခြင်း နှင့် လျှပ်စစ် ဓါတ်အားဖြင့် လည်ပတ်သောစက်များ၊ ပစ္စည်းကိရိယာများ အပူလွန်ကဲမှုကြောင့် ဖြစ်ပေါ်လာသော မီးဘေးအန္တရာယ်များကို ကာကွယ်ရန်အတွက် စီစဉ်ရပါမည်။

ကိုးကား။ IEE Study Team

ဇယား ၄။ တည်ဆောက်ဆဲကာလ သက်ရောက်မှုလျော့နည်းစေရန် နည်းလမ်းများ

အမျိုးအစား	အချက်အလက်	သက်ရောက်မှုလျော့နည်းစေရန်နည်းလမ်းများ
သဘာဝ ပတ်ဝန်းကျင်	လေအရည်အသွေး	<ul style="list-style-type: none"> - လူနေအိမ်ခြေများ ပတ်ဝန်းကျင်တွင် ရေဖြန်းခြင်းများ၊ - မလိုအပ်ဘဲ ကားစက်နှိုးထားခြင်းများ ကိုရှောင်ကြဉ်ခြင်းများကို လုပ်ဆောင်ပါမည်။ - ဆောက်လုပ်ရေး ယန္တရားကြီးများ အသုံးပြု၍ လုပ်ငန်းအား အပြင်းအထန် လုပ်ဆောင်ခြင်းကို ရှောင်ကြဉ်ပါမည်။ - ဆောက်လုပ်ရေးသုံး ကိရိယာများ၊ စက်များ နှင့် ယန္တရားများအား ပုံမှန် စစ်ဆေးထိန်းသိမ်းခြင်းများကို လုပ်ဆောင်ပါမည်။ - ဆောက်လုပ်ရေးသုံး ကိရိယာများ၊ စက်များ နှင့် ယန္တရားများမှ ထွက်ရှိသော အညစ်အကြေးများ အား သတ်မှတ်ထားသော နေရာတွင်သာ သိုလှောင်ထားပါမည်။
	ရေအရည်အသွေး	<ul style="list-style-type: none"> - အနည်ထိုင်ကန်များ (သို့) ရိုးရှင်းသော ညစ်ပတ်သော ရေသန့်စင်စနစ်များအား လိုအပ်သလို တပ်ဆင်ထားပါမည်။ - ရိုးရှင်းသော ရေးဆိုးသန့်စင်သည့် စနစ်များအား ဆောက်လုပ်ရေးလုပ်ငန်းခွင်တွင် ထားရှိပါမည်။
	အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း	<ul style="list-style-type: none"> - ဆောက်လုပ်ရေးလုပ်ငန်းမှ စွန့်ပစ်မြေသားအား ပြန်လည်အသုံးပြုခြင်း။ - ဖယ်ရှားထားသော အမှိုက်များအား သင့်တော်စွာ စွန့်ပစ်ခြင်း။ - အန္တရာယ်ဖြစ်စေသော ပစ္စည်းများနှင့် ဓါတုပစ္စည်းများ အသုံးပြုမှု မှတ်တမ်းထားရှိခြင်း နှင့် ပုံမှန်ပြုပြင်မွမ်းမံခြင်း။ - အန္တရာယ်ဖြစ်စေသော ပစ္စည်းများနှင့် ဓါတုပစ္စည်းများအား သတ်မှတ်ထားသော နေရာတွင် သိုလှောင်ခြင်းနှင့် ကျောက်တန်းမြို့နယ် (သို့) သန်လျင်မြို့နယ် စည်ပင်သာယာရေးကော်မတီအား သိမ်းယူစေခြင်း။
	ဆူညံသံနှင့် တုန်ခါမှု	<ul style="list-style-type: none"> - လူနေအိမ်ခြေများ ပတ်ဝန်းကျင်နှင့် စေတီအစရှိသော ကန့်သတ်နယ်မြေများတွင် လိုအပ်လျှင် အသံထိန်း အကာအရံများ တပ်ဆင်ခြင်း။ - အမြန်ဆုံးမောင်းနှင်နိုင်သည့် ယာဉ်အရှိန်ထက် ပိုမိုမောင်းနှင်ခြင်း။ - ကန့်သတ်နယ်မြေများအနီးတွင် လုပ်ငန်းဆောင်ရွက်ခြင်းအား ကြိုတင်အသိပေးခြင်း နှင့် လုပ်ငန်းလုပ်ကိုင်ချိန်အား ကန့်သတ်ခြင်း။
လူမှုဝန်းကျင်	မြေယာသိမ်းဆည်းခြင်း	<ul style="list-style-type: none"> - ဆောက်လုပ်ရေးကာလ ဓာတ်အားပို့လွှတ်ရေးတာဝါ၏ မြေယာသိမ်းဆည်းခြင်းအတွက် သီးနှံလျော်ကြေးငွေများ ပေးချေမည်ဖြစ်ပါသည်။
ကျန်းမာရေးနှင့် လုံခြုံရေး	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေး (မတော်တဆမှု အပါအဝင်)	<ul style="list-style-type: none"> - လျှပ်စစ်ဓာတ်အားပို့လွှတ်ရေး နှင့် ကွပ်ကဲရေးဦးစီးဌာနမှ ဆောက်လုပ်ရေးကာလအတွင်း လုပ်ငန်းခွင်အခြေအနေများအား အောက်တွင်ဖော်ပြထားသော အချက်များအပေါ် အခြေခံ၍ စီစဉ်ပါမည်။ - ဆောက်လုပ်ရေးလုပ်ငန်းခွင်အတွင်း လုံလောက်သော ကျန်းမာရေးစောင့်ရှောက်မှု အစီအမံများ (အရေးပေါ် သူနာပြုစုနည်းများ) ထားရှိခြင်း။ - ဆောက်လုပ်ရေး လုပ်သားများအား အခြေခံသန့်ရှင်းရေး နှင့် ကျန်းမာရေးကဏ္ဍများ၊ ကျန်းမာရေး နှင့် လုံခြုံရေးကိစ္စများနှင့် အလုပ်နှင့် ပတ်သက်သော ဘေးအန္တရာယ်များအား သင်တန်းပေးခြင်း။ - အလုပ်သမားများအတွက် လည်ရှည်ဖိနပ်၊ ဦးထုပ်၊ လက်အိတ်၊ ကာကွယ်ရေးအဝတ်အစား၊ မျက်မှန်နှင့်

အမျိုးအစား	အချက်အလက်	သက်ရောက်မှုလျော့နည်းစေရန်နည်းလမ်းများ
		<p>နားဆို့ စသည့် တကိုယ်ရေကာကွယ်ရေး ပစ္စည်းများ စီစဉ်ပေးခြင်း။</p> <ul style="list-style-type: none"> - လုပ်သားအားလုံးအတွက် သန့်ရှင်းသော သောက်သုံးရေစီစဉ်ပေးခြင်း။ - လုံခြုံရေး အတားအဆီးများထားခြင်းနှင့် အန္တရာယ်ရှိသော နေရာများအား မြင်သာအောင် သတ်မှတ်ထားခြင်း တို့ကဲ့သို့သော အများပြည်သူများအတွက် လုံလောက်သော ကာကွယ်မှု ပြုလုပ်ထားခြင်း။ - ဆောက်လုပ်ရေး လုပ်ငန်းခွင်အား လုံခြုံစွာ သွားလာဖြတ်သန်းနိုင်သောလမ်းကြောင်း။ - အိုင်နေသော ရေဆိုးများကြောင့် ရောဂါပိုးများ မဖြစ်ပွားစေရန် ယာယီဆောက်လုပ်ရေး နားနေဆောင်နယ်မြေအတွင်း လုံလောက်သော ရေနုတ်မြောင်းများ တူဖော်ထားခြင်း။ - မိလ္လာကန် နှင့် အမှိုက်ပုံးများအား ဆောက်လုပ်ရေးလုပ်ငန်းခွင်တွင် ထားရှိခြင်း၊ ရောဂါပိုးများ မပေါက်ပွားစေရန် ၎င်းတို့အား ကန်ထရိုက်တာမှ ပုံမှန်သန့်ရှင်းရေး ပြုလုပ်စေခြင်း။ - အခါအားလျော်စွာ ကန်ထရိုက်တာမှာ လုပ်ငန်းခွင်များမှ အမှိုက်များအား သိမ်းယူ၍ အနီးရှိ အမှိုက်ပစ် နေရာများသို့ စွန့်ပစ်ခြင်း။ - လုပ်ငန်းခွင်တွင် ဓာတ်ငွေ့ယိုဖိမ့်မှု နှင့် ပေါက်ကွဲမှု မဖြစ်စေရန် စီစဉ်ထားခြင်း။ - အခြားပစ္စည်းများအတွက် လုံလောက်သော နေရာ စီစဉ်ထားခြင်း။ - ဓါတ်လိုက်ခြင်း မရှိစေရန် ကာကွယ်ခြင်း။
	<p>ဒေသတွင်းလူထု ကျန်းမာရေးနှင့် လုံခြုံရေး (မတော်တဆမှုအပါအဝင်)</p>	<ul style="list-style-type: none"> - လျှပ်စစ်ဓာတ်အားပို့ လွှတ်ရေးနှင့် ကွပ်ကဲရေးဦးစီးဌာနမှ ဒေသတွင်း လူထုကျန်းမာရေးနှင့် လုံခြုံရေးအား IFC မှထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင် ထိန်းသိမ်းရေး လုပ်ဆောင်ချက် စံချိန်စံညွှန်း၊ EHS စည်းမျဉ်း၊ လျှပ်စစ်ဓာတ်အားပို့လွှတ်ရေး နှင့် ဖြန့်ဖြူးရေးအတွက် EHS စည်းမျဉ်း ကဲ့သို့သောနိုင်ငံတကာ စည်းမျဉ်းများအတိုင်း စီမံခန့်ခွဲပါမည်။ - ပတ်ဝန်းကျင်လူထုအား ဆောက်လုပ်ရေးလုပ်ငန်း နှင့် ပိတ်သိမ်းခြင်း လုပ်ငန်းကြောင့် ဖြစ်ပေါ်နိုင်သည့် ရုပ်ပိုင်းဆိုင်ရာ၊ ဓာတုဗေဒ သို့ အခြားသောဘေး အန္တရာယ်များမှ ကာကွယ်ပေးခြင်း။ - ဘေးအန္တရာယ်ရှိသော ပစ္စည်းများ၊ ညစ်ညမ်းနေမြေကြီးများနှင့် အခြားအရာများ၊ ဆောက်လုပ်ဆဲ အဆောက်အအုံများ နှင့် ပြိုကျနိုင်သော အဆောက်အအုံတို့အား ထိတွေ့ခြင်းမှ ရှောင်ရှားစေခြင်း။ - အသိပညာပေးခြင်းဖြင့် ဆောက်လုပ်ရေးကာလအတွင်း စီမံကိန်းယာဉ်များအပါအဝင် ယာဉ်မတော်တဆမှုများ လျော့ပါးစေခြင်း။ - လောင်စာ နှင့် အခြားပစ္စည်းများ သယ်ယူပို့ဆောင်ခြင်းကြောင့် ပတ်ဝန်းကျင်လူထုအား ယာဉ်အန္တရာယ် မဖြစ်ပေါ်စေရေး။
	<p>AIDS/HIV စသည့် ကူးစက်ရောဂါများ အန္တရာယ်</p>	<ul style="list-style-type: none"> - ကူးစက်ရောဂါများအတွက် အောက်ဖော်ပြပါအတိုင်း လိုအပ်သလို ဆောင်ရွက်ထားပါမည်။ - ကူးစက်ရောဂါပျံ့နှံ့မှုမှ ကာကွယ်ခြင်း။ - အလုပ်သမားများအား လေ့ကျင့်သင်ကြားခြင်း။ - ဒေသခံပြည်သူများအား သင်တန်းပေးခြင်း အပါအဝင် ပြောဆိုဆက်ဆံခြင်း။
	<p>မတော်တဆမှု</p>	<ul style="list-style-type: none"> - လုပ်ငန်းခွင်နှင့် ဒေသတွင်း လူထုကျန်းမာရေးနှင့် လုံခြုံရေး (OHS) အတွက် သက်ရောက်မှု လျော့နည်းစေရေး နည်းလမ်းများ နှင့် တူညီပါသည်။ - အသိပညာပေးခြင်းဖြင့် ဆောက်လုပ်ရေးကာလအတွင်း စီမံကိန်းယာဉ်များ အပါအဝင်

အမျိုးအစား	အချက်အလက်	သက်ရောက်မှုလျော့နည်းစေရန်နည်းလမ်းများ
		ယာဉ်မတော်တဆမှုများ လျော့ပါးစေခြင်း။
အရေးပေါ် ဘေးအန္တရာယ်	ရေကြီးမှုအန္တရာယ်	- မိုးသည်းထန်စွာ ရွာသွန်းခြင်း၊ ဆိုင်ကလုန်းမုန်တိုင်းနှင့် ဆူနာမီတို့ကဲ့သို့ အရေးပေါ်သတိ ပေးချက်များ ရရှိပါက လုပ်ငန်းခွင်အားလုံးရပ်နားပြီး အလုပ်သမားများအား လုံခြုံသော နေရာသို့ပို့ဆောင်ပါမည်။
	မီးဘေး အန္တရာယ်	- လျှပ်စစ်ဓါတ်အား ယိုစိမ့်ခြင်းနှင့် လျှပ်စစ်ဓါတ်အားဖြင့် လည်ပတ်သောစက်များ၊ ပစ္စည်းကိရိယာ များအပူလွန်ကဲမှုမှ ကာကွယ်ခြင်း။ - လုပ်သားများအား ပုံမှန်မီးသတ် သင်တန်းပေးခြင်းတို့ကို လုပ်ဆောင်ပါမည်။

ကိုးကား။ IEE Study Team

ဇယား ၅။ လုပ်ငန်းလည်ပတ်ဆောင်ရွက်စဉ်ကာလ သက်ရောက်မှုလျော့နည်းစေရန် နည်းလမ်းများ

အမျိုးအစား	အချက်အလက်	ဘေးအန္တရာယ်လျော့ပါးရေးစီမံချက်နှင့် ထည့်သွင်းစဉ်းစားရမည့်အချက်များ
ကျန်းမာရေး နှင့် လုံခြုံရေး	လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် လုံခြုံရေး (မတော်တဆမှုအပါအဝင်)	- လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေးအား မြန်မာနိုင်ငံတွင် ထုတ်ပြန်ထားသော လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေး (OHS) ဥပဒေမူကြမ်း ၂၀၁၇၊ IFC ၏အထွေထွေ EHS လမ်းညွှန်ချက်များ နှင့် လျှပ်စစ်ဓါတ်အားပို့လွှတ်ရေးနှင့် ဖြန့်ဖြူးရေးအတွက် IFC ၏ EHS လမ်းညွှန်ချက်များ၏ လိုအပ်ချက်များအပေါ် အခြေခံ၍ စီစဉ်ရပါမည်။
	ဒေသတွင်းလူထု ကျန်းမာရေးနှင့်လုံခြုံရေး (မတော်တဆမှုအပါအဝင်)	- ဒေသတွင်း လူထုကျန်းမာရေးနှင့် လုံခြုံရေးများအား IFC မှထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်ထိန်းသိမ်းရေး လုပ်ဆောင်ချက်စံချိန်စံညွှန်း၊ IFC ၏အထွေထွေ EHS လမ်းညွှန်ချက် များနှင့် လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ဖြန့်ဖြူးရေးအတွက် IFC ၏ EHS လမ်းညွှန်ချက်များ အတိုင်း စီမံခန့်ခွဲပါမည်။ - အသိပညာပေးခြင်းဖြင့် ဆောက်လုပ်ရေးကာလအတွင်း စီမံကိန်းယာဉ်များအပါအဝင် ယာဉ် မတော်တဆမှုများ လျော့ပါးစေခြင်း။
အရေးပေါ် ဘေးအန္တရာယ်	ရေကြီးမှုအန္တရာယ်	- မိုးသည်းထန်စွာ ရွာသွန်းခြင်း၊ ဆိုင်ကလုန်းမုန်တိုင်းနှင့် ဆူနာမီတို့ကြောင့် ရေကြီးခြင်းတို့မှ ရှောင်ရှားရန် သင့်တော်သောအမြင့်နေရာအား သတ်မှတ်ထားပါမည်။
	မီးဘေးအန္တရာယ်	- လျှပ်စစ်ယိုစိမ့်မှု ဖြစ်ပွားခြင်းနှင့် လျှပ်စစ်ပစ္စည်းများ အပူလွန်ကဲမှု မဖြစ်စေရန် ပြုပြင်ထိန်းသိမ်းမှု လုပ်ငန်းများကို သင့်လျော်အောင် စီမံခန့်ခွဲခြင်း။

ကိုးကား။ IEE Study Team

ဇယား ၆။ လုပ်ငန်းပိတ်သိမ်းကာလ သက်ရောက်မှုလျော့နည်းစေရန် နည်းလမ်း

အမျိုးအစား	အချက်အလက်	ဘေးအန္တရာယ် လျော့ပါးရေးစီမံချက်နှင့် ထည့်သွင်းစဉ်းစားရမည့်အချက်များ
ညစ်ညမ်းမှု	လေထုအရည်အသွေး	- လူနေအိမ်ခြေများ ပတ်ဝန်းကျင်တွင် ရေဖြန်းခြင်းများ၊ မလိုအပ်ဘဲ ကားစက်နှိုးထားခြင်းများ အားရှောင်ကြဉ်ခြင်းများကို လုပ်ဆောင်ပါမည်။ - ဆောက်လုပ်ရေး ယန္တရားကြီးများ၏ အပြင်းအထန် လည်ပတ်ခြင်းကို ရှောင်ကြဉ်ပါမည်။ - ဆောက်လုပ်ရေးသုံး ကိရိယာများ၊ စက်များနှင့် ယန္တရားများအား ပုံမှန် စစ်ဆေးထိန်းသိမ်းခြင်းများကို လုပ်ဆောင်ပါမည်။ - ဆောက်လုပ်ရေးသုံး ကိရိယာများ၊ စက်များနှင့် ယန္တရားများမှ ထွက်ရှိသောအညစ်အကြေးများ အားသတ်မှတ် ထားသော နေရာတွင်သာ သိုလှောင်ထားပါမည်။

	<p>ရေအရည်အသွေး</p>	<ul style="list-style-type: none"> - ရေဆိုးလှောင်ကန်များ (သို့) သန့်စင်စနစ်များအား လိုအပ်သလို တပ်ဆင်ထားပါမည်။ - ဆောက်လုပ်ရေး လုပ်ငန်းခွင်တွင် မိလ္လာကန်များအားလည်း ထားရှိပါမည်။ - ဆောက်လုပ်ရေး လုပ်ငန်းခွင်တွင် ဘိလပ်မြေဖျော်ခြင်းအတွက် ရိုးရှင်းသော ရေဆိုးသန့်စင်စနစ်ကို ထားရှိပါမည်။ - စွန့်ပစ်ရေ၏ ရေအရည်အသွေးအား စောင့်ကြည့်ပါမည်။
	<p>အစိုင်အခဲစွန့်ပစ် ပစ္စည်း</p>	<ul style="list-style-type: none"> - ဆောက်လုပ်ရေးမြေသား အသုံးချခြင်း။ - ဖယ်ရှားထားသော အမှိုက်များအား သင့်တော်စွာ စွန့်ပစ်ခြင်း။ - အန္တရာယ်ဖြစ်စေသော ပစ္စည်းများနှင့် ဓါတုပစ္စည်းများ အသုံးပြုမှု မှတ်တမ်းထားရှိခြင်းနှင့် ပုံမှန်ပြုပြင် မွမ်းမံခြင်း။ - အန္တရာယ်ဖြစ်စေသော ပစ္စည်းများနှင့် ဓါတုပစ္စည်းများအား သတ်မှတ်သောနေရာတွင် သိုလှောင်ခြင်းနှင့် ရန်ကုန်မြို့တော်စည်ပင်သာယာရေးကော်မတီမှ သိမ်းယူခြင်း။
	<p>ဆူညံသံနှင့် တုန်ခါမှု</p>	<ul style="list-style-type: none"> - အထူးသဖြင့် လူနေအိမ်ခြေနှင့် စေတီပုထိုးကဲ့သို့သော နေရာများတွင် လိုအပ်လျှင် အသံထိန်းအကာအရံများ တပ်ဆင်ခြင်း။ - အမြန်ဆုံးမောင်းနှင်နိုင်သည့် ယာဉ်အရှိန်ထက် ပိုမိုမောင်းခြင်း။ - ကန့်သတ်နယ်မြေများအနီးတွင် လုပ်ငန်းဆောင်ရွက်ခြင်းအား ကြိုတင်အသိပေးခြင်းနှင့် လုပ်ငန်းလုပ်ကိုင်ချိန်အား ကန့်သတ်ခြင်း။
<p>ကျန်းမာရေးနှင့် လုံခြုံရေး</p>	<p>လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် လုံခြုံရေး (မတော်တဆမှု အပါအဝင်)</p>	<ul style="list-style-type: none"> - ကန့်သတ်တာဝန်သည် ဖျက်သိမ်းကာလအတွင်း လုပ်ငန်းခွင်အခြေအနေများအား မြန်မာနိုင်ငံ မှထုတ်ပြန်ထားသော လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် လုံခြုံရေး (OHS) မူကြမ်း ၂၀၁၇၊ IFC ၏အထွေထွေEHS လမ်းညွှန်ချက် များနှင့်လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ဖြန့်ဖြူးရေးအတွက် IFC ၏ EHS လမ်းညွှန်ချက်များ၏ လိုအပ်ချက်များ အပေါ်အခြေခံ၍ လုပ်ငန်းအခြေအနေများကို စီမံခန့်ခွဲရမည်။
	<p>ဒေသတွင်းလူထု ကျန်းမာရေးနှင့်လုံခြုံရေး (မတော်တဆမှုအပါအဝင်)</p>	<ul style="list-style-type: none"> - ကန့်သတ်တာဝန်သည်ဒေသတွင်း လူထုကျန်းမာရေးနှင့် လုံခြုံမှုများအား IFC မှ ထုတ်ပြန်ထားသော ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်ထိန်းသိမ်းရေး လုပ်ဆောင်ချက် စံချိန်စံညွှန်း၊ EHS စည်းမျဉ်း၊ လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ဖြန့်ဖြူးရေးအတွက် EHS စည်းမျဉ်းကဲ့သို့သော နိုင်ငံတကာစည်းမျဉ်းများ အပေါ်အခြေခံ၍ စီမံခန့်ခွဲရမည်။

ကိုးကား။ IEE Study Team

(၂) ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်

ပတ်ဝန်းကျင်စောင့်ကြည့်မှု အစီအစဉ်တွင် မတည်ဆောက်မီနှင့် တည်ဆောက်ဆဲကာလ၊ လုပ်ငန်းလည်ပတ်ဆောင်ရွက်စဉ်ကာလ၊ ပိတ်သိမ်းကာလများတွင် စောင့်ကြည့်မည့်အချက်များ နှင့် တည်နေရာများကို ဇယား ၇ မှ ၁၀ အထိ ဖော်ပြထားပါသည်။

လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ကွပ်ကဲရေးဦးစီးဌာနအနေဖြင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ထုံးလုပ်နည်း ပုဒ်မ (၁၀၈) အရ ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများအား လုပ်ငန်းလည်ပတ်ချိန်မှ စတင်၍ တစ်နှစ်လျှင် (၂) ကြိမ် (၆ လတစ်ကြိမ်) စောင့်ကြပ်ကြည့်ရှုသွားမည် ဖြစ်ပါသည်။

ဇယား ၇။ ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ် (မတည်ဆောက်မီကာလ)

အမျိုးအစား	အချက်အလက်	နေရာ	အကြိမ်	တာဝန်ရှိ အဖွဲ့အစည်း
ယေဘုယျ	- ဆောက်လုပ်ရေးကာလအတွင်း သက်ရောက်မှု လျော့နည်းစေရန် နည်းလမ်းများအား စောင့်ကြပ် ကြည့်ရှု ခြင်း။	စီမံကိန်းနယ်မြေ	တစ်ကြိမ်	ကန်ထရိုက်တာ/ လျှပ်စစ်ဓာတ်အား ပို့လွှတ်ရေး နှင့် ကွပ်ကဲရေး ဦးစီးဌာန
ဒေသတွင်းစီပွားရေး (အလုပ်အကိုင်ရရှိမှု၊ သက်မွေး ဝမ်းကျောင်း)	- ဓါတ်အားပို့လွှတ်ရေးတာဝါ၏ မြေယာသိမ်ဆည်း ခြင်းအတွက် လျော်ကြေးငွေ ပေးချေမှုမှတ်တမ်း တင်ထားခြင်း။	ဆောက်လုပ်ရေး လုပ်ငန်းခွင်	ပြဿနာ ဖြစ်ပွားပါက	လျှပ်စစ်ဓာတ်အား ပို့လွှတ်ရေး နှင့် ကွပ်ကဲရေး ဦးစီးဌာန

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ဇယား ၈။ ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ် (တည်ဆောက်ဆဲကာလ)

အမျိုးအစား	အချက်အလက်	နေရာ	အကြိမ်	တာဝန်ရှိ အဖွဲ့အစည်း
ယေဘုယျ	- သက်ရောက်မှုလျော့နည်းစေရန် နည်းလမ်းများအား ဇယား၄တွင်ဖော်ပြထားအတိုင်း စောင့်ကြပ်ကြည့်ရှုခြင်း။	-	တစ်လတစ်ကြိမ်	ကန်ထရိုက်တာ
လေထုအရည်အသွေး	- NO ₂ , PM ₁₀ , PM _{2.5} , SO ₂	စီမံကိန်းဧရိယာ	တစ်နှစ်လျှင် နှစ်ကြိမ် (ခြောက်သွေ့ကာလ နှင့် မိုးတွင်းကာလ)	ကန်ထရိုက်တာ
ရေအရည်အသွေး	- Water temperature, pH, SS, DO, BOD, COD, coliform count, oil and grease, Total Nitrogen, Total Phosphorous	ပင်မဓါတ်အားခွဲရုံ၏ ဆောက်လုပ်ရေး လုပ်ငန်းခွင်အနီးရှိ ချောင်းငယ်	တစ်ကြိမ် (ခြောက်သွေ့ကာလ)	ကန်ထရိုက်တာ
	- Water temperature, pH, Turbidity	ပင်မဓါတ်အားခွဲရုံ၏ ဆောက်လုပ်ရေး လုပ်ငန်းခွင်အနီးရှိ ချောင်းငယ်	တစ်ကြိမ် (မိုးရာသီ)	ကန်ထရိုက်တာ
	- ရွှံ့ပွက်ရေ နှင့်မိုးရေများမှတ်တမ်း	အနီးရှိ မြစ်ချောင်း အင်းအိုင်များ	သုံးလတစ်ကြိမ်	ကန်ထရိုက်တာ
စွန့်ပစ်ပစ္စည်း အစိုင်အခဲ	- ဆောက်လုပ်ရေး လုပ်ငန်းစွန့်ပစ်ပစ္စည်းများ စီမံခန့်ခွဲမှုမှတ်တမ်း - အန္တရာယ်ရှိပစ္စည်းများနှင့် ဓါတုဗေဒပစ္စည်းများ စီမံခန့်ခွဲမှု မှတ်တမ်း	စီမံကိန်းဧရိယာ	တစ်လတစ်ကြိမ်	ကန်ထရိုက်တာ
အပင်နှင့်တိရစ္ဆာန် မျိုးစိတ်များ	- ခုတ်လှဲမည့် အပင်အရေအတွက်နှင့် မျိုးစိတ် များ	စီမံကိန်းဧရိယာ	တစ်လတစ်ကြိမ်	ကန်ထရိုက်တာ
ဆူညံသံနှင့် တုန်ခါမှု	- ဆူညံသံနှင့် တုန်ခါမှုအတိုင်းအတာ	သက်ရောက်မှုကို ခံစားရနိုင်သော အနီးဆုံးနေရာ	၂၄နာရီ (တစ်ကြိမ်)	ကန်ထရိုက်တာ
AIDS/HIVစသည့် ကူးစက်ရောဂါများ အန္တရာယ်	- ကူးစက်ရောဂါကာကွယ်မှု အခြေအနေ	စီမံကိန်းဧရိယာ	တစ်လတစ်ကြိမ်	ကန်ထရိုက်တာ
လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေး	- လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေး အခြေအနေ	စီမံကိန်းဧရိယာ	တစ်လတစ်ကြိမ်	ကန်ထရိုက်တာ

အမျိုးအစား	အချက်အလက်	နေရာ	အကြိမ်	တာဝန်ရှိ အဖွဲ့အစည်း
ဒေသတွင်းလူထု ကျန်းမာရေးနှင့် လုံခြုံရေး	- ဒေသတွင်းလူထုကျန်းမာရေးနှင့် လုံခြုံရေး အခြေအနေ	ဆောက်လုပ်ရေး လုပ်ငန်းခွင်နှင့် ပတ်ဝန်းကျင်နယ်မြေ	ပြဿနာဖြစ်ပွားပါက	ကန်ထရိုက်တာ

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ဇယား ၉။ ပတ်ဝန်းကျင်စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ် (လုပ်ငန်းလည်ပတ်ဆောင်ရွက်စဉ်ကာလ)

အမျိုးအစား	အချက်အလက်	နေရာ	အကြိမ်	တာဝန်ရှိ အဖွဲ့အစည်း
ယေဘုယျ	- သက်ရောက်မှု လျော့နည်းစေရန် နည်းလမ်းများအား စောင့်ကြည့်ခြင်း။	စီမံကိန်းနယ်မြေ	၃လတစ်ကြိမ် (စတင်လည်ပတ်ပြီး ၃နှစ် နောက်ပိုင်း) ၁နှစ်တစ်ကြိမ် (စတင်လည်ပတ်ပြီး ၃နှစ် နောက်ပိုင်း)	လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ကွပ်ကဲရေးဦးစီးဌာန
လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေး	- လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် လုံခြုံရေးအခြေအနေ စောင့်ကြည့်ခြင်း - လုပ်ငန်းခွင် မတော်တဆထိခိုက်မှု - မှတ်တမ်း	စီမံကိန်းနယ်မြေ	၃လတစ်ကြိမ်	လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ကွပ်ကဲရေးဦးစီးဌာန
ဒေသတွင်းလူထု ကျန်းမာရေးနှင့် လုံခြုံရေး	- ပတ်ဝန်းကျင် ကျန်းမာရေးနှင့် လုံခြုံရေး အခြေအနေ - ဆောက်လုပ်ရေးလုပ်ငန်းကြောင့် ဖြစ်ပေါ်သော မတော်တဆထိခိုက်မှု မှတ်တမ်း	ယဉ်လမ်းကြောင်း	တစ်လတစ်ကြိမ်	လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ကွပ်ကဲရေးဦးစီးဌာန
ရေလွှမ်းမိုးမှုအန္တရာယ်	- ရေကြီးမှုမှတ်တမ်းနှင့် ၎င်းအတွက်ကာကွယ်မှု	စီမံကိန်းနယ်မြေ	ပြဿနာဖြစ်ပွားပါက	လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ကွပ်ကဲရေးဦးစီးဌာန
မီးဘေးအန္တရာယ်	- မီးဘေးမှတ်တမ်းနှင့် ၎င်းအတွက်ကာကွယ်မှု	စီမံကိန်းနယ်မြေ	ပြဿနာဖြစ်ပွားပါက	လျှပ်စစ်ဓါတ်အား ပို့လွှတ်ရေးနှင့် ကွပ်ကဲရေးဦးစီးဌာန

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ဇယား ၁၀။ အကြိုစောင့်ကြည့်မှုအစီအစဉ် (ပိတ်သိမ်းကာလ)

အမျိုးအစား	အချက်အလက်	နေရာ	အကြိမ်	တာဝန်ရှိ အဖွဲ့အစည်း
ယေဘုယျ	- သက်ရောက်မှုလျော့နည်းစေရန် နည်းလမ်းများအားစောင့်ကြည့်ခြင်း။ ။	-	တစ်လတစ်ကြိမ်	ကန်ထရိုက်တာ
လေထုအရည်အသွေး	- NO ₂ , PM ₁₀ , PM _{2.5} , SO ₂	ဆောက်လုပ်ရေး လုပ်ငန်းခွင်	၃လတစ်ပတ် (ညှစ်ညှမ်းမှုအမြင့်ဆုံးအချိန်)	ကန်ထရိုက်တာ

စွန့်ပစ်ပစ္စည်းအစိုင်အခဲ	<ul style="list-style-type: none"> - စွန့်ပစ်ပစ္စည်း ပမာဏ - ဆောက်လုပ်ရေးလုပ်ငန်း စွန့်ပစ်ပစ္စည်းများ စီမံခန့်ခွဲမှု မှတ်တမ်း - အန္တရာယ်ရှိပစ္စည်းများနှင့် ဓါတုဗေဒပစ္စည်းများ စီမံခန့်ခွဲမှု မှတ်တမ်း 	စီမံကိန်းနယ်မြေ	တစ်လတစ်ကြိမ်	ကန်ထရိုက်တာ
ဆူညံသံနှင့် တုန်ခါမှု	ဆူညံသံနှင့် တုန်ခါမှုအတိုင်းအတာ	အဆိုပြုထားသော ဆောက်လုပ်ရေးလုပ်ငန်းခွင်ပတ်လည်ရှိ ထိခိုက်လွယ်သော လူနေအိမ်ခြေဧရိယာ	၃လတစ်ခါ၂၄နာရီ (တစ်ကြိမ်) (ထိခိုက်မှုအမြင့်ဆုံးကာလ)	ကန်ထရိုက်တာ
		လုပ်ငန်းခွင်သုံးယာဉ်များသွားလာရာလမ်းတလျှောက်ရှိထိခိုက်လွယ်သောလူနေအိမ်ခြေဧရိယာ	၂၄နာရီ (တစ်ကြိမ်) (ထိခိုက်မှုအမြင့်ဆုံးကာလ)	ကန်ထရိုက်တာ
AIDS/HIVစသည့် ကူးစက်ရောဂါများ အန္တရာယ်	ကူးစက်ရောဂါ ကာကွယ်မှုအခြေအနေ	ဆောက်လုပ်ရေးလုပ်ငန်းခွင်	တစ်လတစ်ကြိမ်	ကန်ထရိုက်တာ
လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် လုံခြုံရေး	လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် လုံခြုံရေးအခြေအနေ	ဆောက်လုပ်ရေးလုပ်ငန်းခွင်	တစ်လတစ်ကြိမ်	ကန်ထရိုက်တာ
ဒေသတွင်းလူထုကျန်းမာရေးနှင့်လုံခြုံရေး	ဒေသတွင်း လူထုကျန်းမာရေးနှင့် လုံခြုံရေးအခြေအနေ	ဆောက်လုပ်ရေးလုပ်ငန်းခွင်နှင့် ပတ်ဝန်းကျင်ဧရိယာ	ပြဿနာဖြစ်ပွားပါက	ကန်ထရိုက်တာ

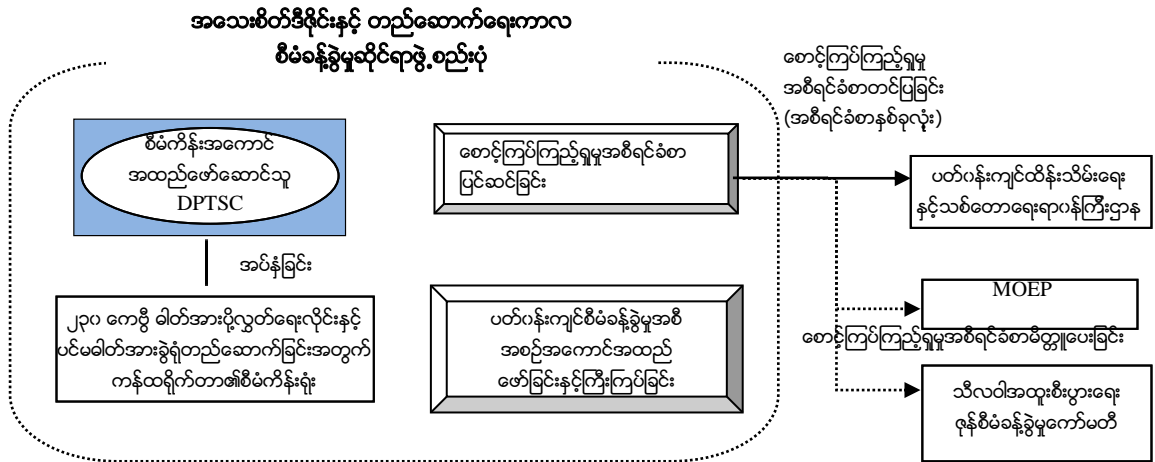
ကိုးကားချက်။ ။ IEE Study Team

၂၃၀ ကေဗီ ဓါတ်အားပို့လွှတ်ရေးလိုင်းနှင့်ပင်မဓါတ်အားခွဲရုံဆောက်လုပ်ရေးအတွက် အထက်ပါစောင့်ကြည့်မှု အစီအစဉ်ကိုနောက်ဆက်တွဲ-၄ (Appendix-4) တွင်ဖော်ပြထားသော သဘာဝပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင် စောင့်ကြပ်ကြည့်ရှုမှုပုံစံအတိုင်း လုပ်ဆောင်သွားမည်ဖြစ်သည်။

၈။ အဖွဲ့အစည်းပိုင်းဆိုင်ရာစဉ်ဆောင်ရွက်မှု

ဓါတ်အားပို့လွှတ်ရေးလိုင်းနှင့် ပင်မဓါတ်အားခွဲရုံစီမံကိန်းဆောက်လုပ်ရေးအတွက်အသေးစိတ်ဒီဇိုင်းနှင့် တည်ဆောက် ရေးကာလစီမံခန့်ခွဲမှုဆိုင်ရာဖွဲ့စည်းပုံကို ပုံ ၄ တွင်ဖော်ပြထားပါသည်။ စီမံကိန်း အကောင်အထည်ဖော်ဆောင်ရွက်သည် ဓါတ်အားပို့လွှတ်ရေးလိုင်းနှင့်ပင်မဓါတ်အားခွဲရုံအတွက် အသေးစိတ် ဒီဇိုင်းရေးဆွဲခြင်းနှင့်ဆောက်လုပ်ရေးလုပ်ငန်း အတွက်ကန်ထရိုက်တာအား ငှားရမ်းလုပ်ကိုင်မည် ဖြစ်သည်။ဓါတ်အားပို့လွှတ်ရေးလိုင်းနှင့် ပင်မဓါတ်အားခွဲရုံစီမံကိန်း ဆောက်လုပ်ရေးအတွက် ငှားရမ်း ထားသောကန်ထရိုက်တာမှ စီမံကိန်းရုံးကိုတည်ထောင်၍ အသေးစိတ်ဒီဇိုင်းရေးဆွဲခြင်း၊ ဆောက်လုပ်ရေး လုပ်ငန်းများ စီမံခန့်ခွဲခြင်းနှင့် ဆောက်လုပ်ရေးလုပ်ငန်းများ ကြီးကြပ်ကွပ်ကဲခြင်း၊ သဘာဝပတ်ဝန်းကျင် နှင့်လူမှုရေးဆိုင်ရာထည့်သွင်းစဉ်းစားချက်များ အစရှိသော လုပ်ငန်းများဆောင်ရွက်မည်ဖြစ်သည်။ စီမံကိန်း အကောင်အထည်ဖော်ဆောင်ရွက်ရာတွင် စောင့်ကြပ်ကြည့်ရှုမှုအစီရင်ခံစာကို ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အရ စောင့်ကြပ်ကြည့်ရှုမှုအစီအစဉ်ပါဝင်သော ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်ကို အကောင်အထည် ဖော်ဆောင်ရွက်မှုရလဒ်များအပေါ် အခြေခံ၍ ပြုစုပါမည်။ ယင်းအစီရင်ခံစာကို စီမံကိန်းအကောင်အထည်

ဖော်သူသည် ပုံမှန်ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာဝန်ကြီးဌာနသို့ တင်ပြပြီး လျှပ်စစ် စွမ်းအားဝန်ကြီးဌာန(MOEP)နှင့် သီလဝါအထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှု ကော်မတီသို့ မိတ္တူပေးပို့ပါမည်။



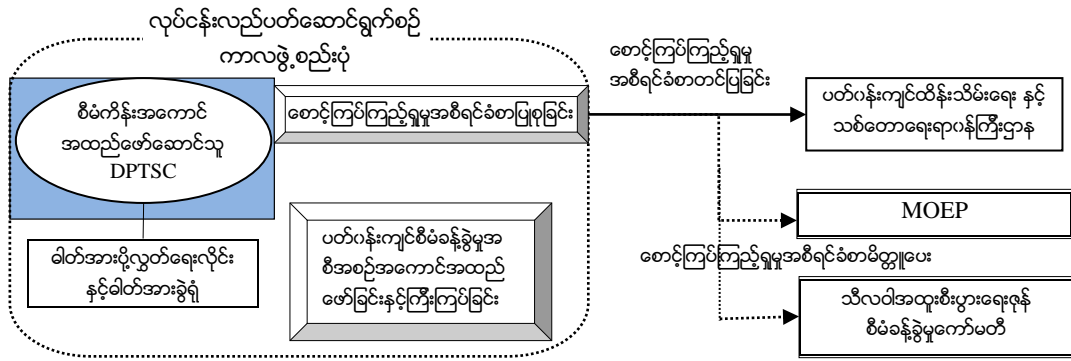
ကိုးကား။ IEE Study Team

ပုံ ၄။ ဓာတ်အားပို့လွှတ်ရေးလိုင်းနှင့်ပင်မဓါတ်အားခွဲရုံတည်ဆောက်မည့်စီမံကိန်းအတွက် အသေးစိတ်ဒီဇိုင်းနှင့်တည်ဆောက်ရေးကာလစီမံခန့်ခွဲမှုဆိုင်ရာအဆိုပြုဖွဲ့စည်းပုံ

၂၃၀ ကေဗီ ဓာတ်အားပို့လွှတ်ရေးလိုင်းနှင့် ပင်မဓါတ်အားခွဲရုံတည်ဆောက်မည့်စီမံကိန်းရုံးသည် ပတ်ဝန်းကျင်နှင့်လူမှုရေးရာဌာနခွဲများကို ထူထောင်ပြီး ၎င်းဌာနများမှ မတည်ဆောက်မီနှင့်တည်ဆောက်ဆဲ ကာလများတွင် ပေါ်ပေါက်နိုင်သောလူမှုရေးနှင့်ပတ်ဝန်းကျင်ဆိုင်ရာကိစ္စများကိုတာဝန်ယူပါမည်။ ထို့အပြင်ယင်းဌာနသည် စက်ရုံ လည်ပတ်စဉ်ကာလအတွက် လိုအပ်သောပတ်ဝန်းကျင်ထိန်းသိမ်းမှုအတွက် ပြင်ဆင်မှုများကို ဆောင်ရွက်ပါမည်။ အဓိက လုပ်ငန်းများမှာအောက်ပါ အတိုင်းဖြစ်ပါမည်။

- ၁) ဆောက်လုပ်ရေးလုပ်ငန်းများအား ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အရကြီးကြပ်စောင့်ကြည့်ခြင်း။
- ၂) ပတ်ဝန်းကျင်နှင့်လူမှုရေးဆိုင်ရာကိစ္စများနှင့်ပတ်သက်ပြီးစီမံကိန်းအကောင်အထည်ဖော်သူအား သက်ဆိုင်ရာအစိုးရဌာနများနှင့်ညှိနှိုင်းဆောင်ရွက်ရန်အတွက်နည်းပညာအကူအညီပေးခြင်း။
- ၃) မတည်ဆောက်မီနှင့်တည်ဆောက်ဆဲကာလများတွင် ပေါ်ပေါက်လာသော အခြားပတ်ဝန်းကျင်နှင့် လူမှုရေးပြဿနာများကိုကိုင်တွယ်ဖြေရှင်းခြင်း။
- ၄) ပတ်ဝန်းကျင်ထိန်းချုပ်မှုလမ်းညွှန်ချက်ကဲ့သို့သော ဓါတ်အားပို့လွှတ်ရေးလိုင်းနှင့်ပင်မဓါတ်အားခွဲရုံ လည်ပတ်စဉ်ကာလအတွင်းတွင်ပတ်ဝန်းကျင်ထိန်းချုပ်မှုအတွက်ပြင်ဆင်ခြင်း။
- ၅) စောင့်ကြပ်ကြည့်ရှုမှုအစီရင်ခံစာများကိုပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့်သစ်တောရေးရာဝန်ကြီးဌာန၊ လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန(MOEP) နှင့်အခြားသက်ဆိုင်ရာဌာနများသို့တင်ပြခြင်း။

ဓါတ်အားပို့လွှတ်ရေးလိုင်းနှင့်ပင်မဓါတ်အားခွဲရုံ လုပ်ငန်းလည်ပတ်ဆောင်ရွက်စဉ်ကာလ၏ဖွဲ့စည်းပုံကို ပုံ ၅ တွင် ဖော်ပြထားပါသည်။ ကိုယ်ပိုင်လည်ပတ်၍စီမံခန့်ခွဲနိုင်သောပင်မဓါတ်အားခွဲရုံ အဖြစ်တည်ထောင်ရန်အဆိုပြုထား ပါသည်။ ပင်မဓါတ်အားခွဲရုံသည် စီမံကိန်းအကောင်အထည်ဖော်ဆောင်သူများကိုယ်စား တာဝန်ဝတ္တရား များကိုတာဝန်ယူဆောင်ရွက်ပါမည်။ ပင်မဓါတ်အားခွဲရုံသည် စောင့်ကြပ်ကြည့်ရှုမှု အစီရင်ခံစာများကို ပတ်ဝန်းကျင်စီမံ ခန့်ခွဲမှုအစီအစဉ်အရအကောင်အထည်ဖော်ဆောင်ရွက်မှု ရလဒ်များ အပေါ်အခြေခံ၍ပြုစုပါမည်။ ယင်းအစီရင်ခံစာကို စီမံကိန်းအကောင်အထည်ဖော်သူသည် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာဝန်ကြီးဌာနသို့တင်ပြပြီး လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန(MOEP) နှင့် သီလဝါအထူးစီးပွားရေးဇုန်စီမံခန့်ခွဲမှုကော်မတီတို့သို့ မိတ္တူပေးပို့ပါမည်။



ကိုးကား။ IEE Study Team

ပုံ ၅။ ဓာတ်အားပို့လွှတ်ရေးလိုင်းနှင့် ပင်မဓာတ်အားခွဲရုံတည်ဆောက်မည့်စီမံကိန်းအတွက် လုပ်ငန်းလည်ပတ်ဆောင်ရွက်စဉ်ကာလအဆိုပြုဖွဲ့စည်းပုံ

CHAPTER 1: INTRODUCTION

1.1 Project Owner and Proponent

Project Owner/Proponent:

Department of Power Transmission and System Control (DPTSC) in the Ministry of Electric Power (MOEP)

Address: Building No. 27, Naypyitaw, Myanmar

1.2 Type of Project and Initial Environmental Examination (IEE) /Environmental Impact Assessment (EIA) Requirement

- 1) Type of Project: Construction of 230 kV Transmission Line and a Substation
- 2) IEE/EIA Requirement: IEE is required to conduct as shown in Table 1.2-1.

Table 1.2-1 Requirement of IEE/ EIA for each Package of the Sub-project for Electric Power Development in Thilawa Area

No.	Project Description	Requirement		Results
		IEE	EIA	
Package 1	33 kV Distribution Line less than 50 km			IEE was conducted
Package 2	Gas Turbine Power Plant with installed capacity 50 MW	Installed capacity \geq 5 MW and $<$ 50 MW	Installed capacity \geq 50 MW	EIA required
Package 3	Electrical Power Transmission Line 230 kV with 10 miles	All	All activities where MONREC requires that the Project shall undergo EIA	IEE is required
	High voltage 230 kV Transformers Substation	\geq 4 ha	All activities where MONREC requires that the Project shall undergo EIA	
Package 4	Gas Pipeline more than 10 km	$<$ 10 km	\geq 10 km	EIA is required and conducted

Source: IEE Study Team based on the EIA Procedures (2015)

1.3 Project Proponent's Commitments

The letter including the following commitments by Department of Power Transmission and System Control in MOEP as the project proponent is submitted to MONREC.

- Commitment to implement the project in accordance with IEE report
- Commitment to implement the project in accordance with a monitoring report
- Commitment to implement the project in accordance with related national laws and regulations in Myanmar

1.4 Implementation Organizations of IEE

- 1) Leading organization: Nippon Koei Co., Ltd. (NK), Over all IEE Study management
Address: 4, 5-chome, Chiyoda-ku Tokyo, Japan.
- 2) Second organization: Myanmar Koei International Ltd., (MKI), Coordination of IEE Study
Address: No. 36A, 1F, Grand Pho Sein Condominium, Pho Sein Rd, Tamwe Township, Yangon, Myanmar.
- 3) Third organization: Resource and Environment Myanmar Ltd., (REM), conducting environmental and social survey.
Address: 702 Delta Plaza, Shwegondaing Road, Bahan Township, Yangon, Myanmar.

The above two organizations received Certificate for Transitional Consultant Registration issued by the Ministry of Natural Resources and Environmental Conservation (MONREC) on 15 July, 2017. Please see Appendix-1 for the Certificate for Transitional Consultant Registration for Nippon Koei Co., Ltd. and that for Myanmar Koei International Ltd.

The member of IEE Study team is listed in Table 1.4-1 and the Curriculum Vitae (CVs) of key experts for the IEE Study are attached in Appendix-2.

Table 1.4-1 Member of IEE Study Team

Organization	Name of Organization	Position	Name	Key Experts	Responsibility in IEE study
Leading Organization	NK	Team Leader	Mr. Shunsuke Hieda	○	<ul style="list-style-type: none"> • Overall management of IEE study • Air pollution prevention and control • Air pollution monitoring • Noise and vibration assessment
		Pollution Control Expert	Mr. Atsushi Minami	○	<ul style="list-style-type: none"> • Water quality and water pollution control • Soil conservation
		Social Environment Expert (1)	Ms. Mayumi Goto	○	Socio-economy analysis
		Social Environment Expert (2)	Ms. Junko Masaki	○	Socio-economy analysis
Second Organization	MKI	Manager of IEE Study	Ms. Wah Wah Han Su Yin	○	<ul style="list-style-type: none"> • Risks assessment • Hazardous management • Social study and analysis including stakeholder engagement, social survey, social impact assessment, social management plan for mitigation measures, public consultation and public disclosure • Hydrology, surface water and ground water assessment • Policy, law, rules and regulation analysis by examining Myanmar legislations and international guidelines • Geology and soil conservation • Land use
		Facilitation of IEE Study	Ms. Thandar Oo	○	<ul style="list-style-type: none"> • Social survey, public consultation meeting and public disclosure
Third	REM	Leader of	Mr. Thura Aung		Physical environmental

Organization	Name of Organization	Position	Name	Key Experts	Responsibility in IEE study
Organization		Environmental Survey			survey
		Leader of Social Survey	Ms. Khin Ohnmar Htwe		Physical social survey

Source: IEE Study Team

1.5 Overall Framework of IEE Study

The Environmental Impact Assessment (EIA) Procedures and National Environmental Quality (Emission) Guidelines (NEQEG) were promulgated by the Ministry of Environmental Conservation and Forestry (MOECAF)¹ in Dec, 2015. The EIA Procedure determines the type of environmental studies such as Initial Environmental Examination (IEE) and EIA based on the category and size of project. The EIA Procedures defines detailed legal process regarding preparation of EIA and IEE report, Environmental Management Plan (EMP), public involvement, approval of EIA/IEE report by MONREC, public disclosure, and monitoring process after approval of EIA/IEE report.

The field survey was implemented from March to August 2014 and the result of IEE investigation including draft EMP was discussed in the 1st stakeholder meeting held on 26th March 2014. The result of IEE Study was discussed in 2nd stakeholder meeting held on 1st September, 2014.

The first IEE report was submitted to the Ministry of Electricity and Energy (MOEE)² in July, 2015 by the consultant. Comments on the first IEE report was received from MOECAF through MOEE in August, 2015. The overall framework of IEE Study is shown in Table 1.5-1.

Table 1.5-1 Overall Framework of IEE Study

Item	2014								
	Mar	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	
1. Environmental Survey	■	■	■						
2. Social Survey									
3. Stakeholder Meeting (Scoping)	▲								
4. Submission of Scoping and TOR						▲			
5. Preparation of Draft IEE Report				■	■	■			
6. Public Consulting Meeting (IEE result)							▲		
7. Preparation of IEE Report						■	■	■	■
8. IEE Report Submission to MONREC (1 st Time)									
9. Comments from MONREC on the IEE Report									
10. Preparation of IEE Report in response to comments from MONREC									
11. IEE Report Submission to MONREC (2 nd Time)									
12. Construction									

Item	2014		2015					
	Nov.	Dec.	Jan.	Feb.	Mar	Apr.	May.	Jun
1. Environmental Survey								
2. Social Survey								
3. Stakeholder Meeting (Scoping)								
4. Submission of Scoping and TOR								
5. Preparation of Draft IEE Report								
6. Public Consulting Meeting (IEE result)								
7. Preparation of IEE Report	■	■	■	■	■	■	■	■

¹ From 1 April 2016, the Ministry of Environmental Conservation and Forestry (MOECAF) and the Ministry of Mining were combined to the Ministry of Natural Resources and Environmental Conservation (MONREC).

² MOEE was changed to MOEP as of February, 2024.

*IEE Report of 230 kV Transmission Line and Substation Development Project
for Sub-Project for Electric Power Development in Thilawa Area*

Item	2014		2015						
	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	
8. IEE Report Submission to MONREC (1 st Time)									▲
9. Comments from MONREC on the IEE Report									
10. Preparation of IEE Report in response to comments from MONREC									
11. IEE Report Submission to MONREC (2 nd Time)									
12. Construction									

Item	2015						2016	
	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.
1. Environmental Survey								
2. Social Survey								
3. Stakeholder Meeting (Scoping)								
4. Submission of Scoping and TOR								
5. Preparation of Draft IEE Report								
6. Public Consulting Meeting (IEE result)								
7. Preparation of IEE Report								
8. IEE Report Submission to MONREC (1 st Time)								
9. Comments from MONREC on the IEE Report		▲						
10. Preparation of IEE Report in response to comments from MONREC								
11. IEE Report Submission to MONREC (2 nd Time)								
12. Construction								

Item	2016							
	Mar.	April	May	June	July	Aug.	Sep.	Oct.
1. Environmental Survey								
2. Social Survey								
3. Stakeholder Meeting (Scoping)								
4. Submission of Scoping and TOR								
5. Preparation of Draft IEE Report								
6. Public Consulting Meeting (IEE result)								
7. Preparation of IEE Report								
8. IEE Report Submission to MONREC (1 st time)								
9. Comments from MONREC on the IEE Report								
10. Preparation of IEE Report in response to comments from MONREC								
11. IEE Report Submission to MONREC (2 nd Time)								
12. Construction								

Item	2016		2017					
	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.
1. Environmental Survey								
2. Social Survey								
3. Stakeholder Meeting (Scoping)								
4. Submission of Scoping and TOR								
5. Preparation of Draft IEE Report								
6. Public Consulting Meeting (IEE result)								
7. Preparation of IEE Report								
8. IEE Report Submission to MONREC (1 st Time)								
9. Comments from MONREC on the IEE Report								

*IEE Report of 230 kV Transmission Line and Substation Development Project
for Sub-Project for Electric Power Development in Thilawa Area*

Item	2016				2017				
	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	
10. Preparation of IEE Report in response to comments from MONREC									
11. IEE Report Submission to MONREC (2 nd Time)									
12. Construction									

Item	2017					
	July	Aug	Sep	Oct	Nov	Dec
1. Environmental Survey						
2. Social Survey						
3. Stakeholder Meeting (Scoping)						
4. Submission of Scoping and TOR						
5. Preparation of Draft IEE Report						
6. Public Consulting Meeting (IEE result)						
7. Preparation of IEE Report						
8. IEE Report Submission to MONREC (1 st Time)						
9. Comments from MONREC on the IEE Report						
10. Preparation of IEE Report in response to comments from MONREC						
11. IEE Report Submission to MONREC (2 nd Time)			▲			
12. Construction						

Source: IEE Study Team

CHAPTER 2: POLICY OF ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

2.1 Project’s Policy of Environmental and Social Considerations

2.1.1 Compliance of Laws and Regulations

(1) Institutional Background

As of August 2017, Myanmar has 22 ministries and the department which is responsible for environmental and social consideration is the Environmental Conservation Department (ECD) under the Ministry of Natural Resources and Environmental Conservation (MONREC). Corresponding regional or state Government is also involved in environmental and social considerations. Ministry of Electricity and Energy, the project owner and the Project proponent takes the main responsibility of environmental and social consideration of this project.

(2) Fundamental Laws and Regulations

Following Table 2.1-1 shows major legislations pertinent to natural and social environment areas in Myanmar.

Table 2.1-1 Major Legislation regarding environmental and social environment

	Name of Laws, Rules, etc.	Year
1. Constitutional and Environmental Policy		
	Constitution of the Republic of the Union of Myanmar	2008
	Myanmar Environmental Conservation Policy	1994
	National Sustainable Development Strategy	2009
2. Environmental Conservation		
	Myanmar Agenda 21	1997
	Environmental Conservation Law	2012
	Environmental Conservation Rules	2014
	Environmental Impact Assessment (EIA) Procedure	2015
	National Environmental Quality (Emission) Guidelines	2015
	Consultant Registration Scheme (Draft)	
	Administrative instruction of EIA Procedure (Draft)	
	The Order on the Hazardous Wastes (Draft)	
	Draft Guidelines on Public Participation in Myanmar Environmental Impact Assessment processes (Draft)	
3. Biodiversity, Natural and Cultural Conservation		
	Wildlife Protection Act 1936	1936
	Irrigation Laws and Regulations	1982
	Law on Aquaculture	1989
	Myanmar Marine Fisheries Law	1990
	Fresh Water Fisheries Law	1991
	Forest Law	1992
	Animal Health and Development Law	1993
	Protection of Wildlife and Conservation of Natural Area Law	1994
	Conservation of Water Resources and River Law	2006
	National Biodiversity Strategy Action Plan in Myanmar	2012
	Conservation of Water Resources and River Rules	2013
	The Law Protecting the Antique Objects	2015
	The Law Protecting the Antique Buildings	2015
	Protection of Wildlife and natural plant and Conservation of Natural Area (Draft)	2017
4. Urban Development and Management		

	Name of Laws, Rules, etc.	Year
	The Yangon Water Works Act	1884
	Yangon Development Trust Act	1920
	The Underground Water Act	1930
	Road and Bridge Utilization Law	1985
	Road Law	2000
	Law Amending the Road and Bridge Utilization Law	2014
	Notification of the Right of Way (ROW) of Roads by the Ministry of Construction	2014
	The Second Amending Law of the Road and Bridge Utilization Law	2015
	The Second Amending Law of the Road	2015
	Highways Law	2015
	Law Amending the Highways Law	2015
	Condominium Law	2016
5. Land Acquisition and Resettlement		
	The Upper Burma Land and Revenue Regulation	1889
	The Land Acquisition Act 1894	1894
	Lower Burma Town and Village Lands Act	1899
	Transfer of Immovable Property Restriction Act	1947
	Land Nationalization Act	1953
	Disposal of Land Tenancies Law	1963
	Transfer of Immovable Property Restriction Law	1987
	Farmland Law 2012	2012
	Farmland Rules 2012	2012
	Vacant, Fallow, and Virgin Lands Management Law	2012
	Vacant, Fallow, and Virgin Lands Management Rules	2012
	The Law Amending the Lower Myanmar Town and Village Lands Act	2015
6. Pollution Control and Occupational Health		
	Factory Act	1951
	Standing Order 2_95 Occupational Health Plan 1995	1995
	Standing Order 3_95 Water and Air Pollution Control Plan 1995	1995
	The Science and Technology Development Law	1994
	Myanmar Mines Law 1994	1994
	The Law Amending the Myanmar Mines Law	2015
	The Law Amending the Factories Act (1951)	2016
	Occupational Safety and Health Law (Draft)	2017
7. Social Security		
	Leave and Holiday Act 1951	1951
	Labour Organization Law	2011
	Social Security Law	2012
	Social Security Rules	2012
	Minimum Wages Law	2013
	Employment and Social Security Notification	2013
	Minimum Wages Rules	2013
	The Law Amending Leave and Holiday Act 1951	2013
	Employment and Skill Development Law	2013
	Settlement of Labour Dispute Law	2014
	Notification for Minimum Wages Law	2015
	Payment of Wages Law	2016
8. Electricity		
	Electricity Inspection Law	1985
	Electricity Law	2014
9. General		
	Public Health Law	1972
	Myanmar Companies Act	1914
	Foreign Investment Law	2012
	Foreign Investment Rules	2012
	Myanmar Citizen Investment Law	2013
	Myanmar Special Economic Zone Law	2014
	Myanmar Special Economic Zone Rules	2015
	Myanmar Investment Law	2016

The following are summary of the main laws related to environmental conservation and environmental quality standard in Myanmar.

Environmental Conservation Law (2012)

To establish sound environment policies in the utilization of water, land, forests, mineral, marine resources, and other natural resources in order to conserve the environment and prevent its degradation, the National Environment Policy of Myanmar was proclaimed in December 1994. Myanmar Agenda 21 was published in 1997. Environmental Conservation Law was promulgated in April, 2012. Table 2.1-2 shows the outline of Environmental Conservation Law.

Table 2.1-2 Outline of the Environmental Conservation Law

Chapter		Section
1	Title and Definition	1-2
2	Objectives	3
3	Formation of the Environmental Conservation Committee	4-6
4	Duties and Powers relating to the Environmental Conservation of the Ministry	7-8
5	Environmental Emergency	9
6	Environmental Quality Standards	10-12
7	Environmental Conservation	13-16
8	Management of Urban Environment	17
9	Conservation of Natural Resources and Cultural Heritages	18-20
10	Prior Permission	21-25
11	Insurance	26-27
12	Prohibitions	28-30
13	Offences and Penalties	31-34
14	Miscellaneous	35-42

Source: Environmental Conservation Law 2012

The Environmental Conservation Rules (2014)

In order to implement the Environmental Conservation Law, the Environmental Conservation Rules including precise information of implementation process for environmental conservation was promulgated in June, 2014. Table 2.1-3 shows outline of the Environmental Conservation Rules.

Table 2.1-3 Outline of the Environmental Conservation Rules

Chapter		Sections
1	Title and Definition	1-2
2	Adopting Policy Relating to Environmental Conservation	3-6
3	Environmental Conservation	7-26
4	International, Regional and Bi-lateral Cooperation Relating to Environmental Conservation	27-28
5	Environmental Management Fund	29-35
6	Environmental Emergency	36-37
7	Environmental Quality Standards	38-39
8	Management of Urban Environment	40
9	Waste Management	41-46
10	Conservation of Natural Resources and Cultural Heritages	47-50
11	Environment Impact Assessment	51-61
12	Prior Permission	62-68
13	Prohibitions	69
14	Miscellaneous	70-74

Source: Environmental Conservation Rules 2014

The Environmental Impact Assessment (EIA) Procedure (2015)

The EIA Procedure was promulgated in Dec, 2016 by MOECAP. Table 2.1-4 describes the outline of the EIA Procedure.

Table 2.1-4 Outline of the EIA Procedure (2015)

Chapter		Sections
1	Title and Definition	1-2
2	Establishment of the Environmental Impact Assessment Process	3-16
	Requirements concerning Third Person or Organization undertaking IEE and EIA	17-22
3	Screening	23-30
4	Initial Environmental Examination	31-34
	IEE Report Requirements	35-36
	Review and Approval Process for IEEs	39-43
5	Environmental Impact Assessment	
	EIA Process	45-46
	Scoping	47-54
	EIA Investigation	55-61
	EIA Report Requirements	62-63
	Submission of EIA Report	64-66
	Review and Approval Process for EIA Report	67-70
6	Appeal Process	71-75
7	Environmental Management Plan	76-82
8	Environmental Consideration in Project Approval	83-86
	Environmental Compliance Certificate, Conditions and Revisions to Conditions	87-101
	Responsibility for all Adverse Impacts	102-105
9	Monitoring	106-110
	Monitoring and Inspection by the Ministry, Relevant Government Departments and Organizations	111-122
10	Strategic Environmental Assessment	123-124
11	Administrative Punishment	125-131

Source: The EIA Procedure (2015)

Protection of Wildlife and Conservation of Natural Areas Law (1994)

Under the jurisdiction of the Ministry of Environmental Conservation and Forestry, this law serves as a fundamental framework for wildlife and biodiversity conservation in the country. However, it is still weak in actual numerical criterion to protect the natural environment.

Conservation of Water Resources and Rivers Law (2006)

The objectives of this law include: (a) to conserve and protect the water resources and river system for the benefit of public use; (b) to enable smooth and safe waterway navigation along rivers and creeks; (c) to contribute to the development of the State economy through improving water resources and river system; and (d) to protect environmental impact.

This law is under the jurisdiction of the Ministry of Transport. Thus, it puts its strength on transportation safety and its development. Also, it does not fully cover any actual numerical criteria to protect natural environment.

2.1.2 Expected Environmental and Social Considerations

The Project proponent set default environmental and social considerations based on the project components.

- To avoid serious negative impacts at local economy such as employment and livelihood when the project proponent decides the route of transmission line, i.e., as transmission line will plan to install along hard shoulder of the road. It is for avoidance of the fixed facilities relocation.

2.2 Quantitative Target Levels for Consideration of Surrounding Environment

According to the Environmental Conservation Law, MONREC shall set standards of environmental qualities as agreed upon by the Union Government and the Environmental Conservation Committee. Standards to be set by MONREC are as follows:

- (a) standard quality of water related to the use of inland water available to public places, dams, ponds, swamps, flooded land, channel, creeks and rivers
- (b) standard quality of water at coastal regions and delta area
- (c) standard quality of groundwater
- (d) standard quality of air
- (e) standard of noise and vibration
- (f) standard of odor and emission gas
- (g) standard of wastewater
- (h) standard of soil and leachate from solid waste
- (d) other standard environment qualities set by the Union Government

As of May 2016, these standards are being prepared by Environmental Quality Standard preparation sub-committee which includes 31 numbers of members from governmental ministries of in collaboration with International Organizations (Asia Development Bank (ADB), European Union (EU)-International Management Group (IMG)), NGOs (Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI)), Coordinator (Private employer), Experts and Specialists. The target of enactment of environmental quality standards is at the end of 2017 by MONREC. Before National Environmental Quality Standard is enacted, National Environmental Quality (Emission) Guidelines (NEQEG) was promulgated in Dec, 2015. These guidelines values are applicable as environmental quality guidelines for monitoring and implementation of IEE/EIA/EMP type of projects. Noise and vibration target level to be applied for the Project is described below.

2.2.1 Noise

(1) Construction Phase

Currently, there is no target noise level at construction phase in Myanmar. But the target noise level during operation phase is set at the most sensitive point of reception as shown in Table 2.2-1 according to the NEQEG (2015).

Table 2.2-1 Target Noise Level in Operation Phase

Category	One Hour LAeq (dBA) ^a	
	Day time 7:00 - 22:00 (10:00 - 22:00 for public holidays)	Evening Time 22:00 - 7:00 (22:00-10:00 for Public holidays)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Note) Evaluation point is at boundary of building
Source: Myanmar NEQEG (2015)

There is not so much difference in noise standard in NEQEG and that in other countries as shown in Table 2.2-2.

Table 2.2-2 Noise Standard at Construction Stage in Various Countries

Items		Day time (Leq)	Night time (Leq)
Japan	Using heavy equipments with high noise level (piling, excavating etc.)	85 dB (Maximum)	-
Singapore	Hospitals, schools, institutions of higher learning, homes for the aged sick, etc.	60 dB (7am – 7pm, 12hrs)	50 dB (7pm – 7am, 12hrs)
	Residential buildings located less than 150m from the construction site where the noise is being emitted	75 dB (7am – 7pm, 12hrs)	60 dB (7pm – 10pm, 3hr) 55 dB (10pm – 7am, 9hr)
	Other Buildings	75 dB (7am – 7pm, 12hrs)	65 dB (7pm – 7am, 12hrs)
UK	In rural, suburban and urban areas away from main road traffic and industrial noise.	70 dB (8:00-18:00)	-
	Urban areas near main roads	72 dB (8:00-18:00)	-
USA	Residential	80 dB (8hrs)	70 dB (8hrs)
	Commercial	85 dB (8hrs)	85 dB (8hrs)
	Urban Area with high ambient noise level (>65 dB)	Ambient Noise Level +10dB	

Source: Noise Regulation Act, Japan (Law No.98, 1968, Amended No.33, 2006)

Environmental Protection and Management Act in Singapore (Chap.94A, Section 77, revised in 2008)

British Standard 5228: 1997 “Noise and vibration control on open and construction sites”

Transit Noise and Vibration Impact Assessment, U.S. Department of Transportation in USA, 1995

2.2.2 Vibration

(1) Construction Phase

There is no vibration standard of construction activity to receptors in Myanmar as well as south-east Asia and International Organizations such as WHO and IFC. Thus, the target vibration level at construction phase shall be set based on the standards in some foreign countries. Accordingly the target level of vibration in construction phase is set based on the following policies.

- Monastery and residential house which are necessary to keep quiet, shall comply with the Japanese standard for residential area,
- Office, commercial facilities, and factories areas shall comply with the Japanese standard for mixed areas including residential, commercial and industrial areas, and
- The category of times is divided into three types in a manner consistency with target noise level for construction.

The target vibration level is shown in Table 2.2-3 and there is not so much difference comparing with vibration standard at construction phase in the other countries as shown in Table 2.2-4.

Table 2.2-3 Target Vibration Level at Construction Phase

Category	Day time (La) (7am-7pm)	Evening Time (La) (7pm-10pm)	Night time (La) (10pm-7am)
Residential houses and monastery	65 dB	65 dB	60 dB
Office, commercial facilities, and factories	70 dB	70 dB	65 dB

Note: Evaluation point is at boundary of buildings

Source: Vibration Regulation Act, Japan (Law No.64, 1976, Amended 2004)

Table 2.2-4 Vibration Standard at Construction Stage in the Various Countries

Items		Category	Day time (La)	Night time (La)
Japan	Residential area Sensitive area necessary to be quiet	Near Heavy Equipment	65 dB	60 dB
	Mixed areas including residential and commercial and industrial areas	Near Heavy Equipment	70 dB	65 dB
	Using heavy equipments with high noise level (piling, excavating etc.)	During Construction	75 dB	-
USA	No cause to damage	During Construction	75 dB (as Lv)	
	Residential Area	During Construction	55-63 dB (as Lv)	52-60 dB (as Lv)

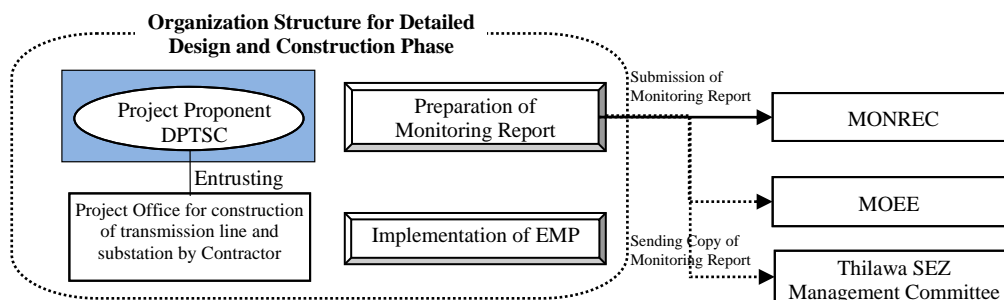
Source: Vibration Regulation Act, Japan (Law No.64, 1976, Amended 2004)

Transit Noise and Vibration Impact Assessment, U.S. Department of Transportation in USA, 1995

Note: La: Vibration as accretion, Lv: Vibration as velocity

2.3 Institutional Arrangement

The organization structure at detailed design and construction phases for construction of the transmission line and substation project is proposed as shown in Figure 2.3-1. The Project proponent is entrusting a contractor to implement detailed design and construction work. The entrusted contractor will establish a project office for construction of transmission line and substation to have a function as implementation of detailed design, management of construction work, and supervision of construction work, environmental and social consideration, and so on. The Project proponent will summarize monitoring report based on results of implementation of EMP including monitoring. Accordingly, the Project proponent will submit the monitoring report to MONREC and send the copy of the monitoring report to Ministry of Electricity and Energy (MOEE) and Thilawa SEZ Management Committee periodically.



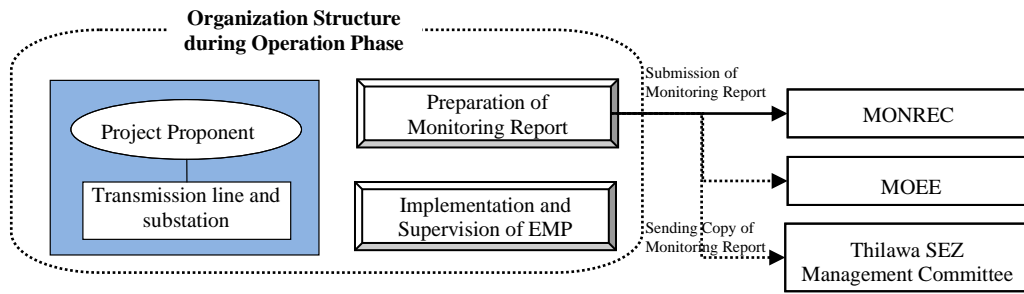
Source: IEE Study Team

Figure 2.3-1 Proposed Organization Structure for Transmission Line and Substation Project at Detailed Design and Construction Phases

The project office for construction of transmission line and substation will establish Social and Environmental Division will be responsible for dealing with social and environmental issues arisen before construction and during construction phases. In addition, the division should undertake any preparations for environment control at operation of the substation. Major tasks of the section are listed as follows.

- 1) Monitoring construction work according to EMP;
- 2) Technical support of the Project Proponent to coordinate with relevant government organizations regarding environmental and social issues;
- 3) Resolving other environmental and social issues arisen before construction and during construction phases;
- 4) Preparation for environment control during operation of the transmission line and substation such as making environment control manual; and
- 5) Submitting monitoring reports to MONREC, MOEE and TSEZMC.

The organization structure at operation phase for the transmission line and substation is proposed as shown in Figure 2.3-2. Establishment of an independent substation to operate and manage the substation is proposed. The substation will execute duties and responsibilities on behalf of the Project proponent. The substation will summarize monitoring report based on results of implementation of EMP. Accordingly the Project proponent will submit the monitoring report to MONREC and send the copy of the monitoring report to MOEE and Thilawa SEZ management committee periodically.



Source: IEE Study Team

Figure 2.3-2 Proposed Organization Structure for Transmission Line and Substation Project at Operation Phase

CHAPTER 3: PROJECT DESCRIPTION

3.1 Project Outline

The Government of Myanmar has received a loan from the Japan International Cooperation Agency (JICA) to finance the Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I). 230 kV Transmission line and a substation development project (the Project) is one of the Packages of the Sub-projects which is to secure the power supply not only to the Thilawa SEZ but also to the surrounding area including the ports, to improve the investment climate of this Thilawa area. 230 kV Transmission Line is connected between Thanlyin substation and a new substation in Thilawa along Dagon-Thilawa Road. The total length of 230 kV Transmission line is 10 miles (16 km).

The operation of factory business has been started in 400 ha wide Thilawa SEZ (Zone A) since September 2015 and 27 numbers of factories are under operation and 35 numbers of factories are under construction as of August, 2017. The infrastructure development of Thilawa SEZ (Zone B) having 101 ha has been started since February, 2017 and it is expected to complete in the middle of 2018. The Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I) includes i) construction of 33 kV distribution line which can feed 20 MW to Thilawa for power supply in a short period in the initial stage, ii) construction of 50 MW Gas Turbine (GT) power plant, iii) 230 kV Transmission Line and Substation as an additional power supply facilities before the power demand for the SEZ exceeds 20 MW to meet increasing power demand in Thilawa area and iv) construction of 32.2 km long Gas Pipeline having 20 inches diameter from South Dagon valve house to GT in Thilawa and construction of Gas Regulation Station (GRS) at about 3.2 km away from Thilawa powerplant in 2015.

3.2 Selection of Alternatives for 230 kV Transmission Line in 2015

Regarding the 230 kV transmission line from Thanlyin Substation to Thilawa Substation, a part of the transmission line which is from the existing Tower No.1 to Tower No.5 has been already constructed by MEPE. Thus, the transmission line is targeted to be constructed from the existing Tower No.5 to Thilawa Substation. There are two alternatives as shown in Table 3.2-1 the route of Case A which is laid across more than half of the paddy field area, and the route of Case B which is laid mostly along the road and channel. An alternative study was examined by comparing the two cases regarding environmental and social consideration, technical aspect, and cost.

As a result of the study, Case A adopted the tower type to support the transmission line. The tower is easy to construct and its costs is lower than Case B. However, it is necessary to acquire the land to build the towers before the commencement of construction as well as to secure a certain period to get an agreement with land owners for compensation. Besides, there is a risk that it may cause delay to the project completion because it is necessary to acquire land at the beginning when the transmission route alignment is changed after the start of construction. On the other hand, Case B requires higher construction cost compared with Case A, but there is no need to acquire land because the route will use the premises of public facilities (road and channel). Thus, risk on delay to the project completion will be minimized. As a result of the alternative study, Case B is selected as shown in Table 3.2-1 because it is necessary to take precedence to supply electric power to the surrounding area as soon as possible. But Case A has a big advantage from the cost aspect. Therefore, it is recommended that an alternative study will be examined again in the detailed design stage.

**Table 3.2-1 Comparison of Alternative Plans for Power Supply Project
(230 kV Transmission Line)**

Alternatives	Case A: Route Across Paddy Field	Case B: Route Along Public Space
Project Description	Construction of one circuit transmission line from Thanlyin Substation to Thilawa Substation. More than half of the transmission routes are across the paddy field area located at the east side of Thanlyin–Kyauktan Road.	Construction of one circuit transmission line from Thanlyin Substation to Thilawa Substation. Most of the routes of the transmission lines are laid along the public facilities such as channel, Route No. 6, and Dagon-Thilawa Road.
Route	<p>Section 1: From Thanlyin Substation to Tower No. 1– No. 5 (use of existing transmission line, same route between Class A and Class B)</p> <p>Section 2: - Construction of two new towers for the existing transmission line to Kamarnut instead of the existing Tower No. 6 and modification of the route. - Use of Tower No.6 for the transmission line to Thilawa,</p>	<p>Section 2: - Construction of cable head for connection between overhead and underground transmission lines within ROW around the existing Tower No. 5.</p>
	<p>Section 3: - Construction of towers in the paddy field area.</p>	<p>Section 3: - Construction of underground transmission line to Dagon-Thilawa Road (2.9 km; 1.3 km along the channel, 1.6 km along route No. 6), - Construction of cable head for connection between overhead and underground transmission lines within ROW of Dagon-Thilawa Road, then construction of steel monopole along the road.</p>
	<p>Section 4: - Changing direction to the southwest bound for Thilawa SEZ - Construction of steel monopole along Dagon-Thilawa Road (same route between Class A and Class B)</p>	
	<p>Section 5: - Construction of towers for four circuits along the channel in Class B of Thilawa SEZ with consideration of future power supply.</p>	<p>Section 5: - Construction of steel monopole for single circuit along Dagon-Thilawa Road same as Section 4. - Construction of one transmission tower inside of Thilawa Substation site.</p>

Alternatives	Case A: Route Across Paddy Field	Case B: Route Along Public Space
<p>Route Map</p>		
<p>Technical Aspect</p>	<p>Length: Approximately 15 km (Towers: 12 km, steel monopoles 3 km)</p> <p>No. of towers: 34</p> <p>No. of steel monopoles: 16</p> <p>Construction method: Necessary to secure spaces for access road from the existing road for towers to be constructed temporary in the paddy field area</p> <p>Normal span of towers: 350 m</p> <p>Normal span of steel monopoles: 150-200 m</p> <p>* All these items will be reviewed in the detailed design stage</p>	<p>Length: Approximately 15.3 km (steel monopoles 12.4 km, underground 2.9 km)</p> <p>No. of tower: 1 (only inside the substation site)</p> <p>No. of steel monopoles: 63 (200m span case)</p> <p>Construction Method: Easy to construct steel monopole compared with Case A due to the use of existing road area, need to construct 2.9 km underground transmission line.</p> <p>Normal span of steel monopoles: 150-200 m</p> <p>Diameter of transmission line in the underground: Approximately 2,000 mm² as a single core</p> <p>Size of conduit line in the underground: 0.2 m diameter at 1.2 m depth from the ground with earthwork of 1.5 m width x 1.6 m depth.</p> <p>* All these items will be reviewed in the detailed design stage.</p>
<p>Economic Aspect</p>	<p>Cost:</p> <ul style="list-style-type: none"> - Lower total cost of towers/monopoles compared with Case B because a tower is a standard production and can be procured in Myanmar - Lower construction cost of transmission line due to short length, - Land acquisition cost will be assumed. <p>Duration:</p> <ul style="list-style-type: none"> - Same as construction period - Delay of construction might be assumed because it is necessary to secure a certain time to negotiate with the land owner about 	<p>Cost:</p> <ul style="list-style-type: none"> - 5.3 times of the total construction cost higher than Case B because high cost materials and construction method such as steel monopole and underground transmission line will be adopted. <p>Duration:</p> <ul style="list-style-type: none"> - Same as construction period - No delay of construction as there will be no land acquisition issue.

Alternatives	Case A: Route Across Paddy Field	Case B: Route Along Public Space
	compensation in case of land acquisition and a deal breaker issue may come up.	
Environmental Consideration	No difference between Case A and Case B.	
Social Consideration	No resettlement will be assumed but land acquisition of approximately 20 paddy fields and some areas in Section 4 will be assumed.	No land acquisition and resettlement will be assumed.
Evaluation	Case A has an advantage on the cost aspect compared with Case B but necessary to conduct land acquisition. Furthermore, delay of construction might be assumed especially a deal breaker issue may arise.	Case B has a disadvantage on the cost aspect compared with Case A but has an advantage on the social consideration component such as unnecessary land acquisition. Furthermore, no delay of construction due to land acquisition will be assumed. In this connection, Case B is selected as a priority plan.

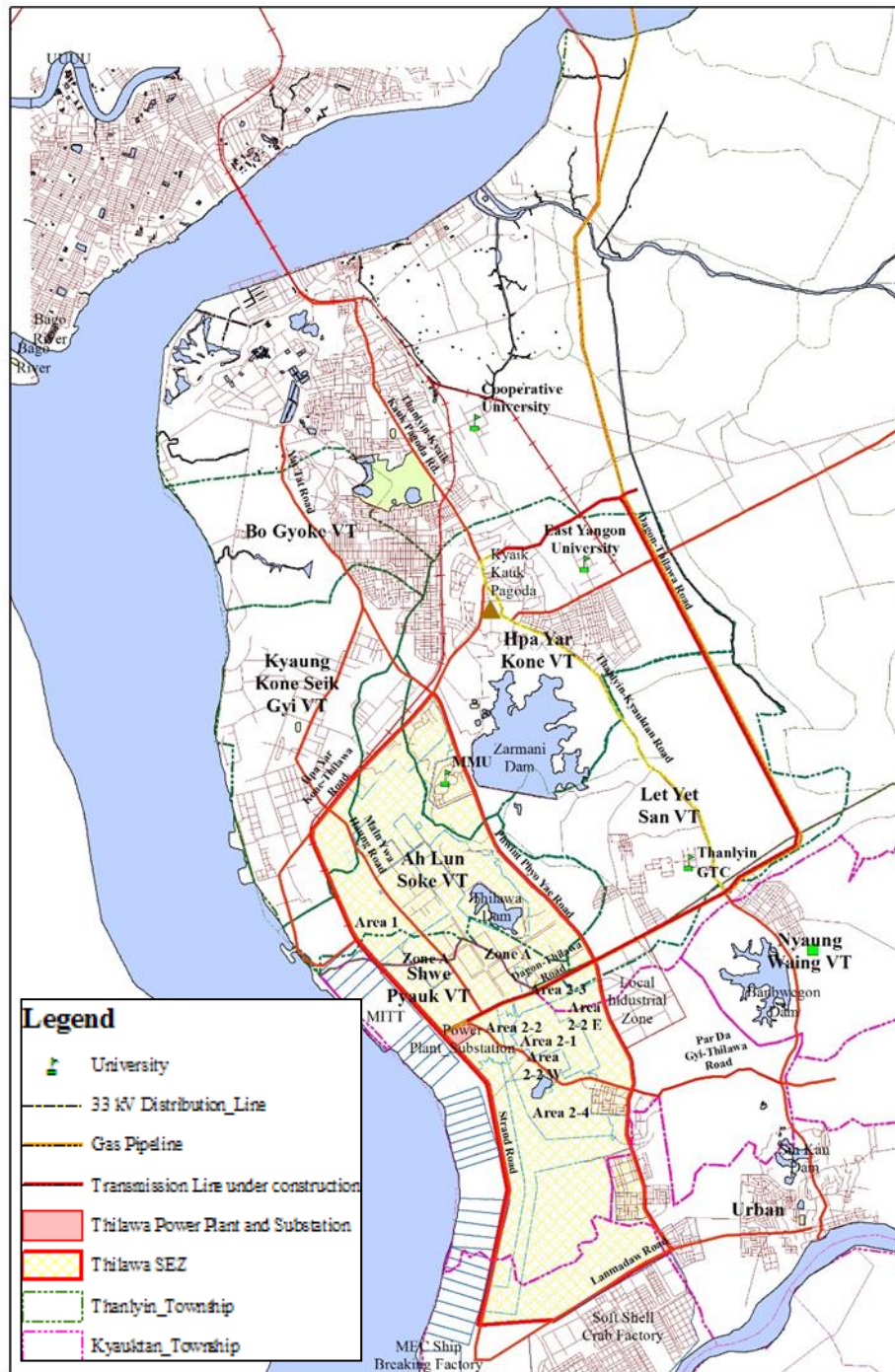
Source: IEE Study Team

3.2.1 Project Description

Approximately 10 miles (16 km) of 230 kV transmission line is to be installed from the Thanlyin substation to the new Thilawa substation. 230 kV transmission line passes Bayet Village Tract, Hpa Yar Kone Village Tract, Let Yet San Village Tract in Thanlyin Township and Shwe Pyi Thar Yar ward in Kyauktan Township in Yangon South District. 230 kV double circuit transmission line is planned to construct with 37 m high Mono Pole (Panzer Mast) steel tower from Thanlyin substation to a new Thilawa substation in order to supply electricity fully to Thilawa SEZ. Mono pole (Panzer Mast) tower type, which is compact and takes a small space, is planned to design along the line route within the Right of Way (ROW) of Dagon-Thilawa Road. High panzer masts are planned to use to have a clearance distance of 25 m between Sag Point and the ground so that big containers can go safely.

In addition, a new 230 kV substation is to be constructed in Thilawa. Thilawa substation is constructed in the same premises with dual fuel gas turbines near the premises of Class A area in Thilawa SEZ in Shwe Pyi Thar Yar ward in Kyauktan Township in Yangon South District. The total premise of dual fuel gas turbines and a substation is 10 ha wide and the new substation requires 2 ha of land. Thilawa substation will be equipped with three numbers of 230/33 kV (100) MVA main transformers and one transformer of 33/11 kV (20) MVA and a 230 kV transmission line switch yard for receiving power from Thanlyin substation.

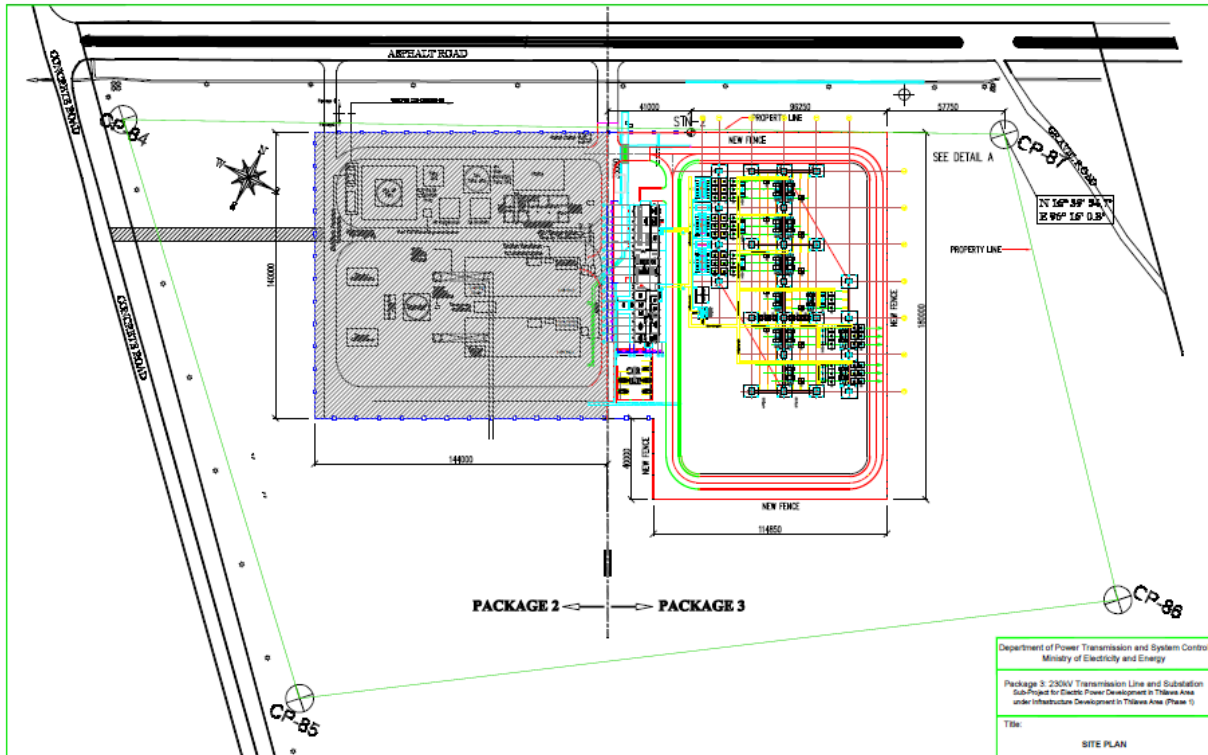
The location of Thilawa substation and the line route of 230 kV Transmission Line are shown in Figure 3.2-1 and on the map following the cover page of this IEE report.



Source: IEE Study Team

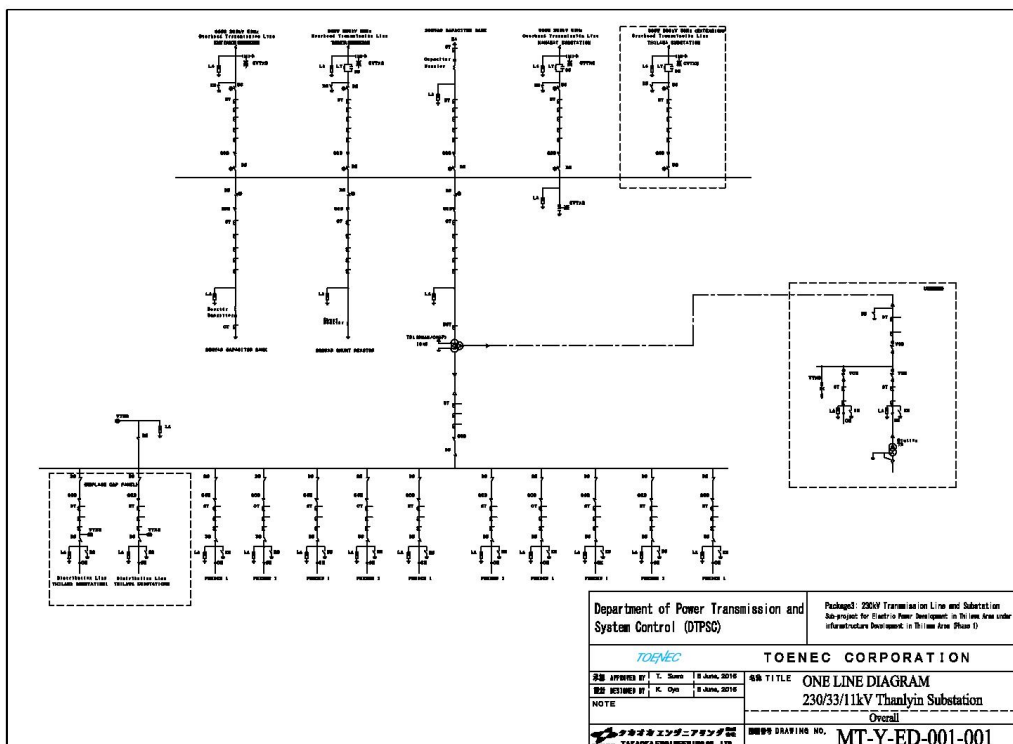
Figure 3.2-1 Location of a Power Plant and a Substation in Thilawa

33 kV Gas Insulated Switchgear (GIS) system, which will be set up in the control room in Thilawa substation, receives 33 kV from seven numbers of sources such as three numbers of main transformers and two numbers of feeder from Thanlyin in Thilawa substation and two numbers of Gas turbines in Thilawa powerplant and then it distributes electricity to 33/11 kV (20) MVA transformer. As shown in Figure 3.2-2 about the layout plan of Thilawa substation, the area of power plant and substation is marked by CP-84 (16° 39' 48.7" N, 96° 15'48.1"E), CP-85 (16° 39' 42" N, 96° 15'55"E), CP-86 (16° 39' 49.1" N, 96° 16'5.8"E) and CP-87 (16° 39' 54.7" N, 96° 16'0.8"E). The overall single line diagram and that of 230 kV Thilawa line are shown in Figure 3.2-3 Figure 3.2-4 and respectively. Cross sectional drawing of Thanlyin and Thilawa Substation is shown in Figure 3.2-5 and Figure3.2-6 respectively.



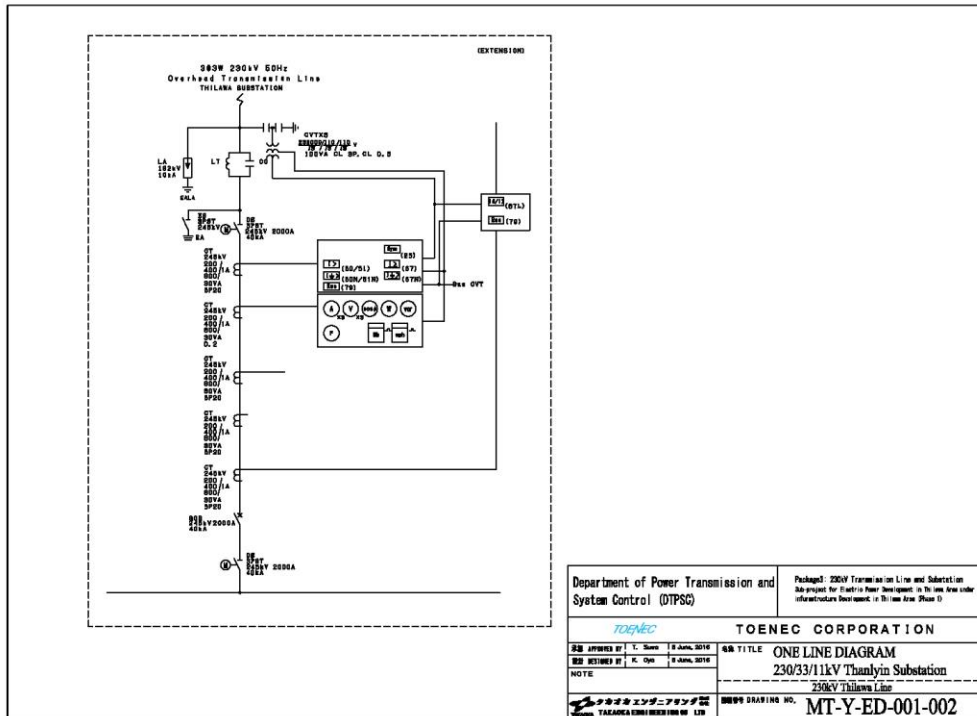
Note: Scale is not applicable
Source: DPTSC

Figure 3.2-2 Layout plan of Thilawa Substation



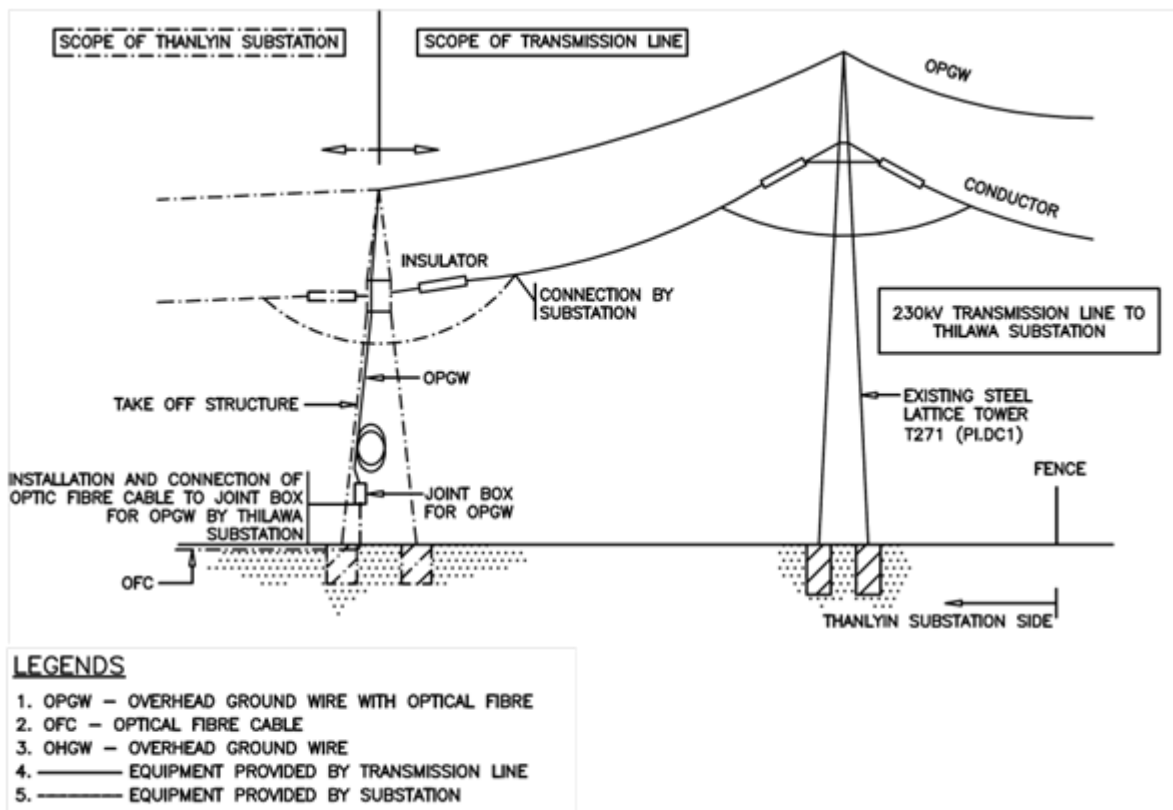
Source: DPTSC

Figure 3.2-3 Overall Single Line Diagram



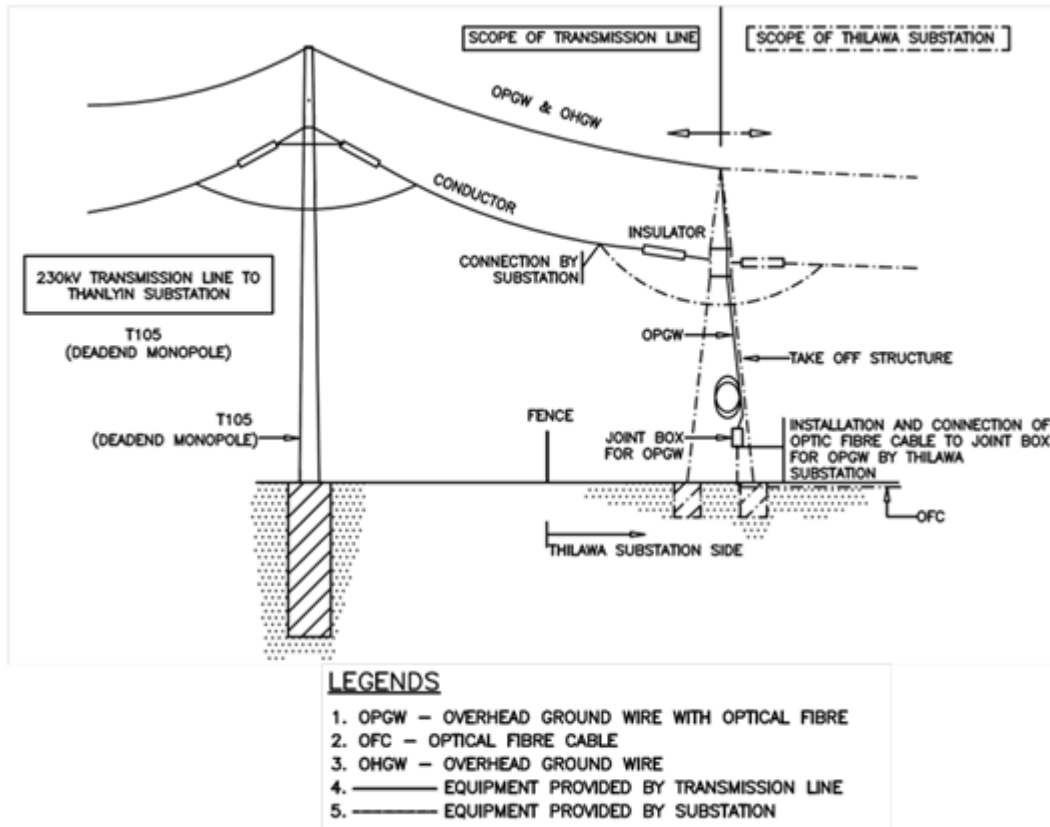
Source: DPTSC

Figure 3.2-4 Single Line diagram of 230 kV Thilawa line



Source: DPTSC

Figure 3.2-5 Cross Sectional Drawing of Thanlyin Substation



Source: DPTSC

Figure 3.2-6 Cross Sectional Drawing of Thilawa Substation

CHAPTER 4: OVERALL CONDITIONS IN THE SURROUNDING AREA

4.1 Living Environment (Pollution Status)

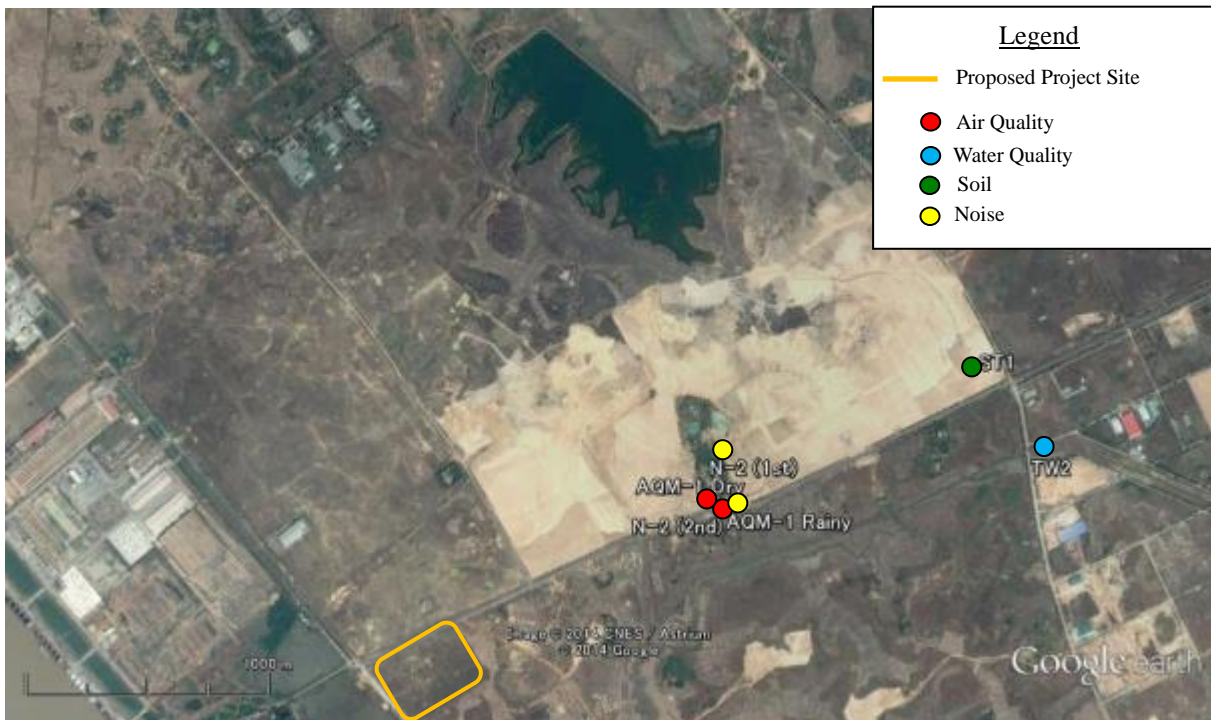
4.1.1 Outline of Environmental Survey in 2013

The overall conditions of air quality, water quality, soil quality, noise levels are quoted from the EIA Report for the Thilawa Special Economic Zone (SEZ) Class A Development Project by Myanmar and Japan Thilawa Development Ltd. (hereinafter referred to as the “Reference”) which was approved by the Thilawa SEZ Management Committee (TSMC) based on the comments of the MONREC. The summary of the field survey for overall conditions is shown in Table 4.1-1. The location of the environmental survey for overall conditions is shown in Figure 4.1-1.

Table 4.1-1 Summary of Environmental Survey for Overall Conditions

Category	Item	Description		
Environmental Conditions (quoted from the existing data from EIA studies near the Project site)	Air Quality	Parameter	1) Sulfur dioxide (SO ₂), 2) Carbon monoxide (CO), 3) Nitrogen dioxide (NO ₂), 4) PM10	
		Period	Two points for dry and rainy seasons (two samples in total)	
		Location	Along the road	
	Water Quality	Parameter	Total of 31 parameters: 1) Temperature 2) Odor 3) Color 4) EC 5) pH 6) BOD ₅ 7) COD _{Cr} 8) SS 9) Turbidity 10) Hardness 11) DO 12) Total Coliforms 13) Total Nitrogen 14) NO ₂ -N 15) NO ₃ -N 16) NH ₄ -N 17) Total Phosphorous 18) Oil and Grease 19) Sulfide 20) Sulfate 21) TOC 22) CN 23) Hg 24) Pb 25) Cd 26) Cr _(VI) 27) Cu 28) Zn 29) Ni 30) Mn 31) Fe	
		Frequency	Monthly (March to August 2013), Six samples in total	
		Location	Surface water	
	Soil Quality	Parameter	Total of 11 parameters: 1) Cadmium (Cd) 2) Chromium (Cr _{VI}) 3) pH 4) Mercury (Hg) 5) Lead (Pb) 6) Arsenic (As) 7) Zinc (Zn) 8) Nickel (Ni) 9) Manganese (Mn) 10) Iron (Fe) 11) Copper (Cu)	
		Period	One time sampling at one point	
		Location	Paddy field	
	Noise Level	Parameter	LAeq (A-weighted loudness equivalent)	
		Period	72 hours survey during weekday and weekend	
		Location	Two locations	

Source: EIA Report for the Thilawa SEZ Class A Development Project



Source: Google Earth, EIA Report for Thilawa SEZ Class A Development Project

Figure 4.1-1 Location of Environmental Survey for Overall Conditions

4.1.2 Air Quality

(1) Survey Condition

According to the Reference, the results of two survey points are available near the Project site. Table 4.1-2 summarizes the survey conditions such as season, period, parameters, and method for air quality survey. The on-site monitoring method was prepared referring to the recommendations of the United States Environmental Protection Agency (USEPA).

Table 4.1-2 Outline of Air Quality Survey

Survey Point	Season	Period	Parameter	Method
AQM-1 Dry (Living Environment)	Dry Season	3 Days (9–12 April 2013)	SO ₂ , CO, NO ₂ , PM ₁₀	On-site monitoring (by Haz-Scanner EPAS Wireless Environmental Perimeter Air Station)
AQM-1 Rainy (Along the road)	Rainy Season	7 Days (22–29 June 2013)		

Source: EIA Report for the Thilawa SEZ Class A Development Project

(2) Survey Location

The locations of survey points are shown in Table 4.1-3.

Table 4.1-3 Locations of Air Quality Survey

Sampling Point	Coordinates	Description of Survey Point
AQM-1 Dry	N 16°40'14.6", E 96°16'31.2"	West side of the Moekyoswun Monastery compound.
AQM-1 Rainy	N 16°40'11.7", E 96°16'36.4"	In front of Moekyoswun Monastery, about 11.2 m away from car road.

Source: EIA Report for Thilawa SEZ Class A Development Project

(3) Air Emission Standard

Most of the countries in the Southeast Asia as well as in Japan have ambient air quality standards. International standard is also available in the IFC EHS Guidelines. Table 4.1-4 shows the ambient air quality standards in Southeast Asian countries, Japan, and IFC. Sampling period is limited to 24 hours,

which could be measured by the available equipment in Myanmar (currently impossible to implement continuous measure for one month at project site due to battery/electrical capacities) as reference. In Myanmar, National Environmental Quality (Emission) Guidelines (NEQEG) was promulgated in Dec, 2015 and target air emission level is set as shown in Table 4.1-5 according to general guidelines of air emission in NEQEG.

Table 4.1-4 Ambient Air Quality Standards in the Southeast Asian Countries, Japan, and IFC

Item	Sampling Period	Japan ^{*1}	Thailand ^{*2}	Vietnam ^{*3}	IFC ^{*4}
SO ₂	10 min	-	-	-	0.5 mg/m ³
	1 hour	0.1 ppm	0.3 ppm	0.35 mg/m ³	-
	24 hours	0.04 ppm	0.12 ppm	0.125 mg/m ³	0.125 mg/m ³ (Interim Target-1) 0.05 mg/m ³ (Interim Target-2) 0.02 mg/m ³ (Guideline)
	1 year	-	-	0.05 mg/m ³	-
NO ₂	1 hour	-	0.17 ppm	-	0.2 mg/m ³
	24 hours	0.04-0.06 ppm	-	-	-
	1 year	-	0.03 ppm	-	0.04 mg/m ³
CO	1 hour	-	30 ppm	30 mg/m ³	-
	8 hours	20 ppm	-	10 mg/m ³	-
	24 hours	10 ppm	9 ppm	-	-
PM _{2.5}	24 hours	0.035 mg/m ³	0.05 mg/m ³	-	0.075 mg/m ³ (Interim Target-1) 0.05 mg/m ³ (Interim Target-2) 0.0375 mg/m ³ (Interim Target-3) 0.025 mg/m ³ (Guideline)
	1 year	0.015 mg/m ³	0.025 mg/m ³	-	0.035 mg/m ³ (Interim Target-1) 0.025 mg/m ³ (Interim Target-2) 0.015 mg/m ³ (Interim Target-3) 0.01 mg/m ³ (Guideline)
PM ₁₀	24 hours	-	0.12 mg/m ³	0.15 mg/m ³	0.15 mg/m ³ (Interim Target-1) 0.10 mg/m ³ (Interim Target-2) 0.07 mg/m ³ (Interim Target-3) 0.05 mg/m ³ (Guideline)
	1 year	-	0.05 mg/m ³	0.05 mg/m ³	0.07 mg/m ³ (Interim Target-1) 0.05 mg/m ³ (Interim Target-2) 0.03 mg/m ³ (Interim Target-3) 0.02 mg/m ³ (Guideline)

*1: National Air Quality Standard in Japan (Circular Nos. 25, 1973, originally), Ministry of Environment, Japan

*2: Notifications of National Environmental Board Nos.10, 24, 28, 33, and 36, Ministry of Natural Resources and Environment, Thailand

*3: National Ambient Air Quality Standard (TCVN5973:2005), Ministry of Science and Technology in Vietnam

*4: Environmental, Health, and Safety Guidelines, General EHS Guidelines, IFC, 2007

Table 4.1-5 Air emission Guidelines

Parameters	Sampling Period	Value (µg/m ³)	Value (mg/m ³)	Value (ppm)
SO ₂	24 hours	20	0.02	0.0076
NO ₂	1 hour	200	0.2	0.1063
Ozone ³	8 hours daily maximum	100	0.1	0.0509
PM _{2.5}	24 hours	25	0.025	
PM ₁₀	24 hours	50	0.05	

Note: ppm was set as the converted value from mg/m³ to ppm under the mean temperature of 25 oC

Source: Myanmar NEQEG (2015)

(4) Survey Result

All of the results were below their respective target levels as shown in Table 4.1-6. The values of all parameters in the rainy season were lower than those of all parameter in the dry season. It is assumed that rainfall might decrease the concentration of air pollutants as the rainfall catches the air pollutant.

Table 4.1-6 Results of Air Quality Survey in 2013

Parameter (Unit)	Date:	Sampling Point	Result		Air Emission General Guidelines in Myanmar NEQEG (2015)
SO ₂ (ppm)	9 to 12 April 2013	AQM-1 Dry	AVG.	0.0164	0.0076
			Minimum - Maximum	0.0147 - 0.0175	
	22 to 29 June 2013	AQM-1 Rainy	AVG.	0.0038	
			Minimum - Maximum	0.0005 - 0.0088	
CO	9 to 12 April	AQM-1 Dry	AVG.	0.4446	-

³ Ozone cannot be easily measured in Myanmar

Parameter (Unit)	Date:	Sampling Point	Result		Air Emission General Guidelines in Myanmar NEQEG (2015)
(ppm)	2013		Minimum - Maximum	0.4320 - 0.4636	
	22 to 29 June 2013	AQM-1 Rainy	AVG.	0.3144	
			Minimum - Maximum	0.2517 - 0.4219	
NO ₂ (ppm)	9 to 12 April 2013	AQM-1 Dry	AVG.	0.0411	0.1063
	22 to 29 June 2013	AQM-1 Rainy	Minimum - Maximum	0.0375 - 0.0482	
			AVG.	0.0347	
			Minimum - Maximum	0.0341 - 0.0349	
PM ₁₀ (mg/m ³)	9 to 12 April 2013	AQM-1 Dry	AVG.	0.0824	0.05
	22 to 29 June 2013	AQM-1 Rainy	Minimum - Maximum	0.0571 - 0.0997	
			AVG.	0.0482	
			Minimum - Maximum	0.0375 - 0.0600	

Source: EIA Report for the Thilawa SEZ Class A Development Project

4.1.3 Water Quality

(1) Survey Condition

According to the Reference, one survey point relevant to the Project is available around the Project site. Table 4.1-7 summarizes the survey conditions such as season, month, parameters, and method for water quality survey.

Table 4.1-7 Outline of Water Quality Survey

Survey Point	Season	Month	Parameters	Method
TW2	Dry Season in 2013	March	Temperature, Taste and Odor, Color, EC, Hardness, pH, Turbidity, SS, DO, COD, TOC, BOD ₅ , Oil and Grease, Fecal Coliform, Total Coliforms, NH ₄ -N, NO ₃ -N, T-N, PO ₄ -P, T-P, Cu, Zn, Cd, Pb, Hg, Ni, Mn, Cr (VI), Fe, Sn, CN, Sulfide, Sulfate, Fluoride	On-site measurement by water quality meter and analysis in laboratories
		April		
		May		
	Rainy Season in 2013	June		
		July		
		August		

Note: Parameters are different in each month.

Source: EIA Report for the Thilawa SEZ Class A Development Project

(2) Survey Location

The location of sampling points is shown in Table 4.1-8.

Table 4.1-8 Location of Water Quality Survey

Category	Sampling Point	Coordinates	Description of Survey Point
Surface Water	TW-2	16°40'20.46"N, 96°17'18.72"E	At the creek which crosses the car road.

Source: EIA Report for the Thilawa SEZ Class A Development Project

(3) Effluent Standard

Myanmar NEQEG was promulgated in Dec, 2015 and Table 4.1-9 shows the effluent standard for Electric Power Transmission and Distribution in NEQEG.

Table 4.1-9 Effluent Standards for Electric Power Transmission and Distribution

Parameter	Unit	Concentration
Biological oxygen demand	mg/l	30
Chemical oxygen demand	mg/l	125
Oil and grease	mg/l	10
pH	Standard Unit	6-9
Total coliform bacteria	100 ml	400
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50

Source: Myanmar NEQEG (2015)

(4) Survey Results

Table 4.1-10 shows the results of the water quality survey at TW2. The results for all parameters are lower than the effluent standard value set up. Thus, the water quality of the survey point was not polluted.

Table 4.1-10 Results of Water Quality Survey at TW2

Parameters (Unit)	2013						Effluent Standard for Electric Power Transmission and Distribution in Myanmar NEQEG (2015)
	March	April	May	June	July	August	
Temperature (°C)	-	-	-	27.39	27.25	26.5	-
Odor	-	-	-	Not objectionable			-
Color	-	-	-	Clear	Clear	Clear	-
Electrical Conductivity (µS/cm)	-	-	-	48	53	62	-
pH	-	-	-	7.21	7.3	7.4	6-9
BOD ₅ (mg/L)	-	-	-	3	2.5	2.5	30
COD _{Cr} (mg/L)	-	-	-	2.36	0.736	1.104	125
SS (mg/L)	-	-	-	91	73	272	-
Turbidity (NTU)	-	-	-	236	98.5	651	-
Hardness (mg/L)	-	-	-	120	100	20	-
DO (mg/L)	-	-	-	4	4.6	4.5	-
Total Coliforms (MPN/100ml)	-	-	-	1.7 x 10 ³	-	4.0 x 10 ²	400
Total Nitrogen (mg/L)	-	-	-	8.1	8.2	8.1	10
Nitrite (NO ₂ -N) (mg/L)	7.6	ND	13	15	13	13	-
Nitrates (NO ₃ -N) (mg/L)	ND	ND	ND	4.2	ND	ND	-
Ammonium Nitrogen (NH ₄ -N) (mg/L)	ND	ND	0.25	ND	ND	ND	-
Total Phosphorous (mg/L)	-	-	-	ND	ND	ND	-
Oil and Grease (mg/L)	<1	2	<1	<1	1	2	10
Sulfide (mg/L)	ND	ND	ND	ND	ND	ND	-
Sulfate (mg/L)	100	100	100	ND	5	40	-
Total Organic Carbon (mg/L)	-	-	-	4.9	5.3	4.1	-
Cyanide (CN) (mg/L)	<0.05	<0.005	<0.05	<0.05	<0.05	<0.05	-
Mercury (Hg) (mg/L)	ND	0.0002	0.0011	0.0001	0.0009	0.0021	-
Lead (Pb) (mg/L)	0.003	ND	0.0622	0.009	0.05	0.0104	-
Cadmium (Cd) (mg/L)	0.0044	0.0007	ND	0.0013	0.0152	0.0004	-
Hexavalent Chromium (Cr (VI)) (mg/L)	ND	ND	ND	ND	ND	ND	-
Copper (Cu) (mg/L)	0.04	ND	0.28	0.18	ND	ND	-
Zinc (Zn) (mg/L)	ND	ND	ND	ND	ND	ND	-
Nickel (Ni) (mg/L)	<0.01	0.01	0.01	<0.01	0.01	<0.01	-
Manganese (Mn) (mg/L)	ND	0.1	0.1	ND	ND	ND	-
Iron (Fe) (mg/L)	0.001	5	0.094	0.05	0.05	4	-

Note: When water hardness more than 100 mg/l as Ca CO₃
Source: EIA Report for the Thilawa SEZ Class A Development Project

4.1.4 Soil Quality

(1) Survey Condition

According to the Reference, one survey point relevant to the Project is available around the Project site. Table 4.1-11 summarizes the survey conditions such as date, parameters, and method for soil quality survey.

Table 4.1-11 Outline of Soil Quality Survey

Survey Point	Survey Date	Parameters	Method
ST-2	29 April 2013	pH, Cd, Cu, Zn, Mn, Pb, As, Fe, Cr, Hg, Ni	Standard operating procedure of U.S. EPA (SOP-2012, SOP2016, and SOP 2003)

Source: EIA Report for the Thilawa SEZ Class A Development Project

(2) Survey Location

The location of the sampling points is shown in Table 4.1-12.

Table 4.1-12 Location of Soil Quality Survey

Sampling Point Name	Coordinates	Description of the Survey Point
ST-2	N 16°40'32.79", E 96°17'13.57"	Site in the paddy field in Thilawa SEZ. It is located about 20 m west of Thanlyin-Kyauktan Road.

Source: EIA Report for the Thilawa SEZ Class A Development Project

(3) Reference Standard

Since there is no official standard on soil quality in Myanmar and the Reference did not cover the quantitative target levels for soil in its scope, the reference standards for soil quality related to the parameters the Project proponent surveyed are quoted from ASEAN countries near Myanmar (Vietnam and Thailand) and Japan as shown in Table 4.1-13.

Table 4.1-13 Reference Standards for Soil Quality

No.	Parameter	Unit	Environmental Standard		
			Japan ¹⁾	Thailand ³⁾	Vietnam ⁴⁾
1	pH	-	-	-	-
2	Cadmium (Cd)	mg/kg	150	37	2
3	Copper (Cu)	mg/kg	125 ²⁾	-	50
4	Zinc (Zn)	mg/kg	-	-	200
5	Manganese (Mn)	mg/kg	-	1,800	-
6	Lead (Pb)	mg/kg	150	400	70
7	Arsenic (As)	mg/kg	150	3.9	12
8	Iron (Fe)	mg/kg	-	-	-
9	Chromium (Cr)	mg/kg	250	300	-
10	Mercury (Hg)	mg/kg	15	23	-
11	Nickel (Ni)	mg/kg	-	1,600	-

Source: 1) Detailed Enforcement Regulations of Soil Contamination Countermeasures Act, 2002, Japan
 2) Environmental Quality Standards for Soil Pollution, 1991, Japan
 3) Regulation for Implementing the Law on Soil Contamination Countermeasures”
 QVVN 03: 2008/BTNMT, Vietnam. It is applied as “industrial area”.
 4) Soil Quality Standard Soil Quality Standard for Other Purposes, 2004, Thailand

(4) Survey Results

The results of soil quality analysis are presented in Table 4.1-14. The results of copper and lead slightly exceeded the soil quality standards in Vietnam. However, these results were far below other countries environmental standards. These results could be evaluated as no lead or copper contamination that could lead to environmental and health impacts. For the other parameters, the results were below their corresponding standards.

Table 4.1-14 Results of Soil Quality Analysis at ST2

No.	Parameter	Unit	Result	Environmental Standard		
			ST 2	Japan ¹⁾	Thailand ³⁾	Vietnam ⁴⁾
1	pH	-	6.2	-	-	-
2	Cadmium (Cd)	mg/kg	0.004	150	37	2
3	Copper (Cu)	mg/kg	80	125 ²⁾	-	50

No.	Parameter	Unit	Result	Environmental Standard		
				ST 2	Japan ¹⁾	Thailand ³⁾
4	Zinc (Zn)	mg/kg	105	-	-	200
5	Manganese (Mn)	mg/kg	15	-	1,800	-
6	Lead (Pb)	mg/kg	80	150	400	70
7	Arsenic (As)	mg/kg	ND	150	3.9	12
8	Iron (Fe)	mg/kg	5,280	-	-	-
9	Chromium (Cr)	mg/kg	ND	250	300*	-
10	Mercury (Hg)	mg/kg	0.002	15	23	-
11	Nickel (Ni)	mg/kg	10	-	1,600	-

Remarks: ND: Not detected

Source: 1) Standard of Soil Contamination Countermeasures Act, 2002, Japan

2) Environmental Quality Standards for Soil Pollution, 1994, Japan

3) Regulation for Implementing the Law on Soil Contamination Countermeasures QCVN 03: 2008/BTNMT, Vietnam. It is applied as "farm land"

4) Soil Quality Standard Soil Quality Standard for Other Purposes, 2004, Thailand

5) EIA Report for the Thilawa SEZ Class A Development Project

4.1.5 Noise Level

(1) Survey Condition

The measurement of sound levels was conducted in reference to the recommendation of the International Organization for Standardization (ISO) in ISO 1996-1:2003 and ISO 1996-2:2007. Noise level surveys were conducted in April and June 2013. The noise standard level in Myanmar and the results of sound level are shown in the below tables.

Table 4.1-15 Noise Standard Level in Myanmar

Category	One Hour LAeq (dBA) ^a	
	Day time 7:00 - 22:00 (10:00 - 22:00 for Public holidays)	Evening Time 22:00 - 7:00 (22:00-10:00 for Public holidays)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Note: ^a Equivalent continuous sound level in decibels

Source: Myanmar NEQEG (2015)

Table 4.1-16 Sampling Duration for Noise Level Survey

Sample Point	Duration	Date and Time
N-2	72 hr x 2 times	1st: 7 April 2013 (Sunday) to 10 April 2013 (Wednesday) 2nd: 23 June 2013 (Sunday) to 25 June 2013 (Tuesday)

Source: EIA Report for the Thilawa SEZ Class A Development Project

(2) Survey Location

The locations of noise level survey point are shown in Table 4.1-17.

Table 4.1-17 Locations of Noise Survey

Sampling Point	Coordinates	Description of Sampling Point
N-2 (1st) (Living Environment)	N 16°40'15.54", E 96°16'33.83"	Near the Moegyoswun Monastery Compound. The location is an open area beside the monk houses and about 150 m from the road. The road is paved and has low traffic.

Sampling Point	Coordinates	Description of Sampling Point
N-2 (2nd) (Along the Road)	N 16° 40' 11.5", E 96° 16'36.4"	In front of Moegyoswun Monastery. The location is an open area beside the road and about 6 m from the road. The road is paved and has low traffic.

Source: EIA Report for the Thilawa SEZ Class A Development Project

(3) Survey Result

The results of noise levels in 2013 are shown in Table 4.1-18. The survey area is assumed as Industrial and commercial area and the survey results are compared with standard values for Industrial and commercial area in Table 4.1-18. All results at each place were below the environmental standard in Myanmar. It was found that the noise was generated by vehicles at daytime along the road.

Table 4.1-18 Results of Noise Levels in 2013

Unit: dB(A)

Location	Weekdays		Weekends		Noise Standard in Myanmar ¹⁾ LAeq (dBA) ^a	
	Daytime (6:00–22:00)	Nighttime (22:00–6:00)	Daytime (6:00–22:00)	Nighttime (22:00–6:00)	Daytime (7:00–22:00)	Nighttime (22:00–7:00)
N-2 (1st) (Living Environment)	57	53	53	54	70	70
N-2 (2nd) (Along the Road)	67	55	68	51	70	70

Note: ^a Equivalent continuous sound level in decibels

Source: ¹⁾ Environmental Quality Standards for Noise in Myanmar NEQEG in 2015
EIA Report for the Thilawa SEZ Class A Development Project

4.2 Natural Environment

4.2.1 Flora, Fauna, and Biodiversity

Until 1998 there has been no reserved forest in Thanlyin Township. Since then, an area of about 2.3 km² (557 acres) has been demarcated as reserved forest. There is a low lateritic hill from north to south identified in Thanlyin Township. Small areas of mangroves are found in the south and the southeastern parts of this township. The common species are Kanazo, Dhani, Tayaws, and some kinds of bamboo.

According to the Reference, there were 139 flora species in the dry season and 181 species in the rainy season in the Thilawa SEZ Class A area and downstream nearby the Yangon River. The listed and recorded plant species were checked with the International Union for Conservation of Nature (IUCN) Red List of threatened species. However, none of those species were found in the IUCN Red List.

The fauna survey was also conducted in 2013 in and around the Thilawa SEZ Class A area. A total of 13 butterfly species were recorded in the study area during the survey period. All the recorded butterfly species were common species. A total of 18 bird species, which belong to 13 families, were recorded in the survey area. A total of four mammal species were recorded during the survey period. Some species such as the white-bellied rat, *Niviventer fulvscens*, and Greater bandicoot rat, *Bandicota indica*, were found mainly in rice fields, whereas the grey squirrel *Callosciurus pygerythrus* was found in both scattered trees and scrubland areas. Eighteen reptilian species and seven amphibian species were recorded in the survey area during the survey period. The reptile species *Calotes versicolor* was observed in areas with mixed vegetation and scattered trees. Among the recorded species, the paddy frog *Fejervarya limnocharis* was found as very common species. The frog species *Holobatrachus tigerinus* was also common in the area and distributed in many parts of the area in the wet season. A total of 15 fish species were recorded during the survey period. The fishes are important for the ecosystem of the canal and rice field water body. The fish species *Mystus cavasius* and *Puntius chola* were found as very common species in the Thilawa SEZ Class A area. The fish species *Mystus bleekeri* and *Labeo calbasu* were also abundant in the aquatic habitat.

4.2.2 Groundwater and Hydrological Situations

The main river around the proposed Project area is the Yangon River, which is a large tidal river in the region. The Hmawwun River, Kondon Creek, and Kawdaun Creek flow into the Yangon River. The water from these water bodies is unsuitable for agricultural and fishing industries.

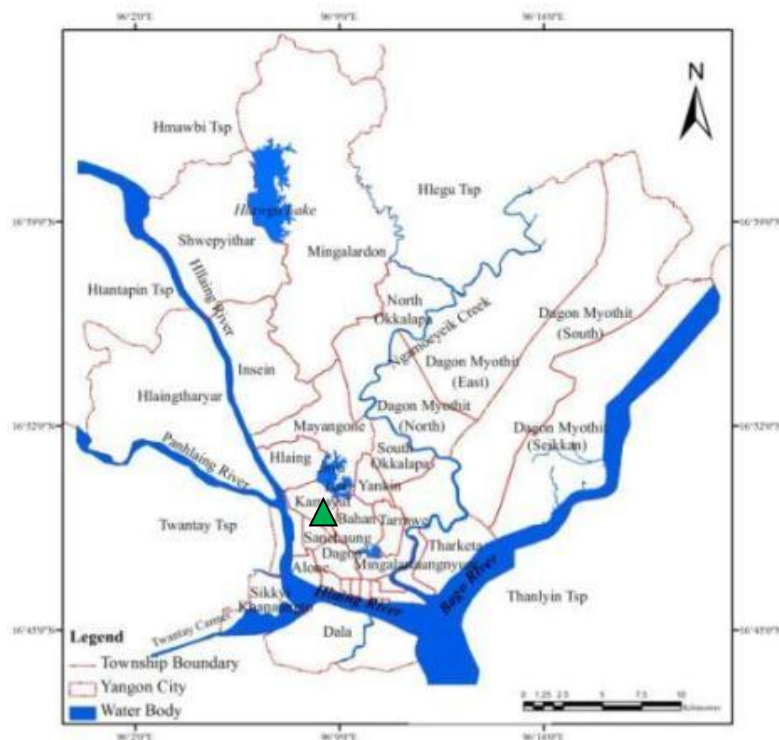
The western part of Thanlyn Township has a lot of tidal rivers and creeks. The main river is the Hmawwun River, which flows from east to west and reaches the Yangon River. Some creeks also flow into the Yangon River, some into the Hmawwun River, and some directly into the Gulf of Mottama (e.g., Kanaung, Myagaing, and Tummyaung).

Hydrology is the second element in determining groundwater occurrence and movement. Since groundwater is being studied here, hydrology is to be discussed only as it affects groundwater. Precipitation and stream flow are to be considered only in relationship with groundwater.

In the alluvial deposits along the major streams, there is a seasonal interchange of surface water and groundwater. During peak runoff or at high tide, water of the Yangon River percolates into the groundwater reservoir in the adjacent area, and as the stream level declines below the adjacent water table, groundwater percolates back into the channels.

4.2.3 Meteorology

Greater Yangon has a tropical monsoon climate characterized by three distinct seasons, namely, summer (March to middle of May), rainy (middle of May to middle of October), and cool (middle of October to February) seasons. The Kaba-aye Meteorological Station, which is managed by the Department of Meteorology and Hydrology (DMH) of the Ministry of Transport (MOT), has been observing meteorological conditions of Greater Yangon since 1968. The location of the Kaba-aye Station is shown in the below figure.



Note: Scale is not applicable

Source: Data of Township (Government Administration)

Figure 4.2-1 Location of Meteorology Station in the Yangon Area

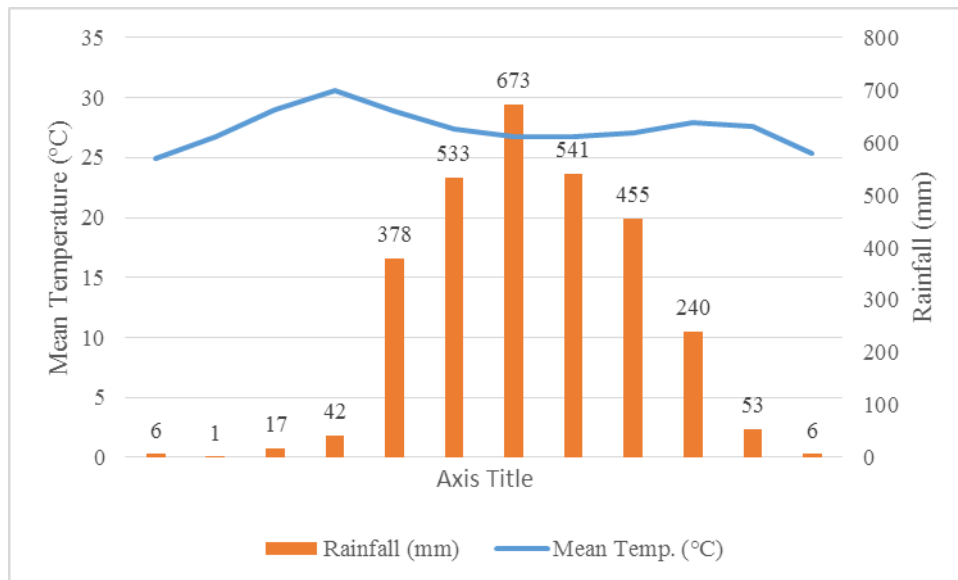
4.2.4 Temperature and Rainfall

From 2006 to 2015, the mean annual temperature is 27.43°C. The mean monthly temperature is highest in April at 30.6 °C and lowest in January at 24.9°C. Except in January, the mean monthly temperatures is above 25.0 °C. The southwest monsoon wind is the main source of rain, and the Yangon area receives rain during the period from May to October. The mean annual amount of rainfall is 245.42 mm. Rainfall sharply decreases from November onwards from December to March as shown in Table 4.2-1 and Figure 4.2-2. According to Koppen's climate classification, the type of climate is Tropical Monsoon (am), which is characterized by alternating wet and dry seasons.

Table 4.2-1 Monthly Average Maximum, Minimum, Mean Temperatures and Rainfall at Kaba-Aye Station in Yangon City (2006-2015)

No.	1	2	3	4	5	6	7	8	9	10	11	12	Average
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Mean Temp. (°C)	24.9	26.8	29.0	30.6	28.9	27.4	26.8	26.8	27.1	27.9	27.6	25.4	27.43
Rainfall (mm)	6	1	17	42	378	533	673	541	455	240	53	6	245.42

Source: Data of the Department of Meteorology and Hydrology, Kaba-aye Station, Yangon (2006-2015)

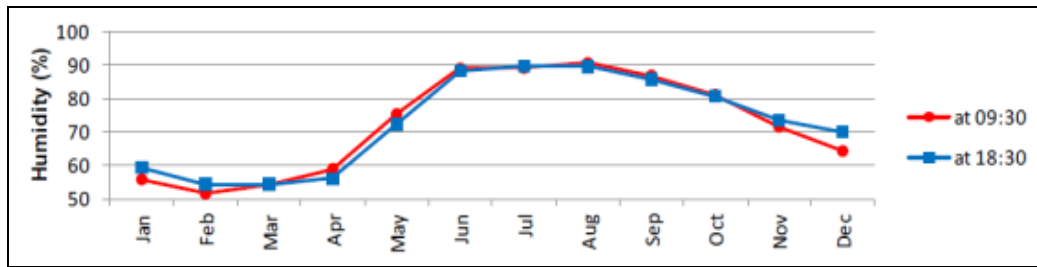


Source: Data of the Department of Meteorology and Hydrology Department, Kaba-aye Station, Yangon

Figure 4.2-2 Climograph of Kaba-aye Station in Yangon City (2006-2015)

4.2.5 Relative Humidity

Relative humidity have been recorded twice a day; at 9:30 and at 18:30. As shown in Figure 4.2-3 humidity difference between the morning and evening is quite small. The annual mean relative humidity at 9:30 and at 18:30 were 72.3% and 72.8%, respectively. The maximum mean monthly relative humidity is 90.6% in August, while the minimum mean monthly relative humidity is 51.4% in February.

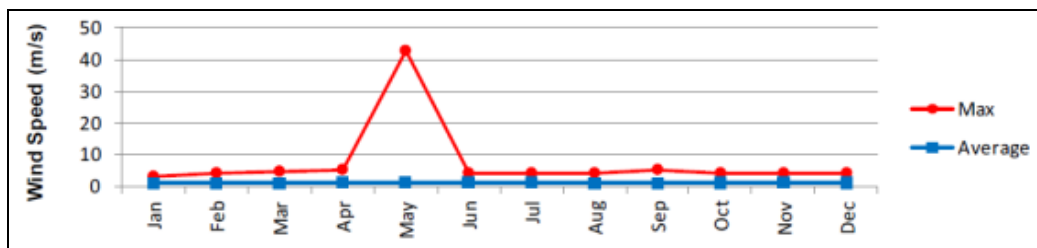


Source: The Strategic Urban Development Plan of the Greater Yangon, April 2013, JICA Study

Figure 4.2-3 Mean Monthly Relative Humidity at Kaba-Aye Station (1991-2000)

4.2.6 Wind Speed and Direction

The annual mean wind speed recorded at Kaba-aye Station was 1.1 m/s, while the maximum wind speed at 42.9 m/s was recorded in May 2008 at the time of Cyclone Nargis. Cyclones come to the country in April, May, and October, but as shown in Figure 4.2-4, Greater Yangon seldom experiences such cyclone winds. Winds are generally in the southwest direction during the summer (March to middle of May) and rainy (middle of May to middle of October) seasons, and in the northeast direction in the cool season (middle of October to February).



Source: The Strategic Urban Development Plan of the Greater Yangon, April 2013, JICA Study

Figure 4.2-4 Maximum Wind Speed and Mean Monthly Wind Speed at Kaba-Aye Station (1991-2008)

4.2.7 Topography

The Thilawa SEZ Class A area is part of the Ayeyarwaddy and Sittaung deltas. The ridges exist on both side of Thanlyin-Kyauktan Bridge and Thilawa Road.

The distinct physiographic units are as follows:

1. Ridges
2. Alluvial plain
3. Coastal lowland

(1) Ridges

The dominant physical features of the study area are three ridges with the Yangon ridge in the northern part, the Thanlyin anticlinal ridge in the eastern part, and the Kawhmu ridge in the western part of the study area. Other parts are flat lowlands. These ridges are the southern continuation of the Pegu Yoma. The Yangon-Mingaladon ridge is an anticlinal ridge and morphologically it looks like a homoclinal ridge. The highest elevation is about 68 m above sea level with 30 m base height and in the north of the area, and the regional slope is towards the south. The Thanlyin ridge is also an anticlinal ridge and covered with thick lateritic soil. The highest elevation of the entire region is about 50 m mean sea level (msl) and base height is about 21 m above sea level. The Kawhmu ridge is dome shaped and covered

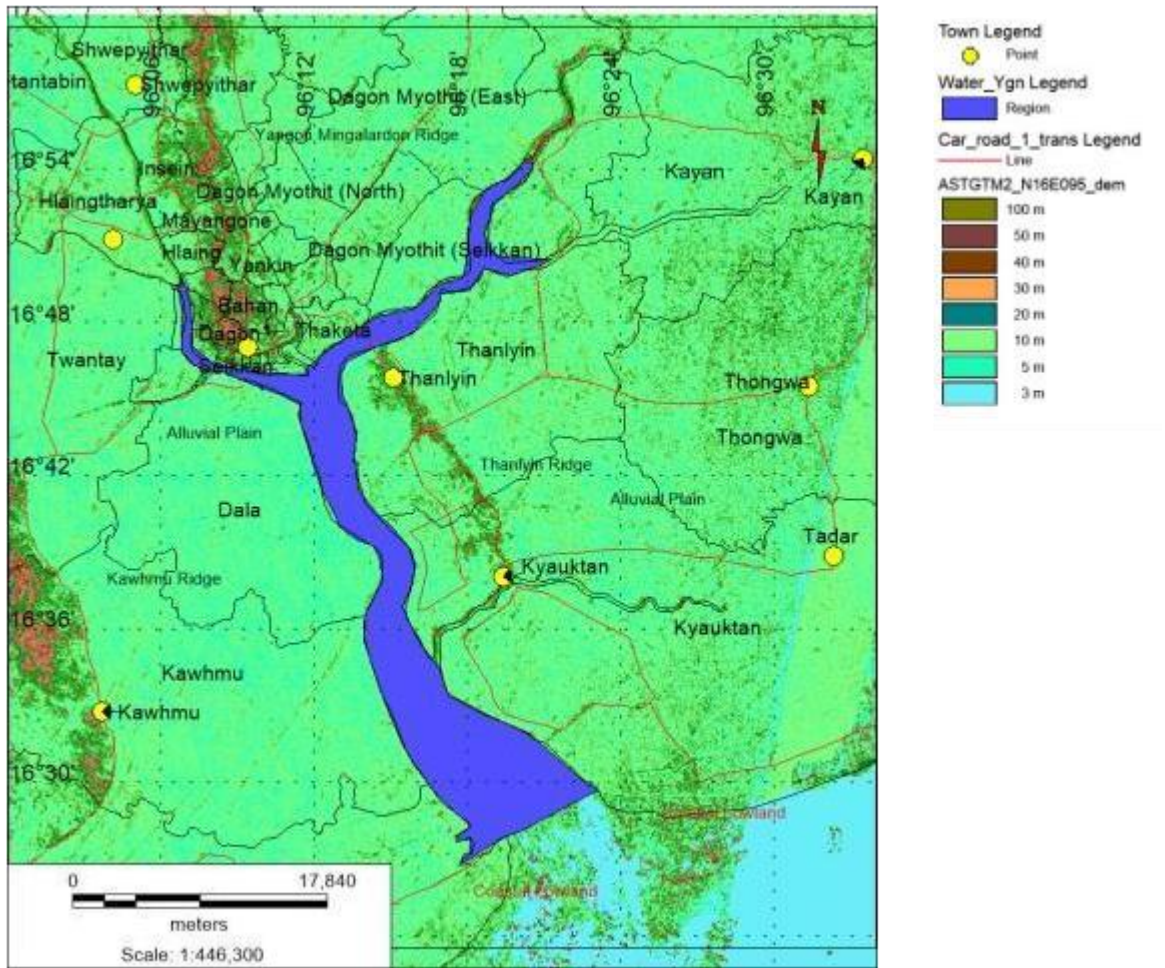
with thick lateritic soil. The highest point is about 60 m and the basement of this ridge is about 20 m. This ridge is wide at about 34 km from the north of Twentay Town to the south of Kawhmu Town. Further at the western part along Thanlyin-Kyauktan Highway and the western part of Nyaungwine Village Tract, Shwebyauk Village, Thanlyin Township and Kyauktan Township are situated. The elevation of the ridges are above 17 m, and are located at the border of Thanlyin Township and Kyauktan Township along the road between Ahle Village of Thanlyin Township and Thilawa Village of Kyauktan Hmawwun by the side of Thilawa Road. The ridges are covered with dense forest vegetation and boundaries, and are composed of laterite. These ridges are gently sloping southward.

(2) Alluvial Plain

The alluvial plain is widespread, and a vast agricultural land found in the study area. This plain is built up with alluvial deposits from the Hlaing and Bago rivers. The general elevation of the alluvial plain is generally less than 6.6 m above mean sea level. In the rainy season the plain is usually flooded, thus it permits old alluvial soil to be deposited in its banks. The plain is rather swampy in some places.

(3) Coastal Lowland

The coastal zone exists in the southern and southeastern parts of Thanlyin Township and Kyauktan Township. These coastal zone structures are from Mibya, Zwebagon, Shan Chaung, and Sinmakwe Village to the southern part up to the Mottama Sea. Large swampy lowlands are found in the lower part of the coastal region where the Hmawwun River, Kondon Creek, and Kawdaun Creek flow into the Yangon River. The drain empties very slowly. Thus, this part is unsuitable for agriculture and fishing industries. The western portion of these townships is drained by a lot of tidal rivers and creeks. The main drainage is the Hmawwun River, which flows from east to west and drains into the Yangon River. Some creeks flow into the Yangon River, some into the Hmawwun River and some directly into the Gulf of Mottama (e.g., Kanaung, Myagaing, and Tummyaung). Figure 4.2-5 shows the topographic features of the Project Area.



Note: Scale is not applicable

Source: Nippon Koei Engineering Service Team

Figure 4.2-5 Topographic feature of the Project Area

4.2.8 Geographic Features

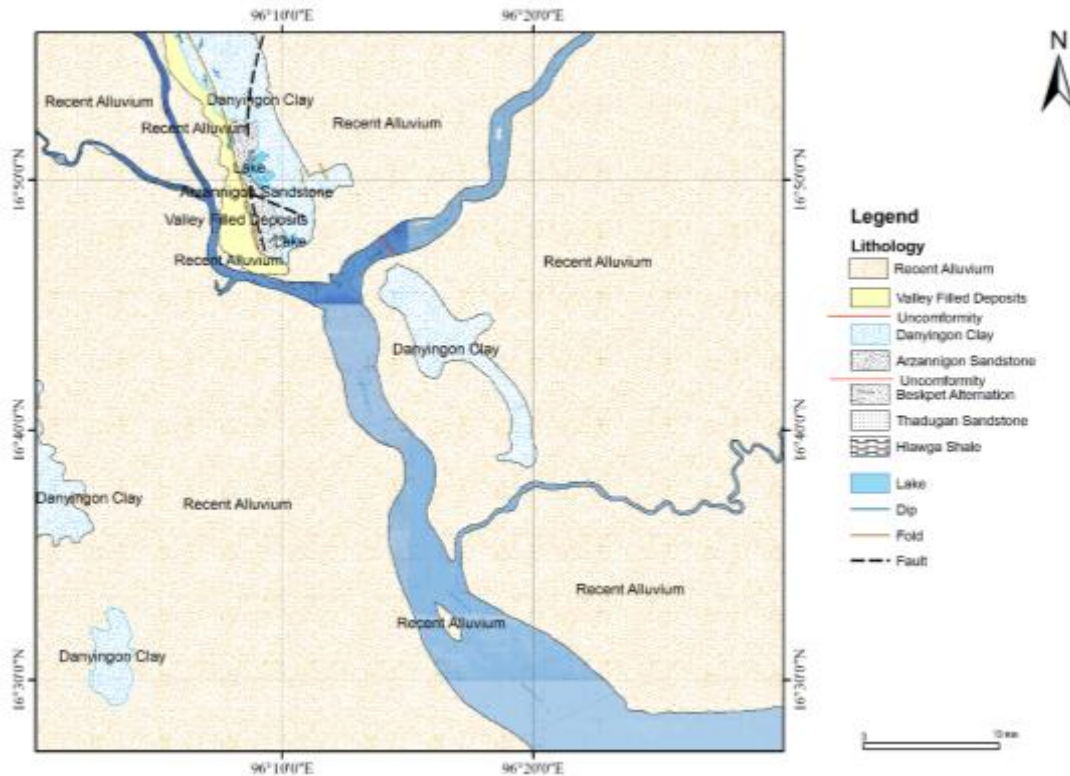
Regional geomorphic features of the entire area include ridges and deltaic lands lying south of the Pegu Yoma between the Sittaung River in the east and the Irrawaddy River in the west. This area is in a north-south trending sedimentary basin containing thick sedimentary deposits from the Tertiary to Quaternary periods. The Tertiary deposits are strongly folded into narrow an echelon anticlinal folds such as the Yangon ridge, the Thanlyin-Kyauktan ridge, and the Twentay-Kawhmu ridge. All these ridges are trending south towards the Gulf or Martaban. Rocks of the Tertiary period contain well consolidated marine sandstone and shale of the Pegu Group and semi-consolidated, continental deltaic and marginal marine deposits of the Irrawaddy Formation. The synclinal valley or trough west of the Yangon anticlinal ridge is filled with unconsolidated deposits from the Quaternary period. There forms a wedge-shaped alluvial accumulation, ranging in thickness from a few feet near the ridge up to 100 m in the synclinal valley. The wedge-shaped form of these sediments extends both in the east-west and north-south directions and shows thickening toward the south and west. These sediments include clay, silt, sand and very coarse-grained gravel. Geological survey and Geological map of the Project Area and are shown in Table 4.2-2 and Figure 4.2-6 respectively.

Table 4.2-2 Geological Survey of the Project Area

Lithostratigraphic Units	Geological Age	Physical Parameter
Recent Alluvial	Recent	Clay and silt with trace sand.
Valley-filled deposits	Pleistocene	Clay, silt, sand and very coarse-grained gravel.
Danyingon clay	Pliocene	Reddish brown, grey to blue, laminated clays, with interbedded sand-rocks.

Lithostratigraphic Units	Geological Age	Physical Parameter
Arzanigon sand-rock		Yellowish grey to bluish grey sand-rock, fine to coarse-grained, sometimes very coarse-grained, sometimes very coarse to gritty with intercalated clay and mudstone/siltstone.
Besapet alternation	Miocene	Alternation of shale and argillaceous sandstone.
Thadugan sandstone		Well consolidated, jointed argillaceous sandstone.
Hlawga shale	Oligocene	Generally indurated shale.

Source: Data from the Geology Department



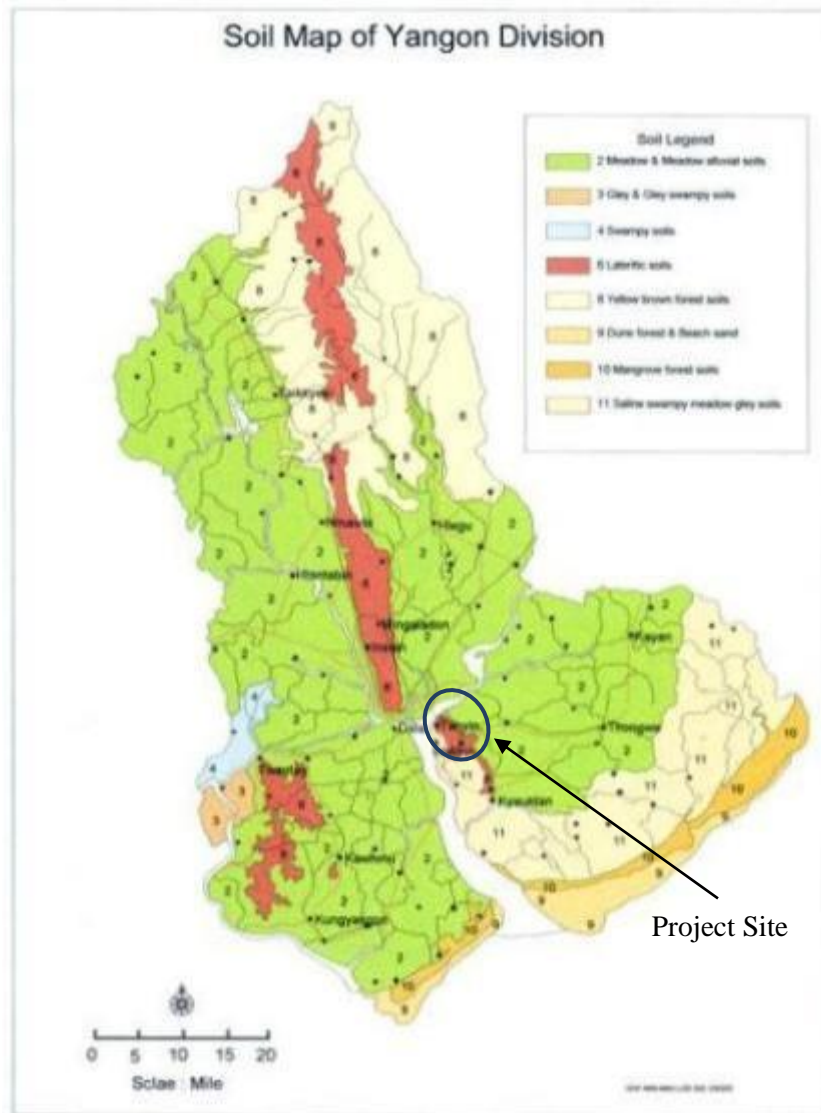
Note: Scale is not applicable

Source: Data from the Geology Department

Figure 4.2-6 Geological Map of the Project Area

4.2.9 Soil Erosion

The main types of soil are Ferrosols, Gleysols, Solovechaks, and Arenesols. Ferrosols (plinthic) or lateritic soils are found on low hills along Thanlyin-Kyauktan. The soil is good for growing rubber and vegetables, and for gardening. Gleysols (dystric) or meadow gley soils occupy much of the area in this township as shown in Figure 4.2-7. About 90% of these soils are composed of silt and clay, but humus content varies from place to place. These soils are favorable for paddy cultivation. The main problem, however, is poor drainage and water-logged conditions. Meadow Solonchak are usually found in lowlands under impeded drainage. In the rainy season, they are covered with flood water. Because of the high content of clay, these soils become very dry and crack in the dry season. Solonchaks (gleyic) or saline swampy gluey soils are found along the coastal area. These soils develop from sediments transported and deposited at the estuaries of the Yangon River.



Note: Scale is not applicable

Source: Data from the Land Use Division, Myanmar

Figure 4.2-7 Soil Map of Yangon Division

4.3 Social Environment

4.3.1 Population

According to census in 2014, the population in Myanmar was estimated at 51.5 million. Approximately 70% reside in rural areas and 30% in urban areas. The densest area is in Yangon Division wherein about 716 people live per km². There are about 268,063 in Thanlyin Township and 132,765 people in Kyauktan Township as shown in Table 4.3-1 according to census result in 2014. Population of in Thanlyin Township and Kyauktan Township in March, 2016 according to General Administrative Department (GAD) is shown in Table 4.3-2.

Table 4.3-1 Total Population in Related Townships (Census Result in 2014)

Town ship	Population	Houses	Households	Under 18 years Population	18 years and above Population	Population		
						Male	Female	Total
Thanlyin	(No.)	268,063	61,597	83,413	184,650	130,537	137,526	268,063
	(%)			31.1	68.9	48.7	51.3	100
Kyauktan	(No.)	132,765	32,976	41,071	91,694	64,378	68,387	132,765
	(%)			30.9	69.1	48.5	51.5	100

Source: 2014 Census Result

Table 4.3-2 Total Population in Related Townships (GAD in 2014)

Town ship	Houses	Households	Under 18 years			Over 18 years			Total		
			Male	Female	Total	Male	Female	Total	Male	Female	Total
Thanlyin (No.)	53,027	53,654	70,866	73,606	144,472	42,314	44,248	86,562	113,180	117,854	231,034
(%)			49.1	50.9	100	95.6	51.1	100	49.0	51.0	100
Kyauktan (No.)	28,531	32,429	18,206	17,962	36,168	44,207	47,370	91,577	62,413	65,332	127,745
(%)			50.3	49.7	100	48.3	51.7	100	48.9	51.1	100

Source: Thanlyin and Kyauktan Township General Administrative Department (GAD)

4.3.2 Ethnicity

The races residing in Thanlyin and Kyauktan townships are shown in Table 4.3-3. Most of the people who live in townships are Myanmar followed by Indian people.

Table 4.3-3 Races in Related Townships (2016)

No.	Race	Thanlyin Township		Kyauktan Township	
		Number	%	Number	%
1	Kachin	20	0	3	0
2	Kayar	-	-	2	0
3	Kayin	579	0.3	224	0.2
4	Chin	16	0	12	0
5	Mon	28	0	8	0
6	Myanmar	222,177	96.2	123,282	96.5
7	Rakhine	500	0.2	90	0.1
8	Shan	23	0	3	0
9	China	449	0.2	325	0.3
10	Indian	4,912	2.1	4,121	3.2
11	Pakistan	0	0	0	0
12	Bangladesh	0	0	0	0
13	Others	0	0	0	0
Total		231,034	100.00	127,745	100.00

Source: Thanlyin and Kyauktan Township General Administration Department

4.3.3 Religion

The religions which people in Thanlyin and Kyauktan townships believe are shown in Table 4.3-4. More than 95% of people living in two townships are Buddhist. The percentage of Hindus living in Kyauktan Township is greater than that in Thanlyin Township.

Table 4.3-4 Religion in Related Townships (2016)

Township	Religion	Buddhist	Christian	Hindu	Muslim	Total
Thanlyin	Number	223,197	595	4,912	2,330	231,034
	%	96.6	0.3	2.1	1.0	100
Kyauktan	Number	121,822	1,208	4,121	594	127,745
	%	95.4	0.9	3.2	0.5	100

Source: Thanlyin and Kyauktan Township Administrative Offices

4.3.4 Education

According to census result in 2014, literacy rate of over 5 years and over in Thanlyin Township and Kyauktan Township are shown in Table 4.3-5.

Table 4.3-5 Population in conventional households 15 years and over, by sex, literacy and urban/rural

Literacy	Both sexes				Male				Female			
	Total	Literate	Illiterate	Literate (%)	Total	Literate	Illiterate	Literate (%)	Total	Literate	Illiterate	Literate (%)
Thanlyin Township	187,405	182,537	4,868	97.4	87,552	86,084	1,468	98.3	99,853	96,453	3,400	96.6
Urban	62,281	61,209	1,072	98.3	28,424	28,121	303	98.9	33,857	33,088	769	97.7
Rural	125,124	121,328	3,796	97.0	59,128	57,963	1,165	98.0	65,996	63,365	2,631	96.0
Kyauktan Township	94,916	90,389	4,527	95.2	44,419	42,960	1,459	96.7	50,497	47,429	3,068	93.9
Urban	30,553	29,399	1,154	96.2	13,851	13,508	343	97.5	16,702	15,891	811	95.1
Rural	64,363	60,990	3,373	94.8	30,568	29,452	1,116	96.3	33,765	31,538	2,257	93.3

Source: 2014 Census Result

Regarding basic education in Thanlyin Township, the number of Basic Education High School, Middle School and Primary School are 7, 16 and 56 respectively. The number of monastery school are 14 such as Bonpyan, Su Taung Pyae, Su Htoo Pan, Thilawa and many more. Moreover, youth development center called Myitar Yang Chi is located in Thanlyin Township. Regarding higher education, there are Government Technological University (GTC) Thanlyin in Ah Le Ywa village, Yangon East University (Tarwa) and Myanmar Maritime University (MMU) in Hpa Yar Kone village tract and Co-operative University (Thanlyin) in Nyaung Thone Pin village tract in Thanlyin Township.

Regarding basic education in Kyauktan township, the number of Basic Education High School, Middle School and Primary School are 7, 11 and 109 respectively. The number of monastery school are 6 such as Myaing Thar Yar School, Sin Kin Ward School, Shwe Kone Ward School, Mee Pya School, Kamar Kaloat School and Tatar (1) Ward School.

4.3.5 Local Economy and Livelihood

The main sources of livelihood in the two townships are agriculture, fishing, and official employment in the government. In Thanlyin Township, other sources of earning are livestock breeding, fish farming, casual labor, and betel leaf and coconut plantations as well as small- to medium-size businesses. In Kyauktan Township, other livelihood activities include livestock breeding, fish farming, and betel leaf and coconut plantations. Most of the casual labor is employed in the agricultural sector. Table 4.3-6 shows existing status of local livelihoods.

Table 4.3-6 Existing Status of Local Livelihoods in Related Townships (2016)

Township	Type of Workers								
	Government Staff	Service Staff	Agricultural	Livestock	Sales Business	Factory	Odd Job	Fishing	Others
Thanlyin	3,843	17,580	11,374	526	29,750	19,670	29,895	-	19,120
Kyauktan	4,400	11,000	8,760	8,706	8,235	5,378	200	200	10,239

Source: Thanlyin and Kyauktan Township General Administration Department

According to census result in 2014, population 10 years and over by usual activity status and sex in Thanlyin township and Kyauktan township are shown in Table 4.3-7.

Table 4.3-7 Population 10 years and over by usual activity status and sex

Usual Activity Status	Total	Employee (Government)	Employee (Private)	Employer	Own account worker	Unpaid family worker	Sought work	Did not seek work	Full time student	Household worker	Pensioner, retired, elderly	Ill, disabled	Other
Thanlyin (Total)	224,169	12,562	53,115	3,253	32,102	9,961	4,265	1,334	29,944	47,545	13,355	2,081	14,652
Male	108,473	8,707	36,297	2,438	20,838	3,650	2,821	729	15,170	1,544	6,335	1,024	8,920
Female	115,696	3,855	16,818	815	11,264	6,311	1,444	605	14,774	46,001	7,020	1,057	5,732
Kyauktan (Total)	111,437	2,569	28,389	4,071	16,326	6,517	3,028	619	13,811	28,034	5,630	830	1,613
Male	53,581	1,365	20,641	3,358	11,577	2,587	1,818	360	7,057	692	2,413	496	1,217
Female	57,856	1,204	7,748	713	4,749	3,930	1,210	259	6,754	27,342	3,217	334	396

Source: 2014 Census Result

4.3.6 Social Infrastructure and Service

Public transportation modes in Thanlyin Township are bus, railway, and inland water transportation. As for the port sector, Thanlyin is an important township for ocean transportation, with three ports being operated there. In Thanlyin, total length of roads is 212.36 km and total length of railroads is 22.12 km. Inland water length is 178.51 km in which three harbors and 110 bridges are in running condition. The main sources of water are five streams and ten reservoirs. Public transportation modes in Kyauktan Township are bus and inland water transportation. There are three bus lines of 115 cars in Kyauktan Township. Conventional households by availability of transportation items according to census in 2014 is shown in Table 4.3-8.

Table 4.3-8 Conventional Households by Availability of Transportation Items

Transportation Items	Conventional households	Car/ Truck/ Van	Motorcycle/ Moped	Bicycle	4-Wheel tractor	Canoe/ Boat	Motor boat	Cart (bullock)
Thanlyin Township	61,597	2,140	18,007	21,011	1,276	454	458	4,900
Kyauktan Township	32,976	582	9,874	11,737	1,586	591	1,089	5,273

Source: 2014 Census Result

Moving onto main source of energy for lighting and cooking fuel, census result in 2014 are shown in Table 4.3-9 and Table 4.3-10 respectively.

Table 4.3-9 Conventional Households by Main Source of Lighting

Source of lighting	Total	Electricity	Kerosene	Candle	Battery	Generator (Private)	Water mill (Private)	Solar System/ energy	Other
Thanlyin Township	61,597	29,199	2,784	5,689	16,023	5,710	81	1,723	388
Kyauktan Township	32,976	10,914	4,617	4,436	8,218	2,057	13	1,793	928

Source: 2014 Census Result

Table 4.3-10 Conventional households by main type of cooking fuel

Type of cooking fuel	Total	Electricity	LPG	Kerosene	BioGas	Firewood	Charcoal	Coal	Straw/ Grass	Other
Thanlyin Township	61,597	17,877	645	77	382	19,369	20,645	443	4	2,155
Kyauktan Township	32,976	7,017	127	52	101	19,256	2,151	114	10	4,148

Source: 2014 Census Result

As for the telecommunications sector, the percentage of households in Thanlyin township with landlines is about 5%, and it represents a very low rate within the Yangon Region. As for the telecommunications sector, the percentage of households in Kyauktan township with landlines and mobile phones is about 50%. Conventional Households by Availability of Communication and Related Amenities according to census result in 2014 is shown in Table 4.3-11.

Table 4.3-11 Conventional Households by Availability of Communication and Related Amenities

Communication and related amenities	Conventional households	Radio	Television	Landline phone	Mobile phone	Computer	Internet at home	% with none of the items	% with all of items
Thanlyin Township	61,597	12,407	40,478	2,406	34,221	3,308	6,175	21.8	0.7
Kyauktan Township	32,976	10,339	17,443	1,511	14,991	668	2,514	25.6	0.2

Source: 2014 Census Result

4.3.7 Water Source

In Thanlyin township, the sources of water for drinking and other uses of residents are river/stream and reservoir. It is bounded by the Bago River in the east, Thongwa and Kayan townships in the west, Kyauktan Township in the south, and the Bago River again in the north. Thanlyin Township is situated in the southern part of the Yangon Region. Some small hills over 100 ft (30 m) can be seen along Thanlyin-Kyauktan Road, but most of the township area is flat. The drainage system of the study area and surrounding area includes three main rivers, namely, the Yangon River, the Bago River, and the Hlaing River, and their tributaries. These tributaries are mostly the alluvial stream and show dendritic pattern whereas combination of dendritic pattern and braided stream system are observed in some low-lying areas. Thus, tidal channels collectively form a special drainage pattern known as tidal flat. The main river in the study area is the Yangon River, which is a large tidal river. The Hmawwun River, Kondon Creek, and Kawdaun Creek flow into the Yangon River. The drainage pattern is very poor. Thus, this part is unsuitable for agriculture and fishing industries.

In Kyauktan Township, the main sources of water for drinking and other uses of residents are river and well/deep well reservoir.

Conventional households by source of water for drinking and non-drinking according to result of census in 2014 are shown in Table 4.3-12 and Table 4.3-13.

Table 4.3-12 Conventional households by source of water for drinking

Source of drinking water	Total	Tap water/ Piped	Tube well/ borehole	Protected well/ Spring	Unprotected well/ Spring	Pool/ Pond/ Lake	River/ Stream/ Canal	Waterfall/ Rainwater	Bottled water/ Water purifier	Tanker/ Truck	Other
Thanlyin Township	61,597	1,392	24,925	10,389	3,602	14,190	33	185	5,595	91	1,195
Kyauktan Township	32,976	1,804	2,171	3,961	1,092	22,833	14	103	864	5	129

Source: 2014 Census Result

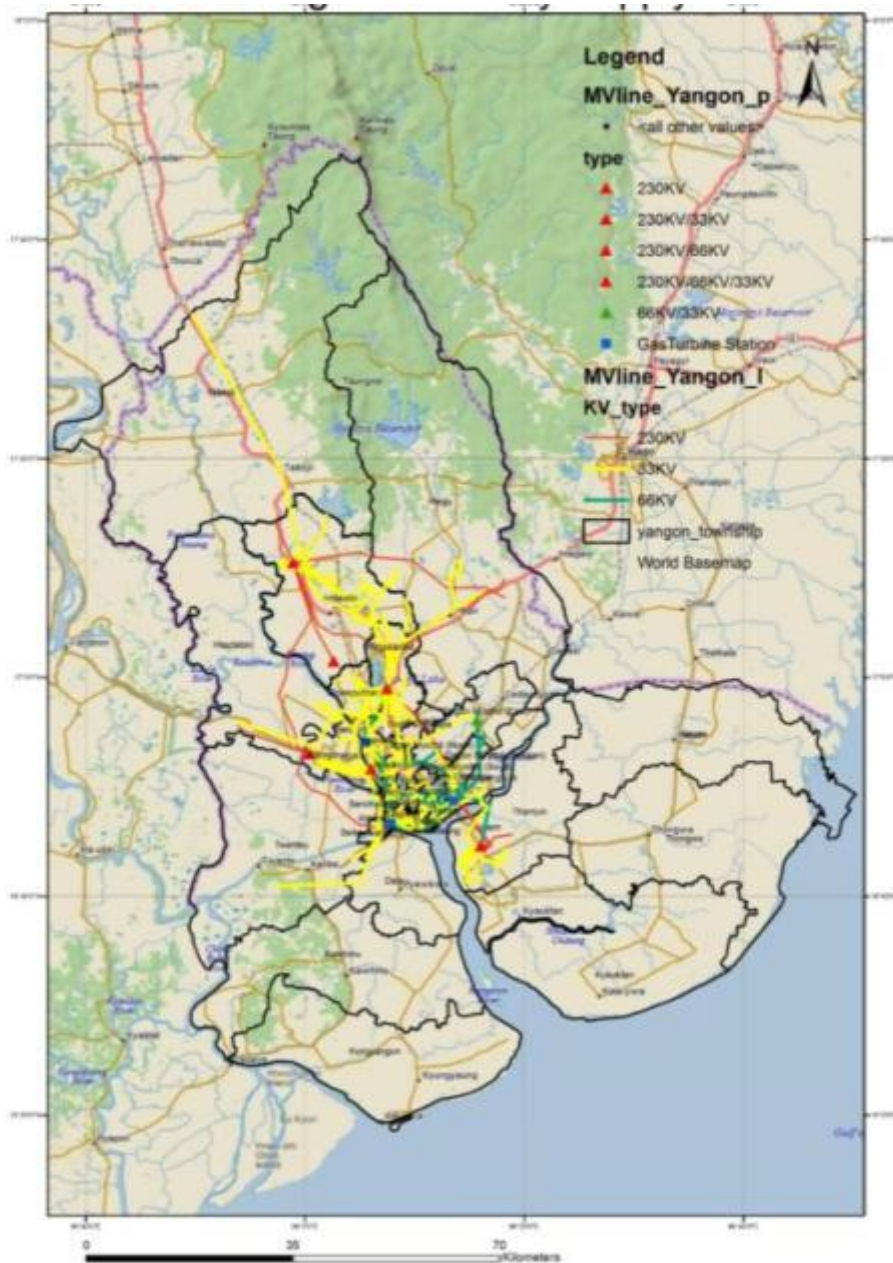
Table 4.3-13 Conventional households by source of water for non-drinking

Source of non-drinking water	Total	Tap water/ Piped	Tube well/ borehole	Protected well/ Spring	Unprotected well/ Spring	Pool/ Pond/ Lake	River/ Stream/ Canal	Waterfall/ Rainwater	Bottled water/ Water purifier	Tanker/ Truck	Other
Thanlyin Township	61,597	3,062	29,188	9,770	3,618	14,545	60	5	63	19	1,267
Kyauktan Township	32,976	2,292	3,376	3,183	995	22,935	15	3	34	2	141

Source: 2014 Census Result

4.3.8 Electric Power System in Yangon

As of Dec, 2011, there were a total of eight power plants connected to the Yangon Power Grid and the total amount of installed capacity of their power supply, all of which are thermal power, is 471 MW. There are four gas turbine power plants with combined installed capacity of 318 MW, and four steam turbine units with combined installed capacity of 153 MW. Moreover, there are seven 230 kV substations in the Yangon Power Grid. The total capacity of the main transformers is 940 MVA, and the length of the 230 kV lines is 959.87 km. Yangon's power supply map is shown in Figure 4.3-1. Thanlyin 230 kV substation is located in Thea Hpyu Chaung village in Thanlyin Township.



Note: Scale is not applicable

Source: Yangon Electric Supply Board

Figure 4.3-1 Yangon Electricity Supply Map

4.3.9 Cultural Heritage

Cultural heritage in Thanlyin and Kyauktan townships is summarized in Table 4.3-14. Many religious heritage sites related to Buddhism, i.e., 146 pagodas and 192 Buddhist temples, are located in Thanlyin Township.

Table 4.3-14 Cultural Heritage of Related Townships (2016)

Township	Type of Cultural Heritage							
	Pagoda	Buddhist Temple	Monastery	Nunnery	Church	Mosque	Hindu Temple	Chinese Temple
Thanlyin	146	36	198	31	5	10	32	2
Kyauktan	57	57	148	50	2	2	7	1

Source: Thanlyin and Kyauktan Township General Administration Department

In Thanlyin township, there are two typical monasteries near the Project site; Mogyo-swan Seated Buddha Monastery which is located at the northeast of a substation and Kyaik Khauk Pagoda which is located at the northern area of Thilawa Lake. In this monastery, there is one seated Buddha statute of unknown time period called “Mogyo-swan yoke-shin-taw Myat”, as shown in Figure 4.3-2 (left). Kyaik Khauk pagoda is believed to be built in 397 B.C. The name of some famous pagodas is Htamalon Pagoda, Parda ancient Kyaik Tharmyaie Pagoda, Manawme Pagoda, Hpa Yar Ngar Su and many more. In Kyauktan Township, famous historical ancient pagodas are Kyaik Mhaw Wun Ye Le Pagoda which is located on an island as shown in Figure 4.3-2 (right) and Parda Ngar Htat Gyi Pagoda and the name of some famous pagodas are Kyaik Par Da Pagoda, etc...

	
<p>Mogyo-swan yoke-shin-taw Myat Buddha image inside the monastery near Thilawa Substation in Thanlyin Township</p>	<p>Historical Pagoda called Kyaik Mhaw Wun Ye Le Pagoda in Kyauktan Township</p>

Source: EIA Report for Thilawa SEZ Class A Development Project

Figure 4.3-2 Picture of famous religious facilities in Thanlyin and Kyauktan Township

4.3.10 Landscape

No specific landscape was identified during the field visit in the study area. The study area and its surrounding area is composed of flat plains and typical rural landscapes of urban neighborhood.

4.4 Emergency Risk

4.4.1 Natural Hazard

The “Hazard Profile of Myanmar” prepared by five government ministries and departments of Myanmar and four non-governmental agencies in July 2009 describes nine types of disasters in Myanmar: 1) Cyclone, 2) Drought/Dry zone, 3) Earthquake, 4) Fire, 5) Flood, 6) Forest Fire, 7) Landslide, 8) Storm, and 9) Tsunami. Among these, some notable natural hazards are described as follows:

4.4.2 Flood

Floods in Greater Yangon can be classified into three types: i) river flood; ii) localized flood inundation in urban areas due to a combination of factors such as cloudburst, poor infiltration rate, poor drainage infrastructure (possibly due to climate change, heat island phenomenon); and in rural areas due to decrepit dams, dikes and levees, and iii) floods due to cyclone and storm surge.

Past major flood events from 1997 to 2007 are described in the “Hazard Profile of Myanmar”, but there are only a few flood events in and around Greater Yangon as shown in Table 4.4-1.

Table 4.4-1 Past Major Floods in Yangon Region (1997-2007)

Location	Date	No. of affected households	Affected population	Deaths	Remark
Kayan Township	7 June 1997	1,189	5,878	0	North part of the region
Hta/16 Ward, Shwe Pyi Thar Township	8 September 2002	886	4,541	0	Along the left bank of the Hlaing River in Greater Yangon

Source: Hazard Profile of Myanmar, July 2009

4.4.3 Cyclone

Cyclones that originate from the Bay of Bengal generally move westward to India and then turn toward Bangladesh and Myanmar. Severe cyclones tend to occur either during the pre-monsoon season from April to May or the post-monsoon season from October to November.

Cyclones have three destructive forces, namely: i) storm surge, ii) heavy rainfall, and iii) strong winds. According to the “Hazard Profile of Myanmar”, 1,248 tropical storms formed in the Bay of Bengal during the period from 1887 to 2005, of which 80 storms (6.4% of the total) hit Myanmar’s coast. In total, 12 cyclones caused severe damage in Myanmar mainly due to the accompanying storm surge, and the highest death or missing toll was 138,373 which was caused by Cyclone Nargis in May 2008. Cyclone Nargis also hit Greater Yangon and floodwater spread on a number of townships around Yangon City. Most of the inundated area during Cyclone Nargis were Dala, Twantay, Htantabin and Hlegu areas.

4.4.4 Earthquake

In the Bay of Bengal west of Myanmar, there is the Andaman Trench, where the Indian Plate is moving northward and subducting underneath the Burma Plate from west to east. In east Myanmar, there is the Sagaing Fault, which is the boundary between the Burma Plate and Sunda Plate. Hence, a magnitude 7.0+ earthquake has occurred more than 16 times, and six earthquakes of around magnitude 7.0 hit the main cities along the Sagaing Fault such as Yangon, Bago and Mandalay from 1930 to 1956. Significantly, Yangon experienced six huge earthquakes around the 1930s as shown in Table 4.4-2.

Table 4.4-2 Major Earthquake Records around Greater Yangon

Date	Location	Magnitude	Remarks
868	Bago	-	Shwemawdaw Pagoda fell down
875	Bago	-	Shwemawdaw Pagoda fell down
13 Sep, 1564	Bago	-	Pagodas including Shwemawdaw and Mahazedi fell down
1567	Bago	-	Kyaikko Pagoda fell down
1582	Bago	-	Umbrella of Mahazedi fell down
9 Feb, 1588	Bago	-	Pagodas and other buildings fell down
30 March, 1591	Bago	-	The Great Incumbent Buddha destroyed
4 June, 1757	Bago	-	Shwemawdaw Pagoda damaged
27 Dec, 1768	Bago	-	Ponnyayadana Pagoda damaged
24 Aug, 1858	Pyay	-	Collapsed houses and tops of pagodas at Pyay, Henzada and Thayetmyo Felt with some damages in Innwa, Sittwe, Kyaukphyu and Yangon

Date	Location	Magnitude	Remarks
8 Oct, 1888	Bago	-	Mahazedi Pagoda collapsed
10 Sep, 1927	Yangon	7.0	-
17 Dec, 1927	Yangon	7.3	Impacts extended to Dedaye
5 May, 1930	Near Kayan, Yangon and Bago Region	-	Collapsed houses and other buildings in Yangon and Bago Regions. Death person in Bago and Yangon Regions were approximately 500 and 50 respectively
27 Mar, 1931	Yangon	-	-
16 May, 1931	Yangon	-	-
21 May, 1931	Yangon	-	-

Source: Hazard Profile of Myanmar, July 2009

4.5 Climate Change

The Republic of the Union of Myanmar is relatively underdeveloped. Large parts of the country have irregular use of electricity. Myanmar has a very low rate of carbon dioxide emissions per capita, at 0.1 metric tons per person in 1990, and rising gradually to 0.21 metric tons per person in 2004. This is in spite of the tropical climate, and the heavy use of air conditioners in the cities. Myanmar has its own oil industry, with petrol and gas used to generate electricity. Approximately 83% of the country's electricity comes from fossil fuels, with the remainder from hydropower. As a result, liquid fuels make up 57% of carbon dioxide emissions, and gaseous fuels make up another 39%. The remainder comes from solid fuels and from the manufacture of cement. About 36% of the carbon dioxide emissions in the country come from transportation, 30% from the generation of electricity, and 15% from manufacturing and construction. The main effect of global warming and climate change in Myanmar has been the increased risk of flooding, especially at the mouth of the Irrawaddy River. The Boxing Day Tsunami in 2004 led to serious flooding of this region. The Myanmar government took part in the United Nations (UN) Framework Convention on Climate Change signed in Rio de Janeiro in May 1992. They adopted the Kyoto Protocol to the UN Framework Convention on Climate Change on 13 August 2003, and it was ratified on 16 February 2005.

CHAPTER 5: SCOPING AND TERMS OF REFERENCE FOR INVESTIGATION OF IEE

5.1 Scoping for Environmental and Social Impact Assessment

In order to assess likely significant environmental and social impacts, conceivable adverse environmental and social impacts by the project were preliminary identified based on the project description and overall environmental and social conditions in the surrounding area. The impacts of pollution, natural environment, social environment was classified as A to D in accordance with the following criteria;

- 1) A-: Significant Negative Impact A+: Significant Positive Impact
- 2) B-: Some Negative Impact B+: Some Positive Impact
- 3) C: Impacts are not clear, need more investigation
- 4) D: No Impacts or Impacts are negligible, no further study required

The environmental and social impact assessment was conducted according to the scoping matrix below.

5.1.1 Scoping for Before/ During Construction and Operation Phases

Table 5.1-1 shows results of scoping for Environmental Impact Assessment (EIA) including pollution, natural environment, Social Impact Assessment (SIA), Health Impact Assessment (HIA), Emergency Risk Assessments (ERA) in before construction, during construction, and operation phases.

**Table 5.1-1 Results of Scoping for Environmental and Social Impact Assessment
(Before/ During Construction and Operation Phases)**

Category	Scoping Item	Evaluation		Reason for Evaluation
		Before / During Construction (BC/DC)	Operation Stage (OS)	
EIA (Pollution, Natural Environment)	Air Pollution	B-	D	DC: Emission from construction equipment, dust arisen by construction activities, air pollutant due to increase of traffic volume is anticipated.
	Water Pollution	B-	D	DC: Muddy water inflows to river from bare land of construction site and drainage from the lodging of construction may deteriorate water quality.
	Solid Waste	B-	D	DC: Causes of solid waste from cuttings and removal of manufactured articles are anticipated.
	Soil Contamination	D	D	Any project activities will not affect to soil contamination. As the results of the existing survey around the project site described in Chapter 4, it was confirmed that there are no soil contamination including nature-derived near project site.
	Noise / Vibration	B-	B-	DC: Noise and vibration from operation of construction machinery and on-site vehicles are anticipated. OS: Buzzing or humming of transformers and control panel machines in the substation facilities may cause noise.
	Subsidence	D	D	DC: Excavation work at small drainage along the Dagon - Thilawa Road will be anticipated.
	Offensive Odor	D	D	Any project activities will not affect to Offensive odor.
	Sedimentation	D	D	Excavation work at small drainage along the Dagon - Thilawa Road will be anticipated.
	Natural Preserve	D	D	No natural preserve area exists in and around the project site.
	Flora and Fauna, Ecosystem	D	D	As the results of the survey (dry/rainy season in 2013) around the project site described in Chapter 4, no important principal/precious species were found as stipulated in IUCN Red List.
	Hydrology	D	D	Because the project does not make changes to water current and riverbed and does not include structure development such as tunnels, impacts on hydrology are not anticipated.
Topography /	D	D	Large scale of excavation work is not assumed. Thus there is no impact	

Category	Scoping Item	Evaluation		Reason for Evaluation
		Before / During Construction (BC/DC)	Operation Stage (OS)	
	Geography			on topography and geography.
	Global warming	D	D	Any project activities will not affect to climate change.
	Electric and Magnetic Field	D	D	In the beginning of the operation phase, it is recommended to check the electric and magnetic field conditions although it is expected that there is no impact of electric and magnetic field.
	Hazardous material	D	D	Transformers which are manufactured recently and free from hazardous materials such as insulating oil of Polychlorinated Biphenyls (PCB) will be installed.
	Insulating oil and fuel	D	B-	Spill or leakage of insulating oil from transformers is anticipated.
SIA	Involuntary Resettlement and Land Acquisition	B-	D	There is no involuntary resettlement by the project. However, land acquisition for construction of transmission tower will be anticipated.
	The Poor	B+	D	DC: Job opportunity and commercial activities may be enhanced by construction works that lead the poor to increase their earnings. OS: By operation of substation, customers to surrounding stores and restaurants may be increased and economical activities may be enhanced that leads poor to increase their earnings.
	Indigenous and Minor People	D	D	No indigenous and minority people are in and around the Project site.
	Local economy such as employment and livelihood	B+	B+	DC: There will be job opportunities for locals and the regional economy will be boosted. Other local resources and food will be procured at the site. OS: The local economy and employment will be boosted with the operation of the substation.
	Land use and local resources	D	D	There is no threat to create negative damages in terms of land use and local resources.
	Water Use	D	D	Any project activities will not affect water use.
	Existing Infrastructure and Services	D	D	No impacts to existing social infrastructures and services.
	Social structure such as Provincial government	D	D	No impacts to existing social structures.
	Uneven distribution of harm and benefit	D	D	The power generated in the substation will not be consumed only in the project area. The power will also be distributed to other area. There is no uneven distribution of harm and benefit.
	Conflict of interests within the region	D	D	There will be no conflict of interests within the region.
	Cultural Heritage	D	D	As the results of the existing survey in 2013 near the project site described in Chapter 4, there is no cultural heritage on the project area.
	Landscape	D	D	As the results of the existing survey in 2013 near the project site described in Chapter 4, there is no important landscapes and viewpoints in the surrounding area.
	Gender	D	D	Negative impact on gender is not anticipated.
Children's Right	D	D	Negative impact on children's right is not anticipated.	
HIA	Occupational health and safety	B-	B-	DC: It is necessary to consider towards occupational health and safety during construction. OS: Working environment may be deteriorated because workers have to work at the area where high voltage exists when the transmission line and substation are operating.
	Community health and safety	B-	D	It is necessary to consider towards community safety and health during construction and operation.
	Risks of infectious disease such as AIDS/HIV	B-	D	DC: There may be risks of infectious disease by influx of workers. OS: Because there is no large change in traffic volume raising the inflow into the site from different regions, impacts on infectious disease is not anticipated.
	Accident	B-	B-	DC: It is necessary to consider towards accidents during construction. OS: Careful attentions are needed because there are some dangerous works when the plant is operating.
ERA	Flood risk	B-	B-	Flood risk such as heavy rain, cyclone, and tsunami are expected with a fixed probability.
	Risks of fire	B-	B-	Risks of fire is expected with a fixed probability.

Evaluation: A-: Significant Negative Impact

A+: Significant Positive Impact

B-: Some Negative Impact

B+: Some Positive Impact

C: Impacts are not clear, need more investigation

D: No Impacts or Impacts are negligible, no further study required

5.1.2 Scoping for Closing, Termination, and after Termination Phases

Table 5.1-2 shows results of scoping for pollution, national environment, social environment, health and safety, emergency risks, and climate change in closing, termination, and after termination phases.

**Table 5.1-2 Results of Scoping for Environmental and Social Impact Assessment
(Closing, Termination, and after Termination)**

Category	Scoping Item	Evaluation		Reason for Evaluation
		Closing (CL)	Termination/after Termination (TM/ATM)	
EIA (Pollution, Natural Environment)	Air Pollution	B-	D	CL: Emission from construction equipment, dust arisen by demolition works, air pollutant due to increase of traffic volume is anticipated.
	Water Pollution	B-	D	CL: Drainage problem due to demolition works may deteriorate water quality.
	Solid Waste	B-	D	CL: Causes of solid waste from cuttings and removal of buildings/substations facilities are anticipated.
	Soil Contamination	D	D	As the results of the existing survey around the project site described in Chapter 4, it was confirmed that there are no soil contamination including nature-derived near project site.
	Noise / Vibration	B-	D	CL: Noise and vibration from operation of construction machinery and on-site vehicles are anticipated.
	Subsidence	D	D	Any activities causing subsidence such as intake water from underground are not anticipated.
	Offensive Odor	D	D	Any activities causing offensive odor is not anticipated.
	Sedimentation	D	D	Any activities causing sedimentation condition are not anticipated.
	Natural Preserve	D	D	No natural preserve area exists in and around the project site.
	Flora, Fauna, and Ecosystem	D	D	No addition impacts on flora, fauna, and ecosystem are anticipated after operation.
	Hydrology	D	D	Any activities causing change of hydrology are not anticipated.
	Topography / Geography	D	D	Large scale of excavation work is not assumed. Thus, impact on topography and geography is not anticipated.
	Global warming	D	D	CL: No significant impact to climate change. TM/ATM: Global warming after demolition work will be back same as before construction.
Hazardous material	D	D	No significant impact due to hazardous material.	
Insulating oil and fuel	B-	D	CL: When demolishing a substation, contamination of soil from oil storage tank is anticipated and it shall be managed properly with enough care.	
SIA	Involuntary Resettlement and Land Acquisition	D	D	No addition impact on involuntary resettlement and land acquisition is anticipated after operation.
	The Poor	B+	D	CL: Job opportunity and commercial activities may be enhanced by demolition works that lead the poor to increase their earnings. TM/ATM: The Project will not cause negative impacts related to the poor after closing stage.
	Indigenous and Minor People	D	D	No indigenous and minority people are in and around the Project site.
	Local economy such as employment and livelihood	B+	D	CL: Job opportunity and commercial activities may be enhanced by demolition works that lead the poor to increase their earnings. TM/ATM: Termination of the Project may impact to local economy situation in the surrounding community due to decreasing the customer of near stores and restaurants.
	Land use and local resources	D	D	There is no threat to create negative damages in terms of land use and local resources.
	Water Use	D	D	Any activities using a large amount of water are not anticipated.
	Existing Infrastructure and Services	D	D	No impact to existing social infrastructures and services is expected.
	Social structure such as Provincial government	D	D	Social structure will not be changed due to closing and termination of the Project.
	Uneven distribution of harm and benefit	D	D	There is no uneven distribution of harm and benefit.
	Conflict of interests within the region	D	D	There will be no conflict of interests within the region.
Cultural Heritage	D	D	No additional impact on cultural heritage is anticipated after operation.	
Landscape	D	D	CL: No additional impact on landscape is anticipated after operation. TM/ATM: Landscape after demolition work will be back same as	

5.2 Terms of References for Investigation of Environmental Impact Assessment

As Terms of References (TOR) for investigation of EIA, the survey items and method of each negative impact evaluation item, which was identified as A, B and C by scoping described in Section 5.1, these items except those that cannot be investigated in the existing report and data. Table 5.2-1 shows the TOR of the implementation for 230kV transmission and substation development project. Among items of EIA investigation, baseline of air quality, water quality, soil, noise and living and livelihood were confirmed by filed survey and laboratory analysis. The environmental baseline data and results of social survey are summarized in Chapter 6.

Table 5.2-1 TOR of the Implementation for 230kV Transmission and Substation Development Project

No.		Item	Survey Item	Frequency	Points	Note
1	EIA (Pollution, Natural Environment)	Water	1) Temperature (Water, atmosphere), 2) Water level, 3) flow rate, 4) Cross Section, 5) Odor, 6)Color, 7)Electrical conductivity, 8) pH, 9) BOD5, 10) SS, 11) Turbidity, 12) DO, 13) Total Coliform, 14) COD, 15) Oil and grease, 16) Hexavalant chromium (Cr (VI))	1 time	1 points across rivers	Field measurement and laboratory analysis
2		Noise	LAeq (dB)	24 hrs surveys on weekday and weekend	2 points (north and south sides of Bago River)	Field measurement
3	SIA	Land Acquisition	Existing structure and land titles inside project site (To confirm current status of the boundary of the project site.)	At least 1 time	Project site	Field measurement
4	HIA	Occupational Health and Safety	-Safety measures for the working environment.	1 time	Project site	-Grasping of impacts and countermeasures based on past cases.
5		Community Health and Safety	-General contents of the project (scale of construction workers).	1 time	Project site and its surrounding area	
6		Risks of Infectious Disease such as AIDS/HIV	-General contents of the project (scale of construction workers).	1 time	Project site and its surrounding area	
7	ERA	Flood risk	- Floods record	1 time	Project site and its surrounding area	-Grasping of impacts and countermeasures based on past floods.
8		Risks for fire	- Safety measures for protection	1 time	Project site and its surrounding area	

Source: IEE Study Team

CHAPTER 6: FIELD SURVEY

6.1 Introduction

6.1.1 Outline of Survey

The summary of environmental conditions and social survey in the field are shown in Table 6.1-1.

Table 6.1-1 Summary of Environmental and Social Survey in the Field

Category	Item	Description	
Environmental Conditions	Water Quality	Parameter	16 parameters for Natural and living environment parameters: 1) Temperature (Water, atmosphere), 2) Water level, 3) Flow rate, 4) Odor, 5) Color, 6) Electrical conductivity, 7) pH, 8) BOD5, 9) SS, 10) Turbidity, 11) DO, 12) Total Coliform, 13) COD, 14) Oil and grease, 15) Hexavalent chromium (Cr (VI))
		Frequency	1time in April 2014 (2samples in total)
		Location	2 locations for surface water of
	Noise Level	Parameter	LAeq (A-weighted loudness equivalent)
		Period	24hour survey for weekday and weekend day
		Location	1 location (Living environment)
Social Survey	Local Economy such as Employment and Livelihood	Item	Living and livelihood in the surrounding area
		Area	Project Site and its surrounding area
		Period	1time in April 2014

Source: IEE Study Team

All result of laboratory analysis was attached in Appendix-3.

6.2 Water Quality

6.2.1 Survey Item

The analyzed parameters are shown in Table 6.2-1. These parameters were selected based on the stipulation by regulation of MOI and the parameters can be analyzed in Myanmar and Thailand.

Table 6.2-1 Parameters for Water Quality Survey

No.	Parameter	Note
1	Flow rate/Velocity	Field analysis
2	Transparency	
3	Temperature (atmosphere)	
4	Temperature (Water)	
5	pH	
6	Oxidation-Reduction Potential (ORP)	
7	Electrical conductivity (EC)	
8	Total Dissolved Solids (TDS)	
9	Dissolved Oxygen (DO)	
10	Turbidity (FNU)	
11	Odor	
12	Color	
13	Suspended Solid (SS)	Laboratory analysis
14	Biological Oxygen Demand (BOD ₅)	
15	Chemical Oxygen Demand (COD)	
16	Oil and grease	
17	Chromium (total)	
18	Zinc (Zn)	

No.	Parameter	Note
19	Copper (Cu)	
20	Iron (Fe)	
21	Fecal Coliforms	
22	E.coli	
23	Total Coliforms	

Source: IEE Study Team

6.2.2 Survey Location

The locations of sampling points are shown in Table 6.2-2. The detail of each sampling point is described below.

Table 6.2-2 Sampling Points for Water Quality Survey

Category	Sampling Point	Coordinates	Description of Sampling Point
Surface Water	WQ-1 (E)	16° 40' 20.35" N 96° 17' 19.17" E	In small stream beside the car road in Thilawa SEZ ; about 300 m south from No.(2) Thanlyin-Thilawa main road
	WQ-2 (E)	16° 39' 28.13" N 96° 16' 6.67" E	Downstream of WQ-1(E) beside the car road in Thilawa SEZ ; about 900 m south No.(2) Thanlyin-Thilawa main road

Source: IEE Study Team

(1) WQ-1 (E)

WQ-1(E) was collected at the upstream of Shwe Byauk Chaung which is located beside the car road in Thilawa SEZ and about 300 m south from No.2 Thanlyin-Thilawa road. This sample point is surrounded by paddy field and construction area for Thilawa SEZ development especially in the western part, while some industrial compounds are in east of WQ-1(E). The creek is about 7.5 m in width and 0.2 m in depth. Figure 6.2-1 shows location and state of water quality survey WQ-1 (E).



Source: IEE Study Team , Google Earth

Figure 6.2-1 Location and State of Water Quality Survey WQ-1 (E)

(2) WQ-2(E)

WQ-2(E) was collected at the downstream of Shwe Byauk Chaung, which is passing through the main car road in Thilawa Port area. It is also away from 900 m south from No. (2) Thanlyin-Thilawa road. This sampling point is bounded by the paddy field in eastern and northwestern part and industrial compounds in southwestern. The width of the stream is 11 m and the depth is about 0.4 m during sampling (ebb tide). This downstream is influent by the tidal activity and very slow flow rate about 0.1 m/s is recorded. Figure 6.2-2 shows location and state of water quality survey WQ-2 (E).



Source: IEE Study Team by using Google Earth

Figure 6.2-2 Location of Water Quality Survey Point (WQ-2(E))

6.2.3 Survey Period

The survey was conducted in 6th April, 2014. It was summer season.

6.2.4 Survey Method

(1) Sampling Method

Water samples were taken by alpha horizontal water sampler and collected in sterilized sample containers in accordance with recognized standard procedures Table 6.2-3 shows container and preservation method for water samples. The parameters of flow rate, transparency, temperature, pH, ORP, EC, TDS, DO, turbidity, odor and color were measured at each site concurrently with sample collection. Table 6.2-4 shows field equipment for water quality survey. All samples were kept in iced boxes and were transported to the laboratory and stored at 2-4°C refrigerators.

Table 6.2-3 Container and Preservation Method for Water Samples

No	Parameter	Container	Preservation
1	Oil and Grease	1000 ml glass bottle	Sulfuric acid, Refrigerate
2	COD	500 ml plastic bottle	Sulfuric acid, Refrigerate
3	BOD ₅	1,800 ml plastic bottle	Refrigerate
4	Heavy metals	500 ml plastic bottle	HNO ₃ Refrigerate
5	Bacteria	200 ml glass bottle (Sterilize)	Refrigerate
6	Others	1,800 ml polyethylene bottle	Refrigerate

Source: IEE Study Team

Table 6.2-4 Field Equipment for Water Quality Survey

No.	Equipment	Manufacturer	Originate Country	Model
1	Digital Water Velocity Meter	Global Water Flow Probe	USA	FP 211
2	Temperature meter	HANNA	USA	HI7609829
3	pH meter	HANNA	USA	HI7609829-1
4	ORP meter	HANNA	USA	HI7609829-1
5	EC meter	HANNA	USA	HI7609829
6	DO meter	HANNA	USA	HI7609829-2
7	Turbidity meter	HANNA	USA	HI7609829-2

Source: IEE Study Team

(2) Analysis Method

The following table provides the analysis method for water samples.

Table 6.2-5 Analysis Method for Water Samples

No	Item	Analysis method
1	Flow rate/Velocity	Digital Water Velocity Meter
2	Transparency	Visual method
3	Temperature (Atmosphere, Water)	HI7609829 Temperature Sensor
4	pH	HI7609829-1 pH Sensor
5	Oxidation-Reduction Potential (ORP)	HI7609829-1 ORP Sensor
6	Electrical conductivity (EC)	HI7609829 EC Sensor
7	Total Dissolved Solids (TDS)	HI7609829-3 TDS Sensor
8	Dissolved oxygen (DO)	HI7609829-2 Galvanic dissolved oxygen (D.O) sensor
9	Turbidity	HI7609829-2 Turbidity Sensor
10	Odor	Olfactory Measurement Method
11	Color	Visual method
12	Suspended Solids	Gravimetric method
13	Biochemical oxygen demand (BOD ₅)	Direct inoculation method
14	Chemical oxygen demand (COD)	Dichromate method
15	Oil & Grease	APHA-AWWA-WEF Method
16	Chromium (Cr) (mg/l)	Hanna HI 83200 Multiparameter Bench Photometer
17	Zinc (Zn) (mg/l)	Hanna HI 83200 Multiparameter Bench Photometer
18	Copper (Cu) (mg/l)	Hanna HI 83200 Multiparameter Bench Photometer
19	Iron (Fe)	Atomic Absorption Spectroscopy Method
20	Fecal Coliforms	AOAC Petrifilm Method
21	E.coli	AOAC Petrifilm Method
22	Total Coliforms	AOAC Petrifilm Method

Source: IEE Study Team

(3) Laboratory

Water samples were sent to the Department of Fishery, Government's laboratory, Myanmar Environment Institute and SGS's laboratory in Thailand.

6.2.5 Survey Result

The analysis result is shown in Table 6.2-6 below and compared with the environmental quality standards in Japan, Vietnam, and Thailand since the environmental standards in Myanmar have not been set yet. Both of results indicated the high SS and BOD. Thus, these parameters will be

investigated continuously during construction stage. Although, the result of pH at WQ-1(E) exceeded Japanese environmental standard, the result was below the environmental standard in Vietnam and Thailand. Therefore, the result of pH is generally good. As for the other parameters, the results were below the related environmental standard.

Table 6.2-6 Result of Water Quality Survey

No.	Parameter	Unit	WQ-1(E)	WQ-2(E)	Detection Limit	Environmental Standard		
						Japan ¹⁾	Vietnam ²⁾	Thailand ³⁾
1	Flow rate/Velocity	m/s	0	0.1	0.1	-	-	-
2	Transparency	-	Low	Low	-	-	-	-
3	Temperature (atmosphere)	°C	35	35	0.01	-	-	-
4	Temperature (Water)	°C	34.4	33.0	0.01	-	-	-
5	pH	-	8.6	7.9	0.01	6 - 8.5	5.5 - 9	5 - 9
6	ORP (mv)	mV	65.1	89.2	0.1	-	-	-
7	EC	us/cm	5,327	26,320	1	-	-	-
8	TDS	ppm	2,664	13,370	1	-	-	-
9	DO	mg/l	4.7	4.7	0.01	>2	>4	>4
10	Turbidity	FNU	769	460	1	-	-	-
11	Odor	-	Earthy	Earthy	-	-	-	-
12	Color	-	Light brown	Light brown	-	-	-	-
13	SS	mg/l	438	258	1	100	50	-
14	BOD ₅	mg/l	2.0	2.5	0.5	8	15	2
15	COD	mg/l	2.9	3.7	0.5	5 as COD _{Mn}	30	-
16	Oil and grease	mg/l	1	1	1	-	0.1	-
17	Chromium (total)	mg/l	0.04	0.02	0.02	0.05 as Cr(VI)	0.04 as Cr(VI)	0.05 as Cr(VI)
18	Zinc (Zn)	mg/l	0.07	<0.01	0.01	-	1.5	1.0
19	Copper	mg/l	0.05	0.12	0.001	-	0.5	0.1
20	Iron (Fe)	mg/l	4.0	3.0	0.1	-	1.5	-
21	Fecal Coliforms	cfu/100ml	140	2,000	-	-	-	-
22	E.coli	cfu/100ml	2,000	1,000	-	-	-	-
23	Total Coliforms	cfu/100ml	3,400	3,000	-	5,000 as MPN/100ml	7,500 as MPN/100ml	20,000 as MPN/100ml

Source: 1) Environmental Quality Standards for Water Pollution, 1971, Japan . Japanese water quality standards are categorized into 6 types, from drinking water to agricultural water and industrial water. It is compared with the standard for "Agricultural use" for this time
2) Surface Water Quality Standard (QCVN 08:2008/BTNMT), Vietnam B1: Standard of irrigation purpose
3) Surface Water Quality Standards 2009 Thailand (Class 3: Standard of Agriculture purpose)

6.3 Noise Level

6.3.1 Survey Item

Noise survey measures equivalent sound level (Leq). For evaluation, parameter for noise level survey was determined in reference to the environmental quality standards in Japan as shown in Table 6.3-1.

Table 6.3-1 Survey Parameters and Related Standard for Noise Level

No.	Parameter	Period	A-weighted loudness equivalent (LAeq) dB
1	Residential area (Living environment)	Daytime (6:00-22:00)	55
		Nighttime (22:00-6:00)	45
2	Noise standard	24hours	70

Source: Environmental Quality Standards for Noise, 1998, Japan
The Conservation and Enhancement of National Environmental Quality Act, 1002, Thailand

6.3.2 Survey Location

The locations of noise level survey area and those descriptions are shown in Table 6.3-2.

Table 6.3-2 Location of noise monitoring station

Sampling Point	Coordinates	Description of Sampling Point
N-1 (E)	16° 44' 28.45" N, 96° 16' 45.97" E	In the Natsinkone village, Thanlyin Township

Source: IEE Study Team

(1) N-1 (E)

It is located in the space of 15 feet Ward in Natsinkone Village, Thanlyin Township. This station is surrounded by the paddy field in the east and the residential houses in the north, west and south. There is also village access road both east and west of the monitoring point. The dominant source of noise was traffic especially from motorbike and human activities nearby the site.



Source: IEE Study Team

Figure 6.3-1 Location and State of Noise Level Survey (N-2)

6.3.3 Survey Period

Noise level survey was conducted 24 hours continuously in April 2014. The measurement duration is shown in Table 6.3-3.

Table 6.3-3 Sampling Duration for Noise Level Survey

Sampling ID	Period	
N-1 (E)	5th - 6th April, 2014 (weekend)	7th - 8th April, 2014 (weekday)

Source: IEE Study Team

6.3.4 Survey Method

Measurement of environmental sound level was conducted by referring to the recommendation of International Organization for Standardization (ISO), i.e. ISO 1996-1:2003 and ISO 1996-2:2007. The instrumentation used for noise quality survey is shown in Table 6.3-4.

Table 6.3-4 Instrumentation for Noise Level Survey

Instrumentation	Description
Sound level meter	Sound level meter with SD Card, Model SL-4023SD

Source: IEE Study Team

6.3.5 Survey Result

The result of noise level at living environment is shown Table 6.3-5. Both day time and night time of weekday's result were exceeded the environmental standard in Japan. It is presumed that it causes the human activity such as noise from motorbike and household. As for the result of weekend, the results were below environmental standard in Japan and Thailand. These measured data should be counted as baseline level in the area.

Table 6.3-5 Result of Noise Level at Living Environment

Unit: dB(A)

Location	Result				Environmental Standard	
	Weekday		Weekend		Day time (6am-10pm)	Night time (10pm-6am)
	Day time (6am-10pm)	Night time (10pm-6am)	Day time (6am-10pm)	Night time (10pm-6am)		
N-1	55	47	62	56	55 ¹⁾	45 ¹⁾
					70 (24hours) ²⁾	

Source: 1) Environmental Quality Standards for Noise, 1998, Japan (It is applied Class A and B) Class A and B: Residential Area
2) The Conservation and Enhancement of National Environmental Quality Act, 1002, Thailand

6.4 Land Acquisition

6.4.1 Survey Item

Detailed Measurement Survey (DMS) was conducted to identify Project Affected Lands (PALs) and Project Affected Peoples (PAPs) due to construction of 230kV transmission line.

6.4.2 Survey Location

The survey of land acquisition was conducted along the ROW of the proposed transmission line route. From Thanlyin substation to Thilawa new substation. (See "Location Map of Transmission Line & Substation Development Project at the cover page")

6.4.3 Survey Period

First DMS was conducted from May to August in 2014. The line route was changed near Thanlyin substation in late 2014 and in June 2016 to mitigate the area of affected land and DMS were conducted again at this time.

6.4.4 Survey Method

A Global Positioning System (GPS) was used to navigate and mark coordinates of the project affected facilities. Field observation was conducted on the proposed transmission line route. During the survey, following information was collected;

- Photo
- Coordination
- Owner of affected land and facilities
- Type of facilities,
- Potentiality of relocation

6.4.5 Survey Result

(1) PALs (according to DMS survey in 2014)

According to field survey, four private owners, who possess farmland, are identified that their farmland are located within proposed construction area of transmission tower. The affected land would be acquired before construction stage. PALs within proposed construction area of transmission tower according to DMS survey in 2014 are shown in Table 6.4-1. The detailed information of DMS is attached as Appendix-3 of Abbreviated Land Acquisition Plan.

Table 6.4-1 Potential Affected Land (according to DMS survey in 2014)

No	Township	Village	Land Owner	Potential Affected Land (acre) / Expected No. of Towers	Type of Land	Land certificate*
1	Thanlyin	Hpa Yar Kone	Mr. A	0.057 / 1 lattice tower	Agriculture	Possession
2			Mr. B	0.17 / 3 lattice towers		
3			Ms. C	0.17 / 3 lattice towers		
4		Bayet	Mr. D	0.17 / 3 lattice towers		

Source: IEE Study Team

Note: "Land certificate" means whether owner has a farm land work permit certificate

All potential affected land is located in Thanlyin township and they are farmland. At the same time, all land owner of potential affected land have possessed the land certification to do agriculture.

(2) PALs (according to DMS survey in 2016)

According to negotiation with PAPs and field survey, the number of land owners is reduced to two in August, 2017 as shown in Table 6.4-2. The size of lattice tower foundation is 1,550 ft² (39.4 ft × 39.4 ft or 12 m×12 m) having four legs. Area of land 100 ft × 100 ft is required during construction for each construction of lattice tower.

Table 6.4-2 Potential Affected Land (according to DMS survey in June, 2016)

No	Township	Village	Land Owner	Potential Affected Land (ft ²) / Expected No. of Towers	Type of Land	Land certificate*
1	Thanlyin	Bayet	Mr. E	1,550/ 1 lattice tower	Agriculture	Possession
2			Mr. F	1,550/ 1 lattice towers		

Source: IEE Study Team

CHAPTER 7: ENVIRONMENTAL, SOCIAL, HEALTH IMPACTS AND EMERGENCY RISKS ASSESSMENT

7.1 Summary of Environmental, Social, Health Impact and Emergency Risks Assessment

Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), and Health Impact Assessment (HIA), and Emergency Risk Assessments (ERA) on the Project are predicted and evaluated based on the Project description, results of baseline survey, and set target level. Table 7.1-1 and Table 7.1-2 show summary of environmental and social impacts on the Project before/ during construction and operation, closing, termination, after termination phases.

**Table 7.1-1 Results of Environmental and Social Impact Assessment
(Before/ During Construction and Operation Phases)**

Category	Scoping Item	Scoping		Evaluation		Reason for Evaluation
		BC/DC	OS	BC/D C	OS	
EIA (Pollution, Natural Environment)	Air Quality	B-	D	B-	D	DC: Impact on air quality will be limited, because sand dust/emission gas by construction work to affect surrounding area is site specific and temporary event.
	Water Quality	B-	D	B-	D	DC: Impact on water quality by construction work will be limited, because this is a temporary event.
	Solid Waste	B-	D	B-	D	DC: Construction soil and waste will be generated, and they will be reused, recycled, and disposed.
	Noise and Vibration	B-	B-	B-	B-	DC: Impact of noise and vibration by construction machineries will be limited, because noise and vibration from construction work which affect surrounding area are site specific and temporary. OS: Noise and vibration is anticipated from the operation of substation facilities such as transformers and machines in the control panel. However, impacts of noise and vibration from substation facilities on religious facilities and residences will be limited. This is because enough distance is planned to keep between substation and receptors.
	Electric and Magnetic Field	D	D	D	D	OS: According to the publication about Electric and Magnetic Fields and Your Health, edited by the Ministry of Health in New Zealand, electric and magnetic field at 132 ft (40 m) distance from high voltage transmission line is estimated as 0.01–0.1 kV/m (one thirtieth at source) and 0.1–0.7 μT (one fifth at source) which is the same as the value exists above an electric blanket. Both electric and magnetic fields decrease rapidly with distance. The impact of transmission line is not anticipated as the height of transmission line is 112 ft (37 m). The impact of substation is not anticipated due to enough distance approx. 825 ft (250 m) between the boundary of substation and residential area. Thus the impact of electric and magnetic field is negligible.
	Hazardous material	D	D	D	D	DC/OS: Transformers which are manufactured recently and free from hazardous materials such as insulating oil of Polychlorinated Biphenyls (PCB) will be installed.
	Transformer's insulating oil and fuel	D	B-	D	B-	OS: Spill or leakage of insulating oil from transformers is anticipated. Prevention of contamination of surrounding environment from spill or leakage of insulating oil from Transformer such as construction of a central oil storage underground concrete tank which collect spill or leakage of oil from all transformers.

Category	Scoping Item	Scoping		Evaluation		Reason for Evaluation
		BC/DC	OS	BC/D C	OS	
SIA	Relocation and Land Acquisition	B-	D	B-	D	DC: Land acquisition for construction of the transmission tower is expected. However, impact of land acquisition will be minimized because most of the transmission line route will be installed within ROW of the existing road which belongs to the Ministry of Construction (MOC). Only two places of agricultural land having 39.3 ft × 39.3 ft (12 m × 12 m) each will be acquired for each number of lattice tower. 100 ft × 100 ft (30.3 m × 30.3 m) wide land area is necessary during construction for construction of each lattice tower.
HIA	Occupational Health and Safety (including accident)	B-	B-	B-	B-	DC: It is necessary to consider occupational health and safety during construction such as accidents, working environment, fire risk, health risk, and use of machineries, chemical, etc... according to Occupational Health and Safety Law (Draft, 2017) in Myanmar, IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guideline and EHS Guidelines for Electric Power Transmission and Distribution. OS: During operation of substation and Transmission Line, occupational health and safety system shall comply with Occupational Health and Safety Law (Draft, 2017) in Myanmar, IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guideline and EHS Guidelines for Electric Power Transmission and Distribution.
	Community Health and Safety (including accident)	B-	B-	B-	B-	DC: It is necessary to avoid impact such as air pollution, water pollution, shortage of natural resources for example ground water, natural noise, vibration, traffic accidents due to construction and many more on local community during construction work according to IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines and IFC EHS Guidelines for Electric Power Transmission and Distribution. OS: During operation phase, community health and safety especially potential exposure to operational accidents and/or natural hazards shall be monitored and evaluated according to IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines, EHS Guidelines for Electric Power Transmission and Distribution.
	Risks of Infectious Disease such as AIDS/HIV	B-	D	B-	D	DC: Risks of infectious diseases such as AIDS/HIV should be checked before the construction phase and awareness training of communicable disease. OS: During operation phase, there is no factor that may increase the risk of infectious diseases.
ERA	Flood risk	B-	B-	B-	B-	DC/BC: Flood risk due to heavy rain and cyclone is expected to be little because proper elevation level will be set.
	Risks of Fire	B-	B-	B-	B-	DC/OS: It is necessary to prepare emergency management plan to reduce the risk of fire due to electric leakage and operational accident.

Evaluation: A-: Significant Negative Impact

A+: Significant Positive Impact

B-: Some Negative Impact

B+: Some Positive Impact

C: Impacts are not clear, need more investigation

D: No Impacts or Impacts are negligible, no further study required

Note: BC: Before Construction, DC: During Construction, OS: Operation Stage

**Table 7.1-2 Results of Environmental and Social Impact Assessment
(Closing, Termination, and after Termination)**

Category	Item	Scoping		Evaluation		Reason for Evaluation
		CL	TM/ ATM	CL	TM/ ATM	
Pollution	Air	B-	D	B-	D	CL: Impact on air quality will be limited, because dust emission by construction work, which affects surrounding area is site specific and temporary event.
	Water	B-	D	B-	D	CL: Impact on water quality by construction work will be limited, because this is a temporary event.
	Solid Waste	B-	D	B-	D	CL: Demolished waste will be generated, and they will be reused, recycled, and disposed.
	Soil	D	D	D	D	CL: Based on the baseline survey result, soil contamination including nature-derived inside project area was not confirmed. Thus, soil contamination by demolishing work will be not occurred.
	Noise and Vibration	B-	D	B-	D	CL: Impact of noise and vibration by construction machineries will be limited, because noise and vibration by construction work, which affects surrounding area is site specific and temporary.
	Subsidence	D	D	D	D	Any activities causing subsidence such as intake water from underground are not anticipated.
	Offensive Odor	D	D	D	D	Any activities causing offensive odor is not anticipated.
	Sedimentation	D	D	D	D	Any activities causing sedimentation condition are not anticipated.
	Natural Preserve	D	D	D	D	No natural preserve area exists in and around the project site.
	Flora, Fauna, and Ecosystem	D	D	D	D	No addition impacts on flora, fauna, and ecosystem are anticipated.
	Hydrology	D	D	D	D	Any activities causing change of hydrology are not anticipated.
	Topography / Geography	D	D	D	D	Large scale of excavation work is not assumed. Thus impact on topography and geography is not anticipated.
	Global warming	D	D	D	D	No significant impact to climate change.
	Hazardous material	D	D	D	D	No significant impact due to hazardous material.
Health and Safety	Transformer's insulating oil and fuel	B-	D	B-	D	CL: When demolishing a substation, contamination of soil from oil storage tank is anticipated and it shall be managed properly with enough care.
	Occupational health and safety (including accident)	B-	D	B-	D	CL: Impact on occupational health and safety is anticipated during closing stage. Working condition, health and safety when closing shall be considered based on Occupational Health and Safety Law (Draft, 2017) in Myanmar, IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guideline and EHS Guidelines for Electric Power Transmission and Distribution.
	Community health and safety (including accident)	B-	D	B-	D	CL: Impact on community health and safety is anticipated during closing stage. Community health and safety shall be considered according to IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guideline and EHS Guidelines for Electric Power Transmission and Distribution.
	Risks of infectious disease such as AIDS/HIV	B-	D	B-	D	CL: Risk of infectious disease is slightly anticipated. Preventive measures against infectious disease shall be considered.
	Risks of fire	B-	D	B-	D	CL: Risk of fire is anticipated during demolition.

Evaluation: A-: Significant Negative Impact A+: Significant Positive Impact
 B-: Some Negative Impact B+: Some Positive Impact
 C: Impacts are not clear, need more investigation
 D: No Impacts or Impacts are negligible, no further study required

Note: CL: Closing, TM: Termination. ATM: After Termination

7.2 Impact Assessment on Air Quality

7.2.1 Prediction Item

The items to be predicted were as below:

- The impacts on air quality caused by the construction work of the proposed project;
- The impacts on air quality caused by the closing work of the proposed project.

7.2.2 Prediction Area

The area where the impacts are to be predicted was set in the proposed project site.

7.2.3 Prediction Period

The prediction periods were as below:

- The prediction period in construction phase was set the duration of the construction work conduction.
- The prediction period in closing phase was set the period of the closing work conduction.

7.2.4 Prediction Method

The impacts on air quality were predicted by the following method:

- To examine the impacts on air quality caused by the construction work and related activities in reference to similar projects in construction phase
- To examine the impacts on air quality caused by the closing work of the proposed project in closing phase.

7.2.5 Prediction Result

(1) Prediction result in construction phase

Fugitive dust would arise from the bare area of construction site associated with transmission tower. Therefore, the contractor would control the implementation schedule of construction work so as to minimize generation of bare area as much as possible. In addition, sprinkling of water as environmental management plan would be implemented by proper timing in order to avoid diffusion of dust during construction phase.

Besides, air pollutants will be emitted from operating construction machineries and moving vehicles during construction phase. However, the impacts on air quality might be limited because the project does not include large scale construction works. In addition, the contractor would control the implementation schedule of construction work so as to avoid excessive idling of construction machineries/vehicles and concentration of construction work.

(2) Prediction in closing phase

Basically, in consideration of the life span of facilities, the transmission line and substation is not expected to close in the immediate future. However, in case the facilities should be closed for any reasons, the impacts on air quality in closing phase are expected to be limited, which are similar to

those in construction phase. It is because construction equipments and vehicles for demolition work which might emit air pollutants and dust will operate only a short time and mitigation measures shall be introduced so as to minimize the impacts.

7.3 Impact Assessment on Water Quality

7.3.1 Prediction Item

The items to be predicted were as below:

- The impacts on water quality caused by the construction work of the proposed project;
- The impacts on water quality caused by the closing work of the proposed project

7.3.2 Prediction Area

The area where the impacts are to be predicted was set in the proposed project site.

7.3.3 Prediction Period

The prediction periods were as below:

- The prediction period in construction phase was set the duration of the construction work conduction.
- The prediction period in closing phase was set the period of the closing work conduction.

7.3.4 Prediction Method

The impact on water quality was predicted by the following methods:

- The prediction period in the construction phase, the forecasting of impact on wastewater by the construction work and related activities will be referred to similar projects.
- To examine the impacts on water quality caused by the closing work of the proposed project in closing phase.

7.3.5 Prediction Result

(1) Prediction result in construction phase

Generally, muddy water would be discharged from the earthwork construction site as a result of rainfall on the exposed construction area. The contractor would examine the implementation schedule of construction work so as to minimize the generation of exposed areas as much as possible and set up settling ponds if necessary.

(2) Prediction result in closing phase

Basically, in consideration of the life span of facilities, the transmission line and substation is not expected to close in the immediate future. However, in case the facilities should be closed for any reasons, drainage from demolition works may deteriorate water quality. But the impacts on water quality in closing phase are expected to be limited which are similar to those in construction phase, since the demolition work won't be large in scale and mitigation measures shall also be introduced properly, which are similar to those in construction phase.

7.4 Impact Assessment on Solid Waste

7.4.1 Prediction Item

The items to be predicted were as below:

- Construction waste generated by the construction work of the project site.
- Solid waste generated by the proposed project in closing phase.

7.4.2 Prediction Area

The area where the impacts are to be predicted was set in the proposed project site.

7.4.3 Prediction Period

The Prediction periods were as below:

- The prediction period in construction phase was set the duration of the construction work conduction.
- The prediction period in closing phase was set the period of the closing work conduction.

7.4.4 Prediction Method

The impacts on solid waste were predicted by the following methods.

- To examine generation status of solid waste by the construction work and related activities by reference to similar projects in construction phase
- To examine generation status of solid waste by the closing work and related activities to by reference to similar projects in closing phase.

7.4.5 Prediction Result

(1) Prediction result in construction phase

The impact of the construction wastes on the surrounding area is estimated to be small, although wastes from excavation and structure removal works are estimated. Most of construction wastes might be recycled and reused in the construction work as much as possible. On the other hand, non-recyclable solid waste will be disposed properly. Therefore, though the construction work for transmission line would generate construction wastes from excavation and structure removal, the generation status of these wastes are expected to be small. Generation status of construction soil by substation development is also estimated to be small since the existing status of the proposed project site for substation is already flatland.

(2) Prediction result in closing phase

Basically, in consideration of the life span of facilities, the transmission line and substation is not expected to close in the immediate future. However, in case the facilities should be closed for any reasons, solid waste from cuttings and removal of buildings/plant facilities will be generated from demolition work. However it is estimated that the amount of these waste would be limited because scrap materials generated by removal of structures would be utilized as recyclable materials as much

as possible and the rest of waste would be disposed to the existing dumping sites in accordance with Myanmar's law and regulations.

7.5 Impact Assessment on Noise and Vibration Level

7.5.1 Prediction Item

The items to be predicted were as below:

- Noise and vibration associated with the construction work of the proposed project;
- Noise and vibration associated with the operation work of the proposed project;
- Noise and vibration associated with the closing work of the proposed project;

7.5.2 Prediction Area

The area where the impacts are to be predicted was set in and around the proposed project site. The prediction points are the houses in the community.

7.5.3 Prediction Period

The prediction periods were as below:

- The prediction period in construction phase was set the duration of the construction work conduction.
- The prediction period in operation phase was set the duration of operation work condition.
- The prediction period in closing phase was set the period of the closing work conduction.

7.5.4 Prediction Method

The impact was conducted to estimate the noise and vibration level increased by construction and closing work emission by using formula prepared by the institute of noise control engineering of Japan (noise) and formula prepared by public works research institute of Japan (vibration). The methodology of the impact prediction was described below:

(1) Method for construction and closing noise prediction

According to the construction plan, one excavator will be used for transmission tower construction and closing work. In order to forecast noise level from construction and demolition activities, the following formula prepared by the institute of noise control engineering of Japan is adapted.

$$L_c = L_{Source} - 8 - 20 \log_{10} \left(\frac{r}{r_0} \right)$$

L_c: Noise Level at evaluation poin [dB]t
r₀: Distance from source to measurement point [m] (=1m)
r: Distance from source to evaluation point [m]

(2) Method for construction and closing vibration prediction

In order to forecast vibration level from construction and closing activities, the following formula prepared by public works research institute of Japan is adapted.

$$L_v = L_{vr0} - 15 \log_{10} \left(\frac{r}{r_0} \right) - 8.68a(r - r_0)$$

- L_v : Vibration Level
- L_{vr0} : Vibration Level at r_0
- r_0 : Distance from Source to Measurement Point (=1m)
- r : Distance from Source to Evaluation Point
- a : Internal reduction coefficient in ground (Normal: 0.01, Hard Rock: 0.001)

(3) Method for operation noise and vibration prediction

To examine generation status of noise and vibration by the operation work and related activities to by reference to similar projects in operation phase.

7.5.5 Prediction Result

(1) Prediction result in construction and closing phase

1) The result of Noise prediction

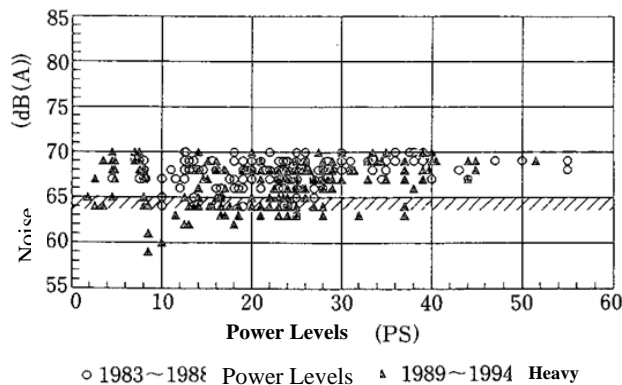
In order to forecast noise impact from construction and closing activities, heavy equipments are set based on the existing construction plan. Noise level at source is set based on the ratio of operation time with noisy work of heavy equipments as shown in the following formula;

$$L_{source} = 10 \log_{10} \left(a \cdot 10^{\frac{L_p}{10}} + (1 - a) \cdot 10^{\frac{L_{Ambient}}{10}} \right)$$

- L_p : Sound power level [dB]
- $L_{ambient}$: Ambient noise level [dB] (55 dB)
(*Based on the result of environmental survey as N-1 Day time of weekdays)
- L_{source} : Noise level at source [dB]
- a : Ratio of operation hours with noisy work (0.7=70% of each hour)

Source: Residential Noise Environment Plan , Institute of Noise Control Engineering of Japan / Japan, 1997

Figure 7.5-1 shows result of noise measurement of small excavator. According to this result, all heavy equipment less than 70 dB noise levels at 7m distance from the source. And, the difference between noise level of low noise type excavator and ordinary excavator were defined 5 dB by Japan Construction Machinery and Construction Association at “Hand Book of Noise and Vibration Countermeasures for Construction Work” Therefore, condition for construction noise forecast has set as Table 7.5-1.



Source: Residential Noise Environment Plan, Institute of Noise Control Engineering of Japan / Japan, 1997

Figure 7.5-1 Noise Measurement of Low Noise Type Small Excavator with Maximum Idling Engine Speed at 7 m Distance

Table 7.5-1 Condition for Construction Noise Forecast

Kind of Construction	Heavy Equipment	Noise Level at Source Lp [dB (A)]	No. of Party
Excavation for groundwork	Excavator (Ordinary Type of Small Excavator)	78	1

Source: Residential Noise Environment Plan , Institute of Noise Control Engineering of Japan / Japan, 1997
Hand Book of Noise and Vibration Countermeasures for Construction Work -3rd Edition,
Japan Construction Machinery and Construction Association / 2003

Table 7.5-2 shows prediction results of construction noise. In the evening time, less than 5 m areas from houses in residential area will be prohibited to implement the construction and closing work. In the night time, less than 8 m areas from the residential area will be also prohibited to operate to implement the construction and closing work.

Hence, it is judged the noise generated in construction and closing work of 230kV transmission line and substation development project would be well controlled and managed, and would not cause any significant impact on noise.

Table 7.5-2 Prediction Results of Noise

Distance from Houses near the project site	Forecasted Noise Level	Target Noise Level for the Monastery and Residence		
		Day time (Leq) (7am-7pm)	Evening time (Leq) (7pm-10pm)	Night time (Leq) (10pm-7am)
		75 dB	60 dB	55 dB
5 m	60 dB	OK	NG	NG
6 m	58 dB	OK	OK	NG
7 m	57 dB	OK	OK	NG
8 m	55 dB	OK	OK	NG
9 m	54 dB	OK	OK	OK
10 m	53 dB	OK	OK	OK

Note: NG: No Good (It exceeds the standard.)
Source: IEE Study Team

2) The result of vibration prediction

Table 7.5-3 shows condition for construction vibration forecast. Among construction works, compacting for groundwork was adopted as main construction work and one of the highest vibration works of 230kV transmission line and substation development project.

Table 7.5-3 Condition for Construction Vibration Forecast

Kind of Construction	Heavy Equipment	Unit Vibration Level Lv [dB]	No. of Party
Compacting for groundwork	Compacting Machine	66	1

Source: Technical Guideline on Environmental Impact Assessment on Road Construction Project,
Highway Environment Research Institute/Japan, 2007

Table 7.5-4 shows Prediction results of vibration. The vibration levels at all distances would be forecasted less than target vibration level for construction and closing work. However, prohibited operation time will be set same as noise result for safety.

Hence, it is judged the noise generated in construction and closing work of 230kV transmission line and substation development project would be well controlled and managed, and would not cause any significant impact on vibration.

Table 7.5-4 Prediction Results of Vibration

Distance from Houses near the project site	Forecasted Vibration Level	Target Vibration Level for the Monastery and Residence		
		Day time (Leq) (7am-7pm)	Evening time (Leq) (7pm-10pm)	Night time (Leq) (10pm-7am)
		65 dB	65 dB	60 dB
5m	55 dB	OK	OK	OK
10 m	50 dB	OK	OK	OK

Source: IEE Study Team

(2) Prediction result in operation phase

According to results of noise and vibration measurement near substation in Myanmar, one transformer, which is similar size as this Project, generated 70-76 dB (A) noise level at 1 meter distance from the transformer. Regarding vibration level, the transformer generated approximately 40 dB vibration level next to the source at a substation.

It is expected that the noise and vibration impacts from the substation will not be significant impact on the surround residential area, because it is enough distance (approximately 250m) from boundary of substation to the residential area to reduce impact on noise and vibration levels.

Hence, it is judged the noise and vibration generated in operation of substation would not cause any significant impact to the surrounding area.

7.6 Impact Assessment on Land Acquisition

7.6.1 Prediction Item

The items to be predicted were as below:

- Impact on land acquisition generated by the 230kV transmission line and substation development project

7.6.2 Prediction Area

The area where the impacts are to be predicted was set in the proposed project site.

7.6.3 Prediction Period

The prediction period in construction phase was set the duration of the construction work conduction for 230kV transmission line and substation development.

7.6.4 Prediction Method

The impacts on land acquisition were predicted by the following method:

- To predict degree of impacts, and its mitigation measures and countermeasures based on the socio-economic survey for PALs (Project Affected Lands) and PAPs (Project Affected Persons). (See Appendix-9 for Abbreviated Resettlement Action Plan (ARAP))

7.6.5 Prediction Result

In the planning stage, the transmission line route was selected by avoiding resettlement. In addition, 95 % of the transmission line route is in the right of way (ROW) of the existing road which belongs to MOC to avoid land acquisition as much as possible. On the other hand, only 5% of transmission line route is necessary to be installed on private land. Result of Land Acquisition Cost

As a result of socio-economic survey in 2014, there were four numbers of PALs. According to the result of continuous negotiation with these four land owners and field survey, the number of PALs is reduced to two in August, 2017. The reason why the number of PALs is reduced to two is that the land owners requested the Project proponent to change the transmission line route to reduce the impact of their land during negotiation with land owners and stakeholder. The Project proponent changed the transmission line route to meet the request of land owners as much as possible if it was feasible technically and economically. The meeting minutes, participants list, evidence letter and photos of Stakeholder Meeting, Public Consultation Meeting and PAPs meetings are attached in Appendix 5.

Two land owners in Bayet village Tract are identified as PAPs. Table 7.6-1 shows expected land acquisition cost for potential affected land of 39.3 ft × 39.3 ft (12 m × 12 m) for each PAP. It was calculated as below.

$$\text{Amount of Land Acquisition Cost} = \text{Area of Potential Affected Land} \times \text{Unit Price}$$

where, Amount: *Amount of Land Acquisition Cost (MMK)*

Unit price: *Unit price of Affected Land (MMK/acre)*

Table 7.6-1 Expected Land Acquisition Cost

No	Township	Village	Land Owner	Potential Affected Land (acre)	Potential Affected Land (ft ²)	Unit Price (MMK/ft ²)	Land Acquisition Cost (MMK)
1	Thanlyin	Bayet	Mr. E	0.23	1,550	-	-
2			Mr. F	0.23	1,550	-	-
Total							-

Source: IEE Study Team

Recommendation: The project owner is not used to paying land compensation for construction of transmission towers. It is recommended to give land compensation to land owners for construction of transmission towers on farmland in accordance with Farm Land Law (2012). It is stipulated in paragraph 67 (b) in Farmland Land Rule (2012) that

“67 (b) Compensation for Land

- 1) Value calculated based on the current market price of the farmland of that area, in confiscating farms in the long term interests of nation for the non-profitable construction activities and national security
- 2) In confiscating lands in the long term interests of nation for the purpose of utilizing the profitable business, amount agreed by the person interested or amount which is not lower than the amount calculated based on the current market price of that area, according to the type of the business, by Compensation Calculation Body organized by the Central Farmland Management Body.”

In this project, the land compensation is not planned to give to land owners.

(1) Compensation for Crops

Table 7.6-2 shows the amount of compensation for crops. Table 7.6-2 shows the amount of crop compensation for the potential affected land of 100 ft × 100 ft (0.23 acre) during construction for each land owner. The Compensation Committee calculated the crop compensation through detailed measurement as below.

$$\text{Amount} = \text{Area} \times \text{Unit Price} \times 3 \text{ (Years)}$$

where, Amount: *Amount of Compensation for Crops (MMK)*

Area: *Affected Area (acre)*

Table 7.6-2 Amount of Compensation for Crops

Type of Cost Estimation	No	Land Owner	Affected Land (acre)	Season	Amount of Compensation for Crops (MMK)
Cost Estimation A	1	Mr. E	0.23	Rain	208,725
				Dry	341,550
	2	Mr. F	0.23	Rain	208,725
				Dry	341,550

Source: Compensation Committee

(2) Compensation for Temporary Land Use

In case that the temporary land use will be occurred during the agricultural season for the construction works, the compensation will be paid for loss of crop. However, if there is no temporary land use, or

the construction work are conducted during the agricultural off-season, the compensation for crops will not occur.

7.7 Impact Assessment on Occupational Health and Safety

7.7.1 Prediction Item

The items to be predicted were as below:

- The impacts on occupational health and safety associated with construction/operation/closing works of the proposed project.

7.7.2 Prediction Area

The area where the impacts are to be predicted was set in the proposed project site.

7.7.3 Prediction Period

The prediction periods were as below:

- The prediction period in construction phase was set the duration of the construction work conduction.
- The prediction period in operation phase was set throughout the period of operation of the transmission line and substation.
- The prediction period in closing phase was set the period of the closing work conduction.

7.7.4 Prediction Method

The impacts on occupation health and safety were predicted by the following methods:

- To examine the impacts on occupational health and safety associated with the construction work in construction phase by considering the construction work plan
- To examine the impacts on occupational health and safety associated with the operation work by considering similar projects
- To examine the impacts on occupational health and safety associated with the closing work by considering of similar projects

7.7.5 Prediction Result

(1) Prediction result in construction phase

Minor negative impacts on occupational safety are inevitable during construction phase since the construction work of the project especially the 230 kV transmission line and substation development work contains some risk of accident at work site as follows,

- Live power lines,
- Working at height,
- Electric and magnetic fields,
- Exposure to chemicals

To minimize the risks, working condition during construction should be managed by the contractor based on Occupational Health and Safety Law (Draft, 2017) in Myanmar. The OHS training should contain as follows.

- Explanation about handling of machinery, equipment and waste disposal safely for workers and the surrounding area
- Explanation about necessity of adequate healthcare facilities (first aid) within construction sites.
- Explanation about necessity of basic sanitation and healthcare issues, general health and safety matters, and on the specific hazards of their work.
- Explanation about necessity of personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, spectacles and ear protection.
- Explanation about necessity of fire-fighting equipment such as potable extinguishers.
- Explanation about prevention and emergency response plan
- Explanation about instruction, notice, danger signs, posters and signboards regarding OHS

(2) Prediction result in operation phase

Occupational health basic level monitoring station is preferred in the project site, and professional personnel and necessary instruments shall be prepared. Settings of labor safety and industrial health monitoring station, instruments and devices may be arranged together with the environmental protection monitoring station. The occupational health plans should be built based on Occupational Health and Safety Law (Draft, 2017) in Myanmar. The occupational health plans should contain as follows.

- Providing personal protection equipment
- Clean drinking water facilities for all workers.
- Adequate protection to the general public, including safety barriers and marking of hazardous areas.
- Septic tank and garbage bins will be set up in substation, which will be regularly cleared to prevent outbreak of diseases.

(3) Prediction result in closing phase

Basically, in consideration of the life span of facilities, the transmission line and substation is not expected to close in the immediate future. However, in case the facilities should be closed for any reasons, minor negative impacts on occupational health and safety which are similar to those in construction phase are inevitable in closing phase. Therefore mitigation measures shall be introduced during closing phase as well, which are similar to those in construction phase.

7.8 Impact Assessment on Community Health and Safety

7.8.1 Prediction Item

The items to be predicted were as below:

- The impacts on community health and safety associated with construction/closing phase of the project.

7.8.2 Prediction Area

The area where the impacts are to be predicted was set in and around the proposed project site.

7.8.3 Prediction Period

The prediction periods were as below:

- The prediction period in construction phase was set the duration of the construction work conduction.
- The prediction period in closing phase was set the period of the closing work conduction.

7.8.4 Prediction Method

The impacts on community health and safety were predicted by the following method:

- To examine the impacts on community health and safety associated with construction/operation/closing works of the proposed project by considering the project plan.

7.8.5 Prediction Result

(1) Prediction result in construction phase

Minor negative impacts on community safety are inevitable during construction phase; especially the transmission line and substation development work contains some risk of electrocution at work site.

To minimize the risks of the accident, working condition during construction will be managed by contractor based on OHS training stipulated in international guidelines such as EHS Guidelines by IFC. The OHS training should contain as follows,

- Preparation of sign and barriers and (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment.
- Installation of grounding conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock.

(2) Prediction result in closing phase

Basically, in consideration of the life span of facilities, the transmission line and substation is not expected to close in the immediate future. However, in case the facilities should be closed for any reasons, minor negative impacts on community health and safety in closing phase are expected to be limited similar to those in construction phase. Therefore mitigation measures shall be introduced during closing phase, which are similar to those in construction phase.

7.9 Impact Assessment on Risks of Infectious Disease such as AIDS/HIV

7.9.1 Prediction Item

The items to be predicted were as below:

- Risks for infectious disease such as AIDS/HIV in and around the proposed project site which might be increased by construction work
- Risks for infectious disease such as AIDS/HIV in and around the proposed project site which might be increased by the closing work.

7.9.2 Prediction Area

The area where the impacts are to be predicted was set in and around the proposed project site.

7.9.3 Prediction Period

The prediction periods were as below:

- The prediction period in construction phase was set the duration of the construction work conduction.
- The prediction period in closing phase was set the period of the closing work conduction.

7.9.4 Prediction Method

The risks of infectious disease were predicted by the following methods:

- To examine risks for infectious disease such as AIDS/HIV in construction phase by considering the construction work plan for the proposed project;
- To examine risks for infectious disease such as AIDS/HIV in operation phase by considering the similar project;

7.9.5 Prediction Result

(1) Prediction result in construction phase

Risks of infectious diseases for labors are expected to be raised during construction work due to the inflow of the construction workers from outside. In order not to spread the infectious disease in and around the labor camps and the construction site, sanitary facilities such as toilet and septic tank shall be adequately installed in the proposed project site.

(2) Prediction result in closing phase

Basically, in consideration of the life span of facilities, the transmission line and substation is not expected to close in the immediate future. However, in case the facilities should be closed for any reasons, there might be at risks of infectious disease in closing phase, which are similar to those in construction phase. Therefore, preventive measures against infectious disease similar to those in construction phase shall be introduced in closing phase as well.

7.10 Impact Assessment on Flood Risk

7.10.1 Prediction Item

The items to be predicted were as below:

- Flood risk increased by the construction and operation of the proposed project.

7.10.2 Prediction Area

The area where the impacts are to be predicted was set in and around the proposed project site.

7.10.3 Prediction Period

The prediction periods were as below:

- The prediction period in construction phase was set the duration of the construction work conduction.
- The prediction period in operation phase was set throughout the period of operation of the transmission line and substation.

7.10.4 Prediction Method

The flood risk was predicted by the following method:

- To confirm flood potential risks in and the surrounding area in construction/operation phase of the proposed project in reference to past analysis

7.10.5 Prediction Result

(1) Prediction result in construction phase

Since there are potential risks for flood during the rainy season in the proposed project site due to the topographic condition, the construction work will be scheduled to be implemented during dry season as much as possible in order to prevent flood damage.

(2) Prediction result in operation phase

Proposed substation site is located near Thilawa SEZ (Class A/Zone A) area. The development plan of Thilawa SEZ (Class A/Zone A) has already prepared in Feasibility Study (F/S) by Japanese companies. The F/S conducted flood risk analysis due to rainfall by 100 years return period analysis in the upper course of Yangon River, storm surge analysis and hearing survey of flood disaster in the Thilawa SEZ (Class A/Zone A area).

1) Flood water level (100 years return rainfall) = +4.9m (Above mean sea level)

Note: This data is calculated based on the formula as below.

Highest recorded water level of yangon river + Inundation height by rainfall

4.24 m+ 0.622 m= 4.9 m

2) Storm surge analysis in Yangon River : +6.5 m (Above mean sea level)

3) Hearing survey of flood disaster : +5.5 m (Above mean sea level)

In F/S, it is proposed that the height of perimeter dyke should be higher than +6.5 m (Above mean sea level). In accord with the past analysis, the proposed substation site poses potential risks for flood. Therefore, substation site is recommended to build at land level higher than +6.5m (Above mean sea level). The elevation of ground level, buildings and foundation of transformers in Thilawa power plant with reference to the above mean sea level are as follows.

The elevation of ground level: +5.6 m (Above mean sea level)

The elevation of floor level of all buildings: +6.1 m (Above mean sea level)

The elevation of concrete foundation of Transformers: +6.0 m (Above mean sea level)

7.11 Impact Assessment on Risk of Fire

7.11.1 Prediction Item

The items to be predicted were as below:

- Risks for fire raised by the construction and operation work of the proposed transmission line and substation;

7.11.2 Prediction Area

The area where the impacts are to be predicted was set in the proposed project site.

7.11.3 Prediction Period

The prediction periods were as below:

- The prediction period in construction phase was set the duration of the construction work conduction.
- The prediction period in operation phase was set throughout the period of operation of the transmission line and substation.

7.11.4 Prediction Method

The risks for fire were predicted by the following method:

- To examine risks of fire due to the construction/operation work by considering the construction/operation work plan of the proposed project;

7.11.5 Prediction Result

(1) Prediction result in construction phase

Risks of fire in construction phase is expected to be little because the construction work for the proposed project does not include large scale works using fire. However, the risks cannot be eliminated because some activities taken by the construction workers such as smoking or cooking could lead to fire in the proposed project site. To reduce the risks for fire as much as possible, working condition will be managed by contractor through provision of the safety education, the training for the construction workers by reference to OHS training stipulated in the international guidelines such as EHS Guidelines by IFC, and proper arrangement of hydrants.

(2) Prediction result in operation phase

Operation of transmission line and a substation has potential risks of fire due to high voltage electricity and overheat to electric machineries and equipment. DPTSC should manage and monitor aging of facilities for safety. Recommended mitigation measures on risks of fire for transmission line and substation development shall be prepared.

CHAPTER 8: ENVIRONMENTAL MANAGEMENT PLAN

8.1 Environmental Management Plan

Environmental Management Plan consists of two components 1) mitigation and consideration measures taken in the course of the project implementation were examined based on project description and result of EIA, SIA, HIA, and ERA and 2) monitoring plan to confirm taken mitigation and consideration measures properly and to confirm environmental levels in construction and operation and closing stages through environmental measurement.

8.1.1 Mitigation and Consideration Measures

Table 8.1-1 to Table 8.1-4 show the mitigation and consideration measures at before construction phase, construction phase, operation phase and closing phase. Mitigation measures of construction and closing works will be implemented by contractors except for the works related to after care of landfill. Mitigation measures of operation will be implemented by the project proponent. All the mitigation measures for all stages will be responsible for the Project proponent.

Table 8.1-1 Mitigation Measures Before Construction Phase

Category	Item	Mitigation and Consideration Measures
SIA	Land Acquisition	<ul style="list-style-type: none"> - Compensation committee shall set compensation price for land acquisition due to construction of transmission towers. - The project proponent shall provide advance notice of operations and prohibited operation time to affected households.
HIA	Occupational Health and Safety	- Consideration of working conditions will be planned based on Occupational Health and Safety Law (Draft, 2017) in Myanmar, EHS General Guidelines and EHS Guidelines for Electric Power Transmission and Distribution by IFC.
	Community Health and Safety	- Consideration of community health and safety will be planned based on IFC Performance Standards on Environmental and Social Sustainability, IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines, EHS Guidelines for Electric Power Transmission and Distribution.
	Risks of Infectious Disease such as AIDS/HIV	<ul style="list-style-type: none"> - Measures of infectious disease will be planned as follows. * Plan for prevention of infectious disease from spreading * Awareness Training plan for construction workers.
ERA	Flood risks	- Proper elevation level will be set to avoid flood risks such as heavy rain and Cyclone.
	Risks of Fire	- Plan for prevention of fire due to various reasons especially electric leakage

Source: IEE Study Team

Table 8.1-2 Mitigation Measures during the Construction Phase

Category	Item	Mitigation and Consideration Measures
EIA	Air quality	<ul style="list-style-type: none"> - Sprinkling water around preservation area such as residence - Prohibition of idling will be implemented. - Intensive operating of the construction machinery will be avoided. - Construction equipment, machines and vehicle will be inspected and maintained regularly - Machines, construction equipment and construction waste will be stored at the designated storage area.
	Water quality	<ul style="list-style-type: none"> - Settling ponds or simple turbid water treatment will be installed as necessary. - Simple wastewater treatment facility will be set up in construction site as necessary.

Category	Item	Mitigation and Consideration Measures
	Solid Waste	<ul style="list-style-type: none"> - Re-utilization of construction soil. - Appropriate disposal of construction waste and solid waste. - Usage of hazardous and chemical substance will be recorded and updated regularly. - Hazardous and chemical substance, which are to be disposed, will be stored at the designated storage area and entrusted to dispose by Kyauktan Township or Thanlyin Township Development Committee or other proper organizations.
	Noise/ Vibration	<ul style="list-style-type: none"> - Installation of soundproof sheet at the places where it is neighbor to preservation area such as residence and pagoda as necessary. - Obey maximum driving speed. - Advanced notice of operations and prohibited time near preservation area.
SIA	Land Acquisition	<ul style="list-style-type: none"> - Crop compensation will be paid for land acquisition for construction of transmission towers.
HIA	Occupational Health and Safety	<ul style="list-style-type: none"> - Working condition during construction will be managed by DPTSC based on Occupational Health and Safety Law (Draft, 2017) in Myanmar, IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guideline and EHS Guidelines for Electric Power Transmission and Distribution. as follow. *Provision of adequate healthcare facilities (first aid) within construction sites. *Conducting training for all construction workers about basic sanitation and healthcare issues, general health and safety matters, and specific hazards at their work. *Providing personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, spectacles and ear protection. *Providing clean drinking water for all workers. *Providing adequate protection to the general public, including safety barriers and marking of hazardous areas. *Safe access across the construction site. *Adequate drainage throughout the construction site to ensure that disease vectors cannot live in stagnant water bodies and in puddles. *Septic tank and garbage bins will be set up at construction site and they will be regularly cleared by the contractors to prevent outbreak of diseases. *The contractor will arrange the temporary integration of waste collection from work sites into existing waste collection systems and disposal facilities of nearby communities.
	Community Health and Safety	<ul style="list-style-type: none"> - Community health and safety will be managed by DPTSC based on IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines, EHS Guidelines for Electric Power Transmission and Distribution as follows; * Protecting the community from physical, chemical, or other hazards associated with sites under construction and decommissioning. * Avoid contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction, or excavations and structures which may pose falling and entrapment hazards * The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness-raising training. * Ensuring safety to the community due to various kinds of construction machineries.
	Risks for Infectious Disease such as AIDS/HIV	<ul style="list-style-type: none"> - The following measures due to infectious disease will be implemented as necessary. * Prevention of infectious disease from spreading. * Conducting training for workers. *Communication with local resident through meeting and dialogue.
	Accident	<ul style="list-style-type: none"> - Same as mitigation measures for Occupational and Community Health and Safety. - The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness-raising training.
ERA	Flood risks	<ul style="list-style-type: none"> - All construction activities will be stopped and area of evacuation for workers will be secured when weather forecast alerts flood risks such as heavy rain and cyclone.
	Risks of Fire	<ul style="list-style-type: none"> - Prevention of electric leakage, overheat to electric machineries and equipment - Periodical training to worker for firefighting will be organized.

Source: IEE Study Team

Table 8.1-3 Mitigation Measures during Operation Phase

Category	Item	Mitigation and Consideration Measures
EIA	Noise and Vibration	<ul style="list-style-type: none"> - Enough distance shall be kept between the substation and receptors.
	Insulating oil and fuel	<ul style="list-style-type: none"> - Transformer oil storage underground concrete tank shall be provided to prevent contamination of soil from it.

Category	Item	Mitigation and Consideration Measures
EIA	Noise and Vibration	- Enough distance shall be kept between the substation and receptors.
	Insulating oil and fuel	- Transformer oil storage underground concrete tank shall be provided to prevent contamination of soil from it.
HIA	Occupational Health and Safety (including accident)	- Consideration of maintenance work will be implemented based on Occupational Health and Safety Law (Draft, 2017) in Myanmar, EHS General Guidelines and EHS Guidelines for Electric Power Transmission and Distribution by IFC.
	Community Health and Safety (including accident)	- Consideration of community health and safety will be implemented based on IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines, EHS Guidelines for Electric Power Transmission and Distribution.
ERA	Flood risks	- Proper elevation level will be set to avoid flood risks due to heavy rain and cyclone.
	Risks of Fire	- Appropriate management of maintenance work to reduce the risk of electric leakage and overheat to electric machineries and equipment.

Source: IEE Study Team

Table 8.1-4 Mitigation and Consideration Measures for Closing Phase

Category	Item	Mitigation and Consideration Measures
EIA	Air quality	<ul style="list-style-type: none"> - Sprinkling water around preservation area such as residence. - Prohibition of idling will be implemented. - Intensive operating of the construction machinery will be avoided. - Construction equipment, machines and vehicle will be inspected and maintained regularly - Machines, construction equipment and construction waste will be stored at the designated storage area.
	Water quality	<ul style="list-style-type: none"> - Settling ponds or simple turbid water treatment will be installed as necessary - Septic tank will be set up in construction site. - Simple wastewater treatment facility from cement producing activity will be set up in construction site as necessary. - Monitoring water quality for discharge water will be implemented.
	Solid Waste	<ul style="list-style-type: none"> - Re-utilization of construction soil at the site - Appropriate disposal of construction waste - Usage of hazardous and chemical substance will be recorded and updated regularly. - Hazardous and chemical substance, which is to be disposed, will be stored at the designated storage area and is entrusted to dispose by Yangon City Development Committee (YCDC) or other proper organizations.
	Noise/ Vibration	<ul style="list-style-type: none"> - Installation of soundproof sheet especially at the places which is neighbor to preservation area such as residence and pagoda as necessary - Obey maximum driving speed - Advanced notice of operations and prohibited time near preservation area
	Insulating oil and fuel	- Oil storage underground concrete tank shall be handled with proper care to prevent contamination of surrounding environment from it.
HIA	Occupational Health and Safety (including accident)	- Working condition during demolition works will be managed by contractor based on Occupational Health and Safety Law (Draft, 2017) in Myanmar, EHS General Guidelines and EHS Guidelines for Electric Power Transmission and Distribution by IFC.
	Community Health and Safety (including accident)	- Community health and safety will be managed by the contractor based on IFC Performance Standards on Environmental and Social Sustainability, IFC General EHS Guidelines, EHS Guidelines for Electric Power Transmission and Distribution.

Source: IEE Study Team

8.2 Mitigation Measures for Termination and after Termination Phases

There is no anticipated the preliminary mitigation and consideration measures for termination and after termination phases.

8.3 Environmental Monitoring Plan

Environmental monitoring plan including monitoring items, location, before construction, during construction, during operation, and at closing phase are shown in Table 8.3-1 to Table 8.3-4. Monitoring for construction and closing works will be implemented by contractors. Monitoring during operation will be implemented by the project proponent.

Regarding the entire monitoring process, the Project Proponent is committed that monitoring report will be submitted to ECD every six months according to article (108) of Environmental Impact Assessment Procedure for the operation stage.

Table 8.3-1 Monitoring Plan (Before Construction Phase)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of planning for mitigation measures for construction phase	Project site	Once	DPTSC/ Contractor
Land Acquisition	- Record of payment for compensation of land acquisition of transmission tower.	Construction site	As occasion arises	DPTSC

Source: IEE Study Team

Table 8.3-2 Monitoring Plan (Construction Phase of a substation and transmission line)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures shown in Table 8.1-2.	-	Once/month	Contractor
Air Quality	- NO ₂ , PM ₁₀ , PM _{2.5} , SO ₂	Construction site	2 times per year (dry and rainy season)	Contractor
Water Quality	- Water temperature, pH, SS, DO, BOD, COD, coliform count, oil and grease, Total Nitrogen, Total Phosphorous	Small stream near the construction site of a substation	1 time (dry season)	Contractor
	- Water temperature, pH, Turbidity	Small stream near the construction site of a substation	1 time (rainy seasons)	Contractor
	- Record of installation of sheet to prevent muddy water and rainfall	Near rivers and channels	Once/3months	Contractor
Waste	- Recording amount of solid waste - Recording of management of construction waste - Recording of hazardous and chemical substance management	Construction site	Once/month	Contractor
Flora and Fauna	- Number of cut trees and its species	Construction site	Once/month	Contractor
Noise and Vibration	- Noise and vibration level	at the nearest receptor location off-site	24 hrs (peak period)	Contractor
Risks for infectious disease such as AIDS/HIV	- Status of measures of infectious disease	Construction site	Once/month	Contractor
Occupational health and safety	- Status of condition of occupational safety and health	Construction site	Once/month	Contractor
Community health and safety	- Status of condition of community safety and health	Construction site and surrounding area	As occasion arises	Contractor

Source: IEE Study Team

Table 8.3-3 Monitoring Plan (Operation Phase)

Survey item	Item	Monitoring Method	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures		Project site	Bi-annually (starting from the time of project operation)	DPTSC
Air Quality	Air quality monitoring of CO ₂ , NO ₂ , SO ₂ , PM _{2.5} , PM ₁₀	Site measurement		Twice a year (Dry and Raining Season)	DPTSC

Survey item	Item	Monitoring Method	Location	Frequency	Responsible Organizations
Water Quality	BOD, COD, Oil and grease, pH, Total coliform bacteria, Total Nitrogen, Total phosphorus,	Laboratory analysis		Twice a year	DPTSC
Solid Waste	Type and amount of solid waste, segregation of waste (hazardous and non-hazardous), storage	Checking records		Monthly	DPTSC
Hazardous Material	Usage of fuel	Checking records		Weekly	DPTSC
Soil Contamination	Oil/Fuel leakage from machine	Visual inspection		Daily	DPTSC
Noise and Vibration	Noise level	Site measurement		Twice a year (First 3 years after operation starts)	DPTSC
Offensive Odor	Check irregular odor at septic tank and working place	Checking records		Monthly	DPTSC
Occupational Health and Safety	- Status of measures for occupational safety and health - Record of working accident	Visual inspection and checking records	Project site	Quarterly	DPTSC
Community Health and Safety	- Status of measures for community safety and health - Record of accident related to construction activity	Checking Record	Vehicle route	Once/month	DPTSC
Flood risk	-Record of flood and its response		Project site	As occasion arises	DPTSC
Risk for fire	- Record of fire and its response		Project site	As occasion arises	DPTSC

Source: IEE Study Team

Table 8.3-4 Estimated Cost for Environmental Monitoring during Operation Phase (Yearly)

Survey Item	Monitoring Item	Location	Frequency	Cost (MMK)	responsible Organization
Air Quality	CO ₂ , NO ₂ , SO ₂ , PM _{2.5} , PM ₁₀	1 point 16° 44' 28.45" N, 96° 16' 45.97" E	Twice per year (24-hours)	3,920,000	DPTSC
Water Quality	BOD, COD, Oil and grease, pH, Total coliform bacteria, Total Nitrogen, Total phosphorus, Total suspended solids	2 points 16° 40' 20.35" N 96° 17' 19.17" E; 16° 39' 28.13" N 96° 16' 6.67" E	Annually	1,640,000	DPTSC
Noise and Vibration	Noise level (dB) and vibration level (dB)	1 point 16° 44' 28.45" N, 96° 16' 45.97" E	Twice per year (24-hours)	3,368,000	DPTSC

Source: IEE Study Team

Table 8.3-5 Preliminary Monitoring Plan (Closing Phase)

Category	Item	Location	Frequency	Responsible Organizations
Common	- Monitoring of mitigation measures	-	Once/month	Contractor
Air Quality	- TSP, PM ₁₀ , SO ₂ , NO _x , PM	Construction site (1 point)	1 week /3 month (Peak time)	Contractor
Water Quality	- Water temperature, pH, SS, DO, BOD, COD, coliform count, oil and grease, chromium	Outlet of septic tank (1 point)	Once/2 month	Contractor
Solid Waste	- Amount of solid waste - Recording of management of construction waste - Recoding of hazardous and chemical substance management	Construction site	Once/month	Contractor
Noise and Vibration	- Noise and vibration level	Sensitive area such as residence around the proposed construction site (1 point)	24 hrs/3 months (peak period)	Contractor
		Sensitive area such as residence along the route for on-site	24hrs (peak period)	Contractor

Category	Item	Location	Frequency	Responsible Organizations
		vehicles (1 point)		
Risks for infectious disease such as AIDS/HIV	- Status of measures of infectious disease	Construction site	Once/month	Contractor
Occupational health and safety	- Status of condition of occupational safety and health	Construction site	Once/month	Contractor
Community health and safety	- Status of condition of community safety and health	Construction site and surrounding area	As occasion arises	Contractor

Source: IEE Study Team

Above monitoring plan will be carried out with environmental and social monitoring form for construction of a substation and that of 230 kV Transmission Line as Appendix-4.

8.4 Cost of Mitigation Measures

The cost of environmental and social mitigation measures during construction stage to mitigate environmental and social impacts is shown in Table 8.4-1. Environmental mitigation measures include environmental monitoring of air quality, water quality and noise and vibration quality measurement. Please see Appendix-8 for Quotation for Environmental Monitoring.

Table 8.4-1 Cost of Mitigation Measures and Environmental Monitoring

No.	Project	Unit Cost (MMK)	Quantity (Times for Environment/ Number for Social)	Total Cost (MMK)
I. Environment				
1.	Substation (Dry Season)	5,521,472	1	5,521,472
2.	Substation (Rainy Season)	682,000	1	682,000
3.	Transmission Line (Dry Season)	5,521,472	1	5,521,472
4.	Transmission Line (Rainy Season)	682,000	1	682,000
	Sub-total (1)			13,007,104
II. Social				
1.	Crop Compensation	208,725	2	417,450
2.	Plant Removal Compensation	7,500	34	225,000
3.	Nursery plant plantation for compensation of plant removal		100	87,000
4.	Stakeholder Meeting	2,523,400	1	2,523,400
5.	Public Consultation Meeting	3,205,400	1	3,205,400
6.	Social Survey	15,686,000	1	15,686,000
	Sub-total (2)			6,545,250
	Total			19,552,354

Note: 1) Land acquisition cost is not included in the above Table 8.4-1.

2) 1 USD= 1364 MMK

Source: IEE Study Team

CHAPTER 9: EMERGENCY RESPONSE PLAN

9.1 Type of Risk Assessment

Following emergency risks are anticipated during the construction, operation and closure phase of a Substation and Transmission Line.

- a) Fire
- b) Explosion
- c) Road Accidents
- d) Medical injury including serious illnesses (heat stroke, heart attack)
- e) Failure & Collapse of Formwork / Building Structure
- f) Failure & Collapse of Heavy Machinery & Equipment
- g) Adverse Weather & Flooding
- h) Electrocutation and electric shock
- i) Gas Poisoning or Oxygen Deficiency While Working in Confined Space
- j) Natural disasters (earthquake, floods, cyclones)

9.2 Institution

Emergency Response Team including Team Leader, Deputy Team Leader, an Incident Coordinator, employees as well as workers shall be established to protect, prevent and prepare for the risks. Emergency Response Team shall prepare Emergency Response Plan to implement the above purposes.

9.3 Responsibilities

9.3.1 Team Leader

The Project Manager shall:

- Review and approve the Emergency Response Plan
- Ensure the plan is effective and drills are conducted
- Notify all incidents to the appropriate regulator within nominated timeframes
- Review all evacuation drill follow-up reports and implement changes as required

9.3.2 Deputy Team Leader

Deputy Team Leader shall:

- Escalate any notification of emergency to the Deputy Warden
- Act as a contact person for persons located within their work area
- Sweep the work areas to ensure all personnel have safely evacuated and report to the Team Leader
- Direct personnel to the evacuation area
- Take role call for personnel in work area and report to the Team Leader
- Liaise with the Team Leader and undertake instructions and duties as directed
- Provide assistance and support at the location of the emergency
- Initiate the incident reporting and investigation process
- Assist in securing the scene for the investigation process
- Participate in drills as required and treat as real life emergency

- Assist in the post-drill meeting

9.3.3 Incident Coordinator

The Assistant shall:

- Assist in reviewing and updating the Emergency Response Plan as required
- Communicate the contents of the plan to all employees and workers on the site as well as visitors during the site induction
- Assist in identifying the evacuating area
- Provide support and assistance during an emergency
- Provide first aid treatment to injured persons

9.3.4 Employees and workers

Employees and workers shall:

- Cease all activities when requested during an emergency event
- Proceed to the designated evacuation area, including during a drill
- Cease non-emergency related radio communication during an emergency
- Respond to all instruction and direction given during an emergency
- Participate in all emergency drills

9.4 Scope

The scope of the Emergency response plan shall include following points.

9.4.1 Protection Priorities

The protection priorities in the event of an emergency include:

1. Safety of People
2. Protection of the Environment
3. The safeguarding of construction/operation of a Substation and Transmission Line

9.4.2 Prevention

The prevention of hazards, accidents, occurrences and emergency situations shall be documented in the substation comprising of the following:

1. Occupational Health and Safety Management Plan
2. Emergency Management Plan

9.4.3 Preparedness

To ensure that the Emergency Response Team is adequately prepared and trained for an occurrences, processes and procedures in place. These include:

- Regular meetings and a minimum of a drill of site emergency processes every three months and procedures, to ensure that each team member understands their role and responsibility.
- Collecting and collating data and documentation to assist them in implementing their role more effectively. For example, contacts, maps, records, reports, etc.
- Identifying and maintaining contact details of possible support personnel or organization that may be of assistance in the event of an emergency.

9.5 Planning for emergencies

Emergency Response Team shall establish and maintain site-specific arrangements using the following guidelines:

- Prepare an Emergency Response Plan and complete the Emergency Contacts lists, along with a Site Plan indicating assembly point at prominent locations around the project site
- Include an effective method of ensuring that site visitors are accounted for
- Include an effective “Emergency Alert” communication system
- Establish and maintain a safe and effective evacuation route and assembly locations
- Include appropriate and adequate firefighting equipment (extinguishers and signage)
- Establish a reliable communications system (mobile phones, etc)
- Appoint a Chief Warden and/or key personnel to take control during an emergency
- Instruct workplace personnel in these procedures and ensure that they are fully aware of them
- Maintain training records of all emergency training
- Maintain an up-to-date daily list(s) of all personnel on the site including visitors
- Conduct regular “Emergency Drills” to ensure the procedures are effective and that all personnel are familiar with them.
- Establish and maintain appropriate first aid resources and training
- Identify local Doctors/Medical Centers
- Identify the local emergency services

9.6 External Emergency Contact Number

The external emergency contact number is shown in below table.

Table 9.6-1 Emergency contact number

No	Emergency Service	Contact Organization	Telephone
1.	Fire Brigade	Emergency	191
		Yangon Central Fire Station	01-252011, 252022
		Kyauktan Fire Station	056-25502
		Thanlyin Fire Station	09-44818-2533
2.	Hospital and Ambulance	Emergency	192
		Thanlyin Hospital	056-21511
		Kyauktan Hospita	
		Yangon General Hospital	01-256112~15, 01-384493~5
		Red Cross	01-383684
		Traffic Police Ambulance	01-500005
		Myanmar International SOS Yangon	01-667879
3.	Police	Yangon Division Police	199 01-254437 245455
		Head of Police force Yangon South District	09-422523722,09-966852229
		Head of Police force Kyauktan Township	09-255841763
		Head of Police force Thanlyin Township	09-5330184
		Thilawa Police Station	191, 192
		Head of Police force Thilawa	09-791659581
		Thanlyin Police Station	191, 192, 056-21504
		4.	Electricity
		Project Manager Office (1), South	01-8011035
		Yangon Electricity Supply Corporation	01-215666

No	Emergency Service	Contact Organization	Telephone
			01-215146 (Call Center)
		Thanlyin Electricity Supply Corporation	09-977275791 (Admin) 09-977275792 (Township Engineer)
		Kyauktan Electricity Supply Corporation	056-25501, 056- 25505 09-977275793 (Admin) 09-977275794 (Township Engineer)

Source: IEE Study Team

9.7 PROCEDURES

9.7.1 Registering of Personnel

The register book shall be maintained by the Deputy Emergency Response Team ensuring all personnel, both workers including contractors and subcontractors and visitors register whenever they in and out of the site office. The Deputy Emergency Response Team shall ensure that this register is taken to the evacuation area and this will be used to conduct the role call.

9.7.2 Emergency Communication

In the event of an emergency, communications shall be via mobile phones. A list of emergency contact numbers is provided in section 9.1 of this Chapter and will be posted on notice boards. The appropriate emergency service shall be notified immediately in the event of an emergency.

9.7.3 Evacuation Area

Evacuation area, where personnel can be assembled in case of emergency, shall be prepared and notified at notice boards. Emergency evacuation area is shown in Figure 9.7-1.



Source: IEE Study Team

Figure 9.7-1 Emergency Evacuation Area of a Substation

9.7.4 First Aid Facilities

First aid facilities as shown in Figure 9.7-2 shall be located in the site office(s) during operation and closure stage in a substation during operation stage. First aid kits shall be easily accessible and left unlocked at all times. First aid kit locations and trained first aiders and contact numbers shall be

displayed on site notice boards. First aid kits shall be kept clean and checked and restocked as necessary on a three-monthly basis.



Source: IEE Study Team

Figure 9.7-2 First Aid Kit during construction

9.7.5 Fire Equipment

Fire-fighting equipment shall be located in every site office(s) during construction, operation and closure stage in a substation as shown in Figure 9.7-3. Fire-fighting equipment shall be easily accessible at all times. Fire-fighting equipment locations and trained fire personnel and contact numbers shall be displayed on site noticeboards. Fire-fighting equipment shall be tested and tagged by a competent person every six months. Used fire extinguishers shall be promptly removed from service and replaced immediately with a full replacement.

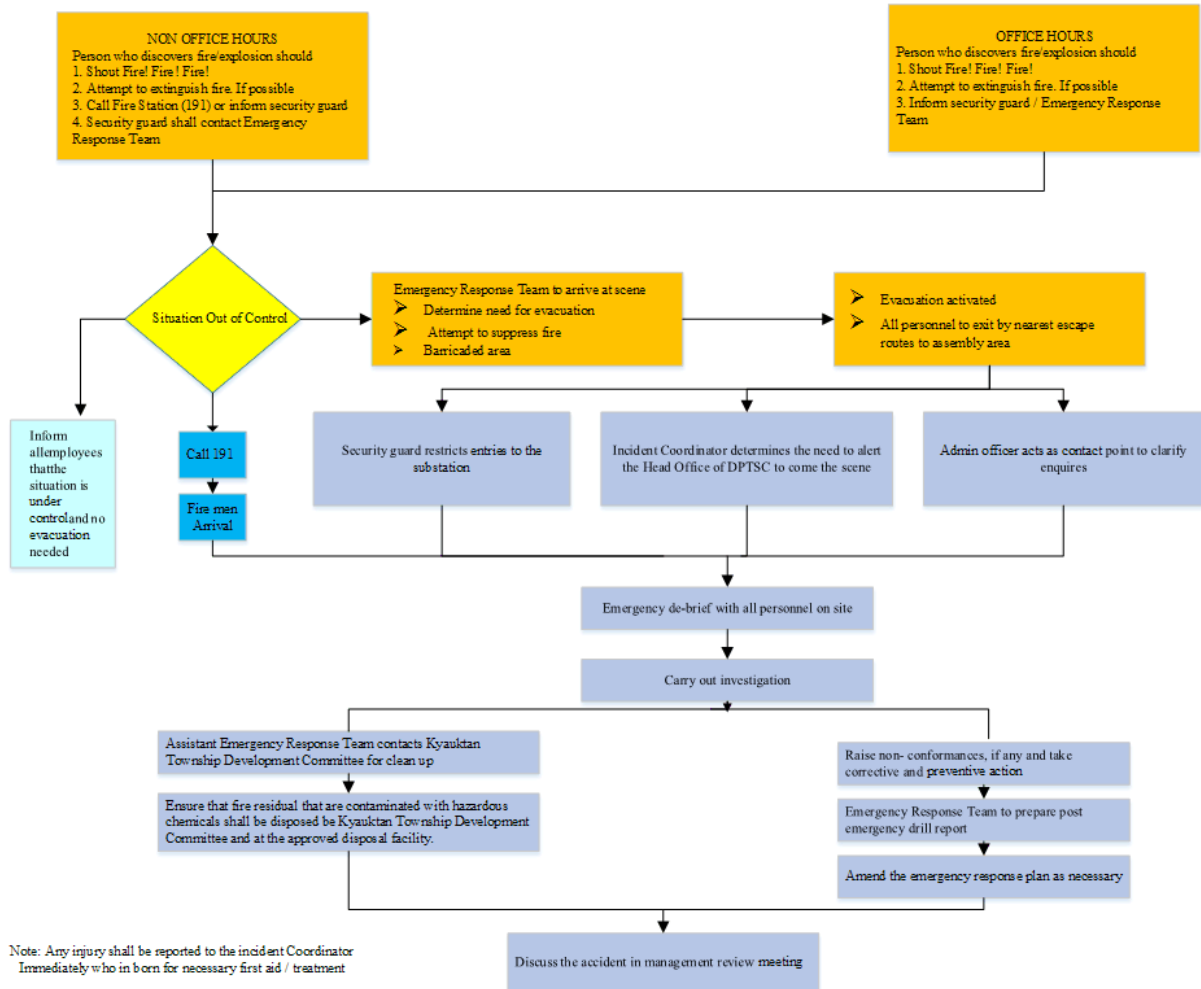


Source: IEE Study Team

Figure 9.7-3 Fire-fighting equipment during construction

9.8 Flow Chart for communication during an emergency

Flow chart for communication during an emergency for each emergency risk such as fire, medical emergency, etc... shall be prepared and posted on notice board. Flow chart for communication during fire is prepared as shown in Figure 9.8-1.



Source: IEE Study Team

Figure 9.8-1 Flow chart for communication during emergency

9.9 Proper usage of herbicides along the Right of Way (ROW)

Environmental impact regarding herbicides usage along the right of way is minimized by the utilization of appropriate equipment and the establishment of buffer zones near sensitive areas. An environmentally responsible approach is facilitated by well-trained applicators, post-application monitoring, and adherence to proper disposal practices, contributing to sustainability and the minimization of harm to the environment. When clearing bushes and shrubs along a transmission line's Right of Way (ROW) using herbicides, the selection of an eco-friendly herbicide, adherence to label instructions, and consideration of factors such as timing and weather are primarily important.

9.9.1 Eco-friendly herbicide

The following factors will be considered to be eco-friendly herbicide:

- Choosing herbicides that are readily biodegradable, meaning they break down into harmless compounds over time, reducing environmental impact.
- Using herbicides with low toxicity to humans, animals, and aquatic life. Look for products that have been classified as low-risk or reduced-risk by regulatory agencies.
- Preferring herbicides with short residual effects, as this reduces the risk of long-term environmental impact and allows for quicker recovery of the ecosystem.
- Choosing herbicides that do not significantly disrupt the soil structure or microbial activity, supporting healthy soil ecosystems

- Ensuring that the selected herbicide is approved by relevant regulatory agencies, indicating that it meets safety and environmental standards.
- Considering herbicides with selective formulations that target specific types of weeds while sparing desirable plants.

9.9.2 Adherence Label Instruction

The following factors will be considered regarding to adherence label instruction:

- Carefully reading the entire herbicide label, including the product name, active ingredients, application rates, and safety precautions.
- Using the recommended application rates specified on the label.
- Ensuring that the herbicide is applied to target weeds specified on the label.
- Storing herbicides securely in accordance with label instructions.
- Well-trained applicators are only allowed for the facilitation of herbicides and post-application monitoring.

9.9.3 Timing and Weather Consideration

The following factors will be considered when the application of herbicides regarding to timing and weather condition:

- Considering the growth stage of the target weeds.
- Choosing a time when weather conditions are favorable for herbicide uptake by plants.
- Refraining from applying herbicides just before or during rainy periods.
- Checking and adhering to wind speed recommendations on the herbicide label.
- Avoiding spraying during temperature inversions.
- Avoiding temperature extremes.

9.10 Prevention of fire hazard along the Right of Way (ROW)

A fire hazard management plan for transmission lines aims to minimize the risk of fires along the lines, protecting nearby communities and the environment. The key components of a fire hazard management plan are vegetation management, line inspections and public awareness, the detail of which are outlined in the following sub-sections. A well-defined emergency response plan outlines the actions to be taken during a risk of fire.

9.10.1 Vegetation Management

The following factors will be applied in vegetation management along ROW:

- Clearing vegetation within the defined clearance zones around the transmission line.
- Using appropriate equipment and methods to ensure effective clearing while minimizing environmental impact.
- Conducting inspections at least annually or as per regulatory requirements.
- Maintaining clear access routes for firefighting equipment and emergency responders.

9.10.2 Transmission Line Inspections

The following points will be done in sections of transmission line:

- Conduct regular inspections of the transmission lines to identify potential fire hazards, including damaged equipment, loose fittings, or any signs of wear and tear.
- Integrating vegetation inspections during line inspections to identify encroachments and potential fire fuel sources.

9.10.3 Public Awareness

Public awareness is one of the important factor for fire prevention along ROW. Therefore, the following points will be considered in raising public awareness:

- Engaging with local communities to raise awareness about the potential fire hazards associated with transmission lines.
- Developing educational programs to inform the public about the importance of fire prevention, proper reporting of hazards, and emergency response procedures.
- Distributing informational materials, such as brochures or pamphlets, detailing fire safety measures related to transmission lines.
- Organizing public meetings to discuss the transmission line project, its fire prevention measures, and address any concerns raised by the community.
- Providing clear and easily accessible emergency contact information for reporting potential fire hazards related to the transmission lines.
- Collaborating with local fire departments and emergency services to enhance public awareness and preparedness for fire incidents.

CHAPTER 10: PUBLIC CONSULTATION

10.1 Outline of Stakeholder Meeting (SHM) and Public Consultation Meeting (PCM)

The outline of the stakeholder meeting, public consultation meeting and negotiation with three numbers of PAPs from May, 2016 to Sep, 2017 is shown in Table 10.1-1. In summary, as of Sep, 2017, the total number of PAPs is two and one PAP received the crop compensation and one PAP agreed for construction of a lattice tower on his land. A series of meeting minutes, participants list, evidence letters and photos are attached in Appendix-5.

Table 10.1-1 Outline of SHM, PCM and Consultation Meetings with PAPs from 2014 to present (Sep, 2017)

No.	Stage	Period	Venue	No. of Participants	Agenda and results
1.	Scoping Stage (SHM)	10:30-11:30, 26 March, 2014	Convention Hall of Housing Department in Thanlyin Township	35	<ul style="list-style-type: none"> ➤ Description of the Project ➤ Dissemination of the EIA outcome ➤ Collection of comments and opinions on the project
2.	Draft EIA Stage (PCM)	9:30 – 10:30, 1 September, 2014	Convention Hall of Housing Department (Land Record Department Branch Office-2)	46	<ul style="list-style-type: none"> ➤ Description of the Project ➤ Explanation of EIA results and EMP ➤ Questions and Answers
3.	First time site survey with related departments and local authorities	8 May, 2016	The project site in Thanlyin Township	15	<ul style="list-style-type: none"> ➤ To specify the location of affected land, affected area and Project Affected Persons (PAPs)
4.	Second time site survey with related departments and local authorities	28 May, 2016	The project site in Thanlyin Township	15	<ul style="list-style-type: none"> ➤ To specify the location of affected land, affected area and Project Affected Persons (PAPs)
5.	Consultation with PAPs	3 June, 2016	Thanlyin Township GAD office	14	<ul style="list-style-type: none"> ➤ To explain about the Project, the affected land, affected area during construction and after construction, the period of construction, etc... ➤ To respond the inquiry from PAPs
6.	Site survey and Consultation with PAPs	6 June, 2016	The project site in Thanlyin Township and Thanlyin Township GAD office	14	<ul style="list-style-type: none"> ➤ Site survey together with PAPs ➤ To show the proposed location of Towers at the site to PAPs ➤ To respond the opinion of PAPs to minimize the area of land loss
7.	SHM	13 June, 2016	Office No. (27), the Ministry of Electricity and Energy in Naypyitaw	11	<ul style="list-style-type: none"> ➤ To inform the result of consultation with PAPs to Stakeholders ➤ To find solution how to solve the issues to meet with the request of PAPs. <p>Result</p> <ul style="list-style-type: none"> ➤ The line route was modified to meet the request of PAPs. See meeting minutes in Appendix-5. ➤ The number of PAP was reduced from four to two.
8.	Consultation with all PAPs	5 July, 2016	Thanlyin Township GAD office	9	<ul style="list-style-type: none"> ➤ To explain about the modified proposed Project, the affected land and to hear the opinion of land owners <p>Result</p> <ul style="list-style-type: none"> ➤ Got agreement from one number of PAP.
9.	Consultation with PAPs who owns Tower No. T-9 (a)	14 July, 2016	Thanlyin Township GAD office	5	<ul style="list-style-type: none"> ➤ To hear the reply from the land owner of Tower No. T-9 (a)
10.	Consultation with PAPs who owns Tower No. T-50	8 Aug, 2016	Thanlyin Township GAD office and the project site in Thanlyin Township	11	<ul style="list-style-type: none"> ➤ To explain about the area of affected land. ➤ To explain about the procedure and amount of crop compensation ➤ To show the affected land at site.

No.	Stage	Period	Venue	No. of Participants	Agenda and results
11.	Consultation with PAPs who owns Tower No. T-9 (a) and T-50	22 Aug, 2016	Thanlyin Township GAD office and the project site in Thanlyin Township	14	<ul style="list-style-type: none"> ➤ To explain about the area of affected land.
12.	SHM	31 Jan, 2017	Office of Thilawa SEZ Management Committee (TSEZMC) in Thilawa	15	<ul style="list-style-type: none"> ➤ To inform all Stakeholders the schedule of construction of 230 kV Transmission Line ➤ To request cooperation from related departments. ➤ To introduce each counterpart from each related department.
13.	Crop Compensation Giving Ceremony	26 April, 2017	Thanlyin Township GAD office	14	<ul style="list-style-type: none"> ➤ To pay crop compensation to three numbers of PAPs ➤ To respond the request of PAPs about the location of towers <p><u>Result</u></p> <ul style="list-style-type: none"> ➤ One PAP received the crop compensation for the rainy season. ➤ Representatives of one PAP attended the ceremony but he did not receive the compensation. ➤ After the ceremony, proposed location of Tower No. T-50 was shown to the representatives of PAPs at the site.
14.	Consultation with one PAP who does not agree	18 May, 2017	The project site of Tower T-50 in Thanlyin Township	8	<ul style="list-style-type: none"> ➤ Site visit together with representatives of PAPs for Tower No. T-50 <p><u>Result</u></p> <ul style="list-style-type: none"> ➤ Based on the result of negotiation with representatives of the owner of Tower No. T-50, the line route was changed to reduce to area of land affected although it costs more. See meeting minutes in Appendix-5. ➤ The number of PAPs was changed from three to two.
15.	Consultation with one PAP who does not agree	21 July, 2017	The project site of Tower T-9 (A) in Thanlyin Township	7	<ul style="list-style-type: none"> ➤ Site visit together with a staff of Ba Yet village tract from GAD for Tower No. T-9 (A) in response to the complaint letter submitted by the land owner of T-9 (A) to oppose the construction of T-9 (A) at the proposed location which belongs to the land owner. The land owner and his representative did not come.
16.	Consultation with one PAP who does not agree	6 Aug, 2017	Thanlyin Township GAD office	7	<ul style="list-style-type: none"> ➤ To point out that the absence of the land owner's cooperation for the Project ➤ To explain the proposed location of T-9 (A) is located under the existing Thanlyin-Kamarnat 230 kV Transmission Line and it does not affect additional land as no building shall exist within the horizontal distance of 50 ft left and right from the center of the 230 kV Transmission Line according to clearance standard set for Electrical Inspection by the Ministry of Industry. ➤ In addition, the construction design and material were confirmed and the construction is to be carried out according to the schedule. <p><u>Result</u></p> <ul style="list-style-type: none"> ➤ Thanlyin GAD reported the actual condition to Yangon South District GAD. It is under negotiation with the land owner.
17	Consultation with one PAP who does not agree	27 Aug, 2017	Yangon South District GAD office	13	<ul style="list-style-type: none"> ➤ Negotiation with the land owner. ➤ The land owner does not agree as the proposed location of the tower is in the middle of his farm land along Dagon-Thilawa road.

No.	Stage	Period	Venue	No. of Participants	Agenda and results
18	Consultation with one PAP who does not agree	29 Aug, 2017	Thanlyin Township GAD office	12	<ul style="list-style-type: none"> ➢ The land owner requested to change the line route. ➢ The project proponent explained to the land owner that the line route is unable to change due to technical reason. <p><u>Result</u></p> <ul style="list-style-type: none"> ➢ The project proponent will report to the Head office of MOEE in Naypyitaw regarding this line route change request and explanation about impossibility of line route change from technical point of view. ➢ The project proponent will negotiate with the land owner to resolve this issue.
19	Consultation with one PAP who does not agree	11 Sep, 2017	Meeting room of Thilawa Gas Turbine	7	<ul style="list-style-type: none"> ➢ DPTSC, the project owner requested land acquisition from the land owner by showing the request letter from DPTSC Head Office.
20	Consultation with one PAP who does not agree	22 Sep, 2017			<ul style="list-style-type: none"> ➢ DPTSC got agreement with the land owner to construct one lattice tower on his land by adjusting the location of this tower.

Source: IEE Study Team

10.2 Summary of general Stakeholder Meeting in 2014

Agenda is as follow.

- Explanation of construction of 230kV Transmission Line from Thanlyin substation to a new Thilawa substation.
- Explanation of location and layout plan of a substation in Thilawa Area.
- Confirmation of EIA necessity and Explanation of scoping result for EIA
- Request by YCDC for management of solid waste from Thilawa SEZ

The opinions and comments from the stakeholder meeting were reflected on the project design as well as in the project procedure. The status of stakeholder meeting is shown in Figure 10.2-1.



Source: IEE Study Team

Figure 10.2-1 Status of Public Consultation Meeting in 2014

10.3 Summary of Public Consultation Meeting in 2014

Agenda is as follow. The status of public consultation meeting is shown in Figure 10.3-1.

- Explanation of proposed transmission line route and location of new Thilawa substation.
- Explanation of EIA results and EMP.



Source: IEE Study Team

Figure 10.3-1 Status of Public Consultation Meeting in 2014

CHAPTER 11: KEY FINDINGS AND CONCLUSION

11.1 Key Findings

As the results of the IEE Study, the following items were founded as key findings.

- 1) The project is the high voltage transmission line with 10 mile (16 km) and 230/33 kV substation in Thilawa.
- 2) The proposed line route was changed in 2016 to reduce the area of land acquisition.
- 3) Before construction, two privates farmlands shall be acquired. However, the impact on land acquisition of 230 kV transmission line and substation development project would be well minimized as 95 % of the line route is planned to construct within the ROW of MOC along Dagon-Thilawa road. Crop compensation for affected land would be compensated properly in accordance with the Farm Land Law and Farm Land Regulations.
- 4) In the construction phase, most of the impacts are temporary and limited within the Project site. As the results of the impact assessment in Chapter 7, the key impacts are occupational health and safety, safety for community, and air quality (dust). In order to manage and mitigate these impacts, it shall be confirmed that the contractor entrusted by the Project proponent will carry out mitigation measures on stipulated in the Environmental Management Plan (EMP).
- 4) In the operation phase, most of the impacts are controlled and limited within the Project site. As the results of the impact assessment in Chapter 7, there are no serious impacts on operation phase. Only measurements for insulating oil, occupational health and safety, community health and safety, emergency response under general operation will be required.
- 5) In the closing phase, impacts related to demolish work are almost same as construction phase. The contractor to be entrusted by the Project proponent will carry out necessary mitigation measures in accordance with the EMP.

11.2 Conclusion

As the results of the conclusion of IEE Study, it was confirmed that the environmental impact assessment (EIA), social impact assessment (SIA), health impact assessment (HIA), and emergency risk assessment (ERA) of the Project are assessed properly as well as establishment of the Environmental Management Plan. Public involvement and comments from public were reflected into the IEE Report. Thus, the IEE study is completed in accordance with requirement of the draft EIA Procedures in Myanmar properly provided that the Project proponent follows EMP accordingly.

CHAPTER 12: COMMENTS FROM MINISTRY OF ENVIRONMENTAL CONSERVATION AND FORESTRY AND ITS CORRESPONDS

12.1 Responses to Comments from MONREC in 2015

MONREC issued a notification (“Notification No. 3(2)/11(D)(6)/(1716/2015)” dated 4 August, 2015) to the MOEE regarding the comments for the draft IEE Report. The Project Proponent finalized IEE report with corresponds to the comments as shown in Table 12-1.

Table 12.1-1 Responses to Comments from MONREC in 2015

No.	Comments from MONREC	Category	Action responded
a)	To give land compensation to four persons, whose land are included in the Right of Way (ROW) of Transmission Tower, for acquiring land and to give crop compensation systematically by establishing a compensation committee according to Land Acquisition Plan, Laws and Rules concerned.	Social	<ul style="list-style-type: none"> ▪ The type of affected land due to the development of the Project is agriculture land. ▪ As of September, 2017, the number of PAPs was changed from four to two as a result of negotiation with land owners and adjustment of the line route in response to request of the land owners. ▪ MOEE, the project proponent is not used to paying land compensation for construction of towers for power transmission and distribution. ⁴ ▪ Crop compensation was provided by establishing a compensation committee according to Farm Land Law (2012) and Farm Land Law (2012) in Myanmar. In doing so, Power Transmission Projects (PTP) (South) in DPTSC plays a leading role in coordination with related departments in Thanlyin Township such as General Administration Department (GAD), Farmland management and Statistic department and the department of Agriculture department and local authorities such as corresponding Village Tract Administrators. ▪ Crop compensation was received by one PAP. ▪ Another PAP agreed to construct a lattice tower on his land as the project proponent adjusted the location of tower in Sep, 2017.
b)	When Stakeholder meeting and Public Consultation meeting were carried out to discuss with stakeholders and local communities, no affected local community is included. As a matter of fact, when Stakeholder or Public Consultation Meeting is carried out in the future, affected local communities shall be included and the result of the meeting and their comments and recommendation shall be reflected in IEE report.	Consultation with PAPs	Please see Appendix-5 for the meeting minutes, participants list and photos of Consultation with PAPs and evidence letters to show the reflection of opinion of PAPs when developing the Project
c)	Regarding Mitigation Measures before construction, during construction, during	EMP	Environmental Management Plan (EMP) before construction, during construction,

⁴ IEE Study Team recommended DPTSC in MOEE to pay land compensation for permanent land acquisition such as construction of towers in the future to meet with Farm Land Rules in Myanmar and the international standard of land acquisition. In this project only crop compensation is paid by MOEE.

No.	Comments from MONREC	Category	Action responded
	operation and closing stage described in Environmental Management Plan to mitigate environmental and social impacts, mitigation measures shall be carried out by complying with IEE report.		operation and closing stage will be carried out in accordance with EMP described in IEE report.
d)	Regarding Environmental Monitoring before construction, during construction, during operation and closing stage described in Environmental Management Plan, Environmental Monitoring shall be carried out by complying with IEE report.	EMoP	Environmental Monitoring Plan (EMoP) before construction, during construction, during operation and closing stage will be carried out in accordance with EMoP described in IEE report. Monthly Environmental Monitoring Report will be submitted to Environmental Conservation Department, Thilawa SEZ Management Committee by the project proponent quarterly.
e)	To calculate and describe planned budget for mitigation measures and environmental monitoring to mitigate environmental and social impacts.	Budget to implement management plan and monitoring plan for environment and social	Please see Table 8.4-1 Cost of Mitigation Measures
f)	To describe technology and instruments to monitor each environmental sector such as water and air regarding environmental monitoring.	Environmental Monitoring	Please see Appendix-6: Instrument for Environmental Monitoring
g)	To include and describe emergency management for unexpected condition due to disaster.	Emergency Response Plan	Please see Chapter 9: Emergency Response Plan
h)	Endorsement by Project Proponent (or) Project Owner to pledge to comply with facts in IEE report	Endorsement Letter by the Project Proponent	Please see an Attached letter of an endorsement signed by the Department of Power Transmission and Control Department (DPTSC) in the Ministry of Electricity and Energy (MOEE), the project owner and the project proponent.
i)	Regarding environmental standard, before National Environmental Standard is enacted by MOECAAF, one suitable international standard shall be selected to comply with and after National Environmental Standard is enacted by MOECAAF, it shall be complied with.	Environment Quality Standard (EQS)	The project will comply with National Environmental Quality Emission Guidelines (NEQEG) which was promulgated in Dec, 2015 in Myanmar.
j)	To submit Environmental Monitoring Report for implementation of the project to MONREC	Environmental Monitoring Report	The project proponent will submit the Monthly Environmental Monitoring Report to MONREC, MOEE and TSEZMC quarterly.
k)	Regarding Occupational Health and Safety and Community Health and Safety, Laws, Rules, Orders, Instructions by the Ministry of Health, the Ministry of Labor and international organizations such as IFC shall be complied with.	Occupational and community Health and Safety	Occupational Health and Safety and Community Health and Safety will be provided in accordance with Occupational Health and Safety (draft, 2017) which was prepared by the Ministry of Labour, Immigration and Population and General EHS Guidelines and EHS Guidelines for Electric Power Transmission and Distribution by IFC.
l)	To negotiate with the Ministry of Construction (MOC) to construct 230 kV Transmission Line from Thanlyin substation to Thilawa substation along the Right of Way (ROW) of the road which may be managed by MOC.	Evidence to show negotiation with MOC	Please see Appendix-7 for Negotiation Letter with MOC for an evidence of negotiation letters between the Ministry of Electricity and Energy (MOEE) and MOC.
m)	To comply with environmental Laws, Rules, Orders, Instructions by MONREC and by other governmental ministries concerned.	Law and regulations related to environmental conservation	When implementing and operating the project, environmental Laws, Rules, Orders, Instruction by MONREC and by other governmental ministries will be abided by.

12.2 Responses to Comments from MONREC in 2023

MONREC issued a notification (“Letter No. EIA-2/9/(IEE) (Report) (5783/2023)”) dated 13 December, 2023) to the MOEE regarding the comments for the draft IEE Report. The Project Proponent finalized IEE report with corresponds to the comments as shown in Table 12.2-1.

Table 12.2-1 Responses to Comments from MONREC in 2023

No.	ECD Comments	Category	Corresponds
1	On the page 17 of summary report, it was mentioned that the environmental monitoring will be conducted once a year, from three years after the project operation.	EMoP	In accordance with the comments, the environmental impacts have been added in Section 8.3 and Table 8.3-3.
2	On the page 16 of summary report, the air quality monitoring should be conducted twice a year, instead of dry season monitoring.	EMoP	In accordance with the comments, Air quality monitoring have been updated in Section 8.3 and Table 8.3-3.
3	In the environmental monitoring plan during project operation, estimated budgets allocated for each environmental component, guidelines to follow, frequency and locations (in Latitude and Longitude) are not described.	EMoP	In accordance with the comments, commitments for the submission of monitoring report have been added in Section 8.3 and Table 8.3-4.
4	A commitment is required to acknowledge that the project proponent, Power Distribution Department, will take responsibility regarding the environmental monitoring plan during project operation.	EMoP	In accordance with the comments, commitments for the submission of monitoring report have been added in Section 8.3.
5	If herbicides were to be used to clear bushes and shrubs along the Right of Way (RoW) of the transmission line, it would be required to include the measures for the proper usage of herbicides to cause no harm to environment and for the prevention of fire hazards along RoW.	Emergency Response Plan	In accordance with the comments, the proper usage of herbicides has been updated in Section 9.9. For the prevention of fire hazards along RoW, it has been added in Section 9.10.
6	It is necessary to amend the submission year 2017, September mentioned on the report cover to the present year of actual submission.	General	In accordance with the comments, the submission year has been updated on the report’s cover.
General			
- To include the following as a supplementary in the			In accordance with the comments, the commitment has been added in Section

<p>commitment presented by the project proponent:</p> <p>“I hereby sign a pledge that the project proponent will comply with the existing laws and regulations of the Union of Myanmar, the laws, regulations and regulations that should be followed in connection with the project, in addition to the Environmental Protection Law and Procedures, EIA Procedures, National Environmental Quality (Emission) Guidelines, as well as the instructions announced from time to time. In the event that the proponent fails to comply, the proponent will be penalized in accordance with the existing rules and regulations.”</p>	<p>1.3.</p>
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*Appendix-1 Certificate for Transitional
Consultant Registration*



REPUBLIC OF THE UNION OF MYANMAR
Ministry of Natural Resources and Environmental Conservation
CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION



(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)

No. 10024

Date 15 Jul 2017

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၅၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို အဖွဲ့အစည်းအား ထုတ်ပေးလိုက်သည်။)

- (a) Name of Organization Myanmar Koei International Limited.
(အဖွဲ့အစည်းအမည်)
- (b) Name of the representative in the organization Mr. Takuji KATAOKA
(အဖွဲ့အစည်းကိုယ်စားလှယ်၏အမည်)
- (c) Citizenship of the representative in the organization Japanese
(အဖွဲ့အစည်းကိုယ်စားလှယ်၏နိုင်ငံသား)
- (d) Identity Card /Passport Number of the representative person in the organization TR1917942
(အဖွဲ့အစည်းကိုယ်စားလှယ်၏ မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)
- (e) Address of organization No. 1A/28 Mya Thidar Housing, Ward 11, South Okkalapa Township, Yangon.
(ဆက်သွယ်ရန်လိပ်စာ) info@myanmar-koei.com , 09 421131892
- (f) Type of Consultancy Organization
(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)
- (g) Duration of validity 31 March 2018
(သက်တမ်းကုန်ဆုံးရက်)

15 Jul 2017

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

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Air Pollution Control
2. Ecology and Biodiversity
3. Facilitation of Meeting
4. Geology and Soil
5. Ground Water and Hydrology
6. Land Use
7. Modeling for Water Quality
8. Noise and Vibration
9. Risk Assessment and Hazard Management
10. Socio-Economy
11. Water Pollution Control
12. Environmental and Social Consideration



REPUBLIC OF THE UNION OF MYANMAR

Ministry of Natural Resources and Environmental Conservation

CERTIFICATE FOR TRANSITIONAL CONSULTANT REGISTRATION

(ကြားကာလအကြံပေးလုပ်ကိုင်သူမှတ်ပုံတင်ခြင်းအထောက်အထားလက်မှတ်)



No. 0012 Date 07 JUL 2017

The Ministry of Natural Resources and Environmental Conservation, hereby, issues this certificate to the organization under Environmental Impact Assessment Procedure, Notification No. 616/2015.

(ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမိန့်ကြော်ငြာစာအမှတ်၊ ၅၁၆/၂၀၁၅ အရ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် ဤအထောက်အထားလက်မှတ်ကို အဖွဲ့အစည်းအား ထုတ်ပေးလိုက်သည်။)

- (a) Name of Organization Nippon Koei Co., Ltd. (Yangon Branch)
(အဖွဲ့အစည်းအမည်)
- (b) Name of the representative in the organization Mr. Tsutomu TAMURA
(အဖွဲ့အစည်းကိုယ်စားလှယ်၏ အမည်)
- (c) Citizenship of the representative in the organization Japanese
(အဖွဲ့အစည်းကိုယ်စားလှယ်၏ နိုင်ငံသား)
- (d) Identity Card /Passport Number of the representative person in the organization TZ 1121972
(အဖွဲ့အစည်းကိုယ်စားလှယ်၏ မှတ်ပုံတင်/ နိုင်ငံကူးလက်မှတ် အမှတ်)
- (e) Address of organization No. 1A/28, Mya Thidar Housing, Ward 11, South Okkalapa Township, Yangon.
(ဆက်သွယ်ရန်လိပ်စာ) nipponkoeiygn@myanmar-koei.com
09250647327
- (f) Type of Consultancy Organization
(အကြံပေးလုပ်ကိုင်မှုအမျိုးအစား)
- (g) Duration of validity 31 March 2018
(သက်တမ်းကုန်ဆုံးရက်)

Handwritten signature in blue ink.

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

Areas of Expertise Permitted
(ခွင့်ပြုသည့် ကျွမ်းကျင်မှုနယ်ပယ်များ)

1. Facilitation of Meeting
2. Geology and Soil
3. Ground water and Hydrology
4. Land Use
5. Modeling for Water Quality
6. Noise and Vibration
7. Risk Assessment and Hazard Management
8. Socio-Economy
9. Water Pollution Control
10. Waste Management

Appendix-2 CVs of Environmental Expert

Curriculum Vitae (CV)

1. Proposed Position:	Team Leader			
2. Name of Firm:	Myanmar Koei International Ltd.			
3. Name of Expert:	Mr. Shunsuke Hieda			
4. Date of Birth:	19 January 1976	Citizenship:	Japanese	
5. Education:	<ul style="list-style-type: none"> • M.S, Engineering Global Architecture, Osaka University, Japan, 2011. • B.S, Naval Architecture and Ocean Engineering, School of Engineering, Osaka University, Japan, 1999. 			
6. Membership in Professional Associations and Publications:	<ul style="list-style-type: none"> • Professional Engineers, Japan (Construction Environment of Civil Engineering, Comprehensive Technical Management), No. 62342, 2007. 			
7. Other trainings:	<ul style="list-style-type: none"> • N/A 			
8. Countries of Work Experience:	Myanmar/ India/ Vietnam/ Indonesia/ Kenya/ Thailand/ China/ Uruguay Brazil/ Cuba/ Japan.			
9. Language Skills (indicate only languages in which you can work):	LANGUAGE	SPEAKING	READING	WRITING
	English	Excellent	Excellent	Excellent
	Japanese	Native	Native	Native
	Indonesian	Good	Good	Good

10. Employment Record:

Period	Employing organization and your title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
July 2016 - Present	Nippon Koei Co., Ltd./ Myanmar Koei International Ltd. Yangon Branch Overseas Consulting Administration <i>Reference:</i> Mr. Kazuhisa IWAMI Managing Director iwami-kz@n-koei.jp	Myanmar	Responsible for studies and engineering on environmental and social fields including ESIA and environmental management projects overseas as well as in Japan.
Apr. 2001 – Jun. 2016	Nippon Koei Co.,Ltd. Environmental Expert Manager of Environmental Science & Engineering Dept, Overseas Consulting Administration	Japan	Responsible for studies and engineering on environmental and social fields including ESIA and environmental management projects overseas as well as in Japan.

11	Reference to Prior Work/ Assignments that Best Illustrates Capability to Handle the Assigned Tasks:
	Name of project or assignment: Project for Improvement of the Capacity of Thilawa SEZ Management Committee, (Phase 1 & 2)
	Year: November 2014 – Date (13 Months)
	Location: Myanmar
	Client: JICA
	Main Project Features: The Thilawa SEZ is a public-private project being undertaken by the governments of Japan and Myanmar. To support this SEZ, JICA has been extending comprehensive assistance that combines

	<p>various ODA schemes, including Private-Sector Investment Finance, ODA Loans, Grant Aid, and Technical Cooperation. In September 2014, JICA started the project to launch the SEZ Management Committee and the One Stop Service Center (OSSC) smoothly and to operate and manage the SEZ effectively. In November 2014, the first investment permit was granted to a Japanese SME. By June 2019, more than 100 companies were granted investment permits and 70 of them commenced commercial operation. Officials from nine government offices concerned are working at the OSSC to streamline the processes of obtaining permits and licenses.</p>
	<p>Position held: Environmental Advisor</p>
	<p>-Activities performed: Responsible for establishment of governmental service for environmental management of investors for Thilawa Special Economic Zone Development. He has been establishing system of environmental management for setting up a business and commencement of commercial operation by an investor in Thilawa Special Economic Zone (TSEZ), the following actions; get approval of Environmental Conservation and Prevention Plan (ECP), conducting EIA. IEE (if required), environmental monitoring, and receiving environmental inspections are requested in the three stages; “Preparatory stage for starting construction”, “Construction stage”, and “regular operation stage”. He has provided OJT to officers in Environment Section of OSSC, who have been dispatched from Environmental Conservation Department (ECD) of MONREC to operate the established environmental management system smoothly. As for EIA studies for some factories in Thilawa SEZ, EIA review is implemented in Thilawa SEZ by inviting Environmental Conservation Department from MONREC, Ministry of Industry, Ministry of Health and Sports, Ministry of Construction, and relevant ministries etc. based on agreement between ECD and Thilawa SEZ Management Committee. He got a know-how about how ECD makes appraisal of EIA reports together with officers of Environmental ECD including approval of EIA Report (and ECC).</p>
	<p>Name of project or assignment: Project for Environmental Baseline Survey necessary for ESIA in East Yangon Area, (Phase 1)</p>
	<p>Year: October 2018 - Date</p>
	<p>Location: Myanmar</p>
	<p>Client: Private</p>
	<p>Main Project Features: Infrastructure development project in Yangon</p>
	<p>Position held: Environmental Advisor</p>
	<p>Activities performed: Responsible fo overall management and technical advice for environmental baseline survey including air, water, noise and vibration, flora and fauna survey in the dry and rainy season.</p>
	<p>Name of project or assignment: EIA Study for Project on Construction of Solid Waste Management Facilities in Thilawa (Special Economic Zone) SEZ Class A Area</p>
	<p>Year: May 2014 – Date (2 Months)</p>
	<p>Location: Myanmar</p>
	<p>Client: Private</p>
	<p>Main Project Features: The Project aims to contribute for self-standing economic development and solid waste management in Myanmar by introducing appropriate solid waste treatment and disposal system, which is in accordance with the international standards, for industrial and business waste discharged inside and outside of Thilawa SEZ. To realize this objective, construction and operation of the Project shall be implemented so as to minimize environmental and social impacts and to guarantee the quality of life of the people in the surrounding area. Before start of the Project, EIA study has been implemented in accordance with draft EIA procedures in Myanmar and Environmental Health and Safety (EHS) Guidelines for solid waste management facilities by International Finance Cooperation including coordination among stakeholders such SEZ Management Committee, Developer of SEZ, Ministry of Environmental Conservation and Forestry, local government authorities.</p>
	<p>Position held: Team Leader</p>
	<p>Activities performed: Responsible for overall project management of the EIA study.</p>
	<p>Name of project or assignment: ADB TA-8786 MYA: Environmental Safeguard Institutional Strengthening (48145-001)</p>
	<p>Year: May. 2017 – Apr. 2019 (0.2 Months)</p>
	<p>Location: Myanmar</p>
	<p>Client: Asian Development Bank (ADB)</p>
	<p>Main Project Features: To assist government officers. who are in charge of EIA review in Ministry of Natural Resources and Environmental Conservation, to review EIA/ IEE/ EMP reports and providing review comments as contents of Environmental Compliance Certificate by the National Consultants Team.</p>

<p>Position held: Senior EIA Review Consultant</p> <p>Activities performed: Responsible for overall project management and supervise of EIA reviewing works by national consultants of the Project. He has implemented i) maintain a roster of the qualified EIA experts available to work under the contract; ii) provide the qualified EIA experts on short notice; iii) provide quality control of the EIA experts work together with ADB TA international team leader. The consultant team assisted review of more than 30 EIA/IEE reports together with ECD officers and organized the technical workshop training on methodology and procedures with technical tools for EIA review.</p>
<p>Name of project or assignment: ESIA Study for Thilawa Special Economic Zone (SEZ) Zone B Development Project</p> <p>Year: August 2015 – June 2016 (1.5 Month)</p> <p>Location: Myanmar</p> <p>Client: Private Developer (Myanmar and Japan Developer)</p> <p>Main Project Features: The project aims to execute ESIA for development of Thilawa SEA (Zone B Area), located at 20km south from Yangon City, where consists of industrial park, residential and commercial area, and logistic area invested by Myanmar and Japan Thilawa Development Ltd. including Myanmar developers, Japanese developers, Myanmar Government and Japanese Government (JICA). This project is national flag project for economic development in Myanmar and many stakeholder including international organizations and NGOs, are interested in the Project.</p> <p>Position held: Technical Advisor</p> <p>Activities performed: Responsible for technical advice related to project management and coordination among client and various stakeholders in Japan and Myanmar and ESIA study. He has been facilitating not only ESIA itself but also coordinating for formulate development/ business plan for each area from the view point of environmental and social aspects to comply General Environmental Health and Safety (EHS) Guidelines by International Finance Cooperation (IFC).</p>
<p>Name of project or assignment: Consulting Service for implementation of EMP and EMOP for Construction and Operation of Solid Waste Management Facilities in Thilawa Special Economic Zone</p> <p>Year: December 2014 – June 2016 (3 months)</p> <p>Location: Myanmar</p> <p>Client: Private Investor (Japanese)</p> <p>Main Project Features: The objective of the consulting services are contribution to smooth starting-up business and its operation of Solid Waste Management Facilities in Thilawa SEZ Zone A through support of establishment of environmental and social management system such as 1) support of coordination with relevant organizations, 2) support of implementation of Environmental Management Plan (EMP), 3) support of establishment of the laboratory and preparation of Standard Operation Procedures (SOPs), and 4) support of organizing community consultation meeting.</p> <p>Position held: Assistance Team Leader/ Water Quality Survey</p> <p>Activities performed: Responsible for overall project management and strengthening establishment of environmental management system for operation of solid waste management facility. He is conducting establishment of sustainable/ continuous improvement system for environmental management to meet Environmental Health and Safety (EHS) Guidelines for solid waste management facilities by International Finance Cooperation (IFC).</p>
<p>Name of project or assignment: EIA Study for Thilawa SEZ Class A Area Development Project</p> <p>Year: Apr. 2013 – Aug. 2013 (2 Months)</p> <p>Location: Myanmar</p> <p>Client: Client</p> <p>Main Project Features: The project aims to execute EIA for development of Thilawa SEA (Class A Area) where consists of industrial zone and commercial area invested by Myanmar and Japan Consortium including Myanmar developers, Japanese developers, Myanmar Government and Japanese Government (JICA). This EIA survey is the first EIA study in Myanmar in accordance with draft Myanmar EIA procedures.</p> <p>Position held: Environment Expert</p> <p>Activities performed: Responsible for overall project management and coordination among client and various stakeholders in Japan and Myanmar. He set target levels of each environmental elements and method of environmental and social impact assessment to control and mitigate impacts from Project because there is no environmental and emission standards in Myanmar. Especially, he set the receiving wastewater quality standard from various factories to treat wastewater by the treatment plant based on various countries standards such as Vietnam, Thailand, Indonesia, Japan.</p>

Name of project or assignment: Consulting Services for Support of Preparation of EIA Procedures and Environmental Management by Myanmar Government
Year: Jan. 2013 – Mar. 2013 (1 Month)
Location: Myanmar
Client: Ministry of Environmental Conservation and Forestry (Myanmar)
Main Project Features: The foundation for environmental conservation in Myanmar was laid down in the Environmental Conservation Law which was enacted in April, 2012. The law is the first environmental related law in Myanmar after March 2011. However, there were urgent necessities for to establish detail as well as practical policies, laws, regulations, rules and standards, as well as institutional arrangements in accordance with the Environmental Conservation Law. Currently, the Environmental Rules, subordinate legislation of the Environmental Conservation Law, is under preparation in the Myanmar Government. In order to ensure enactment of environmental management, the Environmental Conservation Department of Myanmar Government requested Nippon Koei to support establishment of EIA Procedures and Environmental Rules.
Position held: Environmental and Social Impact Assessment Expert
Activities performed: Responsible for reviewing EIA Procedures, and reviewing Environmental Rules. He conducted reviewing draft EIA Procedures and Environmental Rules and lectured examples of actual EIA procedures in Japan, Indonesia, and Vietnam and its lesson and learnt. He also proposed draft framework for possible assistance schemes by ODA based on Environmental Conservation Law of Myanmar.

No.	Project Name, Country	Period	Client/Finance	Types of Service	Position
1.	Environmental Impact Assessment Cooperation Project in Myanmar	Oct. 2017 – March, 2018 (2 months)	Ministry of Environment, Japan	Study and Technical Assistance	Team Leader
2.	Project for Capacity Development in Basic Water Environmental Management and EIA System, Myanmar	May 2015 – June 2018 (10 months)	Japan International Cooperation Agency (JICA)	Technical Assistance	Assistant Team Leader/ Water Quality Survey
3.	Infrastructure Development Project in Thilawa Area Phase II, Myanmar	July 2016 – Date (1 month)	Ministry of Construction of Myanmar/Japan International Cooperation Agency (JICA)	Environmental and Social Consideration	Environmental and Social Expert
4.	Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I), Myanmar	January 2014 – December 2017 (3 months)	Government of Myanmar/ Japanese ODA Loan	Environmental and Social Consideration	Environmental and Social Expert
5.	Preliminary ESIA Study for Port Terminal Development Project in Yangon Region, Myanmar	August 2015 –October 2017 (1 month)	Private	Environmental and Social Consideration	Team Leader
6.	Updating the Strategic Urban Development Plan of the Greater Yangon, Myanmar	August. 2016 – Mar. 2017 (1 month)	Japan International Cooperation Agency (JICA)	Environmental and Social Consideration	Solid Waste Management

No.	Project Name, Country	Period	Client/Finance	Types of Service	Position
7.	Preliminary Environmental and Social Impact Assessment Study for New Hospital Development Project in Yangon	Nov. 2016 – February 2017 (1 months)	Private	Environmental and Social Consideration	Project Manager
8.	Medical Waste Management Survey in Yangon, Myanmar	Nov. 2016 – February 2017 (2 months)	Ministry of Environment, Japan	Study	Team Leader
9.	IEE Study for Project on Construction and Operation of Food Processing Factory in Thilawa Special Economic Zone, Myanmar	December 2014 – June 2015 (1 month)	Private	Environmental and Social Consideration	Team Leader
10.	Preliminary ESHIA Study for IPP Coal Fired Power Project in Thanintharyi Region, Myanmar	December 2014 – June 2015 (1.5 months)	Private	Environmental and Social Consideration	Team Leader
11.	Environmental Due-Diligence Study on Tin Smelting Factory in Yangon Region, Myanmar	September 2014 – March 2015 (1 month)	Private	Environmental and Social Consideration	Team Leader
12.	Environmental Impact Assessment Study on Construction of Coal Fired Plant in Yangon Region, Myanmar	Dec. 2013 – Apr. 2014 (2 months)	Private	Environmental and Social Consideration	Project Manager (Team Leader)
13.	JICA Experts for Preparation of Environmental Social Impact Assessment Frameworks for Category FI Project, India	July 2014 – March 2015 (1.5 months)	Japan International Cooperation Agency (JICA)	Technical Assistance	Environmental Expert
14.	Development of Energy Saving Plan by Simplified Environment Measurement and Promoting an Environmental Education, Vietnam	Sep. 2013 – Dec. 2013 (1.5 months)	Ministry of Foreign Affairs of Japan	Environmental Consideration	Project Manager (including Management of Environmental Survey)
15.	Special Economic Zone (SEZ) Infrastructure Development, Myanmar	Jun. 2013 – Oct. 2013 (3 months)	Japan International Cooperation Agency (JICA)	Environmental and Social Consideration	Social Survey/ Environmental Consideration
16.	The Project on Strengthening Capacity of Water Environmental Management, Vietnam	Mar. 2011 – May 2013 (22.5 months)	Japan International Cooperation Agency (JICA)	Technical Assistance	Deputy Project Manager and Water Pollution Control (including Environmental Survey)
17.	Engineering Consulting Services for Jakarta Mass Rapid Transit System Project, Indonesia	Apr. 2010 – Aug. 2010 (2 months)	Government of Indonesian/ Japanese ODA Loan	Environmental and Social Consideration	Environmental and Social Consideration Expert

No.	Project Name, Country	Period	Client/Finance	Types of Service	Position
18.	Environmental and Social Consideration Scheme and System for Development, Indonesia	Feb. 2010 – May 2010 (1 month)	Japan Bank for International Cooperation (JBIC)	Technical Assistance	Environmental and Social Consideration Expert
19.	The Project on Strengthening Environmental Management Capacity of Local Governments, Indonesia	Jan. 2010 – Aug. 2011 (8 months)	Japan International Cooperation Agency (JICA)	Technical Assistance	Environmental Specialist
20.	Environmental and Social Study on the Olkaria Geothermal Development Project, Kenya	Dec. 2009 – Jan. 2010 (1 month)	Japan International Cooperation Agency (JICA)	Environmental Consideration	Environmental Specialist
21.	The Project on Water Pollution Control and Management of Water Quality in the Santa Lucia River Basin, Uruguay	Apr. 2009 – Mar. 2011 (9 months)	Japan International Cooperation Agency (JICA)	Environmental Consideration	Data Analysis/Evaluation/ GIS (including Environmental Survey)
22.	River Environmental Management on River Basins Project, Vietnam	Jun. 2008 – Sep. 2009 (8 months)	Japan International Cooperation Agency (JICA)	Environmental Consideration	Environmental Specialist
23.	Project for Improvement of Environmental Management Capacity in NAKURU Municipality and the Surrounding Areas, Kenya	July 2007 – July 2009 (7 months)	Japan International Cooperation Agency (JICA)	Environmental Consideration	Environmental Specialist (Water Pollution Mechanism)
24.	Strategic Environment Assessment of River Basin Management Project in the Upper Arakawa Catchments, Japan	Oct. 2007 – Mar. 2008 (2 months)	Ministry of Land, Infrastructure and Transport, Japan	Environmental Consideration	Environmental Specialist (Water Quality)
25.	Countermeasures to Eutrophication Problems in Kakkaku Dam in Saitama Prefecture, Japan	Jan. 2007 – Mar. 2008 (4 months)	Local Government	Environmental Consideration	Environmental Specialist (Water Quality Control)
26.	Kabakawa Dam Project, Kagawa, Japan	2006 (2 months)	Local Government	Environmental Consideration	Environmental Specialist (Water Quality/ Contamination Simulation)
27.	Omoigawa River Development Project in the Upper Tonegawa Catchments, Japan	Dec. 2005 – Mar. 2008 (5 months)	Japan Water Agency	Environmental Consideration	Environmental Expert (Water Quality, Air Pollution, Noise, and Vibration)
28.	Industrial Waste Disposal Site Development Project, Kanagawa, Japan	Aug 2005 – Dec. 2005 (2 months)	Local Government	Environmental and Social Consideration	Evaluation of Industrial Waste Treatment Facilities
29.	Operation of JICA Guidelines for Environmental and Social Considerations under the Development Study, Japan	Mar. 2004 - Sep. 2004 (6 months)	Japan International Cooperation Agency (JICA)	Environmental and Social Consideration	Environmental Specialist (Pollution Control)

No.	Project Name, Country	Period	Client/Finance	Types of Service	Position
30.	The Special Assistance for Project Implementation for Tourism Development Program, Regional Development Program (II), and Social Investment Project, Thailand	2003 - 2004 (10 months)	Japan Bank for International Cooperation Agency (JBIC)	Environmental Consideration	Environmental Specialist (Solid Waste Management/ Carrying Capacity Study)
31.	The Project for Improvement of Solid Waste Management in Xi'an City, China	2002 (4 months)	Japan International Cooperation Agency (JICA)	Environmental Consideration	Environmental Specialist
32.	A Study to Guide Strategies for Japanese Cooperation for Strengthening Environmental Management in the early 21st Century, Cuba	2002 (2 months)	Japan International Cooperation Agency (JICA)	Study	Environmental Specialist (Pollution Control)
33.	Inventory of Environmental Information of Development Countries, Development Countries	2002 (1 month)	Japan International Cooperation Agency (JICA)	Environmental Consideration	Environmental Specialist
34.	Logistic Modernization Project, Brazil	Jan. 2002 – Mar. 2002 (2 months)	Japan International Cooperation Agency (JICA)	Environmental Consideration	Environmental Specialist
35.	Special Assistance for Project Sustainability (I&II) for Greater Nakuru Water Supply Project, Kenya	Jul. 2001 - Jul. 2002 (6 months)	Japan Bank for International Cooperation (JBIC)	Environmental Consideration	Water Pollution Expert (including Environmental Survey)
36.	Environmental Management Center Project, Indonesia	Aug. 2001 – Mar. 2002 (4 months)	Japan International Cooperation Agency (JICA)	Environmental Consideration	Environmental Specialist
37.	M.S., Engineering Global Architecture, Osaka University, Japan	Apr. 1999 – Mar. 2001 (24 months)	-	Research	Researcher

12. Certification:

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe my qualifications, my experiences, and other relevant information about myself.

檜板 俊輔

16/ 11/ 2022

Signature of Personnel

Date (Day/Month/Year)

CURRICULUM VITAE (CV) FOR CONSULTANT EXPERT

Expected Position : **Pollution Control Expert**
Bidder name : Nippon Koei Co., Ltd. (NK)
Expert's name : **Atsushi Minami**
Occupation : Environmental Management Specialist
Date of birth : 19 July 1983
Member of professional organization : Manager for Pollution Control (Water) (Registration No. 05010979, Japan ,2010)
Working process :

Duration	Workplace	Reference information	Position
2021-Present	Nippon Koei Co., Ltd. (NK) International Environment Dept., Consulting Operations	Mr. Yoji Mizuguchi, General Manager E-mail: mizuguchi-yj@n-koei.jp	Environmental Management Expert, Project Manager, Team Leader
2016-2021	Nippon Koei Co., Ltd. / Myanmar Koei International Ltd. General Manager, Yangon Branch Overseas Consulting Administration	Mr. Kazuhisa IWAMI, Managing Director Myanmar Koei International Ltd. E-mail: iwami-kz@n-koei.jp	
2010-2012	Japan International Cooperation Agency	-	Japan Overseas Cooperation Volunteers, Water Analysis Expert
2008-2009	Research and Development Center for New Industry, Osaka Sangyo University	-	Researcher

The tasks expected to be assigned in the procurement:

The tasks expected to be assigned:	Responsible for project management in the Project Team and coordination among client and various stakeholders in Japan and Vietnam including government authorities. Project manager will facilitate ESIA studies incorporating local existing EIA into international ESIA to meet Environmental Health and Safety (EHS) Guidelines for thermal sector by International Finance Cooperation (IFC), Equator Principals (EP), and IFC Performance Standards.
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Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned:

(1) Thilawa 1250MW ESIA/ IEE Advisor

Year: Apr. 2020 to date

Location: Myanmar

Client: Private Company (Myanmar and Japan Developer)

Main project features: [Service: ESIA study] The objective of the project is to implement ESIA/ IEE studies with Environmental and Social Management Plans for 1,250 MW CCGT Power Plant including jetty, LNG terminal, and 500kV transmission line to meet requirement of Myanmar local law and practices, as well as international requirements satisfying IFC and equator principles financial institutions.

Positions held: **Environmental and Social Consideration Expert**

Activities performed: Responsible for overall management of environmental monitoring activities include air quality, wind speed, water quality, and Bathymetric Survey for Thermal & Salinity Plume Modelling, as well as the preparation of environmental monitoring reports.

(2) Technical Support for the Implementation of Environmental Management and Monitoring for Project of Rehabilitation of Tharkeyta Combined Cycle Power Plant

Year: Nov 2018 to Jul. 2019

Location: Myanmar

Client: Private Company

Main project features: [Service: Technical Assistance] The objective of the Project is to support the implementation of environmental management and monitoring in accordance with the Environmental Management Plan (EMP) Report of the Project for the Rehabilitation of the Tharkeyta Combined Cycle (CCGT) Power Plant.

Positions held: **Team Leader**

Activities performed: Main activities include the preparation of environmental management plan and monitoring report and check-up sheet, confirmation of condition for construction work and management, air quality monitoring, gas emission monitoring, water quality monitoring, and noise and vibration monitoring.

(3) Environmental Preparation of EMP Study on Garment Factory in Hlaing Thar Yar Industrial Zone (3)

Year: Jul. 2018 to May 2019

Location: Myanmar

Client: Private Company

Main project features: [Service: Technical Assistance] The objectives of the Project are to prepare EMP report in accordance with Myanmar Environmental Impact Assessment (EIA) Procedures enacted by the Ministry of Natural Resources and Environmental Conservation (MONREC) in 2015.

Positions held: **Environmental Team Leader**

Activities performed: Scope of services include: a) review of Project Outline and Development of EMP Study Framework; b) confirmation of actual environmental management activities in factories; c) preparation of draft EMP Report; d) Public Disclosure (PD) and Public Consultation Meeting (PCM); and e) finalization of EMP Report by reflecting comments from PD and PCM.

(4) Preliminary feasibility Study for Gas to Power

Year: Apr. 2018 to May 2018

Location: Myanmar

Client: Private Company

Main project features: [Service: Feasibility study] The client planned to build 1000 MW power plant in Thilawa port area with utilizing existing transmission line. The government of Myanmar requested not to use Thilawa Port area and existing transmission line for the project. Accordingly, the study is necessary for alternative 1000MW power plant site and new 500kV transmission line route. The critical matter is land acquisition and relocation which is requested to confirm in this study.

Positions held: **Environmental Group Leader (Environment)**

Activities performed: Responsible for overall management of environmental and social survey and regional stakeholders meeting including temple officials and prepare schedule of legal procedures for land acquisition and cost estimation and schedule for relocation of temple.

(5) Initial Environmental Examination (IEE) Study for Industrial Gas Manufacturing Factory in Thilawa

Year: May 2017 to Aug. 2017

Location: Myanmar

Client: Private Company

Main project features: [Service: ESIA Study] The project required actions related to environmental and social impact assessment on construction and operation of piling factory in Thilawa SEZ Zone A in accordance with guidance from Thilawa SEZ Management Committee (TSMC) and the Environmental Impact Assessment (EIA) Procedure (2015) in Myanmar. Based on the particular conditions on Environmental Conservation and Prevention Plan (ECP) prepared by the Project proponent from Environment Section of the One Stop Service Center (OSSC) of TSMC, Initial Environmental Examination (IEE) is necessary to conduct for this Project in accordance with the ECP approved by OSSC of TSEZ.

Positions held: **Project Manager**

Activities performed: Responsible for development of IEE study framework; reviewing environmental management activities in operation of industrial gas manufacturing factory in Vietnam; confirmation of actual environmental management activities in similar factories in Vietnam; assessment of key environmental impacts such as air quality, wastewater discharge, hazardous and chemical usage, occupational health and safety, emergency hazards; summarization of collected data and baseline data and environmental impact evaluation and assessment; preparation of a draft IEE Report; public disclosure and public consultation meeting; finalization of IEE report by reflecting comments from Environment Section of OSSC in TSMC; and Follow-up Activities.

(6) Environmental Impact Assessment for Industrial Area of Zone B on Thilawa Special Economic Zone Development Project in Myanmar

Year: Aug. 2015-to Jun. 2016

Location: Myanmar

Client: Private Company (Myanmar and Japan Developer)

Main project features: [Service: Detailed Design] The project aims to execute ESIA for development of Thilawa SEA (Zone B Area), located at 20km south from Yangon City, where consists of industrial park, residential and commercial area, and logistic area invested by Myanmar and Japan Thilawa Development Ltd. including Myanmar developers, Japanese developers, Myanmar Government and Japanese Government (JICA). This project is national flag project for economic development in Myanmar and many stakeholder including international organizations and NGOs, are interested in the Project.

Positions held: **EIA Expert**

Activities performed: Responsible for implementation of desk survey and field survey for EIA study. He has conducted the secondary data and information collection, environmental baseline survey in rainy and dry season as desk survey and field survey. In addition, he prepared the EIA Report and submitted to Thilwa SEZ Management Committee (TSMC) for their review and approval through the following activities; 1) Implementation of environmental impact assessment, 2) Development of environmental management plan, 3) Preparation of draft EIA report and submission to TSMC, 4) Public consultations meetings and public disclosure, 5) Finalization of EIA report with some modification based on the public's and TSMC's comments on draft EIA report.

(7) Environment and Social Impacts Evaluation for Integrated Agriculture Processing Facilities and Associated Office Buildings at Thilawa Port Plots NO. (20 & 21) & Triangle Land Between Plots 21 & 22, Myanmar

Year: July 2015 to September 2015

Location: Myanmar

Client: Private Company (Singapore and Myanmar Joint Investor)

Main project features: [Service: Feasibility study] The Project aims to establish business in operation of port terminal agriculture processing facilities and associated utility building at Thilawa Port in Yangon Region. The Preliminary ESIA is aimed at evaluating the environmental and social impacts on construction and operation of port terminal and 4 types of factories; 1) edible oil packing plant and an oil tank farm, 2) flour mill plant, 3) fertilizer plant, and 4) warehouses.

Positions held: Team Leader/(ESIA Expert)

Activities performed: Responsible for implementation of desk survey for ESIA study and preparation of preliminary ESIA report. The following contents were studied and described in the ESIA report. 1) Project Description, 2) Project's Environmental, Social and, where relevant, Health Policies and Commitments, legal requirements and institutional arrangements, 3) Summary of Impacts and Mitigation Measures (ex: water purification system and wastewater treatment system, waste management system, emission gas system, system for storage of chemicals), 4) Management and Monitoring Plans by Project phase Pre-Construction, Construction, Operation and Decommissioning, closure and post-closure 5) Emergency Plan, 6) CSR Activities.

(8) Preliminary Study on Environmental and Social Impact Assessment (ESIA) for Gas Fired Plant Development Project, Thanlyin Township, Yangon, Myanmar

Year: Jul. 2015 to Sep. 2015

Location: Myanmar

Client: Private Company r (Myanmar, Thailand and Japan Joint Investors)

Main project features: [Service: Feasibility study] The purpose of the Preliminary Study on ESIA is to set the objectives, define the scope, and establish the overall methodology and schedule in order to develop, review, and approve an ESIA for the construction and operation of a 400 megawatt (MW) gas fired power plant located near the Thanlyin Oil Refinery in Thanlyin Township, Yangon, Myanmar.

Positions held: Assistant Project Manager /Environmental Regulation and Procedures Expert

Activities performed: Responsible for collecting relevant reputational and institutional information i.e. World Bank/ IFC standard and Myanmar law and regulation. The following information will be collected and summarized in the ESIA report. (1) Concerned environmental regulatory agencies, (2) Relevant environmental regulations, (3) Regulations applicable to power station activities in environmental field, (4) Concerned government regulatory agencies, (5) The targeted emission standard/guideline for the Project.

(9) Gurgaon-Bawal Mass Rapid Transit System Project Preparatory Study, India

Year: January, 2015- April 2015

Location: India

Client: Japan International Cooperation Agency (JICA)

Main project features: [Service: Feasibility study] Construct an urban railway system (approx. 108 km in length). The purpose of this study is to implement inspection of project implementation with a Japanese ODA loan, regarding the Gurgaon - Bawal Urban Railway Construction Project, including the purpose, outline, project cost, organization for execution, implementation schedule, method of implementation (procurement, execution of construction work), organization for management, upkeep and control, consideration for the environmental and social.

Positions held: **Natural** Environmental Consideration Expert

Activities performed: This railway project is classified JICA's environmental category A project as per the JICA's Guidelines for Environmental and Social Considerations Guidelines. In this JICA Survey, his responsibilities are providing the technical assistance to counterpart on preparing **Environmental Impact Assessment (EIA) report** and responding to the **environmental review** of JICA's Advisory Committee of Environmental and Social Considerations.

(10) Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I), Myanmar

Year: Dec. 2013 – Dec. 2014

Location: Myanmar

Client: Myanma Electric Power Enterprise, Ministry of Electric Power

Main project features: [Service: Detailed Design, Construction Supervision and Tender Assistance] This Project is to secure the power supply not only to the Thilawa Special Economic Zone but also to the surrounding area including the ports, to improve the investment climate of the Thilawa area. The Scope of the Sub-project comprises are: 1) installation of distribution line, 2) construction of 2x25 MW dual fuel gas turbines (CCGT), 3) construction of 230 kV transmission line and substation, and 4) installation of supply of gas pipeline.

Positions held: Environmental and Social Specialist

Activities performed: Responsible for predicting and evaluating environmental pollution and proposing environmental management and monitoring program for the Japanese Yen-loan project on renovation of a power plant and substations in Yangon region. The environmental and social consideration had to be conducted based on the JICA Guidelines for Environmental and Social Consideration and EIA regulation that was being developed by Ministry of Environmental Conservation and Forestry.

(11) Consulting Service for implementation of EMP and EMOP for Construction and Operation of Solid Waste Management Facilities in Thilawa Special Economic Zone, Myanmar

Year: Dec. 2014 – Jun. 2016

Location: Myanmar

Client: Private Investor (Japanese Investor)

Main project features: [Service: Technical Assistance] The objective of the consulting services are contribution to smooth starting-up business and its operation of Solid Waste Management Facilities in Thilawa SEZ Zone A through support of establishment of environmental and social management system such as 1) support of coordination with relevant organizations, 2) support of implementation of Environmental Management Plan (EMP), 3) support of establishment of the laboratory and preparation of Standard Operation Procedures (SOPs), and 4) support of organizing community consultation meeting.

Positions held: Co-team leader /Environmental laboratory management expert

Activities performed: Responsible for supporting the environmental staff of the Client to implement of Environmental Management Plan (EMP) by the Client themselves for operation of solid waste management facilities in accordance with the EIA report, preparing the Standard Operation Procedures (SOPs) for implementation of EMP, and preparing the Environmental Monitoring Report to be submitted to Government authority. In addition, he supported the environmental staff of the Client to establish the laboratory and its operation, to prepare SOPs for laboratory analysis, and to establishment of Quality Control and Quality Assurance (QA/QC) system.

(12) Expert for Environmental Consideration of Electric Power Sector, Myanmar

Year: Apr. 2014 – Aug. 2014

Location: Myanmar

Client: Japan International Cooperation Agency (JICA)

Main project features: [Service: ESIA Study] The objectives of this Study are for Myanma Electric Power Enterprise (MEPE) to strengthen its capacity on environmental and social considerations and to be able to manage the environment in a proper manner along with related environmental regulations in the country and the JICA Guidelines for Environmental and Social Considerations (April 2010).

Positions held: Environmental Survey/ Workshop Planning Expert

Activities performed: Responsible for predicting and evaluating environmental pollution and proposing environmental management and monitoring program for the Japanese Yen Loan project on renovation of a power plant (CCGT) and substations in Yangon region. The environmental and social consideration had to be conducted based on the JICA Guidelines for Environmental and Social Consideration and EIA regulation that was being developed by Ministry of Environmental Conservation and Forestry.

(13) Study on Organization and Institutions for Public Transport Management Project, Peru

Year: Aug. 2013 – Oct. 2013

Location: Peru

Client: Japan International Cooperation Agency (JICA)

Main project features: [Service: Feasibility study] The Study aimed at collecting and analyzing data and information on status of development, operation and management of urban transport infrastructure in Peru, and required measurement to promote ODA loan projects under PPP scheme with Peru PPP legislation system.

Positions held: Environmental and Social Considerations Expert for Urban Transport

Activities performed: Responsible for confirming required environmental and social consideration measures for public transport sector projects in accordance with Peru environmental legislative system and procedures for application of ODA loans by Japan and other donors.

(14) Feasibility Study on Service for Development of Energy Saving Plan by Simplified Environment Measurement and Promoting an Environmental Education, Vietnam

Year: Sep. 2013 – Mar. 2014

Location: Vietnam

Client: Ministry of Foreign Affairs, Japan (MOFA)

Main project features: [Service: Feasibility study] This project for conducting the energy saving review and countermeasures proposal including air quality management were implemented by simplified gas detector tube. The energy saving method is affordable price and simplified use. By carrying out the energy saving method at each target plant, technical transfer was implemented to counterparts.

Positions held: Capacity Development Expert for Environmental Management

Activities performed: Responsible for reviewing existing energy saving activities and proposing more efficient energy saving measures including air quality management and greenhouse gas emission reduction effectiveness. The project aimed at conducting a feasibility study about the simplified evaluation on efficiency of energy saving activities with gas detector tube, and proposing more efficient energy saving measures, cooperating with Department of Industry and Trade in Da Nang City in Vietnam.

(15) Quang Ninh Provincial Environmental Protection; Environment Planning in Halong Bay to 2020 Vision to 2030, Vietnam**Year:** Aug 2013 – Mar. 2014**Location:** Vietnam**Client:** Socialist Republic of Vietnam Quang Ninh Provincial People's Committee**Main project features:** [Service: Feasibility study] This is an engineering consultant service on preparation of 1) an environmental protection planning for Quang Ninh province to 2020, visions to 2030; 2) an environmental protection planning for Halong Bay to 2020, visions to 2030; and 3) conducting the pre-feasibility of all priority projects for Quang Ninh provincial environmental improvement.**Positions held:** Environmental Monitoring / Coordinator**Activities performed:** Responsible for analyzing current air and water pollution condition of Quang Ninh Province and proposing provincial environmental monitoring network. The Project aimed at preparing; 1) an environmental protection plan for Quang Ninh province to 2020, visions to 2030; 2) an environmental protection plan for Halong Bay to 2020, visions to 2030; and 3) a list of priority projects for Quang Ninh provincial environmental improvement.**(16) Environmental Protection for Sustainable Tourism Development in Halong, Vietnam****Year:** Aug. 2012 – Dec. 2012**Location:** Vietnam**Client:** Japan International Cooperation Agency (JICA)**Main project features:** [Service: Technical Assistance] The objective of the Project was to strengthen an implementation capacity for natural resources and environmental management for sustainable tourism in Halong area toward overall goal of environmental conservation of the Halong Bay. To accomplish the purpose, 1) strengthening of monitoring, inspection, and administrative guidance, 2) implementation of appropriate land use measures with keeping balance between environment and development, 3) strengthening of policy planning for sustainable tourism in Halong area, and 4) activities on environmental education and public relations are planned to be conducted by the counterpart organizations, mainly Department of Natural Resources and Environment (DONRE) of Quang Ninh Province.

Position held: Coordinator / Environmental monitoring and analysis.

Positions held: Coordinator/ Assistant for Environment Monitoring Analyst**Activities performed:** Responsible for technology transfer to counterparts regarding water quality monitoring and laboratory management through a series of training program.**Other projects**

No.	Project Name, Country	Period	Client/Finance	Types of Service	Position
1.	Development of Clean Energy Transition Roadmap towards Carbon Neutral Society in Cambodia	03/2023-date	JICA	Master Plan Study	Environmental and Social Consideration/ Climate Change
2.	Survey on projects related to promotion of renewable energy utilization and energy saving realization projects in remote islands of Fiji	02/2023-date	JICA	Feasibility Study	ODA Project Development/ Environmental and Social Consideration
3.	Feasibility Study on Green Hydrogen Value Chain Development in Kenya	07/2022-02/2023	Ministry of Economy, Trade and Industry (METI)	Feasibility Study	Hydrogen Demand Expert
4.	Detailed Planning Study for Sustainable Management of PM2.5 Prevention and Reduction Measures, Thailand	08/2021-02/2023	JICA	Feasibility Study	Exhaust gas measurement
5.	Data Collection Survey on Promotion of Environmental Compliance in Myanmar (Phase 2)	01/2021-01/2023	JICA	Technical Assistance	Environmental Monitoring 2
6.	Study on Strengthening Air Quality Monitoring in Asia Countries	11/2020-03/2021	Ministry of Environment of Japan (sub-contractor)	Study	Air quality and exhaust gas measurement
7.	The Greater Yangon Water Supply Improvement Project (Phase-2)	06/2018-date (Suspension)	Myanmar Gov.	Detailed Design, and Tender Assistance	Environmental and Social Consideration
8.	Environmental Study for Nyaung U Airport Rehabilitation and Operation	11/2017-01/2018	Myanmar Gov.	Study	Assistant Project Manager
9.	The National Logistics Master Plan Study, Myanmar	07/2016-12/2017	JICA	Master Plan Study	Environmental and Social Consideration Expert
10.	Preparation of Environmental Social Impact Assessment Frameworks for Category FI Project in India	06/2014-03/2015	JICA	Technical Assistance	Indigenous People's Plan
11.	Feasibility Study on Wattay International Port Terminal Expansion Project, Myanmar	09/2013-11/2013	Myanmar Gov.	Feasibility Study	Environmental Monitoring Expert (aircraft noise)

No.	Project Name, Country	Period	Client/Finance	Types of Service	Position
12.	The Project for Capacity Development of Environmental Monitoring in Solomon Island	01/2010-01/2012	JICA	Reserch	Japan Overseas Cooperation Volunteers "Water analysis"

Education M.Sc. in Human Environment, Graduate School of Human Environment, Osaka Sangyo University, Japan 2008
B.Sc. in Urban Environment Department of Human Environment Faculty, Osaka Sangyo University, Japan 2006

Other training : None

Languages	Speaking	Reading	Writing
Japanese	Native	Native	Native
English:	Excellent	Excellent	Excellent

I declare to the best of my knowledge that all the above particulars are correct, if false or untrue, I shall take responsibility before the law.

Hanoi, 15th Sept. 2023

南 淳志

Atsushi Minami /Project Manager
(to be signed)

Curriculum Vitae (CV) of Expert

1. General:

Position Title and No.: Social Environment Expert -1
Name of Key Expert: Mayumi GOTO
Name of the Firm proposing the Key Expert: Nippon Koei Co., Ltd.
Date of Birth: 27 February 1967
Nationality: Japanese
Country of Citizenship/Residence: Japan

2. Education:

- M.Sc., Environmental Sciences and Policy, Central European University, Hungary & Manchester University, U.K. (Joint Degree), 1997
 - M.A., History, City University of New York, U.S.A., 1992
 - B.A., History, Aichigakuin University, Japan, 1989
-

3. Employment Record relevant to the assignment:

<16 years professional experience since 1997>

<i>Period</i>	<i>Employing organization and your title/ position</i>	<i>Country</i>	<i>Summary of activities performed relevant to the Assignment:</i>
2010 – Present	Nippon Koei Co., Ltd. Environmental Expert, Environmental Science & Engineering Dept.	Japan	Responsible for studies on environmental and social fields including EIA and environmental management projects overseas as well as in Japan.
Contact information for reference: Norihiko INOUE, General Manager of Environmental Science & Engineering Dept. int.e@gx.n-koei.co.jp			
2007 – 2010	Individual Consultant Environmental and Social Consideration Expert	Japan	Responsible for studies on environmental and social fields including EIA and environmental management projects overseas as well as in Japan.
2006 – 2007	School Environment Network Program Officer, Environmental Education Department	Kenya	Responsible for managing the activities in environmental awareness raising, especially to plan and implement varieties of environmental education programs provided to local primary and secondary schools.
2003 – 2005	Subtropical Agriculture Research Institute, Tokyo Agriculture University Research Associate	Japan	Responsible for studying the adaptability of more than 50 different plants to the local soil in Miyako island in order to introduce environmentally low- impact agriculture where the conventional farming is highly dependent on chemical fertilizer.
1997 – 2000	Regional Environmental Center for Central and Eastern Europe Consultant/ Project Manager	Hungary	Responsible for conducting a study to analyze the effectiveness of the policy of Hungary in comparison to EU standards under the circumstances of the on-going EU Integration and compiling a report

4. Membership in Professional Associations and Publications:

-

5. Language Skills:	English	<i>Speaking</i> excellent	<i>Reading</i> excellent	<i>Writing</i> excellent
	French	good	good	good
	Japanese	native	native	native

6. Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks:

<i>No.</i>	<i>Title</i>	<i>Client</i>	<i>Poisson</i>	<i>Period</i>
1	Strengthening of Implementation Capacity for Transmission Line and Substation, Myanmar	JICA (Japan International Cooperation Agency)	Environmental and Social Considerations Expert	July 2014 to 2013 to March 2014 (1.1 month)
2	Danhin Hydropower Expansion Project, Vietnam	JICA (Japan International Cooperation Agency)	Environmental and Social Considerations Expert	November 2013 to January 2014 (3 months)
3	Preparatory Survey for the Terminal Expansion Project of Wathay International Airport, Lao PDR	JICA (Japan International Cooperation Agency)	Environmental and Social Considerations Expert	February 2013 to June 2013 (2 months)
4	Southern Region Power System Development Project (Pakbo-Saravan), Lao PDR	Electricite du Laos	Social Environment Expert	March 2013 to April 2013 (1 month)
5	Habarana – Veyangoda Transmission Line Project, Sri Lanka	Ceylon Electricity Board	Social Environment Expert	January 2013 to February 2013 (1 month)
6	Study on Power Extension Project in Vietnam (Environmental and Social Considerations), Vietnam	JICA (Japan International Cooperation Agency)	Environmental and Social Consideration Expert	October 2012 to December 2012 (2 months)
7	Preparatory Survey on Nam Ngun 1 Hydropower Station Expansion, Lao PDR	JICA (Japan International Cooperation Agency)	Environmental and Social Consideration Expert	July 2012 to August 2012 (2 months)
8	Study on Power Supply and Demand in Central Region, Lao PDR	JICA (Japan International Cooperation Agency)	Environmental and Social Consideration Expert	May 2012 to July 2012 (2.5 months)
9	Environmental and Social Assessment for Rural Electrification (REP) Phase 1 Projects, Lao PDR	Government of Lao PDR/World Bank	Safeguard Specialist	Nov 2011 to Dec 2011 (1 month)
10	Preparatory Survey on Dedicated Freight Corridor Project (Phase 2) (II), India	JICA (Japan International Cooperation Agency)	Social Consideration Expert	March 2011 to October 2011 (5 months)
11	Preparatory Survey on the Makassar Water Supply Development Project (Stage II), Indonesia	JICA (Japan International Cooperation Agency)	Environmental and Social Consideration Expert	January 2011 to July 2011 (3.5 months)
12	The Second My Thuan Bridge Construction Project, Vietnam	Ministry of Trade, Economy and Industry, Japan	Environmental and Social Consideration Expert	August 2010 to December 2010 (2.5 months)
13	Hydropower Project, Lao PDR	Private Firm	Safeguard Specialist	May 2010 (1 month)
14	Feasibility Study on Industrial Zone Development (Special Economic Zone), Lao PDR	JICA (Japan International Cooperation Agency)	Social Assessment and Resettlement Expert	June 2009 to April 2010 (4.3 months)
15	The Study on Power Network System Plan and Initial Environmental Examination (IEE) for the Pakbo – Saravan 115 kV Transmission Line Project, Lao PDR	JICA (Japan International Cooperation Agency)	Environmental and Social Consideration Expert	November 2008 to October 2009 (5 months)

End of document

Curriculum Vitae (CV) for Key Expert

1. General:

Position Title and No.: Social Environment Expert - 2
Name of Key Expert: Junko MASAKI (Ms.)
Name of the Firm proposing the Key Expert: Nippon Koei Co., Ltd.
Date of Birth: 13 July 1975
Nationality: Japanese
Country of Citizenship/Residence: Japan

2. Education:

- MSc Environmental Science, Graduate School of Environmental Science Engineering, Tsukuba University 2001
 - BSc Biological Resources Engineering, Tsukuba University 1998
-

3. Employment Record relevant to the assignment:

<15 years professional experience since 2000>

<i>Period</i>	<i>Employing organization and your title/ position</i>	<i>Country</i>	<i>Summary of activities performed relevant to the Assignment:</i>
2000 - Present	Nippon Koei Co., Ltd. Environmental Expert, Environmental Science & Engineering Dept.	Japan	Responsible for studies on environmental and social fields including EIA and environmental management projects overseas as well as in Japan.

Contact information for reference: Norihiko Inoue, General Manager of Environmental Science & Engineering Dept. int.e@gx.n-koei.co.jp

4. Membership in Professional Associations and Publications:

- Professional Engineer, Construction Environment of Civil Engineering (Registration No.67397, Japan ,2009)
-

5. Language Skills:

	<i>Speaking</i>	<i>Reading</i>	<i>Writing</i>
English	excellent	excellent	excellent
Japanese	native	native	native

6. Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks:

<i>No.</i>	<i>Title</i>	<i>Client</i>	<i>Poisson</i>	<i>Period</i>
1	Sub-Project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (PHASE-1)	Myanmar Government (Ministry of Electric Power. Myanmar Electric Power Enterprise)	Social Environment Expert	January 2013 to date (1 month)
2	EIA Study for Construction of Coal Fired Plant in Yangon Region	Myanmar Private Developer	EIA expert	September 2013 to date (1 months)
3	EIA Study for Thilawa Special Economic Zone (SEZ) Class A Development Project	Myanmar and Japanese Private Developer	Natural and Social Expert	February 2013 to November 2013(3 months)
4	Preparatory Study on Thilawa Special Economic Zone (SEZ) Infrastructure Development in the Republic of the Union of Myanmar	JICA (Japan International Cooperation Agency)	EIA expert	April 2013 to October 2013(3 months)

<i>No.</i>	<i>Title</i>	<i>Client</i>	<i>Poisson</i>	<i>Period</i>
5	Preparatory Survey on the Greater Kampala Roads Improvement Project in the Republic Uganda	JICA (Japan International Cooperation Agency)	Environmental and Social Consideration Expert	March 2013 to date(interrupted, 5.5 months)
6	The Development of the National Water Master Plan 2030 (Phase I and Phase II) in India	JICA (Japan International Cooperation Agency)	Environmental Management Expert/SEA Expert	Feb 2010 to November 2013 (interrupted, 5 months)
7	Preparatory Survey for Dedicated Freight Corridor (Phase 2) (II)	JICA (Japan International Cooperation Agency)	Social Consideration Expert	August 2010 to December 2011(interrupted, 3 months)
8	Preparatory Survey for Flood Risk Management and Climate Change Adaptation in South Western Sri Lanka	JICA (Japan International Cooperation Agency)	Environmental Impact Analysis	Feb 2010 to March 2011 (interrupted, 5 months)
9	Engineering Consulting Service for Jakarta Mass Rapid Transit System Project in Indonesia	Government of Indonesia	EIA Expert	April 2010 to October 2010 (interrupted, 1 months)
10	Preparatory Survey on Reconstruction of RUSUMO Bridge and OSBP Facilities in Rwanda and Tanzania	JBIC (Japan Bank International Cooperation)	Environmental and Social Consideration Expert	Nov 2009 to August 2010 (interrupted, 1 months)
11	Basin-Wide Basic Irrigation and Drainage Master Plan Study in the Kingdom of Cambodia	JICA (Japan International Cooperation Agency)	Environmental and Social Consideration Expert	June 2009 to Jan 2010 (interrupted, 1 month)
12	Preparatory Survey for Renewable Energy Promotion Program in Central and South America	JICA (Japan International Cooperation Agency)	Environmental and Social Consideration Expert	July 2009 to July 2010 (interrupted, 3 months)
13	The Survey on Environmental Assessment of East Kyushu Superhighway project in Oita prefecture, JAPAN	Ministry of Land, Infrastructure and Transport, Japan	EIA Expert	September 2008 to March 2009 (interrupted, 7 months)

End of document

Curriculum Vitae (CV)

1. Proposed Position:	Manager of IEE Study			
2. Name of Firm:	Myanmar Koei International Ltd.			
3. Name of Expert:	Wah Wah Han Su Yin (Mrs)			
4. Date of Birth:	22 September 1976	Citizenship:	Myanmar	
5. Education:				
<ul style="list-style-type: none"> • M.E (Environmental Science and Civil Engineering) [Saitama University, Japan] (2006-2008) • B.E (Civil) [Yangon Technological University] (1995-2002), • Post Graduated Diploma in Remote Sensing (RS) and Geographic Information System (GIS) [Yangon University] (2017) 				
6. Membership in Professional Associations and Publications:	<ul style="list-style-type: none"> • Senior Member (Myanmar Engineering Society) • Effect of water level fluctuation on radial oxygen loss (ROL) of Typha Orientalis in a vertical flow wetland mesocosms. In the Ninth International Summer Symposium, International Activities Committee Japan Society of Civil Engineers, page 295-298. • Effect of water level fluctuation on radial oxygen loss, root porosity and nitrogen removal in subsurface vertical flow wetland mesocosms. Ecological Engineering, Vol: 35 (3): page 410-417. 			
7. Other trainings:	• N/A			
8. Countries of Work Experience:	Myanmar/ Japan			
9. Language Skills (indicate only languages in which you can work):	LANGUAGE	SPEAKING	READING	WRITING
	English	Excellent	Excellent	Excellent
	Japanese	Good	Good	Good
	Myanmar	Native	Native	Native

10. Employment Record:

Period	Employing organization and your title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
Jan, 2013– Present	Myanmar Koei International Ltd Social Specialist/ Acting General Manager <i>Reference;</i> Mr. Kazuhisa IWAMI Managing Director iwami-kz@n-koei.jp	Myanmar	Responsible for conducting risks assessment and hazard management, social impact assessment, surface water and ground water monitoring and evaluation on action plan to mitigate social impacts due to infrastructure and community development projects according to international guidelines. Other responsibilities include examining environmental and social related national and international policy, performance standards and good practice, stakeholder engagement, capacity development training in terms of social consideration, quality control of the social consideration project outcomes and monitoring on the progress of project implementation.
Apr. 2008– Dec. 2012	Umeda Kogyo Co., Ltd. Software Developer	Japan	Responsible to develop software for factory production by using Magic Unipass Tools.
Apr. 2005– Mar. 2008	Research at Saitama University Research and Master Student	Japan	Wastewater purification by using a wetland plant called Typha Orientalis.
Jan. 2002– Mar. 2002	A1 Construction Co., Ltd. Civil Engineer	Myanmar	Responsible for drawing and quantity surveying of a building and supervising at construction site.

11	Reference to Prior Work/ Assignments that Best Illustrates Capability to Handle the Assigned Tasks:
	<p>Name of project or assignment: Professional Services for Provision of Technical Assistance to Projects for Social and Environment Standards (SES) Screening, Assessment, Management Plan and Framework</p> <p>Year: December, 2023- July, 2024</p> <p>Location: Myanmar</p> <p>Client: Nippon Koei Co., Ltd.</p> <p>Main Project Feature: The Project consists of response, recovery and resilience projects. The Project requires the consultant to prepare environmental and social management framework and environmental and social management plans according to its UN SES.</p> <p>Position held: Social Expert</p> <p>Activities performed: Responsible for the following tasks</p> <ul style="list-style-type: none"> • Environmental and social risks assessment • Hazardous management plan • Coordination with the Client • Stakeholder Engagement Plan • Grievance Redress Mechanism • Gender Action Plan • Disaster Management Plan
	<p>Name of project or assignment: Multilateral Investment Guarantee Agency (MIGA) consulting service for the fulfillment of the collateral condition in Korea-Myanmar Industrial Complex (KMIC) Project</p> <p>Year: October, 2022- October, 2024</p> <p>Location: Myanmar</p> <p>Client: Private</p> <p>Main Project Feature: The Project consists of development, financing, construction, and operation of KMIC located in Nyaung Hnit Pin, 25km north from the Yangon International Airport. The Project will be developed by a joint venture of LH, Global Sae-A Co., Ltd and Ministry of Construction, which is a representative of the Government of Myanmar. The Project will provide industrial land with quality infrastructure, including reliable electricity and water supply, wastewater management, and residential facilities. MIGA issued a guarantee to LH covering its equity investment to the Korea-Myanmar Industrial Complex Development Co., Ltd (KDC). The MIGA guarantees provide protection to LH against the risks of Currency Inconvertibility and Transfer Restriction, War and Civil Disturbance and Breach of Contract.</p> <p>Position held: Social Expert</p> <p>Activities performed: Responsible for the following tasks:</p> <ul style="list-style-type: none"> • environmental and social risks assessment • hazardous management • stakeholder engagement plan, grievance mechanism, local employment plan, worker’s code of conduct, in Construction Environmental and Social Management Plan and Operational Environmental and Social Management Plan • monitoring program on industrial tenants according to environmental and social management systems (ESMS) in line with International Finance Corporation (IFC)’s Performance Standards, • a gap assessment in relation to Myanmar regulations and IFC’s Performance Standard 2: Labor and Working Condition) requirements • supplemental action plan for ten (10) relocated households regarding resettlement in compliance with Performance Standard 5: Land Acquisition and Involuntary Resettlement and • monitoring and evaluation on ten (10) relocated households based on the supplemental action plan on resettlement and income restoration
	<p>Name of project or assignment: Climate Risk Assessment and Climate and Disaster Resilience Guidance for Climate resilient WASH services for states/regions in Myanmar</p> <p>Year: December, 2021- December, 2022</p> <p>Location: Myanmar</p> <p>Client: UN Organization</p> <p>Main Project Feature: The climate change impact assessment on Water, Sanitation and Hygiene (WASH) sector by using the secondary data and by collecting primary data through online meeting with related</p>

	<p>stakeholders and local community. Climate change projection until 2100 is conducted by using climate change model data and climate change trend is studied by using observed weather station data in Myanmar. Validation questionnaires are used to score hazards, exposure and vulnerability on WASH sectors with related stakeholders to calculate climate risks of each hazards such as cyclone, storm surge, flood, drought, landslide and earthquake. One township from agro-ecological zone is studied for climate risks. Preparing a compendium of mitigation measures for greenhouse gas (GHG) emission and adaptation measures options as well as costing mitigation measures and adaptation plans related to WASH on prioritized risks. Preparation of Technical Guidance on climate risk assessment of WASH systems and making climate resilient WASH shift is the final output.</p> <p>Position held: National Consultant Counterpart</p> <p>Activities performed: Responsible for</p> <ul style="list-style-type: none"> • Communicating with external and internal stakeholders • Project management • Meetings arrangement • Leading the meetings • Interview arrangement by using questionnaires through online • Data Analysis by using SPSS (Statistical Analysis Software) • Myanmar language translation quality control
	<p>Name of project or assignment: Social Impact Assessment in EIA Study and Stakeholder Engagement Plan for Smart and Eco City Development in Yangon Region</p> <p>Year: December, 2019 – present</p> <p>Location: Myanmar</p> <p>Client: Private</p> <p>Main Project Features: Development of the first sustainable Smart and Eco in Yangon, Myanmar by a private international organization in collaborating with the Department of Urban and Housing Development (DUHD), Ministry of Construction (MOC). The Government of Myanmar (GoM) leases the land to the developer for 50 years.</p> <p>Position held: Social Expert</p> <p>Activities performed: Responsible for the following tasks:</p> <ul style="list-style-type: none"> • Environmental and social risks assessment • Hazardous management plan • Collection of social baseline data • Social impact assessment as a part of EIA study and guidance to reduce social risk and to promote social management in particular • Stakeholder Engagement Plan • Grievance Redress Mechanism (GRM) process • Rollout of GRM • GRM Database establishment • Technical assistance in social consideration
	<p>Name of project or assignment: Technical Assistance and Guidance on social risks management to the Ministry of Construction (MoC), Myanmar</p> <p>Year: December, 2019 – May, 2021 (intermittent)</p> <p>Location: Myanmar</p> <p>Client: International Finance Corporation (IFC)</p> <p>Main Project Features: Yangon Elevated Expressway, Public Private Partnership (PPP) Project, sponsored by the MoC, is a 47.5 kilometer long elevated four-lane expressway in Yangon. The MoC, in coordinating with the Yangon Regional Government, is implementing the expressway in phases and is currently in the process of implementing Phase 1, (27.5 kilometer) the Eastern and East-West (North) sections of the inner ring road. As an elevated expressway, the YEX project is planned to be implemented primarily on a viaduct constructed in the middle of the road.</p> <p>Position held: Social Risk Management Consultant</p>

<p>Activities performed: Responsible for the following tasks:</p> <ul style="list-style-type: none"> - Providing technical assistance and guidance to the MoC for social risk management in consistent with IFC’s Performance Standards on Environmental and Social Sustainability (the “IFC PS”) - Questionnaires preparation for detailed measurement survey and socio-economic survey - Assist MoC to collect socio-economic census data as baseline data and conduct data analysis - Inventory of assets - Analysis of collected data - Preparation of Resettlement Action Plan (RAP) including entitlement matrix - Preparation of Livelihood restoration process (LRP) - Preparation of Stakeholder Engagement plan - Preparation of Grievance Redress Mechanism (GRM) process - Technical assistance to personnel
<p>Name of project or assignment: Land Acquisition and Livelihood Restoration Plan for Wind Power Projects in Magway Region</p> <p>Year: August, 2019 – December, 2019</p> <p>Location: Myanmar</p> <p>Client: Private</p> <p>Main Project Features: A wind power project with 113 MW capacity is planned to develop in Minhla Township in Magway Region. It is in advanced planning stage and land acquisition process starting from public consultation/stakeholder engagement, rollout of Grievance Redress Mechanism (GRM), Detail Measurement Survey (DMS) led by governmental departments, inventory of assets, socio-economic census, etc... have been implemented according to ADB and IFC standard.</p> <p>Position held: Land Acquisition and Livelihood Restoration Expert (Regional engineer)</p> <p>Activities performed: Responsible for:</p> <ul style="list-style-type: none"> - Questionnaires preparation according to ADB safeguard - Assisting DMS led by governmental departments, to conduct inventory of assets, socio-economic census and market valuation, to prepare land acquisition plan and livelihood restoration plan and to update an existing Grievance Redress Mechanism (GRM) and stakeholder engagement activities.
<p>Name of project or assignment: Socio-Economic Survey of Deedoke Hydropower Project in Mandalay Region</p> <p>Year: July, 2019 – Dec, 2019 (intermittent)</p> <p>Location: Myanmar</p> <p>Client: Private</p> <p>Main Project Features: A hydropower project with 60 MW capacity is planned to develop on the Myitinge River in Mandalay Region by developers including the Ministry of Electricity and Energy (MOEE), Andritz of Austria, Kansai of Japan and High Tech Construction Trust. It is in advanced planning stage and land acquisition process starting from public consultation/stakeholder engagement, rollout of Grievance Redress Mechanism (GRM), Detail Measurement Survey (DMS) led by governmental departments, cut-off date announcement to socio-economic survey have been implemented according to the international practice.</p> <p>Position held: Team Leader</p> <p>Activities performed: Responsible for:</p> <ul style="list-style-type: none"> - Preparation of questionnaires for socio-economic census as baseline - Conducting socio-economic census to project affected persons who have potential to be impacted by the project physically or economically before the construction of the project as a baseline data. In addition, socio-economic survey to a control group, who are not affected by the project but stay at places which has similar characteristic with the project affected area, has been also conducted. The purpose of socio-economic information to the control group is to identify that the changes are due to the project or other overall factors in Myanmar such as economy, disaster, etc... Socio-Economic status of project affected persons will be monitored throughout the project period. Supervisors of the survey were trained by an international expert of the project and enumerators were trained by the supervisors. Practical socio-economic survey was also conducted to people who are not affected by the project as a practice of enumerators. Supervisors checked survey forms filled by his/her related enumerators for quality control.
<p>Name of project or assignment: Preparation of Resettlement Framework for Yangon Elevated Expressway PPP Project</p> <p>Year: March, 2019 – May, 2019 (intermittent)</p>

<p>Location: Myanmar</p> <p>Client: International Finance Corporation (IFC)</p> <p>Main Project Features: The current rapid urbanization and motorization put more and more pressure on the existing transport infrastructure in Yangon City and its surrounding areas. GoM through MoC would like to implement phase I including eastern wing (up to 19 km length) plus east-west link (5.5 km) with 27 km length and four lanes, north-south elevated expressway toll road in Yangon with development of Public Private Partnership (PPP).</p> <p>Position held: Social Expert</p> <p>Activities performed: Responsible for: Assisting the Ministry of Construction (MOC) in preparation of resettlement framework to clarify the extent and range of land acquisition, resettlement principles, entitlement matrix, compensation principles, grievance processes and organizational arrangements for resettlement action plan (RAP).</p>
<p>Name of project or assignment: Income Restoration Program (IRP) in Thilawa Special Economic Zone (SEZ) Phase (II)</p> <p>Year: Nov 2017 – Sep, 2019 (4.3 months)</p> <p>Location: Myanmar</p> <p>Client: Japan International Cooperation Agency (JICA)</p> <p>Main Project Features: The first international SEZ has been developed in Thilawa area at the outlying area of Yangon since 2013 and resettlement is necessary due to the development of Thilawa SEZ Zone A and Zone B. Resettlement for Zone A and Zone B were carried out in 2013 and 2017 respectively. The Project gives assistance to relocated people in Zone A and Zone B to improve their livelihood and standards of living, or at least to restore their livelihood to the condition before they are displaced; activities include 1) Support for economic condition by using various methods such as providing job matching, and providing vocational trainings so that they can work as skilled labours in and around Thilawa SEZ and they can engage in small businesses, 2) Support for Social welfare and education Condition by using Vulnerable peoples program and by supporting when applying National Registration Card, 3) Support for Environmental, Security and Living Condition by making improvement in infrastructure such as road, electricity supply and water supply (water supply system was installed) in their relocation places to be convenient, and 4) Maintaining the security of relocation site by securing the ownership of land property. In addition, the Project gives assistance to GoM for implementation of IRP activities mentioned above and assistance to affected community such as assurance of remedy, assurance of stakeholder engagement and management of socio-economic impact.</p> <p>Position held: Technical Support for Designing and Implementing Monitoring Survey</p> <p>Activities performed: Responsible for: - Supporting GoM for preparation and implementation of Complaint/Grievance Management Procedure and Stakeholder Engagement Plan, monitoring and evaluation program for implementation of vulnerable people action plan and IRP in Thilawa SEZ. Other tasks consist of providing training to responsible staff in GoM to implement social performance, community/stakeholder engagement and public relations, to manage grievance and inquiry, to monitor socio-economic impact on affected people, vulnerable people and local community internally and to supervise external monitoring on socio-economic impact on affected people and local community. Moreover, one of the tasks included was an assistance to the Complaint/Grievance Management Procedure which was discussed at the panel of 2017 United Nations Forum on Business and Human Rights in Geneva, Switzerland.</p>
<p>Name of project or assignment: Social Consideration Services for Si Mee Khon Port and Road Project in Mandalay Region</p> <p>Year: Sep. 2017 – April, 2018 (1.7 months)</p> <p>Location: Myanmar</p> <p>Client: Reeman Consulting Pty Ltd.</p> <p>Main Project Features: Si Mee Khon Port is located in Myingyan District in Mandalay Region, Myanmar. It will facilitate river transportation of goods and products from Mandalay Myotha Industrial Park (MIP), surrounding areas and nearby towns. The Port is being developed in phases: Phase 1 comprises development of the Domestic Port including a general cargo yard and access ramp to a 50 tons pontoon crane. Phase 1 is planned to handle 200,000 tons of containers, general cargo and roll-on/roll-off cargo. In the next Phase, it is intended that an International Port and oil depot will be developed. International Finance Corporation (IFC) plans to invest in Mandalay Se Mi Khon Port Project in Mandalay where the operation of the Port (Phase 1) has been started since Oct, 2017.</p>

Position held: Local Social Specialist
Activities performed: Responsible for: - Conducting social consultancy services. The project aims to assist the Client to review outstanding compensation, identification of Project Affected Persons (PAPs) and vulnerable PAPs, Stakeholder Engagement & Complaints, socio-economic survey to affected households, standing economic trees, allocation of residential plots at Mandalay Industrial Park (MIP) and CSR Program including livelihoods due to the development of Mandalay Si Mee Khon Port Project in Mandalay to meet with the international social consideration standard.
Name of project or assignment: ADB TA-8786 MYA: Environmental Safeguard Institutional Strengthening (48145-001)
Year: May 2017 – April 2018
Location: Myanmar
Client: Asian Development Bank (ADB)
Main Project Features: ADB is providing assistance to GoM to strengthen environmental safeguards in Myanmar and help the Environmental Conservation Department (ECD), which is the responsible department for environmental conservation, implementing the Environmental Impact Assessment Procedure which was enacted in 2015 by providing trainings and capacity building. The main purpose of the Project is capacity development for technical review of EIA/IEE reports which were submitted to ECD.
Position held: EIA Review Consultant
Activities performed: Responsible for review work on Environmental Impact Assessment (EIA)/Initial Environmental Examination (IEE) reports for development projects in Myanmar. These reports were submitted to the Environmental Conservation Department (ECD) in the Ministry of Natural Resources and Environmental Conservation (MONREC). The project also aims to assist government officers who are in charge of reviewing EIA/ IEE/ EMP reports and providing comments to be included in the contents of Environmental Compliance Certificate which will be issued by MONREC.
Name of project or assignment: Income Restoration Program (IRP) in Thilawa Special Economic Zone (SEZ) Phase (I)
Year: Sep 2016 – July, 2017 (5.7 months)
Location: Myanmar
Client: JICA Japan International Cooperation Agency (JICA)
Main Project Features: The first international SEZ has been developed in Thilawa area at the outlying area of Yangon since 2013 and resettlement is necessary due to the development of this project such as Zone A and Zone B. The Project gives assistance to relocated persons to improve their livelihood and standards of living, or at least to restore them to the condition before they are displaced. Various methods such as providing job matching and providing vocational trainings so that they can work as skilled labor in and around Thilawa SEZ and they can engage in small businesses, making infrastructure in their relocation places convenient, giving technical support about microfinance, etc...
Position held: Expert on promoting of Multi-Stakeholders Engagement
Activities performed: Responsible for getting social communication with Project Affected Persons (PAPs), project proponents, local authorities, governmental authorities, Non-Government Organizations, Civil Society Organizations to help PAPs get stable income after they are relocated. Other responsibilities include carrying out internal monitoring of socio-economic survey , supervising external monitoring of socio-economic survey, job matching for local community including PAPs and their family members, supporting PAPs, who do not have National Registration Card (NRC), for application of NRC, proposing training programs which are useful for PAPs to get more job opportunities and to upgrade their current job position and coordination between government authorities, local authorities, local community, project proponents, contractors and locator when constructing and operating of infrastructure such as road, drainage, water supply system, electric facilities, etc... at the relocation site of Thilawa SEZ. Rapid Social Impact Assessment (SIA) for Thilawa SEZ has also been conducted to monitor the social impact of surrounding area and to mitigate social issues due to the development of Thilawa SEZ.
Name of project or assignment: The Project for Capacity Development of Power Transmission and Distribution System (Phase I)
Year: July 2016 – Nov, 2018 (5.23 months)
Location: Myanmar
Client: Japan International Cooperation Agency (JICA)

	<p>Main Project Features: Japanese Government provides assistance to Myanmar Government for capacity development of power transmission and distribution system (Phase I). The purpose of the Project is to improve efficiency and reliability of power supply and energy access through the reinforcement and improvement of power supply infrastructure in Myanmar. Three main prospective outputs are 1) preparation of the framework of human resource development, 2) training programs are planned and implemented and 3) establishing and practicing Plan, Do, Check and Action (PDCA) cycle for training system. To get the output (1), tasks include identifying institutional and financial challenges of the MOEE, identifying technical challenges of Transmission and Distribution System, carrying out assessment of human resource development plan and policy and existing training system and examining the framework and roadmap of human resource development. Tasks such as discussing and planning training programs, developing syllabi, curricula and textbooks for trainings, conducting Training for Trainers, preparing and implementing trainer's accreditation system, developing a procurement plan of equipment and materials for trainings and introducing them, advising regarding Transmission and Distribution system and reflecting to textbooks for trainings, implementing trainings by trained trainers, proposing and implementing evaluation systems for trainees has been done in order to get the output (2). PDCA cycle is applied continuously throughout the Project to achieve the output (3).</p>
	<p>Position held: Human Resource Development Planning 2 (Regional Cities)</p>
	<p>Activities performed: Responsible for: - Implementing human resource policy and plan in the Ministry of Electricity and Energy (MOEE) and implementing engineering training program for capacity development of engineers who become trainers in the future. Other responsibilities include conducting survey on current status of training program in each department of MOEE, coordinating between departments in MOEE, Trainer Candidates and international JICA experts to conduct safety and technical trainings, to install training facilities at the training center of MOEE in Naypyitaw and site visit.</p>
	<p>Name of project or assignment: Supplemental Survey for Construction Project of Bago River Bridge</p>
	<p>Year: February 2016 – June, 2016 (2 months)</p>
	<p>Location: Myanmar</p>
	<p>Client: Japan International Cooperation Agency (JICA)</p>
	<p>Main Project Features: Feasibility Study (FS) for construction of Bago River Bridge was carried out in 2014. The purpose of Bago River Bridge is to connect Yangon and Thanlyin Township and Thilawa area by passing Bago River. It has been two years after FS was carried out. Therefore, a supplemental survey for construction of Bago River Bridge has been carried out to make improvement of Intersection at Yangon side and at Thanlyin side of Bago River Bridge. Optional designs for improvement at intersections such as construction of a flyover, on-ramp, at grade intersections were proposed to the Project Proponent with environmental and social impacts of each option. The Project Proponent chose the best one in consideration of cost, schedule, technical and financial matter as well as environmental and social issues.</p>
	<p>Position held: Regional Environmental and Social Expert</p>
	<p>Activities performed: Responsible for: - Environmental and social investigation of proposed options for improvement at intersections in Thaketa Township and in Thanlyin Township in Yangon Region. Roads in Yangon and Thanlyin Township are managed by the Roads and Bridges Department in Yangon City Development Committee (YCDC) and the Department of Highway in the Ministry of Construction (MOC) respectively. In general, bridges and flyovers are managed by the Department of Bridges in MOC. Land acquisition from Myanma Railways (MR) is necessary for this project. Therefore, environmental and social investigation was carried out in cooperation with YCDC, MOC and MR to find out environmental and social impacts by each proposed option. IEE report including Abbreviated Resettlement Action Plan (A-RAP) for this project was prepared based on the EIA Procedure and JICA Guidelines for Environmental and Social considerations. In addition, necessary JICA's Environmental and Social Forms such as Checklists, Environmental Management Plan (EMP), Environmental Monitoring Plan (EMoP), Environmental and Social Monitoring Form, Screening and Resettlement Action Plan Monitoring Form were prepared.</p>
	<p>Name of project or assignment: NK-GIAS</p>
	<p>Year: July, 2014, July, 2015, September 2015, October 2016 and October 2017</p>
	<p>Location: Myanmar</p>
	<p>Client: JICA Nippon Koei Research and Development center (NK R&D center)</p>

	<p>Main Project Features: Nippon Koei Research and Development Center (NK R&D) developed NK-GIAS software and it signed a MOU with MES to conduct GIS training by using NK-GIAS software which can be used not only for geographic information system but also for analysis. Training has been conducted once a year (3 days/time) since 2013. NK-GIAS software license has been provided to all participants after the training to apply knowledge what they learned at the training in their careers.</p>
	<p>Position held: Trainer</p>
	<p>Activities performed: Responsible for: - Conducting NK-GIAS training at Myanmar Engineering Society (MES) to Myanmar people who are ranging from governmental departments to private companies and personal. Conducting lectures, demonstrating GIS software, assisting trainees when they are operating the software, providing GIS software and training materials and arranging administrative and logistic things.</p>
	<p>Name of project or assignment: Arc-GIS</p>
	<p>Year: April, 2015 – June, 2015 (1 month)</p>
	<p>Location: Myanmar</p>
	<p>Client: Nippon Koei Research and Development center (NK R&D center)</p>
	<p>Main Project Features: The purpose of the project is to make analysis of vegetation for six numbers of rivers in Japan. Raster Digital Elevation Model (DEM) is interpolated by using Topographic survey data. When making vegetation analysis, Geoprocessing such as Spatial Analysis tools, Cartography Tools, etc... are applied.</p>
	<p>Position held: GIS expert</p>
	<p>Activities performed: Responsible for: - Conducting analysis of vegetation of rivers in Japan by using Arc-GIS mainly and NK-GIAs as necessary.</p>
	<p>Name of project or assignment: Preliminary Study on Environmental and Social Impact Assessment (ESIA) for Gas Fired Power Plant Development Project, Thanlyin Township, Yangon, Myanmar</p>
	<p>Year: July, 2015 – August, 2015 (2 months)</p>
	<p>Location: Myanmar</p>
	<p>Client: Private</p>
	<p>Main Project Features: 400 megawatts (MW) gas fired power plant is planned to implement in Thanlyin Township, Yangon, Myanmar and MOU was signed between the Ministry of Electricity and Energy (MOEE) and a consortium to identify feasibility of the project. Preliminary ESIA was carried out for the project as the first step.</p>
	<p>Position held: Environmental and Social Expert</p>
	<p>Activities performed: Responsible for: - Environmental and social investigation at proposed project site in Thanlyin Township. Scoping for environmental and social impact assessment and preparation of environmental management plan and environmental monitoring plan.</p>
	<p>Name of project or assignment: Preparatory Survey on Distribution System Improvement Project in Main Cities in Myanmar</p>
	<p>Year: November, 2014 – July, 2015 (3.48 months)</p>
	<p>Location: Myanmar</p>
	<p>Client: Japan International Cooperation Agency (JICA)</p>
	<p>Main Project Features: Formulation of a five years distribution system improvement plan in 11 cities which were selected by considering important factors and arranging basic design of the priority projects. Distribution system improvement includes a) Reinforcement of 33 kV and 66 kV substations with transmission line, b) Introduction of Multi-Transformer system for Low Voltage distribution, c) Replacement of overloaded/aged distribution facilities and d) Replacement of power meter to reduce distribution loss.</p>
	<p>Position held: Regional Environmental and Social Expert</p>

<p>Activities performed: Responsible for:</p> <ul style="list-style-type: none"> - Environmental and social investigation at proposed target sites in 11 selected cities: Patheingyi, Bago, Pyaw, Bhamo, Loikaw, Magway, Mandalay, Mawlamyine, Monywa, Taunggyi and Dawei. Moreover, collecting environmental and socioeconomy data, preparation of IEE report, environmental management plan and environmental monitoring plan were included. In addition, coordination and cooperation with Electricity Supply Enterprise (ESE) in the Ministry of Electric Power (MOEP), Environmental Conservation Department (ECD) in the Ministry of Natural Resources and Environmental Conservation (MONREC), General Administration Departments (GAD) in the Ministry of Home Affairs and other related Ministries were carried out.
<p>Name of project or assignment: Pre - Environmental Due Diligence for transfer of rights of Tin Smelting business in Thanlyin Township in Yangon</p> <p>Year: September, 2014 – December, 2014 (2 months)</p> <p>Location: Myanmar</p> <p>Client: Private</p> <p>Main Project Features: Tin Smelting and Refining Plant in Thanlyin managed by No. (2) Mining Enterprise in the Ministry of Mines invited foreign or local company as Private Public Partnership (PPP) with JV or lease to submit the Letter of Expression of Interest (LEOI) in September, 2014. One of the Japanese private companies was interested to submit EOI. Pre environmental due diligence of the factory was carried out to know the existing environmental condition of the factory and to prepare mitigation measures to prevent environmental impact</p> <p>Position held: Environmental and Social Expert</p> <p>Activities performed: Responsible for:</p> <ul style="list-style-type: none"> - Environmental and social survey for environmental and social investigation at the proposed project site in Thanlyin Township. Scoping for environmental and social impact assessment and preparation of environmental management plan and environmental monitoring plan
<p>Name of project or assignment: Solid Waste Management System in Thilawa Special Economic Zone (SEZ) Class A area</p> <p>Year: September, 2014 and June, 2015 (1 month)</p> <p>Location: Myanmar</p> <p>Client: Private</p> <p>Main Project Features: One of the Japanese companies set up a systematic industrial waste management factory in Thilawa SEZ Class A area. Not only land filling but also Integrated Waste Treatment Facilities are planned to include in the factory for treatment of solid waste. After sorting or intermediate treatment including stabilization, fuel blending, water treatment and incineration, recyclable waste are sent to recycle companies for recycling to new products, reusable waste are reused and non-recyclable waste are landfilled in designated area of landfilling.</p> <p>Position held: Environmental and Social Expert</p> <p>Activities performed: Responsible for:</p> <ul style="list-style-type: none"> - Survey about recycle companies such as plastic, paper, metal, old battery, tyre, engine oil, etc...in Myanmar and making an interview with recycle companies to make the research on how they handle or process recycle materials in their companies. Medical Waste Treatment facilities under Yangon City Development Committee (YCDC) are also surveyed to entrust for treatment of medical waste from Thilawa SEZ.
<p>Name of project or assignment: Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I), Myanmar</p> <p>Year: December, 2013 – September, 2017 (16 months)</p> <p>Location: Myanmar</p> <p>Client: Gov. of Myanmar (Ministry of Electricity and Energy (MOEE)) with Japanese ODA Loan</p>

<p>Main Project Features: The Project includes the following four packages.</p> <p>(1) Installation of 33 kV Distribution Line between Thanlyin sub-station and a new Thilawa sub-station. The length is approximately 13.5 km (8.4 mile)</p> <p>(2) Construction of 2 x 25 MW dual fuel Gas turbines (natural gas and diesel oil) with more than 50 MW output in total. The total area of power plant is 3.2 ha.</p> <p>(3) Construction of 15 km (24 miles) long 230 kV Transmission Line between Thanlyin sub-station and a new Thilawa sub-station and construction of 2 ha wide sub-station in Thilawa</p> <p>(4) Installation of 30 km (18 miles) long Gas Pipeline from South Dagon Valve House to a new Thilawa power plant for gas supply.</p>
<p>Position held: Environmental and Social Expert</p>
<p>Activities performed: Responsible for the following tasks:</p> <ul style="list-style-type: none"> - questionnaire preparation for social survey in preparation of IEE and EIA reports - preparation of rapid resettlement action plan (RAP) and Land Acquisition Plan (LAP) - implementation and monitoring of resettlement action plan - environmental and social risks assessment - preparation of hazardous management plan - preparation and implementation of stakeholder engagement plan - supporting the MOEE in land acquisition for construction of 33 kV distribution poles, 230 kV transmission lattice towers, electric poles, gas pipeline and a gas regulation station from MOC and private crop cultivators by coordinating with related government departments, local authorities, local community, project proponents, contractors and sub-contractors - supporting Thermal Power Department, Department of Power Transmission and System Control (DPTSC) and Yangon Electricity Supply Corporation (YESC), Myanmar Oil and Gas Enterprise (MOGE) in MOEE for implementation of environmental management and monitoring plan to mitigate and monitor environmental and social impacts during construction in coordination with Environmental Conservation Department (ECD) in the Ministry of Natural Resources and Environmental Conservation (MONREC), General Administration Departments, other related Ministries and Thilawa SEZ Management Committee.
<p>Name of project or assignment: Preparatory Survey on Base of Pyramid (BOP) business on development of food supply chains in Myanmar</p>
<p>Year: March, 2013 – December, 2013 (10 months)</p>
<p>Location: Myanmar</p>
<p>Client: Japan International Cooperation Agency (JICA)</p>
<p>Main Project Features: Feasibility study to establish sustainable food supply chain for safe and secured food with Japanese Standard. Target items include processed agricultural and fishery products in Myanmar. Main activities include training for contract farmers and fishery workers, construction of a logistics center annexed with a food processing factory, and exporting value added food products to Japan and other Asean countries. Target area are Yangon Division, Tanintharyi Division, Rakhine State and Shan State.</p>
<p>Position held: Project Coordinator</p>
<p>Activities performed: Responsible for:</p> <ul style="list-style-type: none"> - Conducting an interview with Base of Pyramid such as fishermen in Gyeik Taw village under Mya Pin village tract in Thandwe Township, Rakhine State to know family size, family income, expenses, etc... Other duties include arrangement and participating appointments and trips in Myanmar, collecting necessary data, coordinating with Agricultural department in the Ministry of Agriculture and Irrigation, Fisheries department in the Ministry of Livestock, Fisheries and Rural Development, Ministry of Health, Ministry of Commerce, other related industries and local companies. More over coordination between translation and interpretation from Japanese to Myanmar and vice versa and English to Myanmar and vice versa.
<p>Name of project or assignment: Factory production management software developer, Japan</p>
<p>Year: April, 2008 – December, 2012 (4 years and 9 months)</p>
<p>Location: Japan</p>
<p>Client: Umeda Kogyo Co., Ltd</p>
<p>Main Project Features: Developing factory production management software which manage production processes starting from receiving order to delivering order. It also manages financial matters such as sales amount, profit and loss. This software is developed by using Magic Unipass. And package software for factory production management is newly developed according to customer needs from design to testing. Those softwares are widely used in Japan and Indonesia. They are developed in both Japanese and English language.</p>

Position held: Software Developer
Activities performed: Responsible for: - Developing factory production management software which is used in both inside of the company itself and in other similar type of factories, customizing factory production management package software, handling customer issues, requests and support, managing to participate in software exhibition for advertisement, developing company home page, translating from Japanese to English and vice versa.
Name of project or assignment: Teaching, Myanmar
Year: April, 2002 – December, 2003 (1 year and 9 months)
Location: Myanmar
Client: Myanmar Maritime University
Main Project Features: Myanmar Maritime University was opened in February, 2002 for marine subjects such as Naval Architecture, Marine Engineering, Marine Electrical Systems and Electronic, Port and Harbour Engineering, River and Coastal Engineering, etc...
Position held: Assistant Lecturer
Activities performed: Responsible for: - Included in Naval Architecture department and finished attending the first year of Master of Engineering (Civil) at Yangon Technological University, Myanmar.
Name of project or assignment: Civil Engineering Works, Myanmar
Year: January, 2002 – March, 2002 (3 months)
Location: Myanmar
Client: A1 Construction Co., Ltd
Main Project Features: Construction of high-rise buildings in Yangon, Myanmar.
Position held: Drawing and quantity surveying of buildings
Activities performed: Responsible for: - Drawing and quantity surveying of buildings and supervising construction site in Yangon area.

12. Certification:

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe my qualifications, my experiences, and other relevant information about myself.

Wah Wah

16/ 02/ 2024

Signature of Personnel

Date (Day/Month/Year)



Thura Aung



SUMMARY AND SKILL HIGHLIGHTS

- Experienced with all stages of project managements and senior consultant for Environmental Impact Assessment (EIA)
- Research, Education and Consultancy co-operation, collaboration and contributions to local and international institutions

A. Personal Particular:

Date of Birth : 02-05-1976
Gender/ Sex : Male
NRC No. : 12/SAKHANA(N)000978
Marital Status : Married
Nationality : Myanmar
Present Address : No. (613), Marga 6 Street, 12 Quarter, South Okkalapa Township, Yangon.
Telephone : 95-9-777006376
E-mail : thura@enviromyanmar.net

B. Educational Qualifications

1. B.Sc.(Hons.) (Geology), University of Yangon, 2002
2. M.Sc.(Geology), University of Yangon, 2004
3. M.Res.(Geology), University of Yangon, 2005
4. Diploma in Business Law, University of Yangon, 2003

5. Diploma in GIS, University of Yangon, 2008

C. Professional Experiences

1. Consultant (2009-2011), Project Manager (2011-2016), General Manager (2016 to date)
Resource and Environment Myanmar Co., Ltd.
2. Research Associate (2006-2009), Joint Secretary (2009-2014), Secretary (2014 to date)
Myanmar Earthquake Committee, Fed. of Myanmar Engineering Society
3. Demonstrator (2003-2006)
Department of Geology, Maubin University
4. Demonstrator (2006-2009)
Department of Geology, University of Yangon
5. Consultant
Myanmar Environment Institute (2012 to date)

D. INTERNATIONAL COLLABORATION

1. Research Partners (as of Myanmar Earthquake Committee's Member)

- California Technological University, USA
- Earth Observatory of Singapore (EOS), NTU, Singapore
- National Taiwan University, Taiwan
- Tokyo University, Japan

2. Training

- Introductory Seismology for Earthquake Professionals, Yangon, Myanmar (2013)
- ISO 14001:2004 Environmental Management Standards, Yangon, Myanmar (2013)
- AERMOD Air Dispersion Modeling, New Delhi, India (2014)
- Environmental and Social Impact Assessment, Hanoi, Vietnam (2016)
- ISO 9001:2015 Quality Management System Awareness and Implementation, Yangon, Myanmar (2018)

E. MEMBERSHIP

1. Member (Asian Oceania Geosciences Society, AOGS)
2. Life Member (Myanmar Geosciences Society, MGS)
3. Secretary (Myanmar Earthquake Committee, MEC)
4. Consultant (Myanmar Environment Institute, MEI)

F. WORK EXPERIENCES

2016 To date

General Manager (Resource and Environment Myanmar Co., Ltd.)

- ESIA for Baseline Study of Thilawa Special Economic Zone B (2015-2016)
- ESIA of Upper Baluchaung HPP, Shan State (2016)
- Environmental and Social Consideration for National Logistic Master Plan (2017)
- Review on EMP and EMoP and Implementing of Rail Safety Awareness Campaign for Yangon Circular Railway Line Upgrading Project (2017)
- EIA for YTL Cement Co., Ltd. in Thilawa SEZ, Yangon Region (2017-2018)
- Environmental and Social Consideration Survey for the JICA Feasibility Study for Sewerage System Development in Yangon City (2018)
- Environmental Baseline Survey for TOTAL Power Plant and Onshore Pipeline Project, Kanbauk Area (2018)
- ESIA on Twante Canal Improvement Project in Yangon, Myanmar (2018-2019)
- Execution of Environmental and Social Survey for Project Site and Surroundings on Preparatory Survey for Kyaukse Gas Combined-Cycle Power Plant Construction Project in Myanmar (2018-2020)
- Environmental Baseline Survey for New Yangon Development Project, Yangon Region (2019)
- Execution of Social Environmental Survey for Project Site and Surroundings on Preparatory Survey for Kyaukse Gas Combined-Cycle Power Plant Construction Project in Myanmar (2019-2020)

2012 To 2016

Project Manager (Resource and Environment Myanmar Co., Ltd.)

- Environmental Impact Assessment of Shweli River II Hydropower Project (2012)
- EIA of 500 MW CCPP at Hlawga (2012)
- Environmental and Social Information Collection Survey for the Project for the Strategic Urban Development Plan of The Greater Yangon (2012)
- ESIA for Baseline study of Thilawa Special Economic Zone Class A (2013)
- Survey for Preparation of Abbreviated Resettlement Plan for Feasibility study for the construction of new Thaketa and Bago River Bridge (2013-2014)
- Actual Environmental Survey for Feasibility Study for the Construction of Thaketa River Bridge (2013-

2014)

- Actual Environmental Survey for Feasibility Study for the Construction of Bago River Bridge (2013-2014)
- Environmental and Social Baseline Data Collection for Ngaw Chang Hka Hydropower Project (2014)
- Environmental and Social Survey for Environmental Impact Assessment Studies under the Project for Electric Power Development in the Thilawa Area (2014)
- ESIA of Upper Yeywa Hydropower Project (2015)

2009 To 2012

Consultant (Resource and Environment Myanmar Co., Ltd.)

- EIA of Myanmar-China Gas Pipeline Project (2009-2010)

Curriculum Vitae (CV)

1. Proposed Position:	Social Expert			
2. Name of Firm:	Myanmar Koei International Ltd.			
3. Name of Expert:	Khin Ohnmar Htwe (Mrs)			
4. Date of Birth:	25 July 1965	Citizenship:	Myanmar	
5. Education:	<ul style="list-style-type: none"> • Masters in Geography, University of Yangon, 1995 • Bachelor of Arts in Geography, University of Yangon, 1986 			
6. Membership in Professional Associations and Publications:	• N/A			
7. Other trainings:	• N/A			
8. Countries of Work Experience:	Myanmar/ Japan			
9. Language Skills (indicate only languages in which you can work):	LANGUAGE	SPEAKING	READING	WRITING
	English	Excellent	Excellent	Excellent
	Myanmar	Native	Native	Native

10. Employment Record:

Period	Employing organization and your title/position. Contact information for references	Country	Summary of activities performed relevant to the Assignment
Oct. 2018 – Dec. 2018	Asian Development Bank Resource Person	Myanmar	Responsible for resettlement action plan, community engagement and community development agreements at Myanmar Mining EIA Guidelines Working Group.
2016 – 2017	National Commission of Enquiry on Myitsone Hydropower Project Director (Social Expert)	Myanmar	Responsible for Myitsone Hydropower Project
2014 – Present	REM-UAE Lab & Environmental Services Director	Myanmar	Responsible for environmental services.
2014 – Present	Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) Programme Principle Consultant	Myanmar	Responsible for resilience and climate adaptation in Rakhine, Shan and Kayin States, Ayeyarwaddy and Mandalay Regions.
2013 – Present	Stockholm Environment Institute (SEI Bangkok) Principal Consultant	Myanmar	Responsible for social environment
2013 – Present	Ministry of Resources and Natural Environmental Conservation (MONREC) Principal Consultant	Myanmar	Responsible for social environment and natural resources.
2013 – 2014	World Bank and Earth Institute, Columbia University Consultant and Focal person	Myanmar	Responsible for national electrification plan in Myanmar.

2013	National Commission of Enquiry on Lepadaungtaung Copper Mine Project Principal Consultant (Social Environmentalists)	Myanmar	Responsible for national commission of enquiry on lepadaungtaung copper mine project.
2007 – 2009	Shingo Japanese language School Administrator and Instructor	Myanmar	Responsible for administration and instruction.
2001 – 2006	Shinpo Japanese language School Principal	Myanmar	Responsible for administration and instruction.
1992 – 1998	Department of Higher Education Ministry of Education Tutor	Myanmar	Responsible for tutoring in department of geography university of Yangon.

11	Reference to Prior Work/ Assignments that Best Illustrates Capability to Handle the Assigned Tasks:		
	Name of project or assignment: Kyaukse Gas Combined – Cycle Power Plant Project		
	Year: 2018 - 2019		
	Location: Myanmar		
	Client: JICA		
	Main Project Feature: The objective of the Project is to improve the power supply by constructing a combined-cycle gas-fired power plant (tentative output is 320MW class) and facilities associated with the power plant, thereby contributing to economic development of Myanmar.		
	Position held: Social and RAP Expert		
	Activities performed: Responsible for the Resettlement Action Plan for the project		
	Name of project or assignment: Y Complex Project		
	Year: 2018		
	Location: Myanmar		
	Client: Fujita, Tokyo Tatemono and Ayeyar Hintar		
	Main Project Feature: Y Complex Company, a Japan-led consortium, conducted necessary environmental and social assessments required to commence development of a large-scale mixed-development project at the intersection of Shwedagon Pagoda Road and U Wisara Road in Yangon.		
	Position held: Consultant		
	Activities performed: Responsible for Social Impact Assessment project		
	Name of project or assignment: Yangon Circular Line Project, Myanmar Railways		
	Year: 2017		
	Location: Myanmar		
	Client: JICA		
	Main Project Feature: The objective of the Project is to improve the passenger transportation capability associated with safe, accurate and comfortable service of Yangon Circular Line railway by upgrading its timeworn facilities and equipment, thereby contributing to socio-economic development of the Greater Yangon area.		
	Position held: Principal Consultant (Social Environmentalist)		
	Activities performed: Responsible for Social Impact Assessment		
	Name of project or assignment: Hantharwaddy Airport Project		
	Year: 2016		
	Location: Myanmar		
	Client: JICA		
	Main Project Features: The objective of the project is to contribute in achieving smooth air traffic in Myanmar through developing a new international airport.		
	Position held: Social and RAP Expert		
	Activities performed: Responsible for Social Impact Assessment and Resettlement Action Plan for the project.		
	Name of project or assignment: Chipwe Ngwe Hydro power Project		
	Year: 2016		

	Location: Myanmar
	Client: Private
	Main Project Features: Social and Environmental Impact Assessment
	Position held: Principal Consultant (Social Environmentalists)
	Activities performed: Responsible for social and environmental impact assessment.
	Name of project or assignment: Combined Cycle Gas Power Plant in Myingyan, Township
	Year: 2015
	Location: Myanmar
	Client: ADB
	Main Project Features: The Project is located in Taungtha, a township of Myingyan District in Mandalay Division. It is 108 km to Mandalay City and 226 km to Naypyitaw, the administrative capital of Myanmar.
	Position held: Principal Consultant (Social Environmentalist)
	Activities performed: Responsible for social impact assessment of the project.
	Name of project or assignment: Dawei Early Industrial Development Project
	Year: 2015
	Location: Myanmar
	Client: Private
	Main Project Features: Industrial Development
	Position held: Principal consultant
	Activities performed: Responsible for social impact assessment for the project.
	Name of project or assignment: Environmental & Social Impact Assessment (ESIA) for offshore Bay of Bengal Blocks A-4 and AD-02
	Year: 2015
	Location: Myanmar
	Client: BG Group and ERM
	Main Project Features: Environmental and social impact assessment
	Position held: Social environmentalist
	Activities performed: Responsible for environmental and social impact assessment for the project.
	Name of project or assignment: ESIA of Kyaukse Cement Factory, Kyaukse Township
	Year: 2015
	Location: Myanmar
	Client: Private
	Main Project Features: ESIA for cement factory.
	Position held: Director
	Activities performed: Responsible for environmental and social impact assessment.
	Name of project or assignment: ESIA of MongWa Hydro Power Project, Monglar, Eastern Shan State, Special Zone - 4
	Year: 2015
	Location: Myanmar
	Client: Principal Consultant (Social Environmentalist)
	Main Project Features: ESIA for Hydro power project.
	Position held: principal consultant (social environmentalist)
	Activities performed: Responsible for environmental and social impact assessment.
	Name of project or assignment: ESIA of MOGE 4 on shore project
	Year: 2015
	Location: Myanmar
	Client: ERM Co
	Main Project Features: ESIA for shore project.
	Position held: Principal consultant (Social Environmentalists)
	Activities performed: Responsible for environmental and social impact assessment.

Name of project or assignment: ESIA of C1 and H on shore project
Year: 2015
Location: Myanmar
Client: ERM and Pacific Hunt Co.
Main Project Features: ESIA for on shore project
Position held: Principal consultant (Social Environmentalist)
Activities performed: Responsible for environmental and social impact assessment.
Name of project or assignment: ESIA of IOR 4 and 6 on shore project.
Year: 2015
Location: Myanmar
Client: ERM & MPRL
Main Project Features: Environmental and social impact assessment
Position held: Principal Consultant
Activities performed: Responsible for environmental and social impact assessment.
Name of project or assignment: Provision of Pre and Post Site Sampling for Well-1, Well-2, Well-3 and Well-4 at RSF 2&3
Year: 2015
Location: Myanmar
Client: PCML Co., Ltd
Main Project Features: Provision of Pre and Post Site Sampling
Position held: Principal Consultant
Activities performed: Responsible for environmental and social impact assessment.
Name of project or assignment: IEE for Ywathargyi and Myintngwe Dry Port, Malilrna, Automobile Co., Ltd.
Year: 2014
Location: Myanmar
Client: Private
Main Project Features: IEE for Dry Port
Position held: Principal Consultant
Activities performed: Responsible for initial environmental examination.
Name of project or assignment: IEE for Tamu 1.2 MW Hydro Power Project, Tamu District, Sagaing Division.
Year: 2014
Location: Myanmar
Client: Aman Energy Venture Co., Ltd Hongkong
Main Project Features: Initial Environmental Examination.
Position held: Principal Consultant
Activities performed: Responsible for conducting of IEE.
Name of project or assignment: ESIA of Tachileik Coal Fired Factory, Min KhitThit Co.
Year: 2014
Location: Myanmar
Client: Private
Main Project Features: Environmental and Social Impact Assessment
Position held: Principal Consultant
Activities performed: Responsible for environmental and social impact assessment.
Name of project or assignment: ESIA for Soap Factory (20TPD) in Shwepyithar Industrial, Zone 1, Shwepyithar Township, Yangon Region.
Year: 2014
Location: Myanmar
Client: Private
Main Project Features: Environmental and Social Impact Assessment
Position held: Principal consultant
Activities performed: Responsible for: ESIA for Soap factory.
Name of project or assignment: Initial Ecological Desk Study of Ayeyarwaddy Costal Line, Area in Myanmar
Year: 2014

Location: Myanmar
Client: Private
Main Project Features: Initial Ecological Desk Study
Position held: Principal Consultant
Activities performed: Responsible for initial ecological desk study.
Name of project or assignment: Social Impact Assessment (SIA) for Lake View Hotel, Project, Hlaing Township Yangon
Year: 2014
Location: Myanmar
Client: Private
Main Project Features: Social Impact Assessment.
Position held: Principal Consultant
Activities performed: Responsible for social impact assessment.
Name of project or assignment: Gas Pipe line from Dagon Myo Thit (Seikkan)
Year: 2014
Location: Myanmar
Client: JICA
Main Project Features: Social Impact Assessment (SIA)
Position held: Principal Consultant
Activities performed: Responsible for social impact assessment.

Lists of Experience in Environmental Impact Assessment, EIA

Period	Title	Responsibility
2009	Traffic Survey in ESHIA for Myanmar-China Gas Pipeline Project, (CNPC)	Senior Consultant and Team Leader of SIA
2010	Multi-hazard Risk Assessment in Rakhine State , (UNDP Project)	Senior Consultant and Team Leader of SIA
2010	ESHIA for MongHkok Coal-fired Power Plant Project (Italian-Thai Development Co.)	Senior Consultant and Team leader of SIA
2011	EIA and SIA of Yeywar-Shwesaryan Power Transmission Line (Ministry of No. 2 Electric power)	Senior Consultant and Team leader of SIA
2011	EIA and SIA of Baluchaung-Shwemyo Power Transmission Line (Ministry of No. 2 Electric power)	Senior Consultant and Team leader of SIA
2012	EIA and SIA of the Dawei Deep Sea Port and Industrial Development Project (Italian-Thai Development Co.with TEAM Consultant)	Senior Consultant and Team leader of SIA
2012	Public Meeting (SIA) of the Dawei Main Road Project (Italian-Thai Development with Chulalongkon University)	Senior Consultant and Team Leader of SIA
2012	SIA for Tharkayta Gas Turbine Project (BKB Co.Ltd.)	Senior Consultant and Team Leader of SIA
2012	SIA of Shweli River II Hydropower Project (Hydrolancang International Energy)	Principal Consultant and Team Leader of SIA
2012	IEE for Small Scale Gold Processing Plant, ModiTaung Project, Yamethin (National Prosperity Co. Ltd)	Senior Consultant and Team Leader of SIA
2012 - 2013	Environmental & Social Information Collection Survey for The Project for The Strategic Urban Development Plan of the Greater Yangon (JICA, Nippon Koie)	Senior Consultant and Team Leader of SIA
2013	SIA for Thilawa Cement Package Plant, Thilawa Cement Building Material Project	Senior Consultant and

		Team Leader of SIA
2012 to 2013	Household Attitude Survey and Public Consideration Meetings, Dawei Industrial Estate Project (Italian-Thai Development Co. with UAE Consultant and Mahidol University, Thailand)	Senior Consultant and Team Leader of SIA
2013	SIA for Hlawga Gas Turbine Project, Mingalrdon Township (Hydrolancang International Energy)	Principal Consultant and Team Leader of SIA
2013	SIA for Fully-Integrated Cement Production Facility, Mawlamyine Cement Co.,Ltd (SCG Co. Ltd, Siam, Thailand)	Principal Consultant and Team Leader
2013	SIA for Ywama Gas Turbine Project, Insein Township (MSDE Co.Ltd)	Principal Consultant and Team Leader
2013	Environmental and Social Consideration Study on Taungoo Education College Project (JICA)	Principal Consultant and Team Leader
2013	Village Heads and Household Attitude Survey in Dawei Deep Sea Port Project (Italian-Thai Development Co. with UAE Consultant)	Principal Consultant and Team Leader
2013	Nature Gas-Combined Cycle Power Plant, Thaketa Project (Korea)	Principal Consultant and Team Leader
2013	Detail Measurement Survey and Social Assessment for Thilawa Special Economic Zone (Nippon Koie, JICA)	RAP and Social Specialist
2013 -2014	National Electrification Plan in Myanmar (World Bank and Earth Institute, Columbia University)	Consultant and Focal Person
2013	Public Participation Meeting of Access Road (Tarana Road) (Thailand)	Principal Consultant and Team Leader
2013	Environmental Check List for Labour Conditions Snapshot Survey Concerning the Maung Kong Sugar Mill, Fertilizer Plant and Ethanol Plant (SLP Company, Thailand)	Social Auditor
2013 to 2014	Social Impact Assessment of MYANMAR 5 MMTA REFINARY PROJECT, Longlon (China Guangdong Zhenrong Energy Co Ltd (hereinafter referred to as "GDZR"), Myanmar MEHL company and Myanmar HTOO company)	Principal Consultant and Team Leader
2013-2014	IEE for 500KV Power Transmission Line and Substation Facilities Mandalay, Bago, Shan and Yangon Regions, Myanmar(Nippon Koie, JICA)	RAP Specialist and Team Leader
2013	Thilawa Port Project(Nippon Koie, JICA)	Principal Consultant and Team Leader
2013	Stakeholder Meetings of Block M-12 Offshore Myanmar Project (PETRONAS Carigali Myanmar Limited (PCML)	Principal Consultant
2014	Social Impact Assessment (SIA) for Corner Stone Zinc Factory Project in Lashio Township, Northern Shan State	Principal Consultant
2014	Social Impact Assessment (SIA) for Mohti-Momi Gold Mining Project, Yemethin Township, Mandalay Region (National Prosperity Co. Ltd)	Principal Consultant
2014	Fishery Activity and Social Condition Survey for the project for Expansion of Yangon Port in Thilawa (Nippon Koie, JICA)	Principal Consultant
2014	Building Resilience and Adaptation to Climate Extremes and	Principal

	Disasters Programme(BRACED)	Consultant
2014	An Initiative towards Sustainable Development in the Ayeyarwaddy River Basin: Case Study of Chindwin Basin with SEI (Stockholm Environment Institute (SEI), Thailand)	Principal Consultant
2014	Social Impact Assessment (SIA) for Manufacturing Plant of Raw Materials for Detergent in Ngwepinle Industrial Zone, Hlaingthatyar Township, Yangon Region (Toyotsu Paragon Company)	Principal Consultant
2014	TA 8330-MYA: Project Preparatory TA for the Greater Mekong Subregion (GMS) East-West Economic Corridor (EWEC) Eindu to Kawkareik Road Improvement RESETTLEMENT SURVEYS (SOCIO ECONOMIC SURVEYS (SES) . (SMEC International Pty Ltd (SMEC), ADB Project)	RAP specialist and Principal Consultant
2014	Upper Yeywa Hydropower Project, Kyaukme Township, Northern Shan State (Ministry of Electricity (MOE)	Principal Consultant
2014	Social Impact Assessment (SIA) for Ngwa Chan Kha Hydro power Project, Kachin State	Principal Consultant
2014	Social Impact Assessment (SIA) for Tae KwangVina Industry Joint Stock Company Project (Shoes), Bago Township, Bago Region	Principal Consultant
2014	Transmission line along Dagon-Thilawa road to Thilawa SEZ (Nippon Koie, JICA)	Principal Consultant
2014	Gas Pipe line from Dagon MyoThit (Seikkan) , Thanlyin and Kyauktan to Thilawa (Nippon Koie, JICA)	Principal Consultant
2014	Social Impact Assessment (SIA) for Lake View Hotel Project, Hlaing Township, Yangon Region	Principal Consultant
2014	Initial Ecological Desk Study of Ayeyarwaddy Coastal Line Area in Myanmar	Principal Consultant
2014	ESIA for Soap Factory (20TPD) in Shwepyithar Industrial Zone 1, Shwepyithar Township, Yangon Region	Principal Consultant
2014	ESIA of Tachileik Coal Fired Factory, Min KhitThit Co.,	Principal Consultant
2014	IEE for Tamu 1.2 MW Hydro power Project, Tamu District, Sagaing Division (Aman Energy Venture Co. Ltd, Hongkong)	Principal Consultant
2014	IEE for Ywathargyi and Myintngwe Dry Port, Malilrna Automobile Co.,Ltd	Principal Consultant
2015	Proposal for Provision of Pre and Post Site Sampling for Well-1, Well-2, Well-3 and Well-4 at RSF 2 & 3 , PCML Co.,	Principal Consultant
2015	ESIA of IOR 4 and 6 (ERM and MPRL Co.,) On Shore Project	Principal Consultant
2015	ESIA of C1 and H (ERM and Pacific Hunt Co.) On Shore Project	Principal Consultant
2015	ESIA of MOGE 4 (ERM Co.,) On Shore Project	Principal Consultant
2015	ESIA of MongWa Hydro Power Project, MongLar, Eastern Shan State, Special Zone (4)	Principal Consultant
2015	ESIA of Kyaukse Cement Factory, Kyaukse Township	Director SEM Company
2015	Myanmar: Environmental & Social Impact Assessment (ESIA) for Offshore Bay of Bengal Blocks A-4 and AD-02 (BG Group and ERM)	Principal Consultant
2015	Dawei Early Industrial Development Project	Principal Consultant
2015	Combined Cycle Gas Power Plant in Myingyan Township with IFC	Principal

	and ADB	Consultant
2016	Chipwe Ngwe Hydro power Project	Principal Consultant
2016	Hantharwaddy Airport Project (JANUS, JICA)	Social and RAP Expert
2017	Yangon Circular Line Project, Myanmar Railways (JICA Project)	Principal Consultant
2018	Deedoke Hydropower Project with ICEM	Social and Gender Expert
2018	Y Complex Project (Fujita, Tokyo Tatemono and Ayeyar Hinthar)	Principal Consultant
2018-2019	Kyaukse Gas Combined-Cycle Power Plant Project (Nippon Koie, JICA)	Social and RAP Expert
2018-2019	Environment & Social Impact Assessment for the Improvement of Twantay Canal Project (Yooshin Co., Korea)	Social and RAP Expert
2018-2019	Social and Economic Survey and Public Consultation for Mekong River Navigation Channel Improvement Project (CCCC Second Harbor Consultants Co., Ltd., China)	Social Principal Consultant
2019-2020	Nam Nim Hydropower Project, Kwakkhine Township	Team Leader
2020	Scoping of Work and Technical Specification for Land Acquisition and Resettlement Action Plan Study for Myanmar national Power Transmission Network Development (Phase III) Preliminary Project (Nippon Koie, JICA)	Social and RAP Expert
2020	Feasibility Study of Resettlement Plan for Yangon Ngayokeykaung Expressway Development in Myanmar (Yooshin Co., Ltd., Korea)	Social and RAP Expert
2023	Ka Than Dam (Dawei) Project	Team Leader
2022 - 2023	Nam Ma HPP Project, Hsipaw Township (Uni Energy Co.,)	Team Leader
2022 - 2023	Ye Da Gun Taung Project, Patheingyi Township (Pwint Phyo Thit Co.,)	Social Principal Consultant
2022 - 2023	Domestic Gas to Power (DG2P) Project (MOGE, EPGE & PTTEP (DGT) Co.,)	Social Principal Consultant
2022 - 2023	1. CNTIC VPOWER YG1 LIMITED (CNTIC VPOWER) 400 MW 2. CNTIC VPOWER YG2 LIMITED (CNTIC VPOWER) 350 MW 3. Liquefied Natural Gas Terminal (Kyauktan) 4. EIA of 150 MW Gas fired power plant in Kyaukphyu Township, (V power Co.,)	Social Principal Consultant
2023	Residential Housing and Small Industrial Facilities Project (Taunggyi Garden City Co.,)	Social Principal Consultant

12. Certification:

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe my qualifications, my experiences, and other relevant information about myself.

Oh

19/06/2023

Signature of Personnel

Date (Day/Month/Year)



Appendix-3 Result of laboratory Analysis

Report No. : 2014-00429 / 001-1 (Page 1 of 1) Issued date : May 7, 2014

CLIENT : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
CONTACT : Ms. Pwint Pwint
ADDRESS : B702 Delta Plaza, Shwegondaing Rd., Bahan, Yangon, Myanmar
 Tel. +959-73013448 Fax. +951-552901
 E-mail : pwint@enviromyanmar.net

Analysis Report

PROJECT NAME : Project for Electric Power Development in Thilawa Area
 (Environmental Survey for Package 2 & 3)
SAMPLE DESIGNATED AS : Water Quality **SAMPLING DATE :** 6 & 7 April, 2014
SAMPLING LOCATION : Thilawa, Yangon in Myanmar **SAMPLING BY :** Client

Stations	Results	
	Oil and Grease (mg/l)	Total Chromium (mg/l)
1. WQ-1(E)	1.0	0.04
2. WQ-2(E)	1.0	0.02
Detection Limit	1.0	0.02

Remark : - Analysis Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA-AWWA-WEF.

Siriporn I.

 (Siriporn Imwilaiwan)
 License ID : ๓-010-๙-1793



Thepson Y.

 (Thepson Yommana)
 License ID : ๓-010-๙-333

TY/Client/VVWs

WARNING: The sample(s) to which the findings recorded herein (the sample(s) date was/were) drawn and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativeness of any goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.

This document is issued by the Company under its General Conditions of Service printed overleaf. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

General Conditions of Service

1 General

(a) Unless otherwise agreed in writing or except where they are at variance with (i) the regulations governing services performed on behalf of governments, government bodies or any other public entity or (ii) the mandatory provisions of local law, all offers or services and all resulting contractual relationship(s) between any of the affiliated companies of SGS SA or any of their agents (each a "Company") and Client (the "Contractual Relationship(s)") shall be governed by these general conditions of service (hereinafter the "General Conditions").

(b) The Company may perform services for persons or entities (private, public or governmental) issuing instructions (hereinafter, the "Client").

(c) Unless the Company receives prior written instructions to the contrary from Client, no other party is entitled to give instructions, particularly on the scope of the services or the delivery of reports or certificates resulting therefrom (the "Reports of Findings"). Client hereby irrevocably authorises the Company to deliver Reports of Findings to a third party where so instructed by Client or, at its discretion, where it implicitly follows from circumstances, trade custom, usage or practice.

2 Provision of Services

(a) The Company will provide services using reasonable care and skill and in accordance with Client's specific instructions as confirmed by the Company or, in the absence of such instructions:

(1) the terms of any standard order form or standard specification sheet of the Company, and/or

(2) any relevant trade custom, usage or practice; and/or

(3) such methods as the Company shall consider appropriate on technical, operational and/or financial grounds.

(b) Information stated in Reports of Findings is derived from the results of inspection or testing procedures carried out in accordance with the instructions of Client, and/or our assessment of such results on the basis of any technical standards, trade custom or practice, or other circumstances which should in our professional opinion be taken into account.

(c) Reports of Findings issued further to the testing of samples contain the Company's opinion on those samples only and do not express any opinion upon the lot from which the samples were drawn.

(d) Should Client request that the Company witness any third party intervention, Client agrees that the Company's sole responsibility is to be present at the time of the third party's intervention and to forward the results, or confirm the occurrence, of the intervention. Client agrees that the Company is not responsible for the condition or calibration of apparatus, instruments and measuring devices used, the analysis methods applied, the qualifications, actions or omissions of third party personnel or the analysis results.

(e) Reports of Findings issued by the Company will reflect the facts as recorded by it at the time of its intervention only and within the limits of the instructions received or, in the absence of such instructions, within the limits of the alternative parameters applied as provided for in clause 2(a). The Company is under no obligation to refer to, or report upon, any facts or circumstances which are outside the specific instructions received or alternative parameters applied.

(f) The Company may delegate the performance of all or part of the services to an agent or subcontractor and Client authorises Company to disclose all information necessary for such performance to the agent or subcontractor.

(g) Should Company receive documents reflecting engagements contracted between Client and third parties or third party documents, such as copies of sale contracts, letters of credit, bills of lading, etc., they are considered to be for information only, and do not extend or restrict the scope of the services or the obligations accepted by the Company.

(h) Client acknowledges that the Company, by providing the services, neither takes the place of Client or any third party, nor releases them from any of their obligations, nor otherwise assumes, abridges, abrogates or undertakes to discharge any duty of Client to any third party or that of any third party to Client.

(i) All samples shall be retained for a maximum of 3 months or such other shorter time period as the nature of the sample permits and then returned to Client or otherwise disposed of at the Company's discretion after which time Company shall cease to have any responsibility for such samples. Storage of samples for more than 3 months shall incur a storage charge payable by Client. Client will be billed a handling and freight fee if samples are returned. Special disposal charges will be billed to Client if incurred.

3 Obligations of Client

The Client will:

(a) ensure that sufficient information, instructions and documents are given in due time (and, in any event not later than 48 hours prior to the desired intervention) to enable the required services to be performed;

(b) procure all necessary access for the Company's representatives to the premises where the services are to be performed and take all necessary steps to eliminate or remedy any obstacles to, or interruptions in, the performance of the services;

(c) Supply, if required, any special equipment and personnel necessary for the performance of the services;

(d) ensure that all necessary measures are taken for safety and security of working conditions, sites and installations during the performance of services and will not rely, in this respect, on the Company's advice whether required or not;

(e) inform Company in advance of any known hazards or dangers, actual or potential, associated with any order or samples or testing including, for example, presence or risk of radiation, toxic or noxious or explosive elements or materials, environmental pollution or poisons;

(f) Fully exercise all its rights and discharge all its liabilities under any relevant sales or other contract with a third party and at law.

4 Fees and Payment

(a) Fees not established between the Company and Client at the time the order is placed or a contract is negotiated shall Last version modified on August 2007- Published on line on October 9th 2007 be at the Company's standard rates (which are subject to change) and all applicable taxes shall be payable by Client.

(b) Unless a shorter period is established in the invoice, Client will promptly pay not later than 30 days from the relevant invoice date or within such other period as may be established by the Company in the invoice (the "Due Date") all fees due to the Company failing which interest will become due at a rate of 1.5% per month (or such other rate as may be established in the invoice) from the Due Date up to and including the date payment is actually received.

(c) Client shall not be entitled to retain or defer payment of any sums due to the Company on account of any dispute, counter claim or set off which it may allege against the Company.

(d) Company may elect to bring action for the collection of unpaid fees in any court having competent jurisdiction.

(e) Client shall pay all of the Company's collection costs, including attorney's fees and related costs.

(f) In the event any unforeseen problems or expenses arise in the course of carrying out the services the Company shall endeavour to inform Client and shall be entitled to charge additional fees to cover extra time and cost necessarily incurred to complete the services.

(g) If the Company is unable to perform all or part of the services for any cause whatsoever outside the Company's control including failure by Client to comply with any of its obligations provided for in clause 3 above the Company shall nevertheless be entitled to payment of:

(1) the amount of all non-refundable expenses incurred by the Company; and

(2) a proportion of the agreed fee equal to the proportion of the services actually carried out.

5 Suspension or Termination of Services

The Company shall be entitled to immediately and without liability either suspend or terminate provision of the services in the event of:

(a) failure by the Client to comply with any of its obligations hereunder and such failure is not remedied within 10 days that notice of such failure has been notified to Client; or

(b) any suspension of payment, arrangement with creditors, bankruptcy, insolvency, receivership or cessation of business by Client.

6 Liability and Indemnification

(a) Limitation of Liability.

(1) The Company is neither an insurer nor a guarantor and disclaims all liability in such capacity. Clients seeking a guarantee against loss or damage should obtain appropriate insurance.

(2) Reports of Findings are issued on the basis of information, documents and/or samples provided by, or on behalf of, Client and solely for the benefit of Client who is responsible for acting as it sees fit on the basis of such Reports of Findings. Neither the Company nor any of its officers, employees, agents or subcontractors shall be liable to Client nor any third party for any actions taken or not taken on the basis of such Reports of Findings nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to the Company.

(3) The Company shall not be liable for any delayed, partial or total non-performance of the services arising directly or indirectly from any event outside the Company's control including failure by Client to comply with any of its obligations hereunder.

(4) The liability of the Company in respect of any claim for loss, damage or expense of any nature and whatsoever arising shall in no circumstances exceed a total aggregate sum equal to 10 times the amount of the fee paid in respect of the specific service which gives rise to such claim or US\$ 20,000 (or its equivalent in local currency), whichever is the lesser.

(5) The Company shall have no liability for any indirect or consequential loss including without limitation loss of profits, loss of business, loss of opportunity, loss of goodwill and cost of product recall. It shall further have no liability for any loss, damage or expenses arising from the claims of any third party (including, without limitation, product liability claims) that may be incurred by the Client.

(6) In the event of any claim, Client must give written notice to the Company within 30 days of discovery of the facts alleged to justify such claim and, in any case, the Company shall be discharged from all liability for all claims for loss, damage or expense unless suit is brought within one year from:

(i) the date of performance by the Company of the service which gives rise to the claim; or (ii) the date when the service should have been completed in the event of any alleged nonperformance.

(b) Indemnification: Client shall guarantee, hold harmless and indemnify the Company and its officers, employees, agents or subcontractors against all claims (actual or threatened) by any third party for loss, damage or expense of whatsoever nature including all legal expenses and related costs and whatsoever arising relating to the performance, purported performance or non-performance, of any services.

7 Miscellaneous

(a) If any one or more provisions of these General Conditions are found to be illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.

(b) During the course of providing the services and for a period of one year thereafter Client shall not directly or indirectly entice, encourage or make any offer to Company's employees to leave their employment with the Company.

(c) Use of the Company's corporate name or registered marks for advertising purposes is not permitted without the Company's prior written authorisation.

8 Governing Law, Jurisdiction and Dispute Resolution

Unless specifically agreed otherwise, all disputes arising out or in connection with Contractual Relationship(s) hereunder shall be governed by the substantive laws of Switzerland exclusive of any rules with respect to conflicts of laws and be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with the said rules. The arbitration shall take place in Paris (France) and be conducted in the English language.

Report No. : 2014-00429 / 001-2 (Page 1 of 1) Issued date : May 7, 2014

CLIENT : RESOURCE AND ENVIRONMENT MYANMAR CO., LTD.
CONTACT : Ms. Pwint Pwint
ADDRESS : B702 Delta Plaza, Shwegondaing Rd., Bahan, Yangon, Myanmar
 Tel. +959-73013448 Fax. +951-552901
 E-mail : pwint@enviromyanmar.net

Analysis Report

PROJECT NAME : Project for Electric Power Development in Thilawa Area
 (Environmental Survey for Package 4)
SAMPLE DESIGNATED AS : Water Quality **SAMPLING DATE :** 6 & 7 April, 2014
SAMPLING LOCATION : Thilawa, Yangon in Myanmar **SAMPLING BY :** Client

Stations	Results	
	Oil and Grease (mg/l)	Chromium Hexavalent (mg/l)
1. WQ-1(G)	1.0	< 0.02
2. WQ-2(G)	1.0	< 0.02
3. WQ-3(G)	1.0	< 0.02
Detection Limit	1.0	0.02

Remark : - Analysis Methods followed to Standard Methods for the Examination of Water and Wastewater, recommended by APHA-AWWA-WEF.

Siriporn Z
 (Siriporn Imwilaiwan)
 License ID : ๓-010-๓-1793



Thepson Y
 (Thepson Yommana)
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APPLIED GEOLOGY DEPARTMENT, GEOCHEMISTRY
LABORATORY

Sample Type – River Sediment and Soil
Method – Atomic Absorption Spectrophotometer
Digestion – Aqua-regia

Project – Project for Electric Power Development (Package 4)
Requested by Resource & Environment Myanmar Co., Ltd.
Issue Date – 9-4-2014

Sample No	pH	As	Hg	Se	CN	Cu	Pb	Zn	Cr	Ni	Mn	Fe	Cd	Unit
SO1(G)	6.8	<0.001	<0.002	<0.36	<0.05	105	135	80	18	15	30	2150	0.004	mg/kg
SO2(G)	6.8	<0.001	<0.002	<0.36	<0.05	110	140	85	20	18	32	2300	0.008	mg/kg



Dr. Han Sein
Associate Professor
Applied Geology Department

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THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF LIVESTOCK, FISHERIES AND RURAL DEVELOPMENT
DEPARTMENT OF FISHERIES
FISH INSPECTION AND QUALITY CONTROL DIVISION
YANGON, MYANMAR
ANALYTICAL LABORATORY SECTION



ORIGINAL

Test Report for Microbiological Analysis

Name of Project : Project for Electric Power Development in the Thilawa Area

Name of Company : Resource and Environment Myanmar Co., Ltd.

Date of Received : 7.4.2014

Date of Analysis : 7.4.2014

Test Method : AOAC Petrifilm Method


No	Date of Analysis	Detail of Samples (Water)	Total Coliforms cfu/100ml	Fecal Coliforms cfu/100ml	E.coli cfu/100ml	Remarks
1	7.4.14	WQ-1	3.4×10^3	1.4×10^2	2×10^3	
2	7.4.14	WQ-2	3×10^3	2×10^3	1×10^3	

Reference : The International Commission on Microbiological Specification for foods (ICMSF, 1986), 98/93 EC, Guidelines for drinking water quality WHO 1997 (2nd Edition).

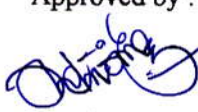
Analyzed by :


(Than Than Myint)
Micro Lab

Evaluated by:


Dr. Su Myo Thwe
Ph.D Japan
TM, Head of Micro Lab

Approved by :


Thet Naing (QMR)
B.Sc (Chemistry)
Assistant Director
Analytical Laboratory Section
Department of Fisheries

Remarks: This result is responsible for the sample in the lab.

*Appendix-4 Environmental and Social
Monitoring Form*

Environmental and Social Monitoring Form for a substation

This environmental and social monitoring form shall be attached in monthly progress report.

1. Check List of Implementation Status for Mitigation and Improvement Measures

Please mark the implementation status of mitigation and improvement measures.

(1) Pollution

1) Air Quality

No.	Items	Implementation status		
1	Sprinkling water around construction area	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
2	Prohibition of idling	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
3	Avoidance of intensive operation of construction machinery	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
4	Regular inspection and maintenance of construction equipment, machines and vehicle	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
5	Proper storage of construction equipment, machines and waste such as construction soil	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			

2) Water Quality

No.	Items	Implementation status		
1	Settling ponds or simple turbid water treatment (as necessary) in construction site	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
2	Installation of a sheet to prevent muddy water at excavation	<input type="checkbox"/>	<input type="checkbox"/> Not	<input type="checkbox"/>

No.	Items	Implementation status		
		Implemented	Applicable	Others
	site (as necessary)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			

3) Solid waste

No.	Items	Implementation status		
		Implemented	Applicable	Others
1	Utilization of construction soil waste in the construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			
2	Construction of hygienic human waste disposal systems such as mobile toilets and restore sites properly on completion of work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			
3	Disposal of vegetable waste at designated dumping site regulated by local authorities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			
4	Arrangement to sort out recyclable waste such as paper, cans, tins, bottles, cardboard, and polythene at collecting points and disposed of complying with local authority's regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			
5	Recording the usage of hazardous and chemical substance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			
6	Safekeeping of hazardous and chemical substance at designated storage area and entrustment to dispose by Yangon City Development Committee or other proper organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			

4) Noise and Vibration

No.	Items	Implementation status		
1	Installation of a soundproof sheet around construction area as necessary	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
2	Complying with the maximum driving speed	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
3	Advanced notice of operations and prohibited time to surrounding area	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			

(2) Social Environment

1) Poor

No.	Items	Implementation status		
1	Contribution to regional economy such as hiring workers from surrounding area within the limitation of the contractors' capacity.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			

2) Local economy such as employment and livelihood

No.	Items	Implementation status		
1	Contribution to regional economy within limitation of the contractors' capacity. (such as Hiring worker from surrounding area)	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			

3) Gender and Children's Right

No.	Items	Implementation status		
1	Preventing the impact on gender and children right. (such as promotion of equal employment opportunity and prohibition of child labour)	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			

(3) Health and Safety

1) Occupational health and safety

No.	Items	Implementation status		
1	Provision of adequate health care facilities (first aid) within construction sites.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
2	Training all construction workers about basic sanitation, health care issues, general health and safety matters, and on the specific hazards of construction work.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
3	Provision of personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, spectacles and ear protection.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
4	Provision of clean drinking water facilities for all workers.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
5	Adequate protection to the general public, including safety barriers and marking of hazardous areas.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
6	Ensuring a safe access across the construction site	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
7	Securing the adequate drainage throughout the camp. It is for prevention of disease vectors such as stagnant water bodies and puddles.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			

No.	Items	Implementation status		
8	Installation of a septic tank and garbage bins in construction site. And it is regularly cleared for prevention of outbreak disease.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
9	Arrange the temporary integration of waste collection from work sites to an existing waste collection system and disposal facilities of nearby communities.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
10	Preventing and control measures for heat and noise condition at working site.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
11	Preventing and control measures for working at height (in construction phase and during test operation)	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
12	Management of a proper method for electrical hazards.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
13	Installation of fire-fighting equipment such as potable extinguishers is to be provided at the potential fire hazard areas.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			

2) Community health and safety

No.	Items	Implementation status		
1	Protection of the community from physical, chemical, or other hazards associated with sites under construction and decommissioning	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
2	Avoid a contact with hazardous materials, contaminated soils, etc...	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			

No.	Items	Implementation status		
3	Minimization of incidence of road accidents involving project vehicles during construction by education and awareness-raising training If "Not Applicable" or "Others", please describe the remarks in here.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others

3) Risk for infectious disease such as AIDS/HIV

No.	Items	Implementation status		
1	Conducting the training to workers for preventing the infectious disease. If "Not Applicable" or "Others", please describe the remarks in here.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
2	Conducting the training to local resident for preventing the infectious disease. If "Not Applicable" or "Others", please describe the remarks in here.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others

2. Complaints from Public

Please mark and describe the status of complaints from public

Complains from public	Category	Number of complains	Number of solved complains
<input type="checkbox"/> Received <input type="checkbox"/> Not Received	Pollution		
	Social Environment		
	Health and Safety		
	Others (if any)		

Please describe the detail information of complaints from public and its countermeasures.

Detail information of complaints from public
Pollution:
Social Environment:

Detail information of complaints from public
Health and Safety:
Others (if any):

3. Air Quality

(1) Ambient Air Quality

Is there any implementation of ambient air quality measurement in this monitoring period? Yes, No

If “Yes”, please describe and fill in below the table.

Parameter	Sampling Point	Date and Duration	Method	Result (Minimum) (µg/m ³)	Result (Average) (µg/m ³)	Result (Maximum) (µg/m ³)	Remarks
Nitrogen Dioxide (for 1 hour)							
Particulate Matter (PM ₁₀) ¹ (for 24 hour)							
Particulate Matter (PM _{2.5}) ² (for 24 hour)							
Sulfur Dioxide (for 24 hour and 10 minute)							

4. Water Quality

Is there any implementation of water quality analysis in this monitoring period? Yes, No

If “Yes”, please describe and fill in below the table.

Sampling point	Sampling time, Date	Method	BOD (mg/l)	COD (mg/l)	Oil and Grease (mg/l)	pH	Total Coliform bacteria (100 ml)	Total Nitrogen (mg/l)	Total Phosphorous (mg/l)	Total suspended solids (mg/l)

¹ Particulate Matter up to 10 micrometers in size

² Particulate Matter 2.5 micrometers or less in diameter

5. Noise and Vibration

Is there any implementation of noise and vibration level survey in this monitoring period? Yes, No
If “Yes”, please describe and fill in below the table.

No.	Location	Items	Unit	Type of area Residential house and monastery located less than 250m	Results		Remarks
		Parameter			7:00 - 22:00 (10:00 - 22:00 for Public holidays)	Evening Time (Leq) 22:00 - 7:00 (22:00-10:00 for Public holidays)	
1		Noise (L _{eq})	One hour LAeq (dB(A)) during 24 hours on a weekday	<input type="checkbox"/> Yes, <input type="checkbox"/> No			
		Vibration (L _a)	dB during 24 hours on a weekday	<input type="checkbox"/> Yes, <input type="checkbox"/> No			
2		Noise (L _{eq})	One hour LAeq (dB(A)) during 24 hours on a weekend	<input type="checkbox"/> Yes, <input type="checkbox"/> No			
		Vibration (L _a)	dB during 24 hours on a weekend	<input type="checkbox"/> Yes, <input type="checkbox"/> No			

6. Monitoring Form for Solid Waste Amount

Please report the amount of solid wastes that was entrusted to Thanlyin or Kyauktan Township Development Committee or other proper organizations to dispose.

No.	Waste characteristics	Activity that is cause of solid waste generation	Number of times that entrusted to dispose	Organization of solid waste collection
e.g.	Oil	Maintenance of construction vehicle	2	A
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

End of Document

Environmental and Social Monitoring Form for a Transmission Line

This environmental and social monitoring form shall be attached in monthly progress report.

1. Check List of Implementation Status for Mitigation and Improvement Measures

Please mark the implementation status of mitigation and improvement measures.

(1) Pollution

1) Air Quality

No.	Items	Implementation status		
1	Sprinkling water around construction area	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
2	Prohibition of idling	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
3	Avoidance of intensive operation of construction machinery	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
4	Regular inspection and maintenance of construction equipment, machines and vehicle	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
5	Proper storage of construction equipment, machines and waste such as construction soil	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			

2) Water Quality

No.	Items	Implementation status		
1	Settling ponds or simple turbid water treatment (as necessary) in construction site	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
2	Installation of a sheet to prevent muddy water at excavation	<input type="checkbox"/>	<input type="checkbox"/> Not	<input type="checkbox"/>

No.	Items	Implementation status		
		Implemented	Applicable	Others
	site (as necessary)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			

3) Solid waste

No.	Items	Implementation status		
		Implemented	Applicable	Others
1	Utilization of construction soil waste in the construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			
2	Construction of hygienic human waste disposal systems such as mobile toilets and restore sites properly on completion of work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			
3	Disposal of vegetable waste at designated dumping site regulated by local authorities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			
4	Arrangement to sort out recyclable waste such as paper, cans, tins, bottles, cardboard, and polythene at collecting points and disposed of complying with local authority's regulations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			
5	Recording the usage of hazardous and chemical substance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			
6	Safekeeping of hazardous and chemical substance at designated storage area and entrustment to dispose by Yangon City Development Committee or other proper organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	If "Not Applicable" or "Others", please describe the remarks in here.			

4) Noise and Vibration

No.	Items	Implementation status		
1	Installation of a soundproof sheet (neighbour to preservation area such as residence and pagoda) as necessary	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
2	Complying with the maximum driving speed	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			
3	Advanced notice of operations and prohibited time to surrounding area	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			

(2) Social Environment

1) Land Acquisition

Monitoring form related to land acquisition is shown in Item 7 (Land Acquisition) in this form.

2) Poor

No.	Items	Implementation status		
1	Contribution to regional economy such as hiring workers from surrounding area within the limitation of the contractors’ capability.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			

3) Local economy such as employment and livelihood

Monitoring form related to land acquisition is shown in Item 8 (Temporary Land Use) in this form.

4) Gender and Children’s Right

No.	Items	Implementation status		
1	Preventing the impact on gender and children right. (such as promotion of equal employment opportunity and prohibition of child labour)	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If “Not Applicable” or “Others”, please describe the remarks in here.			

(3) Health and Safety

1) Occupational health and safety

No.	Items	Implementation status		
1	Provision of adequate health care facilities (first aid) within construction sites.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
2	Training all construction workers about basic sanitation, health care issues, general health and safety matters, and on the specific hazards of construction work.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
3	Provision of personal protection equipment for workers, such as safety boots, helmets, gloves, protective clothing, spectacles and ear protection.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
4	Provision of clean drinking water facilities for all workers.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
5	Adequate protection to the general public, including safety barriers and marking of hazardous areas.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
6	Ensuring the safe access across the construction site	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
7	Securing the adequate drainage throughout the camp. It is for prevention of disease vectors such as stagnant water bodies and puddles.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			

No.	Items	Implementation status		
8	Installation of a septic tank and garbage bins in construction site. And it is regularly cleared for prevention of outbreak disease.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
9	Arrange the temporary integration of waste collection from work sites to an existing waste collection system and disposal facilities of nearby communities.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
10	Preventing and control measures for heat and noise condition at working site.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
11	Preventing and control measures for working at height (in construction phase and test operation)	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
12	Management of a proper method for electrical hazards.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
13	Installation of fire-fighting equipment such as potable extinguishers is to be provided at the potential fire hazard areas.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			

2) Community health and safety

No.	Items	Implementation status		
1	Protection of the community from physical, chemical, or other hazards associated with sites under construction and decommissioning	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			
2	Avoid a contact with hazardous materials, contaminated soils, etc...	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
	If "Not Applicable" or "Others", please describe the remarks in here.			

No.	Items	Implementation status		
3	Minimization of incidence of road accidents involving project vehicles during construction by education and awareness-raising training If "Not Applicable" or "Others", please describe the remarks in here.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others

3) Risk for infectious disease such as AIDS/HIV

No.	Items	Implementation status		
1	Conducting the training to workers for preventing the infectious disease. If "Not Applicable" or "Others", please describe the remarks in here.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others
2	Conducting the training to local resident for preventing the infectious disease. If "Not Applicable" or "Others", please describe the remarks in here.	<input type="checkbox"/> Implemented	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Others

2. Complaints from Public

Please mark and describe the status of complaints from public

Complains from public	Category	Number of complains	Number of solved complains
<input type="checkbox"/> Received <input type="checkbox"/> Not Received	Pollution		
	Social Environment		
	Health and Safety		
	Others (if any)		

Please describe the detail information of complaints from public and its countermeasures.

Detail information of complaints from public
Pollution:
Social Environment:

Detail information of complaints from public
Health and Safety:
Others (if any):

3. Air Quality

(1) Ambient Air Quality

Is there any implementation of ambient air quality measurement in this monitoring period? Yes, No

If “Yes”, please describe and fill in below the table.

Parameter	Sampling Point	Date and Duration	Method	Result (Minimum) (µg/m ³)	Result (Average) (µg/m ³)	Result (Maximum) (µg/m ³)	Remarks
Nitrogen Dioxide (for 1 hour)							
Particulate Matter (PM ₁₀) ¹ (for 24 hour)							
Particulate Matter (PM _{2.5}) ² (for 24 hour)							
Sulfur Dioxide (for 24 hour and 10 minute)							

4. Water Quality

Is there any implementation of water quality analysis in this monitoring period? Yes, No

If “Yes”, please describe and fill in below the table.

Sampling point	Sampling time, Date	Method	BOD (mg/l)	COD (mg/l)	Oil and Grease (mg/l)	pH	Total Coliform bacteria (100 ml)	Total Nitrogen (mg/l)	Total Phosphorous (mg/l)	Total suspended solids (mg/l)

¹ Particulate Matter up to 10 micrometers in size

² Particulate Matter 2.5 micrometers or less in diameter

5. Noise and Vibration

Is there any implementation of noise and vibration level survey in this monitoring period? Yes, No
If “Yes”, please describe and fill in below the table.

No.	Location	Items	Unit	Type of area Residential house and monastery located less than 250m	Results		Remarks
		Parameter			7:00 - 22:00 (10:00 - 22:00 for Public holidays)	Evening Time (Leq) 22:00 - 7:00 (22:00-10:00 for Public holidays)	
1		Noise (L _{eq})	One hour LAeq (dB(A)) during 24 hours on a weekday	<input type="checkbox"/> Yes, <input type="checkbox"/> No			
		Vibration (L _a)	dB during 24 hours on a weekday	<input type="checkbox"/> Yes, <input type="checkbox"/> No			
2		Noise (L _{eq})	One hour LAeq (dB(A)) during 24 hours on a weekend	<input type="checkbox"/> Yes, <input type="checkbox"/> No			
		Vibration (L _a)	dB during 24 hours on a weekend	<input type="checkbox"/> Yes, <input type="checkbox"/> No			

6. Monitoring Form for Solid Waste Amount

Please report the amount of solid wastes that was entrusted to Thanlyin or Kyauktan Township Development Committee or other proper organizations to dispose.

No.	Waste characteristics	Activity that is cause of solid waste generation	Number of times that entrusted to dispose	Organization of solid waste collection
e.g.	Oil	Maintenance of construction vehicle	2	A
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

7. Monitoring Form for Cutting Tree

If there were some cutting trees, please report the tree census as below.

No.	Tree species	Category	Numbers	Height of trees (m)	Status	Remark
1		<input type="checkbox"/> Common <input type="checkbox"/> Valuable			<input type="checkbox"/> Cut <input type="checkbox"/> Replant <input type="checkbox"/> Untouched	
2		<input type="checkbox"/> Common <input type="checkbox"/> Valuable			<input type="checkbox"/> Cut <input type="checkbox"/> Replant <input type="checkbox"/> Untouched	
3		<input type="checkbox"/> Common <input type="checkbox"/> Valuable			<input type="checkbox"/> Cut <input type="checkbox"/> Replant <input type="checkbox"/> Untouched	
4		<input type="checkbox"/> Common <input type="checkbox"/> Valuable			<input type="checkbox"/> Cut <input type="checkbox"/> Replant <input type="checkbox"/> Untouched	
5		<input type="checkbox"/> Common <input type="checkbox"/> Valuable			<input type="checkbox"/> Cut <input type="checkbox"/> Replant <input type="checkbox"/> Untouched	
6		<input type="checkbox"/> Common <input type="checkbox"/> Valuable			<input type="checkbox"/> Cut <input type="checkbox"/> Replant <input type="checkbox"/> Untouched	
7		<input type="checkbox"/> Common <input type="checkbox"/> Valuable			<input type="checkbox"/> Cut <input type="checkbox"/> Replant <input type="checkbox"/> Untouched	
8		<input type="checkbox"/> Common <input type="checkbox"/> Valuable			<input type="checkbox"/> Cut <input type="checkbox"/> Replant <input type="checkbox"/> Untouched	
9		<input type="checkbox"/> Common <input type="checkbox"/> Valuable			<input type="checkbox"/> Cut <input type="checkbox"/> Replant <input type="checkbox"/> Untouched	
10		<input type="checkbox"/> Common <input type="checkbox"/> Valuable			<input type="checkbox"/> Cut <input type="checkbox"/> Replant <input type="checkbox"/> Untouched	

8. Monitoring Form for Land Acquisition

Please describe the detail of compensation for land acquisition and attach the picture below.

No.	Status of compensation for land acquisition 1: Total affected area 2: Compensation price	Date of issue the advance notice	Date of payment the compensation cost	Date of completion (Restitution)	Name of affected person	Location	Remark
e.g.	1: Total: 3ha 2: 1, 450,000 MMK	28th November 2016	8th December 2016	30th December 2016	Mr. XXXXXX	Pha Yar Gone Village Tract in Thanlyin Township	
1							
2							
3							
4							
5							

9. Monitoring Form for local economy such as employment and livelihood (Compensation for temporary land use)

If there were compensation for temporary land use, please describe the detail of compensation for temporary land use and attach the picture below.

No.	Status of compensation for temporary land use 1: Total affected area 2: Compensation price	Date of issue the advance notice	Date of payment the compensation cost	Date of completion (Restitution)	Name of affected person	Location	Remark
e.g.	1: Total: 3ha 2: 1,000 MMK	28th November 2015	8th December 2015	30th December 2015	Mr. XXXXX	Pha Yar Gone Village Tract in Thanlyin Township	
1							
2							
3							
4							
5							

10. Monitoring Form for removal of vendors within Right of Way of the Ministry of Construction

Please describe the detail of temporary setback and attach the picture as below.

No.	Date of issue of an advanced notice	Date of Implementation	Date of completion	Name of affected person	Type of facilities*	Location	Picture of original state	Picture of completion state	Remark
1					<input type="checkbox"/> Mobile vendors operating with carts <input type="checkbox"/> Vendors with easily transition <input type="checkbox"/> Vendors which are easily reassemble				
2					<input type="checkbox"/> Mobile vendors operating with carts <input type="checkbox"/> Vendors with easily transition <input type="checkbox"/> Vendors which are easily reassemble				
3					<input type="checkbox"/> Mobile vendors operating with carts <input type="checkbox"/> Vendors with easily transition <input type="checkbox"/> Vendors which are easily reassemble				
4					<input type="checkbox"/> Mobile vendors operating with carts <input type="checkbox"/> Vendors with easily transition <input type="checkbox"/> Vendors which are easily reassemble				
5					<input type="checkbox"/> Mobile vendors operating with carts <input type="checkbox"/> Vendors with easily transition <input type="checkbox"/> Vendors which are easily reassemble				

* Image pictures of type of facilities are shown below.

		
<p>Mobile Vendors Operating with Carts</p>	<p>Vendors with easy Transition</p>	<p>Vendors which are easily reassemble</p>

End of Document

Appendix-5 The meeting minutes, participants list and photos of Stakeholder Meeting and Public Consultation Meeting and evidence letters to show the reflection of opinion of PAPs when developing the Project

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Thanlyin Township General Administration Department (hereinafter referred to as “GAD”), Settlement and Land Record Department (hereinafter referred to as “LRD”), and Nippon Koei Co., Ltd. (hereinafter referred to as “the Consultant”) have carried out site investigation for the construction of 230 kV Transmission towers and power lines in Hpa Yar Kone Village Tract, Ba Yet Village Tract and Let Yet San Village Tract in Thanlyin Township on the captioned project on 28 May, 2016.

1. The purpose of the joint site investigation is to confirm the location of proposed transmission towers in Hpa Yar Kone Village Tract and Ba Yet Village Tract near Thanlyin substation and in Let Yet San Village Tract and to confirm who own these land.

Figure 1: Photos of site investigation



Site survey with following organizations.

1. Thanlyin Township GAD
2. Hpa Yar Kone Village Tract, Ba Yet Village Tract Administrator and Let Yat San Village Tract Administrator
3. Hpa Yar Kone Village Tract, Ba Yet Village Tract and Let Yat San Village Tract Settlement and Land Record Department in Thanlyin Township
4. Department of Power Transmission and System Control (DPTSC)
5. Takaoka Co., Ltd., Contractor
6. Supreme Group Companies, Sub-contractors,
7. Nippon Koei (Myanmar Koei)

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Thanlyin Township General Administration Department (hereinafter referred to as “GAD”), Settlement and Land Record Department (hereinafter referred to as “LRD”), and Nippon Koei Co., Ltd. (hereinafter referred to as “the Consultant”) have carried out discussion on land acquisition for the construction of 230 kV Transmission towers and power lines in Hpa Yar Kone Village Tract, Ba Yet Village Tract and Let Yet San Village Tract in Thanlyin Township on the captioned project on 3rd June, 2016 at Thanlyin Township GAD office and confirmed the followings.

1. Please see Figure 1 for proposed tower locations near Thanlyin substation.
2. Proposed Tower No. 11, 12 and 13, which are existed near Thanlyin substation in Hpa Yar Kone village tract in Thanlyin Township, are located within the land which have the right to use for a factory or organic farming. (Please see Figure 2 and 3)
3. The land is allowed to use for other usage other than farming in March, 2016 by the government.
4. The above land is owned by Ms. Khin Ye, Ve Ve soft drink Co., Ltd., a famous soft drink local company in Myanmar.
5. Three numbers of representatives of Ms. Khin Ye attended the meeting and they said that the proposed location of Tower No. 11, 12 and 13 are existed inside the area which is planned to construct the factory. They requested to change the location of these towers as they pass through the planned factory area diagonally.
6. Proposed Tower No. 5, which is existed in Let Yat San village tract in Thanlyin Township, is located on the land which is owned by Mr. Htay Naing, the husband of Ms. Khin Ye. (Please see Figure 4, 5 and 6)
7. The owner of the above land, on which Tower No. 5 located, submitted an application to allow to use this land for other usage. The government does not approve it yet and the approval is under processing.
8. Three representatives of the owner of the land does not give any comment on this Tower No. 5.
9. Proposed Tower No. 6 is located on the land belongs to Mr. Khin Nyo in Hpa Yar Kone village in Thanlyin Township. The owner of this land did not attend the meeting.
10. Proposed Tower No. 7, 8 and 9 are located on the land which belongs to Mr. Ko Ko Naing. He said that if possible, proposed tower locations shall be changed to mitigate the impacts on its farmland.
11. Proposed Tower No. 10 located on the land which belongs to Mr. Bar Bu. According to Settlement and Land Record Department, there may be no objections from him.
12. Proposed Tower No. 14 is located within the Right of Way of Dagon-Thilawa road.
13. A joint survey is planned to conduct on 6 June, 2016 to find a new line route to mitigate impacts due to the construction of electric towers and power lines together with Thanlyin Township Administrator,

Hpa Yar Kone Village Tract Administrator, Ba Yet Village Tract Administrator, Let Yet San Village Tract Administrator, Hpa Yar Kone Village Tract LRD, Ba Yet Village Tract LRD, Let Yet San Village Tract LRD, Thanlyin Township YESC, related Land owners, Sub-contractors, a Survey company and the Consultant.



Figure 1: Proposed Tower locations near Thanlyin Sub-Station



Figure 2: Tower No. 11, 12 and 13 located within the factory area in Hpa Yar Kone village in Thanlyin Township



Figure 3: The boundary of the land approved to utilize for other usage



Figure 4: Location of a proposed Tower No. 50



Figure 5: Tower No. 50 located on a farm land in Let Yat San village in Thanlyin Township

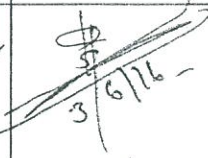







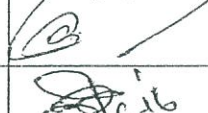

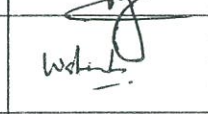
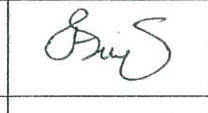
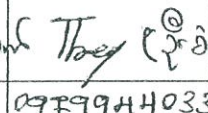



Figure 6: The boundary of the land which the owner applied an approval request to utilize for other usage

Participants

No.	Name	Position	Department
1	Mr. Win Naing	Deputy Township Administrator	Thanlyin Township General Administration Department
2	Mr. Mya Shwe	Township Manager	Township Electricity Supply Cooperation
3	Mr. Khin Maung Swe	Assistant Office Staff	Township Farm Land Management, Settlement and Land Record Department
4	Mr. Wai Phyo Aung Daw Khin Swe Myint	Second head	Township Agricultural Department
5	Mr. Aye Min Naing	Land Measurement-4 (Hpa Yar Kone Village Tract)	Township Farm Land Management, Settlement and Land Record Department
6	Mr. Aung Myat Thu	Land Measurement-4 (Ba Yet Village Tract)	Township Farm Land Management, Settlement and Land Record Department
7	Mr. Nyan Tun Win	Land Measurement-4 (Let Yat San Village Tract)	Township Farm Land Management, Settlement and Land Record Department
8	Mr. Phone Kyaw Thu	Village Tract Administrator	Hpa Yar Kone Village Tract
9	Mr. Sein Nwet	Village Tract Administrator	Ba Yet Village Tract
10	Mr. Soe Naing Oo	Village Tract Administrator	Let Yet San Village Tract
11	Mr. Phyo Pyae Win (Representative of Ms. Khin Yee and Mr. Htay Naing)	Land owner of proposed Tower No. 11, 12, 13 and 50	09-73206007
12	Ms. Wah Wah Han Su Yin	Consultant	Myanmar Koei International Ltd.
13	Mr. Aung Kyaw Htun	Assistant Staff Officer	Project Manager Office (1)
14	Mr. Ko Ko Naing (or) Mr. Wa Tin Thein	Farmer and Land owner of proposed Tower No. 7, 8 and 9	Myo Haung (East) Ward /Ba Yet

(၃.၆.၂၀၁၆)ရက်နေ့၊နံနက်(၁၀၀၀)နာရီအချိန် မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနရုံး၌ ကျင်းပပြုလုပ်သော သီလဝါ-သန်လျင် ဓါတ်အားလှိုင်းတည်ဆောက်ခြင်း လုပ်ငန်းညှိနှိုင်း အစည်းအဝေး

စဉ်	အမည်	ရာထူး	ဌာန	လက်မှတ်
၁။	ဦးဝင်းနိုင်	ဒုတိယမြို့နယ်အုပ်ချုပ်ရေးမှူး	မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊သန်လျင်မြို့	
၂။	ဦးမြရွှေ	မြို့နယ်မန်နေဂျာ	မြို့နယ်လျှပ်စစ်ဓါတ်အားပေးရေးကော်ပိုရေးရှင်း	
၃။	ဦးခင်မောင်ဆွေ	ဒုတိယဦးစီးမှူး	မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန	
၄။	ဦးဝေဖြိုးအောင် ဒေါ်ခင်ဆွေမြင့်	ဒုတိယဦးစီးမှူး "	မြို့နယ်စိုက်ပျိုးရေးဦးစီးဌာန ၀၄၇၄၆၆၇၄၂၇၂	
၅။	ဦးအေးမင်းနိုင်	မြေတိုင်း-၄ ၁၃၇၁ ကုန်	မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန	
၆။	ဦးအောင်မြတ်သူ	မြေတိုင်း-၄ ၁၀၂၀၀၀	မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန	
၇။	ဦးဥက္ကဋ္ဌဦးဖိုး	မြေတိုင်း-၄ လက်ယက်ခင်း	မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန	
၈။	ဦးဘုန်းကျော်သူ	အုပ်ချုပ်ရေးမှူး	ဘုရားကုန်းကျေးရွာအုပ်စု	
၉။	ဦးစိန်နွဲ့	အုပ်ချုပ်ရေးမှူး	ဘယက်ကျေးရွာအုပ်စု	
၁၀။	ဦးစိုးနိုင်ဦး	အုပ်ချုပ်ရေးမှူး	လက်ယက်စမ်းကျေးရွာအုပ်စု	
၁၁။	ဒေါ်ခင်ရီ (ကျမ်းစာ)	(ကျမ်းစာ) ကိုဖြိုးဖြူ	ဖုန်း: ၀၉ ၇၃၇၀၆၀၀၇	
၁၂။	ဝါဝါဟန်စုယုန်	အဆိုပိုင်ခံ	Myanmar Kaei	
၁၃။	ဦးကောင်ကျော်ထွန်း	ဦးစီးမှူး	ခြံမင်္ဂလာမန်နေဂျာ ခွဲ (၁)	
၁၄။	ဦးကျော်စွာ	လက်ထောက်	(မြို့လှောင်) ကျေးရွာအုပ်စု/ဘယက်	
	စာရင်းအင်း			၀၄၇၄၇၄၄၀၃၃၆

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Thanlyin Township General Administration Department (hereinafter referred to as “GAD”), Settlement and Land Record Department (hereinafter referred to as “LRD”), and Nippon Koei Co., Ltd. (hereinafter referred to as “the Consultant”) have carried out site survey on land acquisition for the construction of 230 kV Transmission towers and power lines in Hpa Yar Kone Village Tract, Ba Yet Village Tract and Let Yet San Village Tract in Thanlyin Township on the captioned project on 6th June, 2016 and confirmed the followings:

1. Mr. Ko Ko Naing, the owner of the land on which Tower No. 7, 8 and 9 approved to construct them on his land after confirming the location of these towers at site. (See Figure 1)
2. Line route alternatives will be prepared by Integral Co., Ltd., the survey company based on agreement from all land owners to mitigate impacts due to the construction of towers.
3. Three numbers of representatives from Ms. Khin Ye, the owner of the land on which Tower No. 50 located will give a reply if the land can be used for construction of this tower after confirming with the owner. They asked the Consultant about the amount of compensation and the Consultant explained the procedure of compensation; the compensation amount will be decided by a compensation committee and compensation will be provided by the Ministry of Electricity and Energy (MOEE) after getting an approval of compensation unit price from Yangon Regional Government. (See Figure 2)
4. Line route alternatives will be submitted to the Power Transmission and System Control Department to get an approval of a new line route after the survey company submitted them.



Figure 1: Proposed Tower locations near Thanlyin Sub-Station



Figure 2: Location of Tower No. 50

Participants

No.	Name	Position	Department
1.	Mr. Win Naing	Deputy Township Administrator	Thanyin Township General Administration Department
2.	Mr. Myat Ko Ko	Township Assistant Engineer	Township Electricity Supply Cooperation
3.	Mr. Aye Min Naing	Land Measurement-4 (Hpa Yar Kone Village Tract)	Township Farm Land Management, Settlement and Land Record Department
4.	Mr. Aung Myat Thu	Land Measurement-4 (Ba Yet Village Tract)	Township Farm Land Management, Settlement and Land Record Department
5.	Mr. Nyan Tun Win	Land Measurement-4 (Let Yat San Village Tract)	Township Farm Land Management, Settlement and Land Record Department
6.	Mr. Phone Kyaw Thu	Village Tract Administrator	Hpa Yar Kone Village Tract
7.	Mr. Sein Nwet	Village Tract Administrator	Ba Yet Village Tract
8.	Mr. Soe Naing Oo	Village Tract Administrator	Let Yet San Village Tract

No.	Name	Position	Department
9.	Mr. Phyo Pyae Win Representative of Ms. Khin Yee	Land owner of proposed Tower No. 11, 12, 13 and 50	09-73206007
10.	Mr. Thaung Han Soe	Surveyor	Integral Co., Ltd. (Survey Company)
11.	Mr. Aung Hlaing Tun	General Manager	Supreme Group Companies (Sub Contractor)
12.	Mr. Murai		Takaoka Co., Ltd. (Sub Contractor)
13.	Ms. Wah Wah Han Su Yin	Consultant	Myanmar Koei International Ltd.
14.	Mr. Ko Ko Naing (or) Mr. Naing Win	Farmer, Land owner of proposed Tower No. 7, 8 and 9	Myo Haung (East) Ward /Ba Yet

Memorandum (3)
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Department of Power Transmission and System Control (hereinafter referred to as “DPTSC”), Nippon Koei Co., Ltd. (hereinafter referred to as “the Consultant”) and Myanmar Koei International Ltd. ((hereinafter referred to as “MKI”) have conducted a meeting about the location of 230 kV Transmission towers and power lines in Hpa Yar Kone Village Tract, Ba Yet Village Tract and Let Yet San Village Tract in Thanlyin Township on the captioned project on 13th June, 2016 and confirmed the followings:

1. In order to avoid land use for construction of proposed Tower No. 11, 12 and 13 in the previous approved line route, DPTSC considered two new line route proposals: Proposal 1 and Proposal 2. Please see white color line in Figure 1 for line route of Proposal 2 near Thanlyin substation.
2. The land on which Tower No. 11, 12 and 13 located in Hpa Yar Gone Village Tract were approved to utilize for other means such as construction of a soft drink factory and organic farming by the Central Farm Land Management Committee on 21 March, 2016.
3. Proposal 1 will be prepared by Mr. Nyunt Wai and it will be shared to the Consultant by mail.
4. Line route of Proposal 1 takes longer black out time than Proposal 2 during power line installation. On the other hand, the area of land acquisition necessary for Proposal 1 is less than Proposal 2.
5. The decision of choosing new Proposal 1 and Proposal 2 depends on an agreement from land owners.
6. Project Manager-1 in Yangon South District will meet with land owners at the project site in cooperation with Thanlyin Township General Administration Department (GAD), corresponding Village Tract Administrators, Thanlyin Township Land Record Department, related Village Tract Land Measurement and MKI.
7. DPTSC requested TOENEC, the contractor to submit the above two proposals near Thanlyin substation to DPTSC and DPTSC will reply an official letter for confirmation of the selected line route.
8. Regarding Tower No. 50 in Let Yet San Village Tract is located on the land which is under application to utilize it for other purposes. DPTSC will submit a letter to related Ministry to inform that Tower No. 50 is located on that land.
9. Concerning the document submission about pile foundation from TOENAC, the contractor, Mr. Kyaw Naing Wynn from Civil Department asked the contractor to submit soil test results including bearing capacity of the soil at each layer in order to determine pile foundation is necessary for each mono pole electric tower.



Figure 1: Proposed Tower locations near Thanlyin Sub-Station

Participants

No.	Name	Position	Department
1.	Mr. Ye Toe Lwin	Deputy Chief Engineer	DPTSC
2.	Mr. Thein Lwin	Deputy Chief Engineer	DPTSC
3.	Mr. Kyi San Lin	Deputy Chief Engineer	DPTSC
4.	Mr. Kyaw Naing Wynn		Civil Department
5.	Mr. Thura Tun	Executive Engineer	DPTSC
6.	Mr. Thi Han Tun	Executive Engineer	Civil Department

No.	Name	Position	Department
7.	Mr. Zaw Lwin	Executive Engineer	DPTSC
8.	Mr. Nyunt Wai	Executive Engineer	Naypyitaw North District, Civil Department
9.	Mr. Yupa	Assistant Engineer	Project Manager-1 office, Yangon South District, DPTSC
10.	Mr. Akihisa Manita	Deputy Team Leader	Nippon Koei Co., Ltd.
11.	Mrs. Wah Wah Han Su Yin	Environmental and Social expert	Myanmar Koei International Ltd.



TOENEC CORPORATION

1-32, Chitose 3-chome, Minato-ku
 Nagoya, 455-0011, Japan
 Tel: +81-52-659-1200
 Fax: +81-52-659-1178

Date: 15 June 2016
 Letter No.: MT-M160615A

Attention : Mr. Htein Lwin
 Director General
Department of Power Transmission System Control
Ministry of Electricity and Energy

Subject : Sub-project for Electric Power Development in Thilawa Area
 under infrastructure Development in Thilawa Area (Phase 1)
 Project for Package 3: 230kV Transmission Line and Substation

Re. : **Request for Decision of Transmission Line Route (Tower Nos. 05 to15)**

Dear Sir;

According to the result of site survey held on 06 June 2016 attended with;

- Department of Power Transmission and System Control
- Thanlyin Township General Administration Department
- Nippon Koei Co., Ltd.

we, TOENEC Corporation would like to propose 2 alternative plans for the route of transmission line which tower No. #05 ~ #15 attached herewith.

The comparison table of each alternative plan is shown as below:

Tower List of Transmission Line (TW08 - TW15)

Item		Bidding Documents	Alternative Plan 1	Alternative Plan 2
I. Tower	Monopole Suspension (pcs)	6	5	6
	Monopole Tension (pcs)	1	1	2
	Lattice Tower (pcs)	3	2	3
II. Conductor Length (km)		2.32	1.53	2.53
III. Cost	Material	¥73,700,000	¥58,300,000	¥85,600,000
	Installation	¥10,300,000	¥8,200,000	¥11,800,000
	Total	¥84,000,000	¥66,500,000	¥97,400,000
IV. Assumed Shutdown Works (hour) *cumulative hour		90	100	90

You are kindly requested to instruct us which plan is suitable to be executed by official letter.

Your kind consideration and taking necessary issuance would be highly appreciated.

Yours Faithfully,

TOENEC CORPORATION



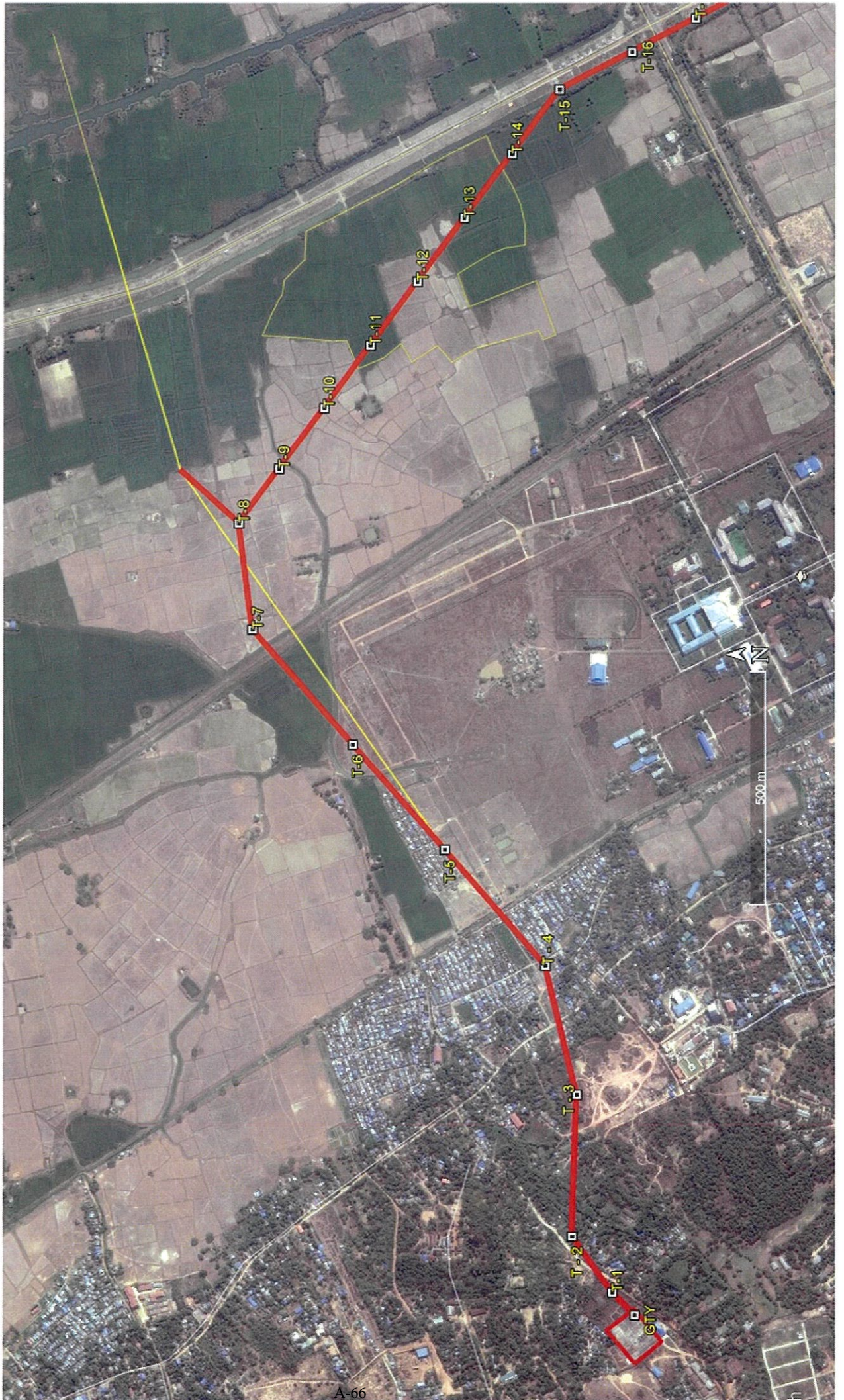
Kazuki Mikuriya
Project Site Manager

Attached: 2 sheets of alternative plan (Plan 1 & 2)

cc)

- 1) Power Transmission Projects Department
Mr. Kyi San Lin, Director
- 2) Nippon Koei Co., Ltd.
Mr. Akihisa MANITA, Deputy Team Leader

230kV Thanlyin-Thilawa Transmission
Thanlyin Switchyard to T-15
MOEE BIDDER



230kV Thanlyin-Thilawa Transmission
Thanlyin Switchyard to T-15
TENTATIVE-1



230kV Thanlyin-Thilawa Transmission
Thanlyin Switchyard to T-15
TENTATIVE-2



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန

မြန်မာ့လျှပ်စစ်ဓာတ်အားလုပ်ငန်း

စာအမှတ်- ၆၁၄ /ပေစ(ဒီဇိုင်း/၂၀၁၄

ရက်စွဲ - ၂၀၁၄ ခုနှစ်၊ မေလ (၁၅)ရက်

သို့

Nippon Koei Co.,Ltd. ✓

အကြောင်းအရာ။ သန်လျင် ပင်မဓာတ်အားခွဲရုံမှ သီလဝါစက်မှုဇုန်ခွဲရုံသို့ သွယ်တန်းမည့် ၂၃၀ ကေဗွီ ဓာတ်အားလိုင်းအူကြောင်းအား အတည်ပြုပြန်ကြားခြင်း

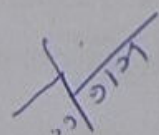
ရည်ညွှန်းချက်။ Nippon Koei Co.,Ltd. ၏ (၂.၅.၂၀၁၄) ရက်စွဲပါစာ

၁။ ၂၃၀ ကေဗွီ သန်လျင်-သီလဝါ ဓာတ်အားလိုင်းအူကြောင်း (၃)ခုအနက်မှ (၁)ခုအား ရွေးချယ်ပေးပါရန် Nippon Koei Co.,Ltd. မှ ရည်ညွှန်းချက်ပါစာဖြင့် တင်ပြလာပါသည်။

၂။ လိုင်းအူကြောင်း (၃)ခုအနက်မှ အမှတ်(၁)လိုင်းသည် စက်မှုဇုန်လမ်းမကြီးနှင့်အပြိုင် ကပ်လျက် Borrow မြေပေါ်မှ လျာထားသည်ကို တွေ့ရှိရပါသည်။ ယင်းပတ်ဝန်းကျင်တွင် ၃၃ ကေဗွီ လိုင်းများ၊ ဓာတ်ငွေ့ပိုက်လိုင်းများရှိပါ၍ ဓာတ်ငွေ့ပိုက်လိုင်းနှင့် အနည်းငယ်ရှောင်ကွင်း၍ ဆောင်ရွက်နိုင်မည်ဆိုပါက သင့်လျော်မှုရှိသည်ကို တွေ့ရှိရပါသည်။ အမှတ်(၂)လမ်းကြောင်းသည် လက်ရှိလျာထား စက်မှုဇုန်အားရှောင်ကွင်း၍ အသုံးပြုထားပြီး Tension တိုင်အများအပြား သုံးစွဲရပါမည်။ ထို့အပြင် လယ်ယာမြေများအား ဖြတ်သန်းထားသည်ကို တွေ့ရှိရပါသည်။ ထို့ကြောင့် မြေယာလျော်ကြေးပေးသည့်အခါ ပိုင်ရှင်အများအပြားနှင့် ထိတွေ့မှုရှိနိုင်ပါသည်။ အမှတ်(၃) လမ်းကြောင်းသည် စက်မှုဇုန်အတွင်းမှ ဖြတ်သန်းသည်ကိုတွေ့ရှိရပြီး ဓာတ်ငွေ့ပိုက်လိုင်း၊ ၃၃ ကေဗွီ လိုင်းနှင့်လည်း လွတ်ကင်းသည်ကို တွေ့ရှိရပါသည်။ မြေယာလျော်ကြေးပေးသည့်အခါ စက်မှုဇုန်အတွင်းဖြစ်၍ ဈေးနှုန်းကြီးမြင့်နိုင်ပါသည်။

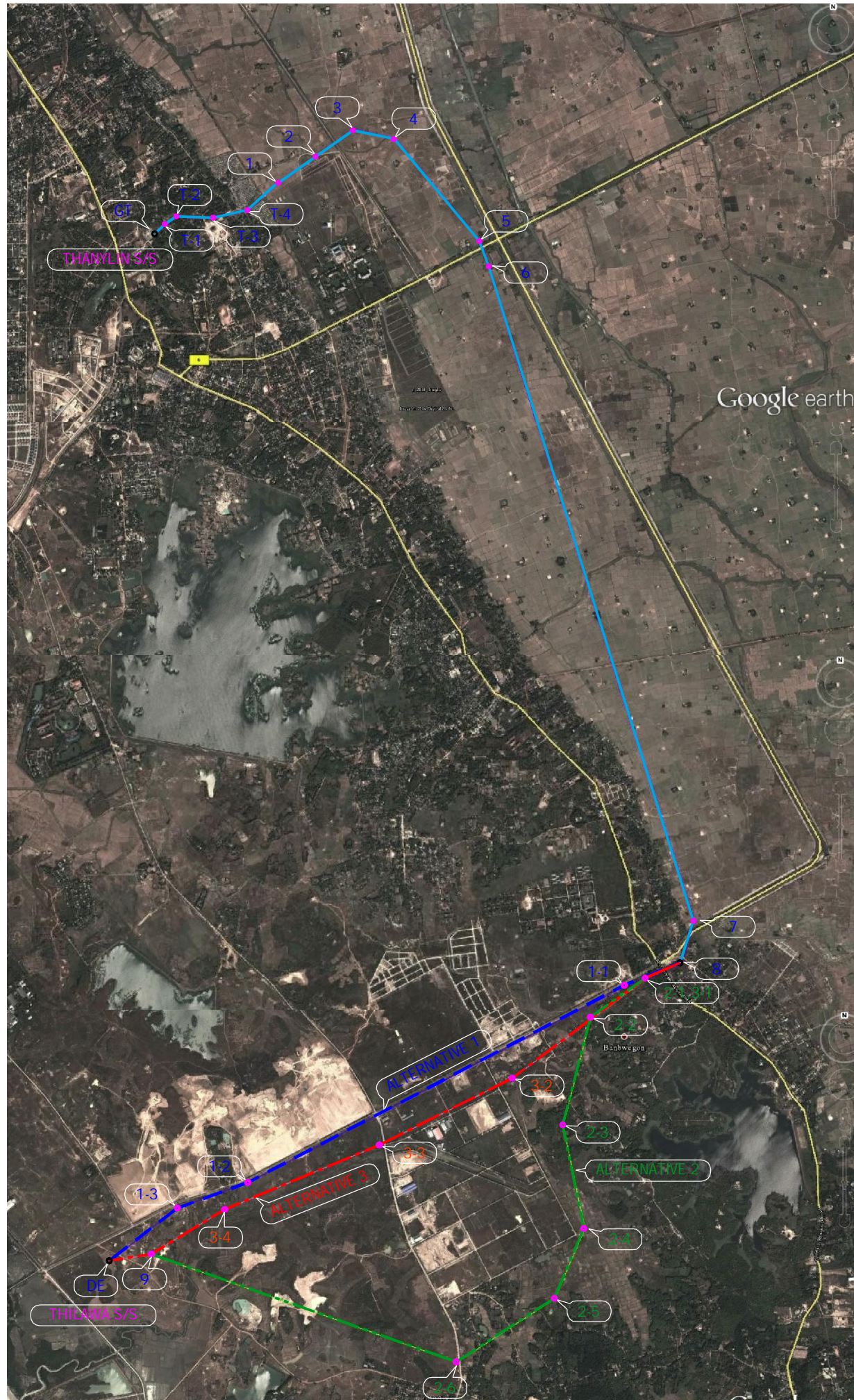
၃။ အထက်ပါ အခြေအနေများအရ အမှတ်(၁)လမ်းကြောင်း (Alternative-1) အား ရွေးချယ်အတည်ပြုပါကြောင်းနှင့် မြေယာလျော်ကြေးအား မြန်မာ့လျှပ်စစ်ဓာတ်အားလုပ်ငန်းမှ မြန်မာကျပ်ငွေဖြင့် ပေးချေမည်ဖြစ်ပြီး Nippon Koei Co.,Ltd. မှ ပြည်သူနှင့်တွေ့ဆုံခြင်း Effective People အား စိစစ်ပေးခြင်းများ ဆောင်ရွက်ပေးရန်လိုပါမည်။

၄။ ဆောင်ရွက်ရမည့် တာဝန်ဝတ္တရားများနှင့် ပတ်သက်၍ မြန်မာ့လျှပ်စစ်ဓာတ်အား လုပ်ငန်းအနေဖြင့် သက်ဆိုင်ရာရန်ကုန်တိုင်းဒေသကြီး အစိုးရအဖွဲ့သို့ ဆက်သွယ်အကြောင်းကြား ပေးခြင်း၊ စက်မှုဇုံကော်မတီနှင့် ညှိနှိုင်းပေးခြင်း၊ မြန်မာ့လျှပ်စစ်ဓာတ်အားလုပ်ငန်း၏ စီမံခန့်ခွဲရေး ဌာနနှင့် စီမံကိန်းမန်နေဂျာ(၁)၊ တောင်ပိုင်းတို့ ပူးပေါင်း၍ လျော်ကြေးငွေကိစ္စဆောင်ရွက်ပေး မည်ဖြစ်ပါသည်။ Nippon Koei Co.,Ltd. ၏ ပတ်ဝန်းကျင်ထိန်းသိမ်း စီစစ်ရေးအဖွဲ့မှ လိုအပ်သည့် Guide Line နှင့် Effective People များ တွေ့ဆုံပွဲစီစဉ်ပေးရမည် ဖြစ်သည့်အပြင် Compensation Area အား သတ်မှတ်ပေးရမည်ဖြစ်ပါကြောင်း ပြန်ကြားအပ်ပါသည်။


 ဦးဆောင်ညွှန်ကြားရေးမှူး(အမှုထမ်း)
 ဇော်ရဲမြင့် ၊ ဒုတိယအင်ဂျင်နီယာချုပ်

မိတ္တူကို

- ဥက္ကဋ္ဌ၊ ရန်ကုန်မြို့တော်လျှပ်စစ်ဓာတ်အားပေးရေးအဖွဲ့
- ဦးဆောင်ညွှန်ကြားရေးမှူးရုံး၊ မြန်မာ့လျှပ်စစ်ဓာတ်အားလုပ်ငန်း
- အထွေထွေမန်နေဂျာ၊ စီမံခန့်ခွဲရေးဌာန
- စီမံကိန်းညွှန်ကြားရေးမှူး၊ တောင်ပိုင်း
- သီလဝါအထူးစီးပွားရေးဇုံကော်မတီ
- ရုံးလက်ခံ



230kV TRANSMISSION LINE		
POINT NUMBER	ALTERNATIVE 1	
	WGS84 ZONE 47	
	EAST	NORTH
GT	209125	1852656
T-1	209174	1852708
T-2	209293	1852795
T-3	209595	1852782
T-4	209872	1852843
1	210080	1853030
2	210403	1853254
3	210726	1853481
4	211058	1853403
5	211729	1852574
6	211784	1852429
7	213323	1847088
8	213204	1846752
1-1	212744	1846577
1-2	209691	1845033
1-3	209104	1844827
DE	208553	1844413
TOTAL DISTANCE (KM)	14.57	

230kV TRANSMISSION LINE		
POINT NUMBER	ALTERNATIVE 2	
	WGS84 ZONE 47	
	EAST	NORTH
GT	209125	1852656
T-1	209174	1852708
T-2	209293	1852795
T-3	209595	1852782
T-4	209872	1852843
1	210080	1853030
2	210403	1853254
3	210726	1853481
4	211058	1853403
5	211729	1852574
6	211784	1852429
7	213323	1847088
8	213204	1846752
2-1	212921	1846638
2-2	212476	1846337
2-3	212229	1845454
2-4	212383	1844618
2-5	212129	1844064
2-6	211338	1843574
9	208894	1844459
DE	208553	1844413
TOTAL DISTANCE (KM)	16.44	

230kV TRANSMISSION LINE		
POINT NUMBER	ALTERNATIVE 3	
	WGS84 ZONE 47	
	EAST	NORTH
GT	209125	1852656
T-1	209174	1852708
T-2	209293	1852795
T-3	209595	1852782
T-4	209872	1852843
1	210080	1853030
2	210403	1853254
3	210726	1853481
4	211058	1853403
5	211729	1852574
6	211784	1852429
7	213323	1847088
8	213204	1846752
3-1	212921	1846638
3-2	211824	1845842
3-3	210756	1845322
3-4	209478	1844801
9	208894	1844459
DE	208553	1844413
TOTAL DISTANCE (KM)	14.59	

PROPOSE LINE ROUTES

- - - - - = ALTERNATIVE 1
- - - - - = ALTERNATIVE 2
- - - - - = ALTERNATIVE 3

Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I)	Drawing No.	TL- 01
	Title 230 kV TRANSMISSION LINE KEY MAP & LINE ROUTES THALYIN S/S - THILAWA S/S	



သီလဝါ အပိုင်း(က) ၏ အခြေခံအဆောက်အအုံများဖွံ့ဖြိုးရေးစီမံကိန်းအောက်ရှိ
သီလဝါဒေသလျှပ်စစ်ဓါတ်အားဖွံ့ဖြိုးတိုးတက်ရေးအတွက် ၂၃၀ကေစီဓါတ်အားပို့လွှတ်ရေးလှိုင်း နှင့်
ဓါတ်အားခွဲရုံ တည်ဆောက်ရေးလုပ်ငန်း (လုပ်ငန်း-၃) အတွက်အစည်းအဝေးမှတ်တမ်း

၂၃၀ ကေစီ ဓါတ်အားပို့လွှတ်ရေးတာဝါနှင့်ဓါတ်အားပို့လွှတ်ရေးလှိုင်းများဆောက်လုပ်ရေး အတွက်
မြေနေရာရယူမှုနှင့်ပတ်သက်သောဆွေးနွေးပွဲ ကို ၂၀၁၆ခုနှစ်၊ ဇူလိုင်လ ၅ရက်နေ့ တွင် သန်လျင်မြို့နယ်
အထွေထွေ အုပ်ချုပ်ရေးမှူးရုံးတွင် သန်လျင်မြို့နယ်ဘယကံကျေးရွာရှိ သန်လျင်မြို့နယ် အထွေထွေအုပ်ချုပ်ရေး
ဦးစီးဌာန၊ လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့် စာရင်းအင်းဦးစီးဌာန၊ ဘယကံကျေးရွာအုပ်စုရှိ တာဝါအမှတ် T-9 DTTE
နှင့်T-9(a)၏ မြေပိုင်ရှင်များ၊ ရန်ကုန်တောင်ပိုင်းခရိုင်လျှပ်စစ်ဓါတ်အားပို့လွှတ်ရေးနှင့်ကွပ်ကဲရေးဦးစီးဌာန မှ
စီမံကိန်းမန်နေဂျာ-၁ နှင့် အတိုင်ပင်ခံကုမ္ပဏီ ဖြစ်သော Nippon Koei ကုမ္ပဏီတို့မှ ဆွေးနွေးခဲ့ပြီး
အောက်ပါအချက်အလက်များကို အတည်ပြုခဲ့ပါသည်။

- ၁) သန်လျင်ဓါတ်အားခွဲရုံအနီးရှိ ၂၃၀ ကေစီဓါတ်အားပို့လွှတ်ရေးအဆိုပြုလမ်းကြောင်းအား ပုံ-၁ တွင်ကြည့်ပါ။
- ၂) သန်လျင်မြို့နယ်ဘယကံကျေးရွာအုပ်စုရှိ ဦးကိုကိုနိုင် နှင့် ဦးအောင်ကျော်လွင်တို့ အသီးသီး ပိုင် ဆိုင်
သော မြေနေရာတွင်အဆိုပြုထားသော တာဝါအမှတ်T-9 DTTEနှင့်T-9 (a) တို့ကိုပုံ(၁)တွင် ဖော်ပြထား
ပါသည်။
- ၃) ဤအစည်းဝေးပွဲကို ဦးကိုကိုနိုင် နှင့် ဦးအောင်ကျော်ဦး၏ကိုယ်စားလှယ်နှစ်ဦးတို့ တက်ရောက်ခဲ့သည်။
- ၄) ပိုင်ရှင်အသီးသီးကို အဆိုပြုထားသော တာဝါအမှတ်T- DTTE နှင့် T-9 (a) တို့ ၏တည်နေရာများကို
မြေပြင်တွင်ပြသခဲ့ပါသည်။
- ၅) ဦးကိုကိုနိုင်သည်တာဝါအမှတ် T-9 DTTE ကို၎င်း၏မြေပေါ်တွင်ဆောက်လုပ်ရန် သဘောတူခဲ့သည်။
ဦးကိုကိုနိုင်သည်လျှပ်စစ်တာဝါကို၎င်းပိုင်ဆိုင်သောမြေနေရာအလယ်တွင်တည်ဆောက်ခြင်းကိုတတ်
နိုင်သမျှရှောင်ကျဉ်ရန်အတွက်ထိုတာဝါကို ၎င်း၏စိုက်ပျိုးမြေနယ်နိမိတ်ဖြစ်သောတာဝါအဟောင်း(T-9DTTE)
(T-8နှင့်T-9(a) ကြား)နှင့်နီးနီးသမျှနီးနီးတွင်တည်ဆောက်ရန်တောင်းဆိုခဲ့သည်။
- ၆) ဦးအောင်ကျော်လွင်၏ကိုယ်စားလှယ်နှစ်ဦးမှလည်း တာဝါအမှတ်T-9 (a) ၏တည်နေရာကို ဦးအောင်
ကျော်လွင်ထံသို့ပြန်လည်ရှင်းပြမည်ဖြစ်ပြီး ၎င်းတို့မှဖုန်းဖြင့်ဦးရှုပထံသို့ ဦးအောင်ကျော်လွင်၏ သဘော
ထားကိုအကြောင်းကြားမည်ဖြစ်ပါသည်။
- ၇) ထိုနောက်မြေပြင်တွင်အသေးစိတ်တိုင်းတာမှုများကို ကန်ထရိုက်တာမှ ဌာနရမ်းထားသောတိုင်းတာရေး
ကုမ္ပဏီမှဆောင်ရွက်ပါမည်။
- ၈) မြေပြင်တွင်အသေးစိတ်တိုင်းတာမှုများပြုလုပ်ပြီးနောက်တာဝါအမှတ်T-9DTTEနှင့်T-9(a)တို့ ၏ တည်နေရာ
အတိအကျကိုမြေပိုင်ရှင်အသီးသီးအားပြသပြီး၎င်းတို့ထံမှအတည်ပြုချက်ရယူမည်ဖြစ်ပါသည်။

၉) ဦးရူပမှမြေပိုင်ရှင်များကိုလျော်ကြေးနှင့်ပက်သက်၍ ရှင်းပြခဲ့ပါသည်။ လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန သည် ဝန်ကြီးဌာန၏ခွင့်ပြုချက်ရယူပြီးနောက်လျော်ကြေးပေးရေးကော်မတီကဆုံးဖြတ်သောလျော်ကြေးနှုန်းကိုအခြေခံ၍ ဆောက်လုပ်ရေးလုပ်ငန်းလုပ်ဆောင်နေစဉ်အတွင်းထိခိုက်မှုရှိသောစိုက်ပျိုးမြေဧရိယာအတွက်သီးနှံလျော်ကြေးကိုတစ်ရာသီစာပေးချေမည်ဖြစ်ပါသည်။ မြေပိုင်ရှင်များမှလည်းအထက်ပါကိစ္စအတွက်သဘောတူပါသည်။

၁၀) ၂၀၁၅ တွင်ဖွဲ့စည်းခဲ့သော လျော်ကြေးပေးရေးကော်မတီတွင် ဘယက်ကျေးရွာအုပ်စုနှင့်သက်ဆိုင်သော မြေစာရင်းနှင့် ဘယက်ကျေးရွာအုပ်စုအုပ်ချုပ်ရေးမှူးတို့မပါဝင်သောကြောင့်လျော်ကြေးပေးရေး ကော်မတီကို သန်လျင်မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးရမှ ဖွဲ့စည်းပါမည်။



ပုံ ၁။ ၂၃၀ ကေဗွီဓါတ်အားပို့လွှတ်ရေးအဆိုပြုလမ်းကြောင်းပြပုံ

အစည်းအဝေးသို့ တက်ရောက်သူများ

စဉ်	အမည်	ရာထူး	ဌာန
၁	ဦးသက်မြင့်ဦး	ဒုတိယမြို့နယ် အုပ်ချုပ်ရေးမှူး	မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊ သန်လျင်မြို့
၂	ဦးအောင်ကျော်ခင်	ဒုတိယဦးစီးမှူး	မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန
၃	ဦးစိန်နွဲ့	အုပ်ချုပ် ရေးမှူး	ဘယက်ကျေးရွာအုပ်စု
၄	ဦးကိုကိုနိုင်	တာဝါအမှတ် T-9 DTTE ၏မြေပိုင်ရှင်	ဘယက်ကျေးရွာအုပ်စု

စဉ်	အမည်	ရာထူး	ဌာန
၅	ဦးအောင်ကျော်လွင် ၏ ကိုယ်စားလှယ်	တာဝါအမှတ် T-9 (a) ၏မြေပိုင်ရှင်	ဘယက်ကျေးရွာအုပ်စု
၆	ဦးစိုးမိုးနိုင်	စီမံကိန်းမန်နေဂျာ-၁	ရန်ကုန်တောင်ပိုင်းခရိုင်စီမံကိန်းမန်နေဂျာရုံး-၁ လှုပ်စစ်ခါတ်အားပို့လွှတ်ရေးနှင့်ကွတ်ကဲရေးဦးစီးဌာန
၇	ဦးရူပ	လက်ထောက် အင်ဂျင်နီယာ	ရန်ကုန်တောင်ပိုင်းခရိုင်စီမံကိန်းမန်နေဂျာရုံး-၁ လှုပ်စစ်ခါတ်အားပို့လွှတ်ရေးနှင့်ကွတ်ကဲရေးဦးစီးဌာန
၈	ဦးအောင်လှိုင်ထွန်း	အထွေထွေ မန်နေဂျာ	Supreme Group Companies
၉	ဒေါ်ဂါဂါဟန်စုယဉ်	ပတ်ဝန်းကျင်ထိန်းသိမ်း ရေးနှင့် လူမှုရေးတာဝန်ခံ	Myanmar Koei International Ltd

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Thanlyin Township General Administration Department (hereinafter referred to as “GAD”), Agricultural Land Management and Statistic Department, Land owners of Tower No. T-9 DTTE and T-9 (a) in Ba Yet Village Tract, Project Manager-1 in Yangon South District, Department of Power Transmission and System Control (hereinafter referred to as “DPTSC”) and Nippon Koei Co., Ltd. (hereinafter referred to as “the Consultant”) have carried out discussion on land acquisition for the construction of 230 kV Transmission towers and power lines in Ba Yet Village Tract in Thanlyin Township on the captioned project on 5 July, 2016 at Thanlyin Township GAD office and confirmed the followings.

1. Please see Figure (1) for a new proposed line route near Thanlyin substation
2. Proposed Tower No. T-9 DTTE and T-9 (a) as shown in Figure (1) near Thanlyin Township in Ba Yet Village Tract in Thanlyin Township belongs to Mr. Ko Ko Naing and Mr. Aung Kyaw Lwin respectively.
3. Mr. Ko Ko Naing and two representatives of Mr. Aung Kyaw Lwin attended the meeting.
4. The location of proposed tower No. T-9 DTTE and T-9 (a) were shown to each owner at the site.
5. Mr. Ko Ko Naing agreed for construction of Tower No. T-9 DTTE on his land. He requested to construct it nearer to the older Tower, which is the boundary of his agricultural land, between T-8 and T-9 (a) as much as possible in order to avoid an electric tower in the middle of his land.
6. Two representatives of Mr. Aung Kyaw Lwin will explain about the location of Tower No. T-9 DTTE to Mr. Aung Kyaw Lwin and they will inform to Mr. Yupa by phone about the agreement of Mr. Aung Kyaw Lwin.
7. Then, detailed survey will be carried out by a survey company hired by the contractor.
8. After the detailed survey, the exact location of Tower No. T-9 DTTE and T-9 (a) will be shown again to each land owner for confirmation.
9. Mr. Yupa explained about compensation to land owners; crop compensation for affected area during construction for one season will be paid by the Ministry of Electricity and Energy (MOEE) based on the unit price decided by the compensation committee after getting an approval from MOEE. Land owners agreed on it.
10. Thanlyin GAD will establish a compensation committee including Ba Yet Village Tract Administrator and Land measurement staff of Ba Yet Village Tract as they are not included in the compensation committee established in 2015.



Figure 1: A newly proposed line route near Thanlyin Sub-Station

Participants

No.	Name	Position	Department
1	Mr. Thet Myint Oo	Deputy Township Administrator	Thanlyin Township GAD
2	Mr. Aung Kyaw Khin	Assistant Staff Officer	Township Agricultural Land Management and Statistic Department
3	Mr. Sein Nwet	Village Tract Administrator	Ba Yet Village Tract
4	Mr. Ko Ko Naing	Land owner of Tower No. T-9 DTTE	Ba Yet Village Tract
5	Ms. Thuzar, (Representative of Mr. Aung Kyaw Lwin)	Land owner of proposed Tower No. No. T-9 (a)	Ba Yet Village Tract
6	Mr. Soe Naing Oo	Project Manager (1)	Yangon South District Project Manager Office-1, DPTSC
7	Mr. Yupa	Assistant Engineer	Yangon South District Project Manager Office-1, DPTSC

(၅.၇.၂၀၁၆)ရက်နေ့၊နံနက်(၁၁၀၀)နာရီအချိန် မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာနရုံး၌ ကျင်းပပြုလုပ်သော သီလဝါ-သန်လျင်ခါတ်အားလှိုင်းတည်ဆောက်ခြင်းလုပ်ငန်းညှိနှိုင်းအစည်းအဝေး

စဉ်	အမည်	ရာထူး	ဌာန	လက်မှတ်
၁။	ဦးသက်မြင့်ဦး	ဒုတိယမြို့နယ်အုပ်ချုပ်ရေးမှူး	မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊သန်လျင်မြို့	
၂။	ဦးမြရွှေ	မြို့နယ်မန်နေဂျာ	မြို့နယ်လျှပ်စစ်ခါတ်အားပေးရေးကော်ပိုရေးရှင်း	
၃။	ဦးအောင်ကျော်စွာ	ဒုတိယဦးစီးမှူး	မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန	
၄။	ဦးဝေဖြိုးအောင်	ဒုတိယဦးစီးမှူး	မြို့နယ်စိုက်ပျိုးရေးဦးစီးဌာန	
၅။	ဦးအေးမင်းနိုင်	မြေတိုင်း-၄	မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန	
၆။	ဦးအောင်မြတ်သူ	မြေတိုင်း-၄	မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲရေးနှင့်စာရင်းအင်းဦးစီးဌာန	
၇။	ဦးစိန်နွဲ့	အုပ်ချုပ်ရေးမှူး	ဘယက်ကျေးရွာအုပ်စု	
၈။	ဦးကိုကိုနိုင်		ဘယက်ကျေးရွာအုပ်စု	
၉။	ဦးအောင်ကျော်စွာ (က/ခ)		ဘယက်ကျေးရွာအုပ်စု သူဇာ	
၁၀။	ဦးစိုးစိုးစိုး	ဦးစိုးစိုးစိုး	ဦးစိုးစိုးစိုး (၁) / ၂၂၇၅	
၁၁။	ဦးအောင်ညိုညို	R.M	Supreme Trading Co, Ltd.	
၂၂။	ဦးစိုးစိုး	နယ်ချုပ်ကျေးရွာ	Myanmar Koei International	
၁၃။	ဒေါ်ဝါဝါဟန်စု	ဧကန်တန်းလမ်း၌ လူမှုရေးဧကန်တန်း	Myanmar Koei International Ltd.	

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Thanlyin Township General Administration Department (hereinafter referred to as “GAD”), Agricultural Land Management and Statistic Department, Land owner of Tower No. T-9 (a) in Ba Yet Village Tract, Project Manager-1 in Yangon South District, Department of Power Transmission and System Control (hereinafter referred to as “DPTSC”) and Nippon Koei Co., Ltd. (hereinafter referred to as “the Consultant”) have carried out discussion on land acquisition for the construction of 230 kV Transmission towers and power lines in Ba Yet Village Tract in Thanlyin Township on the captioned project on 14 July, 2016 at Thanlyin Township GAD office and confirmed the followings.

1. Please see Figure (1) for a new proposed line route near Thanlyin substation
2. Proposed Tower No. T-9 (a) as shown in Figure (1) near Thanlyin Township in Ba Yet Village Tract in Thanlyin Township belongs to Mr. Aung Kyaw Lwin.
3. Ms. Thuzar said that Mr. Aung Kyaw Lwin did not agree to construct a new electric tower on his land.
4. Mr. Thet Myint Oo, Deputy Administrator of Thanlyin Township GAD, told Ms. Thuzar to inform Mr. Aung Kyaw Lwin that the captioned project is the National project.
5. It is just to inform him for construction of a new tower on the land. A new proposed tower is under the existing T/L. According to the Electricity Procedure, 75 ft each from the center of the existing T/L is regarded as Fairway of the existing T/L. Nobody is not allowed to enter to this Fair way and even cultivation under the existing T/L is not allowed officially. However, the Ministry of Electricity and Energy (MOEE) plans to pay crop compensation for impacted crop due to the project.
6. Myanmar Government borrowed money from Japanese Government to implement the captioned project. Two governments don't want to give burden to land owners due to the implementation of the project. Therefore land owners are called for negotiation to incorporate the project.
7. Ms. Thuzar said that she would explain Mr. Aung Kyaw Lwin about the message from Deputy Administrator of Thanlyin Township GAD and reply to Mr. Yupa tomorrow (15 July) by phone.



Figure 1: A newly proposed line route near Thanlyin Sub-Station

Participants

No.	Name	Position	Department
1	Mr. Thet Myint Oo	Deputy Township Administrator	Thanlyin Township GAD
2	Ms. Thuzar (a Representative of Mr. Aung Kyaw Lwin)	Land owner of proposed Tower No. No. T-9 (a)	
3	Mr. Yupa	Assistant Engineer	Yangon South District Project Manager Office-1, DPTSC
4	Mr. Aung Hlaing Tun	General Manager	Supreme Group Companies (Sub Contractor)
5	Ms. Wah Wah Han Su Yin	Environmental and Social expert (Consultant)	Myanmar Koei International Ltd.

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Township Farmland Management Committee (hereinafter referred to as “TFMC”), Thanlyin Township General Administration Department (hereinafter referred to as “GAD”), Settlement and Land Record Department (hereinafter referred to as “SLRD”), Department of Power Transmission and System Control (hereinafter referred to as “DPTSC”) and Nippon Koei Co., Ltd. (hereinafter referred to as “the Consultant”) have carried out discussion on land acquisition for the construction of 230 kV Transmission towers and power lines in Let Yat San Village Tract in Thanlyin Township on the captioned project on 8 August, 2016 at Thanlyin Township GAD office and confirmed the followings.

1. Firstly, Mr. Kyaw Swar Win, Secretary of Thanlyin Township Farmland Management Committee (TFMC) and Township officer of Settlement and Land Record Department (SLRD), explained about the purpose of the meeting and crop compensation procedure for land acquisition to construct 230 kV Transmission Tower No. 50 on Plot No. 652-A in Let Yat San Village Tract in Thanlyin Township in Yangon South District in Yangon Region as follow.
2. Crop compensation will be paid for affected farm land area and the amount is three times of the market price of affected crop for one season during construction. This amount is the same for all project affected farmland area for all owners.
3. As the Project is the National Project, farmland owners have to follow the Government rules and regulation without any reason.
4. Secondly, Mr. Yu Pa, Assistant Engineer of Project Manager Office (1) in DTPSC, MOEE explained to Mr. Phyo Pyae Win, a representative of farmland owner of plot No. 652-A about affected land area as follow.
5. The affected area for a tower construction is about (30x30) square meters or (100 x100) square ft during construction period. After the construction, there will be only (2 x 2) square meters or (6.6 x6.6) square feet of a foundation tower is left above ground. Therefore, the affected area after construction is not so big.
6. The construction period is tentatively expected one year. However, if the actual construction period is more than the expectation, the crop compensation will be considered for those over due period.
7. Mr. Phyo Pyae Win, a representative of Mr. Htay Naing, said that he will inform all information to Mr. Htay Naing, the farmland owner of Tower No. 50.
8. Finally, all participants went to the site to confirm the location of Tower No. 50.
9. The location of Tower No. 50 is shown in Figure 1.



Figure 1: Location of a proposed Tower No. 50

Participants

No.	Name	Position	Department
1.	Mr. Kyaw Swar Win	Secretary of Township Farmland Management Committee (TFMC) and Township Officer	Settlement and Land Record Department (SLRD)
2.	Ms. Khin Ma Ma	Members of TFMC and Township Officer	National Planning and Development
3.	Ms. Thein Thein Oo	Members of TFMB and Township Officer	Ministry of Agriculture, Live Stock and Irrigation
4.	Ms. Phyu Pyar Aung	Senior Clerk	Thanlyin Township General Administration Department (GAD)
5.	Mr. Myo Oo	Senior Clerk	Thanlyin Township General Administration Department (GAD)
6.	Mr. Mya Shwe	Township Manager	Thanlyin Township Electricity Supply Cooperation
7.	Mr. Phyo Pyae Win (a representative of Mr. Htay Naing)	Land owner of proposed Tower No. 50	
8.	Mr. Yu Pa	Assistant Engineer	Project Manager Office-1, Yangon South District, DPTSC, Ministry of Electricity and Energy (MOEE)
9.	Mr. Aung Hlaing Tun	Assistant Manager	Supreme Group Companies (Sub Contractor)
10.	Mr. Thiha Kyaw	Civil Engineer	Myanmar Koei International Ltd.
11.	Ms. Tin Mar Lwin	Environmental Expert	Myanmar Koei International Ltd.

Photo Records

	
<p>Explanation by Mr. Kyaw Swar Win, a Secretary of Thanlyin Farmland Management Committee</p>	<p>Discussion between Mr. Yu Pa, Assistant Engineer of MOEE and a representative of the owner.</p>
	
<p>Discussion between Mr. Yu Pa, Assistant Engineer of MOEE and a representative of the owner.</p>	<p>Confirmation of location of Tower No. 50 at site.</p>

သီလဝါအတွက် စီမံကိန်းရေးဆွဲခြင်း 230 KV လှိုင်လမ်းရေကြောင်း ဖြေဆိုရေးရာအဖွဲ့အစည်း
 ဖွဲ့စည်း ဝေဟင်သည့်များ ဖွဲ့စည်းခြင်း

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စဉ်	အမည်	ရာထူး	ဌာန	လက်မှတ်
၁။	မောင်မာလွင်	Environmental Expert	Myanmar Koer International Ltd	
၂။	သီဟကျော်	CIVIL ENGR	—	
၃။	ဦးဒေါ်ဦးစွာ	AM	Supreme Trading Co, Ltd.	
၄။	ဦးဌေးနိုင်(ကေ.ခ) ဦးမင်းဝင်း	Asst မြေတူးရေး	Green Circle, Co, Ltd	 0973206007
၅။	ဦးစွာ	A.E.	စီမံကိန်းရေးရာဌာန	
၆။	ဦးကျော်	စာရေးဆရာ(အ/မ)	၂၆၆၆ ဘဏ်	
၇။	ဦးကျော်စွာ	အကြံပေး	စီမံကိန်း	
၈။	ဦးကျော်	အကြံပေး	A.D. - စီမံကိန်း ဦးစီးဌာန	
၉။	ဦးကျော်စွာ	—	စီမံကိန်း	

Memorandum (2)
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Township Farmland Management Committee (hereinafter referred to as “TFMC”), Thanlyin Township General Administration Department (hereinafter referred to as “GAD”), Settlement and Land Record Department (hereinafter referred to as “SLRD”), Department of Power Transmission and System Control (hereinafter referred to as “DPTSC”) and Nippon Koei Co., Ltd. (hereinafter referred to as “the Consultant”) have carried out discussion on land acquisition for the construction of 230 kV Transmission towers and power lines in Let Yat San Village Tract and Ba Yat Village in Thanlyin Township on the captioned project on 22 August, 2016 at Thanlyin Township GAD office and confirmed the followings.

1. Firstly, Mr. Thet Myint Oo, Deputy Township Administrator of Thanlyin Township GAD, on behalf of the Chairman of Thanlyin Township Farmland Management Committee (TFMC) explained about the purpose of the meeting and the required land area to construct 230 kV Transmission Tower No. 50 on Plot No. 652-A in Let Yat San Village Tract in Thanlyin Township in Yangon South District in Yangon Region as follow.
2. The affected area for a tower construction is about (30x30) square meters or (100 x100) square feet during the construction period. After the construction, there will be only (2 x 2) square meters or (6.6 x6.6) square feet of a foundation tower left above ground. Therefore, the affected area after construction is not so big.
3. As the Project will contribute not only to the National development, but also to the development of Thilawa region, GAD would like to request the farmland owners to cooperate and allow for the construction of towers in their farmlands. Moreover, as the Project is the National Project, farmland owners have to follow the Government rules and regulation without any reason.
4. Though the affected area is not big, the crop compensation of the affected area will be provided for all owners.
5. Mr. Phyo Pyae Win, a representative of Mr. Htay Naing, said that the proposed place of the tower is at the front of Mr. Htay Naing’s proposed facilities. Therefore, Mr. Htay Naing doesn’t agree to construct the tower construction in his farmland area, and if possible Mr. Htay Naing would like to request to avoid using his farmland area.
6. Then, Mr. Nay Min Oo, Executive Engineer (Civil) in DTPSC in MOEE explained to Mr. Phyo Pyae Win about the affected land area due to tower construction as follow.
7. For the time being the tower location is existed inside the farmland area. However, the contractor will adjust the location of tower foundation in order to decrease the affected farm land as much as possible at the construction time.

8. If the tower is neither be constructed nor omitted in that area, the suspended electrical cables will sag and be more dangerous in the future. In addition, there is no other way to shift the tower construction alignment.
9. Mr. Phyo Pyae Win, a representative of Mr. Htay Naing, said that he will inform again to Mr. Htay Naing and reply soon.
10. Mr. Aung Kyaw Lwin (Tower No. 9 (a)) didn't attend the meeting. Therefore, Mr. Thet Myint Oo explained to Mr. Aung Kyaw Lwin about the meeting purpose and the affected area of tower in his farmland on phone. Mr. Aung Kyaw Lwin answered that he will reply soon.
11. Mr. Thet Myint Oo told to Mr. Phyo Pyae Win to hear good reply.
12. The location of Tower No. 50 and 9 (a) are shown in Figure 1 and Figure 2 respectively.





Figure 1: Location of a proposed Tower No. 50



Figure 2: Location of a proposed Tower No. 9 (a)

Participants

No.	Name	Position	Department
1.	Mr. Thet Myint Oo	On behalf of the Chariman of Township Farmland Management Committee (TFMC) and Deputy Township Administrator	Thanlyin Township General Administration Department (GAD)
2.	Mr. Khin Maung Swe	Members of TFMC and Assistant Office Staff	Settlement and Land Record Department (SLRD)
3.	Mr. Nyan Htun Linn	Land Record Surveyor (4)	Settlement and Land Record Department (SLRD)
4.	Mr. Aung Myat Thu	Land Record Surveyor (4)	Settlement and Land Record Department (SLRD)
5.	Ms. Phyu Pyar Aung	Senior Clerk	Thanlyin Township General Administration Department (GAD)
6.	Ms. Aye Mya Moe	Senior Clerk	Thanlyin Township General Administration Department (GAD)
7.	Mr. Sein Nwe	Village Administrator	Ba Yat Village Tract
8.	Mr. Soe Naing Oo	Village Administrator	Let Yat San Village Tract
9.	Mr. Soe Moe Naing	Project Manager, Superintendent Engineer	Project Manager Office-1, Yangon South District, DPTSC, Ministry of Electricity and Energy (MOEE)
10.	Mr. Nay Min Oo	Executive Engineer (Civil)	Ministry of Electricity and Energy (MOEE)
11.	Mr. Aung Kyaw Tun	Assistant Staff Officer	Project Manager Office-1, Yangon South District, DPTSC, Ministry of Electricity and Energy (MOEE)
12.	Mr. Phyo Pyae Win (a representative of Mr. Htay Naing)	A representative of Land owner of proposed Tower No. 50	
13.	Mr. Aung Hlaing Tun	Assistant Manager	Supreme Group Companies (Sub Contractor)
14.	Ms. Tin Mar Lwin	Environmental Expert	Myanmar Koei International Ltd.

Photo Records

	
<p>Explanation by Mr. Thet Myint Oo, Deputy Township Administrator of Thanlyin Township GAD</p>	<p>Discussion between Mr. Nay Min Oo (MOEE), Mr. Thet Myint Oo (GAD), Mr. Khin Maung Aye (SLRD) and Mr. Phyo Pyae Win, representative of Mr. Htay Naing (T-50)</p>
	
<p>Contacting to Mr. Aung Kyaw Lwin, a farmland owner of T-9 (a) by Mr. Thet Myint Oo, Deputy Township Administrator of Thanlyin Township GAD via phone.</p>	

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Crop Compensation for the construction of 230 kV Transmission towers and power lines from Thanlyin substation to Thilawa substation was given to two affected persons at 11:30 on 26th April, 2017 (Wednesday) with a ceremony at Thanlyin Township General Administration Department (GAD) office. Site investigation was carried out with Project Manager (1) office in DPTSC, Owners/ Representatives of the Land, Ba Yet Village Tract Administrator, a surveyor of Ba Yet Village Tract in the Land Record Department, Supreme Group of Companies (hereinafter referred to as “the Sub-contractor”) and Nippon Koei Co., Ltd. (or) Myanmar Koei International Ltd. (hereinafter referred to as “the Consultant”).

1. Please see Figure 1 and Figure 2 for the overall line route of 230 Transmission Line from Thanlyin substation to Thilawa and detailed line route of 230 Transmission Line near Thanlyin substation.
2. Please see Table 1 for the participants of the crop compensation ceremony.
3. It is confirmed that the crop in the rainy season will be affected by the construction of 230 kV Transmission towers and power lines.
4. The numbers of Project Affected Person (PAP) to give crop compensation is 3.
5. The name of PAP are (1) Mr. Naing Win (Mr. Ko Ko Naing) for Tower No. T-9, (2) Mr. San Aye Hla (Mr. Aung Kyaw Lwin) for Tower No. T-9A and (3) Mr. Yan Myin Shu (or) Mr. Htay Naing for Tower No. T-50.
6. Please see Table 2 for the amount of crop compensation calculated by Thanlyin Township Land Management Committee in August, 2016.
7. Firstly, Mr. Thet Myint Oo, Assistant Township Administrator made an opening speech of the ceremony.
8. Secondly, Mr. Soe Moe Naing, Deputy Director of Project Manager Office (1) from DPTSC in Yangon South District explained about the construction of 230 kV Transmission Line.
9. Finally, crop compensation was given to following Two Persons.
(1) Mr. Naing Win (Mr. Ko Ko Naing) for Tower No. T-9
(2) Mr. Sein Nwe, a representative of Mr. Aung Kyaw Lwin) for Tower No. T-9A
10. Please see Figure 3 for the photo of the ceremony.
11. Regarding Tower No. T-50, three representatives of the land owner attended the ceremony. They said that they don't receive the compensation today (27 April) and they will inform the detailed information such as location of the Tower, Size of the Tower to Mr. Yan Myin Shu (or) Mr. Htay Naing. Then they will reply to Thanlyin Township GAD.
12. After the crop compensation ceremony, the site investigation was carried out together with the owner of Tower No. T-9 and representatives of the owners of Tower No. T-9A and T-50, Ba Yet Village Tract

Administrator, a surveyor of Ba Yet Village Tract, a responsible person from the Sub-contractor and the Consultant. Please see Table 3 for the participants list of the site survey and Figure 4 for photos of site investigation.

13. Representatives of the Tower No. **T-50** said that the location of the proposed Tower No. T-50 which the owner of this land agreed in August, 2016 is different from the current location at the site. They said that the owner of the land will not agree this current location of **T-50** as the current location of T-50 is between the two farm land which belong to that owner. In August, 2016, the location of the T-50 which the owner agreed is just at the front of the front plot which is near to the Dagon-Thilawa road.
14. They requested to move the location of tower No. T-50 to the previous proposed location as shown in Figure 5.
15. Thanlyin Township GAD also requested DPTSC to re-consider the location of Tower T-50 as it is difficult to get agreement from the land owner with the present location.
16. The owner of Tower No. T-9 and representatives of the owners of Tower No. T-9A also requested the location of each tower as shown in Figure 6, 7, 8 and 9.

230kV Thanlyin - Thilawar Transmission Line Route Map (10 Miles)

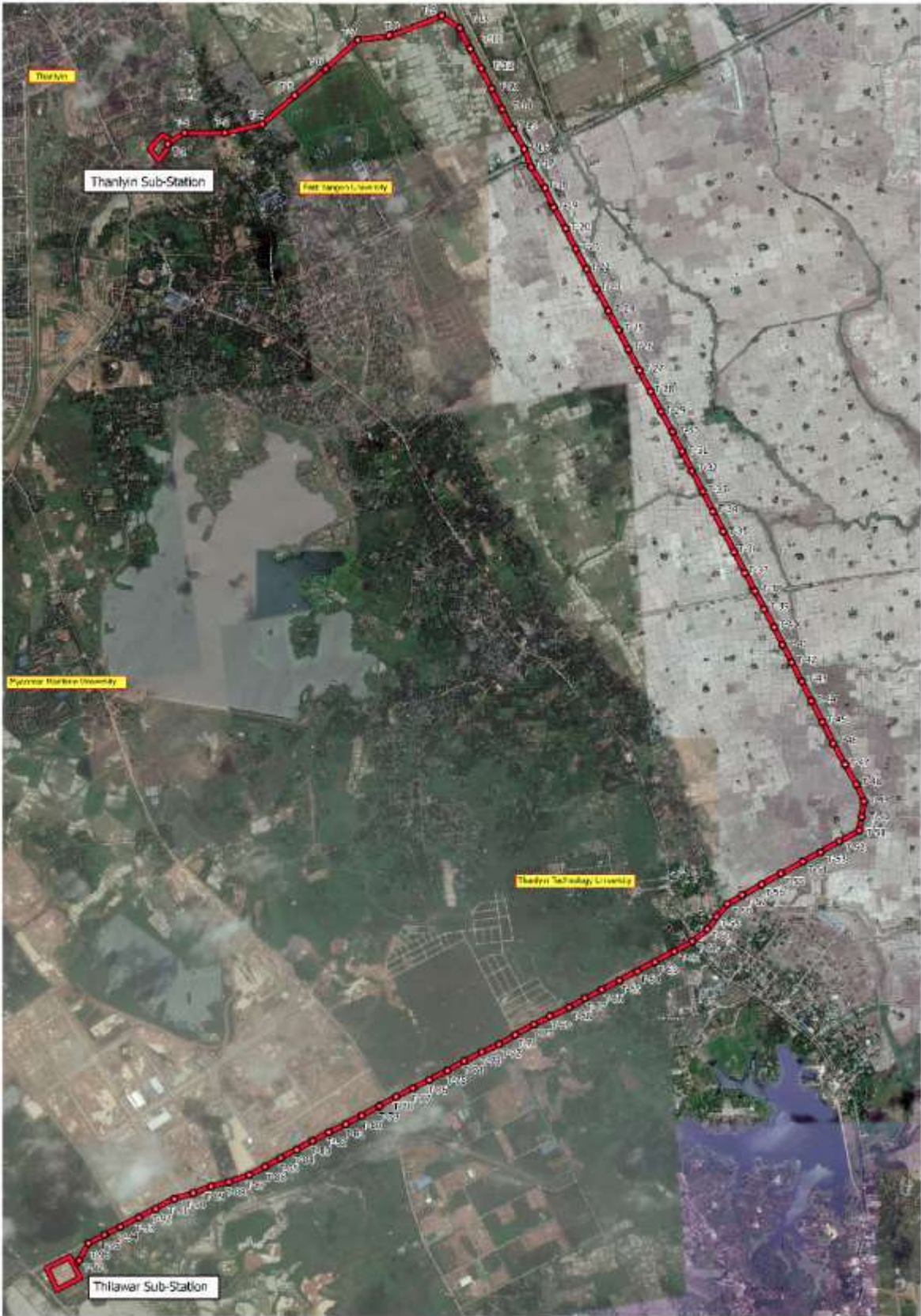


Figure 1: Overall line route of 230 kV Transmission Line from Thanlyin substation to Thilawa



Figure 2: Detailed line route of 230 kV Transmission Line near Thanlyin substation

Table 1: Participant List of a crop compensation ceremony

No.	Name	Position	Department/ Village Tract/ Village
1	Mr. Thet Myint Oo	Assistant Township Administrator	Thanlyin Township General Administration Department
2	Ms. Ei Phyu Htwe	Deputy Chief Officer	Thanlyin Township General Administration Department
3	Mr. Soe Moe Naing	Deputy Director, Project Manager (1) Office	DPTSC in Yangon South District, MOEE
4	Mr. Yupa	Assistant Engineer (Machine/Electrical)	DPTSC in Yangon South District, MOEE
5	Ms. Khin Khin Si	Chief Officer Project Manager (1) Office	DPTSC in Yangon South District, MOEE
6	Ms. Khin Ma Ma	Senior Clerk	DPTSC in Yangon South District, MOEE
7	Mr. Kyaw Naing Ohn	Senior Assistant Engineer	YESC in Thanlyin Township
8	Mr. Phyo Pyae Win (Representative of Mr.	Mr. Htay Naing is the owner of Land for Tower No. T-50	Let Yet San Village Tract
9	Mr. Soe Naing Oo	Village Tract Administrator	Let Yet San Village Tract

No.	Name	Position	Department/ Village Tract/ Village
10	Mr. Sein Htay	Village Tract Administrator	Ba Yet Village Tract
11	Mr. Ko Ko Naing	Owner of Land for Tower No. T-9	Ba Yet Village Tract
12	Mr. Aung Myat Thu	Surveyor-4	Land Record Department, Ministry of Agriculture
13	Mr. Zaw Min	Electrical Engineer	Myanmar Koei International Ltd.
14	Ms. Wah Wah Han Su Yin	Social and Environmental Expert	Myanmar Koei International Ltd.

Table 2: Crop Compensation amount calculation by Thanlyin Township Land Management Committee

No.	Name	Tower No.	Type of crop	Area affected (Acre)	Yield rate	Unique Price (MMK)	(Market) Price (MMK)	Total Compensation (MMK) Three times of the price
1.	Mr. Yan Myin Shu (or) Mr. Htay Naing	T-50	Paddy in the rainy season	0.23	55	5,500	69,575	208,725
2.	Mr. San Aye Hla (Mr. Aung Kyaw Lwin)	T-9 A	Paddy in the rainy season	0.23	55	5,500	69,575	208,725
3.	Mr. Naing Win (Mr. Ko Ko Naing)	T-9	Paddy in the rainy season	0.23	55	5,500	69,575	208,725
	Total							62,6175



Crop Compensation given to Mr. Ko Ko Naing, land owner of Tower No. **T-9**



Crop Compensation to Mr. Sein Htay, a representative of Mr. Aung Kyaw Lwin for Tower No. **T-9A**



Figure 3: Photo of a crop compensation ceremony

Table 3: Participant of the site investigation

No.	Name	Position	Department/ Village Tract/ Village
1	Mr. Yupa	Assistant Engineer (Machine/Electrical) Project Manager (1) Office	DPTSC in Yangon South District, MOEE
2	Mr. Phyo Pyae Win (Representative of Mr. Htay Naing)	Mr. Htay Naing is the owner of Land for Tower No. T-9 A	Let Yet San Village Tract
3	Mr. Sein Htay	Village Tract Administrator	Ba Yet Village Tract
4	Mr. Ko Ko Naing	Owner of Land for Tower No. T-9	Ba Yet Village Tract
5	Mr. Aung Myat Thu	Surveyor-4	Land Record Department, Ministry of Agriculture, Livestock and Irrigation
6	Mr. Amit	Project Manager	Supreme Group of Companies
6	Mr. Zaw Min	Electrical Engineer	Myanmar Koei International Ltd.
7	Ms. Wah Wah Han Su Yin	Social and Environmental Expert	Myanmar Koei International Ltd.



Site investigation at Tower T-50

Figure 4: Photo of a site investigation



Figure 5: Requested Location for Tower No. **T-50** by the representatives of the land owner



Figure 6: Requested Location for Tower No. **T-9A** near Thanlyin substation by the representative of the land owner



Figure 7: Detailed Requested Location for Tower No. **T-9A** near Thanlyin substation by the representative of the land owner

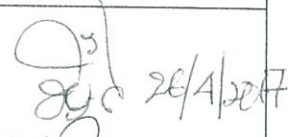
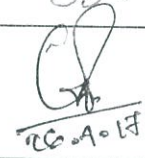





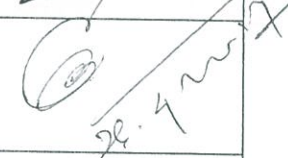




Figure 8: Requested Location for Tower No. T-9 near Thanlyin substation by the land owner





Figure 9: Detailed Requested Location for Tower No. T-9A near Thanlyin substation by the land owner

၂၆.၄.၂၀၁၇ ရက်နေ့တွင် သန်လျင်မြို့နယ်၊အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊
 အစည်းအဝေးခန်းမတွင် ကျင်းပပြုလုပ်သော သီလဝါသီးနှံ လျော်ကြေးပေးအပ်ပွဲ
 သို့ တက်ရောက်သူများစာရင်း

စဉ်	အမည်	ရာထူး/ဌာန	ကျေးရွာ	လက်မှတ်
၁။	ဦးစိုးမိုးစိန်	ဦးစိုးမိုးစိန် (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	 26/4/17
၂။	ဦးစိုးဝင်း	ဦးစိုးဝင်း (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	 26.4.17
၃။	ဦးစိုးမိုးစိန်	ဦးစိုးမိုးစိန် ဦးစိုးမိုးစိန် (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	
၄	ဦးစိုးမိုးစိန်	ဦးစိုးမိုးစိန် ဦးစိုးမိုးစိန် (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	
၅	ဦးစိုးမိုးစိန်	SAE ဦးစိုးမိုးစိန် (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	
၆	ဦးစိုးမိုးစိန်	ဦးစိုးမိုးစိန် (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	
၇	ဦးစိုးမိုးစိန်	အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	အိမ်ကွက်	 26/4/17
၈	ဦးစိုးမိုးစိန်	အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	အိမ်ကွက်	 26.4.17
၉	ဦးစိုးမိုးစိန်		~	
၁၀	ဦးစိုးမိုးစိန်	အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန		

၂၆.၄.၂၀၁၇ ရက်နေ့တွင် သန်လျင်မြို့နယ်၊ အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊
 အစည်းအဝေးခန်းမတွင် ကျင်းပပြုလုပ်သော သီလဝါသီးနှံ လျော်ကြေးပေးအပ်ပွဲ
 သို့ တက်ရောက်သူများစာရင်း

စဉ်	အမည်	ရာထူး/ဌာန	ကျေးရွာ	လက်မှတ်
	ဦးမာအိုဦး	ဗဟိုဌာန	မင်္ဂလာ	
	ဝါဝါဟန်စုဟန်	ယက်ဝန်၊ လှိုင် ဇေယျာ၊ စာတန်း	Myanmar Koe International Ltd.	Wahwah
	ဒေါ်အိမ်စွယ်	ဒု-ဦးစီးဌာန	စော/တော်	

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Department of Urban and Housing Development (hereinafter referred to as “DUHD”) and Department of Highways (hereinafter referred to as “DOH”) in the Ministry of Construction (hereinafter referred to as “MOC”), Max Myanmar Co., Ltd, (responsible for the operation and maintenance of Dagon-Thilawa Road), Yangon Electricity Supply Corporation (hereinafter referred to as “YESC”), Thilawa SEZ Management Committee (hereinafter referred to as “TSEZMC”), Myanmar Japan Thilawa Development (hereinafter referred to as “MJTD”), Department of Power Transmission and System Control (hereinafter referred to as “DPTSC”), TOENAC (hereinafter referred to as “the contractor”), Supreme (hereinafter referred to as “the Sub-contractor”) and Nippon Koei Co., Ltd. (or) Myanmar Koei International Ltd. (hereinafter referred to as “the Consultant”) have carried out discussion on land acquisition for the construction of 230 kV Transmission towers and power lines along Dagon-Thilawa Road from Thanlyin substation to Thilawa substation on 31 January, 2017 at TSEZMC office and confirmed the followings.

1. DUHD in MOC will issue an official letter for the removal of 13 numbers of street lamps and three numbers of conconut trees on the central divider on Dagon-Thilawa Road until this week (3 Feb, 2017). (Note: Regarding street lamps, the total number of lamps on the central divider is 85. MOC wants to remove all numbers of street lamps when 13 numbers of street lamps are removed as they are not working and later it will be problem to remove them due to the construction of 230 kV Transmission Tower on the central divider. In the letter from MOC, this request may be included. The contract complained about it. DPTSC and the Contractor will discuss about it.
2. DOH in MOC will make a survey on vendor shops and huts which are obstacles to construction of 230 kV T/L along Dagon-Thilawa Road. Then DOH will inform to them together with Thanlyin Township General Administration Department (GAD) to leave their places. DOH said that these vendor shops and huts were law-
3. As far as a concrete sign board written as “from Regional Development to the Country Development”, DUHD in MOC would like to get a new concrete sign board after construction if it is necessary to remove. After checking the site, the Sub-Contractor requested that firstly, the construction is done by preventing the removal of the existing sign board. If it is necessary to remove according to the construction condition, the Sub-Contractor is allowed to remove by DUHD. (Note: In the meeting on 25 Jan, the contractor agreed to install the existing sign board after the construction of T/L as MOC requested that it is the memorial sign board and MOC wants to keep as it is. But on 31 Jan, MOC changed its mind that MOC wants to get a new sign board after the construction. The Contractor complained about the construction of a new sign board in response to a request from MOC. DPTSC will negotiate with the Contractor based

on the letter from DUHD. In conclusion, the Sub-Contractor said that they will try to do the construction of Tower Foundation without removing the concrete first. If it is not impossible to do the construction without removing the concrete sign board, they will remove it. After the removal of the sign board, how to install the sign board is not yet confirmed.)

4. All related departments will be updated the information about the latest schedule of the construction including the block of one lane of Dagon-Thilawa Road near TSEZ by the Sub-contractor.
5. The construction will be done day and night shift.
6. There are six groups who will carry out the construction in total along the route.
7. MJTD will provide the location of underground facilities to the Sub-Contract near TSEZ so that they cannot be damaged during the construction.
8. After the meeting, the site investigation was carried out together with all participants to show obstacles to get approval to remove.
9. After the site investigation, DPTSC, the Sub-Contractor and NK went to meet with Office Staff in Forest Department in Thanlyin to inquire the approval request application letter about the removal of 41 numbers of trees along Dagon-Thilawa Road. It was found that coconut trees on the central divider road is not related to Forest Department and they belong to DUHD. Forest Department requested Thanlyin Township General Administration Department (GAD) to set up a committee including Assistant Administrator of Thanlyin Township, Joint Secretary of TSEZMC, Township Development Committee, Forest Manager, Forest Department, Hpa Yar Kone Village Tract (VT) and Let Yet San VT for the removal of these trees and it was set up by Thanlyin GAD. Forest Department first make a site survey together with committee members, DPTSC and the Sub-contractor on 2 Feb. The starting time will be informed to Wah Wah on 1 Feb, 2017. After getting the survey data about the trees which are necessary to remove, Forest Department in Thanlyin Township will submit to the Forest Department in District and get an instruction. (Note: There has been an order that it is necessary to pay the compensation when cutting trees recently.)
10. After then, DPTSC, the Sub-Contractor and NK went to meet with Thanlyin Township Administrator and requested to organize a meeting with Mr. Ko Ko Naing as there are some huts for goats on his land and they are necessary to remove. Mr. Ko Ko Naing already agreed to let his land use for construction of tower with compensation.
11. DPTSC will submit the schedule of the construction of T/L to DUHD, DOH in MOC, Forest Department in Thanlyin Township, Thanlyin Township GAD, Kyauktan Township GAD, TSEZMC, Thilawa Local Industrial Zone, Thilawa Police Office, Kyauktan Township Police Office and other related departments.

Table 1: Participant List

Participants

No.	Name	Position	Department	Contact
1	Mr. Kyaw Swar Soe Naing	Deputy Chief Engineer (DyCE)	Department of Power Transmission and System Control (DPTSC), Ministry of Electricity and Engery (MOEE) in Naypyitaw	09-8610210
2	Mr. Soe Moe Naing	Deputy Director, Project Manager (1)	Yangon South District, DPTSC, MOEE in Yangon	09-964601031
3	Ms. Yee Mon Thaw	Assistant Director	Department of Urban and Housing Development, MOC	09-5027674
4	Ms. Than Than Htay	Staff Officer	Department of Highways, Yangon South District, Ministry of Construction,	09-5050274
5	Mr. Myint Soe	Executive Engineer (EE)	Max Myanmar Co., Ltd	09-421105402
6	Ms. Than Than Thwe	Joint Secretary	Joint Secretary, TSEZMC	09-5151745
7	Ms. Soe Soe Aye	Member	TSEZMC	09-8304026
8	Mr. San Aung	Electrical Engineer	Myanmar Japan Thilawa Development (MJTD)	09-421171745
9	Mr. Naing Naing Soe	Assistant Manager	Thanlyin Township, Yangon Electricity Supply Corporation (YESC)	09-799455506
10	Mr. Aung Hlaing Tun	General Manager	Supreme Group of Company	09-254407647
11	Mr. Naing Win		Supreme Group of Company	09-5148647
12	Mr. Arai		TOENAC	

No.	Name	Position	Department	Contact
13	Mr. Murai		TOENAC	
14	Mr. Zaw Min	Electrical Engineer	Myanmar Koei International Ltd.	09-5066727
15	Ms. Wah Wah Han Su Yin	Environmental and Social expert (Consultant)	Myanmar Koei International Ltd.	09-5105867



Figure 1: Photo of a meeting

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Crop Compensation for the construction of 230 kV Transmission towers and power lines from Thanlyin substation to Thilawa substation was given to two affected persons at 11:30 on 26th April, 2017 (Wednesday) with a ceremony at Thanlyin Township General Administration Department (GAD) office. Site investigation was carried out with Project Manager (1) office in DPTSC, Owners/ Representatives of the Land, Ba Yet Village Tract Administrator, a surveyor of Ba Yet Village Tract in the Land Record Department, Supreme Group of Companies (hereinafter referred to as “the Sub-contractor”) and Nippon Koei Co., Ltd. (or) Myanmar Koei International Ltd. (hereinafter referred to as “the Consultant”).

1. Please see Figure 1 and Figure 2 for the overall line route of 230 Transmission Line from Thanlyin substation to Thilawa and detailed line route of 230 Transmission Line near Thanlyin substation.
2. Please see Table 1 for the participants of the crop compensation ceremony.
3. It is confirmed that the crop in the rainy season will be affected by the construction of 230 kV Transmission towers and power lines.
4. The numbers of Project Affected Person (PAP) to give crop compensation is 3.
5. The name of PAP are (1) Mr. Naing Win (Mr. Ko Ko Naing) for Tower No. T-9, (2) Mr. San Aye Hla (Mr. Aung Kyaw Lwin) for Tower No. T-9A and (3) Mr. Yan Myin Shu (or) Mr. Htay Naing for Tower No. T-50.
6. Please see Table 2 for the amount of crop compensation calculated by Thanlyin Township Land Management Committee in August, 2016.
7. Firstly, Mr. Thet Myint Oo, Assistant Township Administrator made an opening speech of the ceremony.
8. Secondly, Mr. Soe Moe Naing, Deputy Director of Project Manager Office (1) from DPTSC in Yangon South District explained about the construction of 230 kV Transmission Line.
9. Finally, crop compensation was given to following Two Persons.
(1) Mr. Naing Win (Mr. Ko Ko Naing) for Tower No. T-9
(2) Mr. Sein Nwe, a representative of Mr. Aung Kyaw Lwin) for Tower No. T-9A
10. Please see Figure 3 for the photo of the ceremony.
11. Regarding Tower No. T-50, three representatives of the land owner attended the ceremony. They said that they don't receive the compensation today (27 April) and they will inform the detailed information such as location of the Tower, Size of the Tower to Mr. Yan Myin Shu (or) Mr. Htay Naing. Then they will reply to Thanlyin Township GAD.
12. After the crop compensation ceremony, the site investigation was carried out together with the owner of Tower No. T-9 and representatives of the owners of Tower No. T-9A and T-50, Ba Yet Village Tract

Administrator, a surveyor of Ba Yet Village Tract, a responsible person from the Sub-contractor and the Consultant. Please see Table 3 for the participants list of the site survey and Figure 4 for photos of site investigation.

13. Representatives of the Tower No. **T-50** said that the location of the proposed Tower No. T-50 which the owner of this land agreed in August, 2016 is different from the current location at the site. They said that the owner of the land will not agree this current location of **T-50** as the current location of T-50 is between the two farm land which belong to that owner. In August, 2016, the location of the T-50 which the owner agreed is just at the front of the front plot which is near to the Dagon-Thilawa road.
14. They requested to move the location of tower No. T-50 to the previous proposed location as shown in Figure 5.
15. Thanlyin Township GAD also requested DPTSC to re-consider the location of Tower T-50 as it is difficult to get agreement from the land owner with the present location.
16. The owner of Tower No. T-9 and representatives of the owners of Tower No. T-9A also requested the location of each tower as shown in Figure 6, 7, 8 and 9.

230kV Thanlyin - Thilawar Transmission Line Route Map (10 Miles)

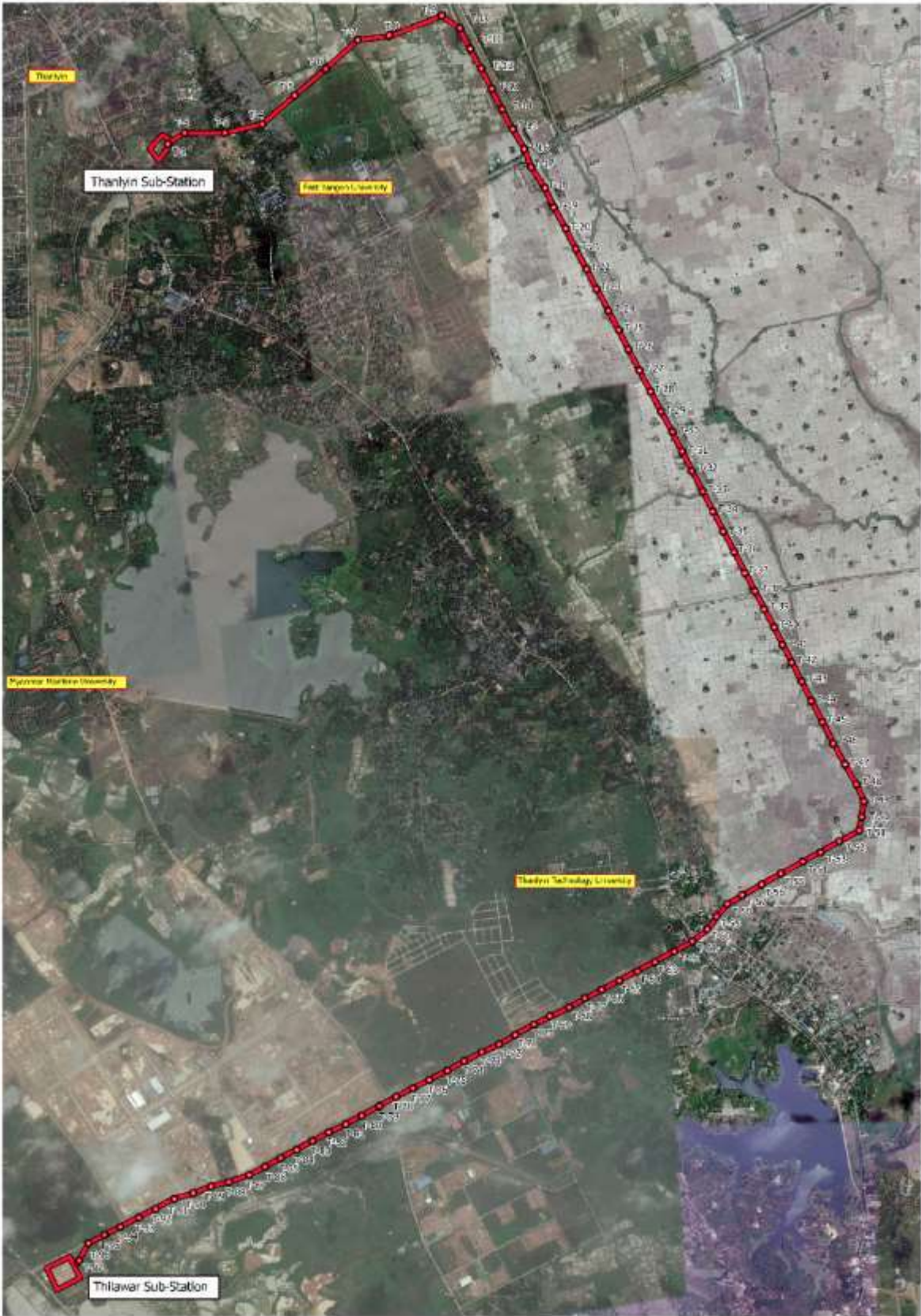


Figure 1: Overall line route of 230 kV Transmission Line from Thanlyin substation to Thilawa



Figure 2: Detailed line route of 230 kV Transmission Line near Thanlyin substation

Table 1: Participant List of a crop compensation ceremony

No.	Name	Position	Department/ Village Tract/ Village
1	Mr. Thet Myint Oo	Assistant Township Administrator	Thanlyin Township General Administration Department
2	Ms. Ei Phyu Htwe	Deputy Chief Officer	Thanlyin Township General Administration Department
3	Mr. Soe Moe Naing	Deputy Director, Project Manager (1) Office	DPTSC in Yangon South District, MOEE
4	Mr. Yupa	Assistant Engineer (Machine/Electrical)	DPTSC in Yangon South District, MOEE
5	Ms. Khin Khin Si	Chief Officer Project Manager (1) Office	DPTSC in Yangon South District, MOEE
6	Ms. Khin Ma Ma	Senior Clerk	DPTSC in Yangon South District, MOEE
7	Mr. Kyaw Naing Ohn	Senior Assistant Engineer	YESC in Thanlyin Township
8	Mr. Phyto Pyae Win (Representative of Mr.	Mr. Htay Naing is the owner of Land for Tower No. T-50	Let Yet San Village Tract
9	Mr. Soe Naing Oo	Village Tract Administrator	Let Yet San Village Tract

No.	Name	Position	Department/ Village Tract/ Village
10	Mr. Sein Htay	Village Tract Administrator	Ba Yet Village Tract
11	Mr. Ko Ko Naing	Owner of Land for Tower No. T-9	Ba Yet Village Tract
12	Mr. Aung Myat Thu	Surveyor-4	Land Record Department, Ministry of Agriculture
13	Mr. Zaw Min	Electrical Engineer	Myanmar Koei International Ltd.
14	Ms. Wah Wah Han Su Yin	Social and Environmental Expert	Myanmar Koei International Ltd.

Table 2: Crop Compensation amount calculation by Thanlyin Township Land Management Committee

No.	Name	Tower No.	Type of crop	Area affected (Acre)	Yield rate	Unique Price (MMK)	(Market) Price (MMK)	Total Compensation (MMK) Three times of the price
1.	Mr. Yan Myin Shu (or) Mr. Htay Naing	T-50	Paddy in the rainy season	0.23	55	5,500	69,575	208,725
2.	Mr. San Aye Hla (Mr. Aung Kyaw Lwin)	T-9 A	Paddy in the rainy season	0.23	55	5,500	69,575	208,725
3.	Mr. Naing Win (Mr. Ko Ko Naing)	T-9	Paddy in the rainy season	0.23	55	5,500	69,575	208,725
	Total							62,6175



Crop Compensation given to Mr. Ko Ko Naing, land owner of Tower No. **T-9**



Crop Compensation to Mr. Sein Htay, a representative of Mr. Aung Kyaw Lwin for Tower No. **T-9A**



Figure 3: Photo of a crop compensation ceremony

Table 3: Participant of the site investigation

No.	Name	Position	Department/ Village Tract/ Village
1	Mr. Yupa	Assistant Engineer (Machine/Electrical) Project Manager (1) Office	DPTSC in Yangon South District, MOEE
2	Mr. Phyo Pyae Win (Representative of Mr. Htay Naing)	Mr. Htay Naing is the owner of Land for Tower No. T-9 A	Let Yet San Village Tract
3	Mr. Sein Htay	Village Tract Administrator	Ba Yet Village Tract
4	Mr. Ko Ko Naing	Owner of Land for Tower No. T-9	Ba Yet Village Tract
5	Mr. Aung Myat Thu	Surveyor-4	Land Record Department, Ministry of Agriculture, Livestock and Irrigation
6	Mr. Amit	Project Manager	Supreme Group of Companies
6	Mr. Zaw Min	Electrical Engineer	Myanmar Koei International Ltd.
7	Ms. Wah Wah Han Su Yin	Social and Environmental Expert	Myanmar Koei International Ltd.



Site investigation at Tower T-50

Figure 4: Photo of a site investigation



Figure 5: Requested Location for Tower No. **T-50** by the representatives of the land owner



Figure 6: Requested Location for Tower No. **T-9A** near Thanlyin substation by the representative of the land owner



Figure 7: Detailed Requested Location for Tower No. **T-9A** near Thanlyin substation by the representative of the land owner

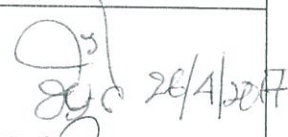
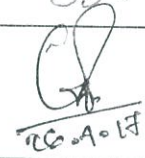





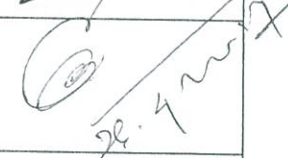




Figure 8: Requested Location for Tower No. T-9 near Thanlyin substation by the land owner





Figure 9: Detailed Requested Location for Tower No. T-9A near Thanlyin substation by the land owner

၂၆.၄.၂၀၁၇ ရက်နေ့တွင် သန်လျင်မြို့နယ်၊အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊
 အစည်းအဝေးခန်းမတွင် ကျင်းပပြုလုပ်သော သီလဝါသီးနှံ လျော်ကြေးပေးအပ်ပွဲ
 သို့ တက်ရောက်သူများစာရင်း

စဉ်	အမည်	ရာထူး/ဌာန	ကျေးရွာ	လက်မှတ်
၁။	ဦးစိုးမိုးစိန်	ဦးစိုးမိုးစိန် (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	 26/4/17
၂။	ဦးစိုးဝင်း	ဦးစိုးဝင်း (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	 26.4.17
၃။	ဦးစိုးမိုးစိန်	ဦးစိုးမိုးစိန် ဦးစိုးမိုးစိန် (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	
၄	ဦးစိုးမိုးစိန်	ဦးစိုးမိုးစိန် ဦးစိုးမိုးစိန် (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	
၅	ဦးစိုးမိုးစိန်	SAE ဦးစိုးမိုးစိန် (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	
၆	ဦးစိုးမိုးစိန်	ဦးစိုးမိုးစိန် (အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန)	အိမ်ကွက်	
၇	ဦးစိုးမိုးစိန်	အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	အိမ်ကွက်	 26/4/17
၈	ဦးစိုးမိုးစိန်	အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန	အိမ်ကွက်	 26.4.17
၉	ဦးစိုးမိုးစိန်		~	
၁၀	ဦးစိုးမိုးစိန်	အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန		

၂၆.၄.၂၀၁၇ ရက်နေ့တွင် သန်လျင်မြို့နယ်၊အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊
 အစည်းအဝေးခန်းမတွင် ကျင်းပပြုလုပ်သော သီလဝါသီးနှံ လျော်ကြေးပေးအပ်ပွဲ
 သို့ တက်ရောက်သူများစာရင်း

စဉ်	အမည်	ရာထူး/ဌာန	ကျေးရွာ	လက်မှတ်
	ဦးမာအိုဦး	ဗဟိုဌာန	မင်္ဂလာ	
	ဝါဝါဟန်စုဟန်	ပတ်ဝန်းကျင်နှင့် ဇယားစာတန်း	Myanmar Koe International Ltd.	Wahwah
	ဒေါ်အိမ်စွယ်	ဒု-ဦးစီးဌာန	စော/တုတ်	

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Site visit at the construction of 230 kV Transmission towers and power lines from Thanlyin substation to Thilawa substation was conducted with Project Manager (1) office in DPTSC (hereinafter referred to as “the Project Owner”), representatives of the farmland owner of Tower No. T-50 (hereinafter referred to as “the Representatives”), Let Yet San Village Tract Administrator, a surveyor of Let Yet San Village Tract in the Land Record Department, Supreme Group of Companies (hereinafter referred to as “the Sub-contractor”) and Nippon Koei Co., Ltd. (or) Myanmar Koei International Ltd. (hereinafter referred to as “the Consultant”). at 11:30 on 18th May, 2017 (Thursday).

1. On 26 April, 2017, site visit was carried out with three Representatives and they requested to move the location of Tower T-50 as near as possible to the Dagon-Thilawa Road.
2. In response to the above request by the Representatives, the proposed location of Tower No. T-50 (Suspension Tower) could be moved to 24 ft from the original proposed location to the Dagon-Thilawa Road by adjusting the location of Tower No. T-49 (Tension Tower) and T-51 (Tension Tower) as shown in Figure 1.
3. When the new proposed location was shown to two Representatives, they said that it is nearly the same as the original proposed location. Their owner told them that he will not oppose anything if the tower is constructed outside of his farmland and along Dagon-Thilawa Road, all towers are located outside of the farmland and why only T-50 was planned to construct within his farmland according to Mr. Phyo Pyae Win, one of the representatives. It means that he does not allow to construct a tower within his farmland.
4. Mr. Phyo Pyae Win went the new location of T-50 but Ms. Nu Nu Htwe did not go there.
5. Mr. Phyo Pyae Win was explained that 2 m×2 m×1 m concrete foundation is left above ground after the construction although the area necessary during the construction is 100 ft×100 ft. A sample of the tower foundation which was nearly completed was shown to him at the construction site near Thilawa SEZ so that he can explain to his owner.
6. Mr. Phyo Pyae Win was requested by the Project Owner to make an appointment with Mr. Yan Myin Shu (or) Mr. Htay Naing, the owner of farmland whenever he is available. The Project Owner wants to explain about the project in detail by meeting with him when he comes back to Yangon from Naypyitaw.
7. Mr. Phyo Pyae Win recommended to meet with Mr. Yan Myin Shu (or) Mr. Htay Naing instead of meeting with his wife who is difficult to make negotiation.
8. From now on Ms. Nu Nu Htwe will be the Representative as Mr. Phyo Pyae Win will resign his current job of this company which belongs to the farmland owner of Tower No. T-50.
9. The owner of Tower No. T-9 and representatives of the owners of Tower No. T-9A also requested to

change a little of the location of each tower on 26 April.

- In response to their request, new proposed location for Tower No. T-9 and T-9A were marked with a red flag at the site and they were informed about the new proposed location to check.



Figure 1: New proposed location of Tower No. T-50 (Suspension Tower)

Table 1: Participant of the site investigation

No.	Name	Position	Department/ Village Tract/ Village
1	Mr. Soe Moe Naing	Deputy Director, Project Manager (1) Office	DPTSC in Yangon South District, MOEE
2	Mr. Thu Yein Lin	Assistant Engineer (Civil)	Ministry of Electricity and Energy
3	Mr. Phyo Pyae Win (Representative of Mr. Htay Naing)	Mr. Htay Naing is the owner of Land for Tower No. T-50	
4	Ms. Nu Nu Htwe (Representative of Mr. Htay Naing)		

No.	Name	Position	Department/ Village Tract/ Village
5	Mr. Soe Naing Oo	Village Tract Administrator	Let Yet San Village Tract
6	Mr. Nyan Lin Tun	Surveyor-4	Land Record Department, Ministry of Agriculture
7	Mr. Wai Yan Phy	Surveyor	Supreme Group of Companies
7	Mr. Zaw Min	Electrical Engineer	Myanmar Koei International Ltd.
8	Ms. Wah Wah Han Su Yin	Social and Environmental Expert	Myanmar Koei International Ltd.



Figure 2: Photos of site Visit



၂၃၀ ကေစွီ သန်လျင်-သီလဝါမဟာဓာတ်အားလှိုင်းရှိ တာဝါတိုင်အမှတ်(၅၀) အားပြောင်းလဲသတ်မှတ်ထားသည့် အခြေအနေအားပြန်လည်တင်ပြခြင်းကိစ္စ ဤရုံး၏(၁၇.၅.၂၀၁၇) ရက်စွဲပါစာအမှတ်၊၇၇၅/စီဂျာ(၁)လှိုင်း/၂၀၁၇

၁။ အထက်အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍၊ ၂၃၀ ကေစွီ သန်လျင် - သီလဝါ မဟာ ဓာတ်အားလှိုင်း တည်ဆောက်ရေးလုပ်ငန်းတွင် တာဝါတိုင်အမှတ်(၅၀) ကျရောက်သော လယ်ပိုင်ရှင် ဦးရန်မြင်ရှု(ခ)ဦးမြင့်နိုင် မြေနေရာအား တာဝါတိုင် လျာထားသည့် မူလနေရာမှ လမ်းမဘက် သို့ (၂၄)ပေ အကွာအဝေးထိ ရွှေ့ပြောင်းထားသည့်အခြေအနေအား(၁၈.၅.၂၀၁၇) ရက်နေ့တွင် NIPPON KOEI Co.Ltd မှ တာဝန်ရှိသူများ ၊ Superme Co.Ltd မှ Survey တိုင်းတာရေးအဖွဲ့များ ၊ကျေးရွာ အုပ်ချုပ်ရေးမှူး(လက်ယက်စန်းကျေးရွာ) နှင့် မြေစာရင်းအဖွဲ့များ မှအတည်ပြုချက်ရရှိနိုင်ရေးအတွက် ကွင်းဆင်း၍ သွားရောက်ခဲ့သော်လည်း မြေပိုင်ရှင်၏ ကိုယ်စားလှယ်များသာ လာရောက်ခဲ့ပါသည်။

၂။ တာဝါအမှတ်(၅၀) ရွှေ့ပြောင်းထားသည့်နေရာအား မြေပိုင်ရှင်၏ကိုယ်စားလှယ်များ မှ ပြောကြားရာတွင် လက်ရှိတာဝါတိုင်နေရာသည် လယ်မြေဧရိယာအစပ်မှ အတွင်းသို့ ပေ(၉၀)အတွင်း ကျရောက်နေပြီး ဓာတ်အားလှိုင်းအကြောင်းသည်လည်း ၎င်းလယ်မြေ၏ မျက်နှာပွင့်အကျယ်ပေ(၂၀၀) မျှ ဖြတ်သွားကြောင်း ၊ ယခင်ညှိနှိုင်းထားခြင်းသည် လယ်မြေ၏ဧရိယာ အပြင်ဘက်အစပ်ဟု သိရှိ ထားကြောင်း၊နောက်ဆုံးအနေဖြင့် လယ်မြေဧရိယာအတွင်း ကျရောက်လျက်ရှိသော တာဝါစိုက်ထူမည့် နေရာအား လယ်မြေ၏ ကင်းလွတ်ရာနေရာသို့ ရွှေ့ပြောင်းပေးနိုင်ရေးအား ပြောကြားလာပါသည်။

၃။ သို့ပါ၍ တာဝါအမှတ်(၅၀)(Suspension Tower) စိုက်ထူမည့်နေရာအား Tension Tower အဖြစ်ပြောင်းလဲ၍ ၎င်းလယ်မြေ၏ အပြင်ဘက် ဆက်စပ်ဧရိယာအနီးရှိ ကားလမ်းမကြီးဘေး (ရေမြောင်းအနီး) မြေနေရာ၌ အစားထိုးစိုက်ထူလျှင် ရရှိနိုင်ပါကြောင်း မှတ်တမ်းဓာတ်ပုံနှင့်တကွ အစီရင်ခံ တင်ပြအပ်ပါသည်။

[Handwritten signature]
18/5/2017
စိုးမိုးနိုင်

ဒု-ညွှန်ကြားရေးမှူး(စက်/လျှပ်)
စီမံကိန်းမန်နေဂျာရုံး(၁)၊ရန်ကင်းမြို့

ဒု-ညွှန်ကြားရေးမှူးချုပ်(စက်/လျှပ်)
ဓာတ်အားပို့လွှတ်ရေးစီမံကိန်းများဌာန
နေပြည်တော်
စာအမှတ်၊ ၇၈၇ /ပေစ(တ)စီဂျာ(၁)လုပ်ငန်း/၂၀၁၇
ရက်စွဲ ၊ ၂၀၁၇ - ခုနှစ် ၁၈ မေလ ရက်
မိတ္ထူကို

စီမံကိန်းညွှန်ကြားရေးမှူး၊ဓာတ်အားပို့လွှတ်ရေးစီမံကိန်း(တောင်ပိုင်း)၊နေပြည်တော်
မြို့နယ်အထွေထွေအုပ်ချုပ်ရေးမှူး၊အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန၊သန်လျင်မြို့နယ်
ရုံးလက်ခံ

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Site visit at the construction of 230 kV Transmission towers and power lines from Thanlyin substation to Thilawa substation was conducted with Project Manager (1) office in DPTSC (hereinafter referred to as “the Project Owner”), the farmland owner of Tower No. T-9 A (hereinafter referred to as “the Land Owner”), Ba Yet Village Tract Administrator, Farm Land Management and Statistic Department in Ba Yet Village Tract, Supreme Group of Companies (hereinafter referred to as “the Sub-contractor”) and Nippon Koei Co., Ltd. (or) Myanmar Koei International Ltd. (hereinafter referred to as “the Consultant”). at 10:30 on 27th August, 2017 (Sunday) at Yangon South District General Administration Department (GAD).

1. The excavator entered to the area of T-9 (A) and started excavation work when Mr. Sein Nwe, Ba Yet Village Tract Administrator and one staff from Ba Yet Village Tract Administration Office arrived the construction site at 8:00 am.
2. There are people living beside the area of T-9 (A) who works for the land owner of T-9 (A). They informed to Ma Thuzar, a representative of the land owner about our excavation work by phone. Mr. Sein Nwe also talked with Ma Thuzar by phone at that time and explained that the land owner can meet with Thanlyin Township Administrator today (27 Aug) if the land owner wants.
3. At 9:00, Ms. Phyu Pyar Aung from Thanlyin Township General Administration (GAD) office called to the Consultant and informed to call all related Stakeholders to Yangon South District GAD at 10:30 for a meeting about T-9 (A).
4. Meeting was held from 10:30 at the office of Yangon South District General Administrator.
5. The land owner attended the meeting and he said that he had never been invited to the meeting except the previous time.
6. He was angry that without his permission, an excavator entered his land and excavation was carried out this morning.
7. He asked how he will be apologized for such condition.
8. Township General Administrator explained that he has been invited to the meeting for a several times and he never attends the meeting. The land owner replied that the project proponent could come to his place if he did not attend the meeting.
9. The land owner together with the following participants visited the construction site and Integral Co., Ltd explained the line route of 230 kV.
10. The next meeting was set at 13:00 on 28 Aug (Mon) at Thanlyin Township General Administration Office.
11. The Land Owner said that he will talk at the meeting how he shall be apologized after considering carefully.

12. Table 1 shows the participants list and Figure 1 and Figure 2 show Location of T-9 (A) and photos respectively.

Remark: The Land Owner owns 5 acre of land (La Na 39) which can be used for other ways instead of cultivation. The total area which the Land Owner owns near this place is 47.73 acre. There is a steel structure building inside this 5 acre and a fence is under construction between the existing Thanlyin-Kamarnet line and this 5 acre.



Figure 1: Location of T-9(A)

Table 1: Participants list

No.	Name	Position	Department/ Village Tract/ Village
1.	Mr. Aung Kyaw Lwin	Land owner of T-9 (A)	
2.	Mr. Myo Kyaw	District Administrator	Yangon South District GAD
3.	Mr. Myint Sein	Township Administrator	Thanlyin Township GAD
4.	Ms. Ei Phyu Htwe	Deputy Staff Officer	Thanlyin Township GAD
5.	Ms. Phyu Pyar Aung	Higher Clerk	Thanlyin Township GAD
6.	Mr. Sein Nwe	Village Tract Administrator	Ba Yet Village Tract GAD
7.	Mr. Nyi Nyi Soe	Assistant Engineer	YESC in Thanlyin Township
8.	Mr. Soe Moe Naing	Project Manager-1	DPTSC in South, MOEE
9.	Mr. Aung Moe Thu	Assistant Engineer, Project Manager (1) Office	DPTSC in South District, MOEE
10.	Mr. Aung Myat Thu	Surveyor-4	Farm Land Management and Statistic Department
11.	Mr. Wai Yan Phy	Surveyor	Supreme Group of Companies
12.	Mr. Za Bu	General Manager	Integral Power Transmission Group Co., Ltd.
13.	Ms. Wah Wah Han Su Yin	Social and Environmental Expert	Myanmar Koei International Ltd.



Site Visit by the Land Owner and Stakeholders



Site Visit by the Land Owner and Stakeholders



Excavation work at the site in the morning



Existing Thanlyin-Kamarnet Line and 5 acres

Figure 2: Photos

Memorandum
On
Package 3: 230 kV Transmission Line and a substation for
Sub-Project for Electric Power Development in Thilawa Area
under Infrastructure Development Project in Thilawa Area (Phase I)

Site visit at the construction of 230 kV Transmission towers and power lines from Thanlyin substation to Thilawa substation was conducted with Project Manager (1) office in DPTSC (hereinafter referred to as “the Project Owner”), the farmland owner of Tower No. T-9 A (hereinafter referred to as “the Land Owner”), Ba Yet Village Tract Administrator, Farm Land Management and Statistic Department in Ba Yet Village Tract, Supreme Group of Companies (hereinafter referred to as “the Sub-contractor”) and Nippon Koei Co., Ltd. (or) Myanmar Koei International Ltd. (hereinafter referred to as “the Consultant”). at 13:00 on 28th August, 2017 (Monday).

1. Three friends of the Land Owner and the Land Owner attended the meeting.
2. One friend of the Land Owner called Mr. Hla Win requested to change the line route from the proposed location under the existing line route of Thanlyin-Kamarnet 230 kV line to the new location according to the arrow direction as shown in the Figure 1 as the front of their farmland is blocked with the tower. It seems that the land cannot be able to sold this farmland if there is a tower at the front of their farmland.
3. Mr. Nay Min Oo (Civil, DPTSC) explained that their proposed line route is not feasible as Tower No. T-10 is necessary to replace with tension type lattice tower and it costs million of dollars.
4. Mr. Nay Min Oo also confirmed with Mr. Nyunt Wai by phone if the location of tower can be moved to the side of the drainage and the result is No.
5. Mr. Nay Min Oo also explained that the Head Office of MOEE will not allow to change the line route as the proposed tower location is under the existing line route and the affected area is the smallest.
6. One of the friends of the Land Owner asked to submit the letter regarding this matter to the Minister of MOEE and give copy to the Land Owner who will bring this letter to the Minister of MOEE and a group of Land Owner will meet with the Minister of MOEE to discuss about this matter. Mr. Nay Min Oo agreed to submit a letter about his issue.
7. In the evening, Thanlyin Township General Administrator called to the Consultant and told that a group of Land Owners came to his office after the meeting. The Land Owner was angry that the Sub-contractor did not initiate to talk about compensation money.
8. Thanlyin Township General Administrator wants the Contractor to meet with the Land Owner to talk about the amount of compensation without his existence. This compensation will be illegal and it cannot be discussed in front of Township General Administrator or other related departments.
9. The Land Owner and his friends are used to doing power projects in Myanmar and they know how much profit the Contractor can get and the Land Owner wants the Contractor to give compensation for construction of 230 kV at the proposed location according to Thanlyin Township General Administrator

10. Yangon South District Administrator also wants the Contractor to give compensation to the Land Owners based on Thanlyin Township General Administrator.
11. The Consultant replied Thanlyin Township General Administrator that the responsible person for land acquisition is MOEE and not the Contractors according to the contract.
12. If the Contractor gives enough compensation to the Land Owner, the line route is not necessary to change based on Thanlyin Township General Administrator.
13. The Consultant told to Thanlyin Township General Administrator that the Consultant will inform this message to MOEE and inform to Thanlyin Township General Administrator.
14. Table 1 shows the participants list and Figure 2 shows photos.



Figure 1: A new location of T-9(A) by the Contractor

Table 1: A list of Participants

No.	Name	Position	Department/ Village Tract/ Village
1.	Mr. Aung Kyaw Lwin	Land owner of T-9 (A)	
2.	Mr. Hla Win	A friend of the land owner of T-9 (A)	
3.	Mr. Myint Sein	Township Administrator	Thanlyin Township GAD
4.	Ms. Ei Phyu Htwe	Deputy Staff Officer	Thanlyin Township GAD
5.	Ms. Phyu Pyar Aung	Higher Clerk	Thanlyin Township GAD
6.	Mr. Sein Nwe	Village Tract Administrator	Ba Yet Village Tract GAD
7.	Mr. Soe Naing Win	Executive Engineer, Project Manager (1) Office	DPTSC in South, MOEE
8.	Mr. Khin Maung Swe	Deputy Staff Officer	Farm Land Management and Statistic Department
9.	Mr. Aung Myat Thu	Surveyor-4	Farm Land Management and Statistic Department
10.	Mr. Myint Aung	Construction Manager	Supreme Group of Companies
11.	Mr. Ye Myint Aung	Coordinator	Supreme Group of Companies
12.	Ms. Wah Wah Han Su Yin	Social and Environmental Expert	Myanmar Koei International Ltd.



Figure 1: Photo

*Appendix-6 Instrument of measuring Air,
Water and Sound Quality*

1. Air Quality

1.1 Measuring instrument

Table 1.1 shows a summary of air quality measuring instrument and Figure 1.1 shows photos of air quality measurement instrument.

Table 1.1 A summary of Air Quality measuring instrument

Item	Instrument	Characteristic of the instrument
Air Quality	The Haz-Scanner EPAS Wireless Environmental Perimeter Air Station	- Portable direct reading - Configure up to 14 simultaneous air measurements including U.S. EPA criteria air pollutants - Standard configuration measures particulate matter, NO ₂ , CO, temperature, and relative humidity



Figure 1.1 Figure of a Haz-Scanner

1.2 Test Method for air quality

Air quality measuring station is installed at survey points. Table 1.2 describes test method for air quality

Table 1.2 Test method for air quality

No.	Parameter	Analysis Method
1	Sulfur dioxide (SO ₂)	On site reading
2	Carbon monoxide (CO)	On site reading
3	Nitric oxide (NO)	On site reading
4	Nitrogen dioxides (NO ₂)	On site reading
5	Particle matter 2.5 (PM _{2.5})	On site reading
6	Particle matter 10 (PM ₁₀)	On site reading

2. Water Quality



2.1 Measuring Instrument

Table 2.1 shows Water Quality measuring instrument.

Table 2.1 A list of Water Quality measuring instrument

No.	Equipment	Manufacturer	Originate Country	Model
1	pH meter	HANNA	USA	HI7609829-1 pH Sensor
2	DO meter	HANNA	USA	HI7609829-2 Sensor
3	Multi-parameter Bench Photometer	HANNA	USA	HI83200-2
4	Alpha Bottle (Water Sampler)	Wildlife Supply Company®	Indonesia	-

Table 2.2 Water Quality measuring instrument Photo

Instrument	Photo
HANNA HI83200-2	
HANNA HI 9829, the top part of the instrument contain the sensors of HI7609828-1 and HI7609829-2	

2.2 Analytical Method for Water Quality

Water samples were taken by Alpha horizontal water sampler and collected in sterilized sample containers. The parameters as pH, temperature, Dissolved Oxygen (DO), Electrical Conductivity (EC), and turbidity were measured at site concurrently with sample collection. All samples were kept in iced boxes and were transported to the laboratory and stored at 2-4 °C refrigerators. Table 2.2 shows Analytical method for water quality.

Table 2.2 Analytical method for Water Quality

No.	Item	Field/Laboratory Analysis	Analysis method
1	Flow rate/Velocity	Field analysis	Digital Water Velocity Meter
2	Transparency		Visual method
3	Temperature (Atmosphere, Water)		HI7609829 Temperature Sensor
4	pH		HI7609829-1 pH Sensor
5	Oxidation-Reduction Potential (ORP)		HI7609829-1 ORP Sensor
6	Electrical conductivity (EC)		HI7609829 EC Sensor
7	Total Dissolved Solids (TDS)		HI7609829-3 TDS Sensor
8	Dissolved oxygen (DO)		HI7609829-2 Galvanic dissolved oxygen (D.O) sensor
9	Turbidity		HI7609829-2 Turbidity Sensor
10	Odor		Olfactory Measurement Method
11	Color		Visual method
12	Suspended Solids	Laboratory analysis	Gravimetric method
13	Biochemical oxygen demand(BOD ₅)		Direct inoculation method
14	Chemical oxygen demand(COD)		Dichromate method
15	Oil & Grease		APHA-AWWA-WEF Method
16	Chromium (Cr) (mg/l)		Hanna HI 83200 Multiparameter Bench Photometer
17	Zinc (Zn) (mg/l)		Hanna HI 83200 Multiparameter Bench Photometer
18	Copper (Cu) (mg/l)		Hanna HI 83200 Multiparameter Bench Photometer
19	Iron (Fe)		Atomic Absorption Spectroscopy Method
20	Fecal Coliforms		AOAC Petrifilm Method
21	E.coli		AOAC Petrifilm Method
22	Total Coliforms		AOAC Petrifilm Method

2.3 Container and Preservation Method for Water Samples

Table 2.3 shows Container and Preservation Method for water samples

Table 2.3 Containers and Preservation Method for water samples


No.	Parameter	Container	Preservation
1	Oil and Grease	1000 ml glass bottle	Sulfuric acid, Refrigerate
2	COD	500 ml plastic bottle	Sulfuric acid, Refrigerate
3	BOD ₅	1,800 ml plastic bottle	Refrigerate
4	Heavy metals	500 ml plastic bottle	HNO ₃ Refrigerate
5	Bacteria	200 ml glass bottle (Sterilize)	Refrigerate
6	Others	1,800 ml polyethylene bottle	Refrigerate

3. Noise

3.1 Measuring Instrument

Table 3.1 shows noise measuring instrument.

Table 3.1 Noise measuring instrument

Item	Instrument	Characteristic of the instrument	Photo
Sound	Sound Level Meter Rion NL-42	<ul style="list-style-type: none"> - Sound level meter with SD Card - Equivalent continuous A-weighted sound pressure level: L_{Aeq}(dB) 	

The microphone is placed about 1.55 m above the ground level for noise measurement. Ten minutes interval is set for 24 hours and the data is initially calculated as hourly average and then as daily equivalent of maximum and minimum sound level.

3.1 Analytical Method for noise

One day Noise levels (L_{Aeq}) of the monitoring points is calculated by using the following array Formula in the excel sheet. Firstly, hourly L_{Aeq} is calculated by using the following formula and then 24 hours L_{Aeq} is calculated by using the same formula.

$$10 \cdot \text{LOG}_{10}(\text{AVERGAE}(10^{((\text{RANGE})/10)}))$$

*Appendix-7 Negotiation between the Ministry
of Construction (MOC) and the
Ministry of Electricity and
Energy (MOEE)*



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
ဆောက်လုပ်ရေးဝန်ကြီးဌာန
 ဝန်ကြီးရုံး
 နေပြည်တော်

လျှပ်စစ်စွမ်းအားဝန်ကြီးရုံး
 ဝင်စာမှတ်ပုံစာင်
 အမှတ် ၁၀ / ၅
 နေ့စွဲ ၁၅ - ၇ - ၂၀၁၄

စာအမှတ်၊ ၁ / ခွဲ - ၃ / ၂၀၁၄ (စီ ၇၆၈၅)
 ရက် စွဲ၊ ၂၀၁၄ ခုနှစ် ဇူလိုင်လ ၁၅ ရက်

သို့

လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန

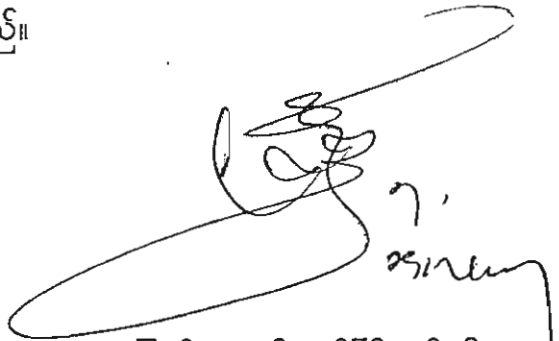
၃၉
 ၁၅/၇

အကြောင်းအရာ။ သီလဝါ အထူးစီးပွားရေးဇုန်တွင် ဓာတ်အား ပြည့်ဝစွာ ရရှိရေး အတွက် တည်ဆောက်မည့် ၂၃၀ ကေပီ ဓာတ်အားလိုင်းအကြောင်းသစ်အား ခွင့်ပြုပေးနိုင်ပါရန် ညှိနှိုင်းခြင်း

ရည် ညွှန်းချက်။ လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန၏ ၂၀၁၄ ခုနှစ် ဇွန်လ (၃၀)ရက် နေ့စွဲပါ စာအမှတ်၊ ၃ လစ / (MEPE) / (၇၈၃၄) / ၂၀၁၄

၁။ အထက်အကြောင်းအရာပါ ကိစ္စနှင့်ပတ်သက်၍ သီလဝါအထူးစီးပွားရေးဇုန်သို့ သန်လျင် ပင်မဓာတ်အားခွဲရုံမှ ၂၃၀ ကေပီ Compact Mono Pole တိုင်များအား စက်မှုဇုန်လမ်းမကြီး၏ လမ်းလယ်ကျွန်းအပေါ်မှ တာဝါတိုင်စိုက်မည့် အစီအစဉ် နှင့် အချို့အပိုင်းတွင် ရေမြောင်းဘေး (လမ်း Center မှ ၇၇.၆' အကွာ)မှ တာဝါတိုင်စိုက်မည့် အစီအစဉ်အပေါ် ခွင့်ပြုပေးနိုင်ပါရန် ရည်ညွှန်းပါ စာဖြင့် ညှိနှိုင်းလာပါသည်။

၂။ အဆိုပါ ညှိနှိုင်းလာမှုအပေါ် သီလဝါအထူးစီးပွားရေးဇုန် သို့ ၂၃၀ ကေပီ Compact Mono Pole တိုင်များကို စိုက်ထူရာ၌ Center line of existing road မှ လမ်းဝဲယာ (၉၅')တိတိ၌ စိုက်ထူရန် သဘောတူခွင့်ပြုပါကြောင်း ပြန်ကြားအပ်ပါသည်။


 ပြည်ထောင်စုဝန်ကြီး(ကိုယ်စား)
 အောင်ထွန်း၊ ရုံးအဖွဲ့မှူး

မိတ္တူကို

ဦးဆောင်ညွှန်ကြားရေးမှူး၊ ပြည်သူ့ဆောက်လုပ်ရေးလုပ်ငန်း
 ဒုတိယဦးဆောင်ညွှန်ကြားရေးမှူး(လုပ်ငန်း)၊ ပြည်သူ့ဆောက်လုပ်ရေးလုပ်ငန်း
 အင်ဂျင်နီယာချုပ်(လမ်း)၊ ပြည်သူ့ဆောက်လုပ်ရေးလုပ်ငန်း



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ
လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန

စာအမှတ်၊ ၃၀၈/(MEPE)/(၇၈၃၄) /၂၀၁၄
ရက်စွဲ၊ ၂၀၁၄ ခုနှစ်၊ ဇွန်လ (၃၀) ရက်

သို့

ပြည်ထောင်စုဝန်ကြီး
ဆောက်လုပ်ရေးဝန်ကြီးဌာန

အကြောင်းအရာ ။ သီလဝါ အထူးစီးပွားရေးဇုန်တွင် ဓာတ်အားပြည့်ဝစွာ ရရှိရေးအတွက် တည်ဆောက်မည့် ၂၃၀ ကေစီ ဓာတ်အားလိုင်းအကြောင်းသစ်အား ခွင့်ပြုပေးနိုင်ပါရန် ညှိနှိုင်းခြင်း

- ရည်ညွှန်းချက် ။ (၁) လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန၏ (၃၀.၅.၂၀၁၄) ရက်စွဲပါ စာအမှတ်- ၃၀၈/MEPE(၆၃၀၇)/၂၀၁၄
(၂) ဆောက်လုပ်ရေးဝန်ကြီးဌာန၏ (၁၆.၆.၂၀၁၄) ရက်စွဲပါ စာအမှတ်-၁/ ခွဲ-၃/၂၀၁၄ (စီ၇၀၃၄)
(၃) လျှပ်စစ်စွမ်းအားဝန်ကြီးဌာန၏ (၂၀.၆.၂၀၁၄) ရက်စွဲပါ စာအမှတ်- ၃၀၈/MEPE(၇၃၉၂)/၂၀၁၄

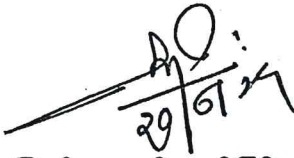
၁။ သီလဝါ အထူးစီးပွားရေးဇုန်သို့ သန်လျှင် ပင်မဓာတ်အားခွဲရုံမှ ၂၃၀ ကေစီ ဓာတ်အားလိုင်း တာဝါတိုင်များအား လမ်းလယ်ကျွန်းနှင့် လမ်းနယ်နိမိတ်စပ်မှ တည်ဆောက်သွားမည့် အစီအစဉ် အပေါ် ဆောက်လုပ်ရေးဝန်ကြီးဌာနသို့ ရည်ညွှန်းချက်(၁)ပါစာဖြင့် ညှိနှိုင်းခဲ့ပါသည်။ ထို့နောက် ဆောက်လုပ်ရေးဝန်ကြီးဌာနမှ လမ်းတိုးချဲ့ရန် ရှိသဖြင့် ခွင့်မပြုနိုင်ပါကြောင်းနှင့် ကွင်းဆင်း ပြသမည်ဆိုပါက ပူးပေါင်းဆောင်ရွက်ပေးမည်ဖြစ်ကြောင်း ရည်ညွှန်းချက်(၂)ပါစာဖြင့် ပြန်ကြားလာ သည့်အပေါ် ရည်ညွှန်းချက်(၃)ပါစာဖြင့် (၂၂.၆.၂၀၁၄)ရက်နေ့တွင် ဝန်ကြီးဌာနနှစ်ခုမှ ကိုယ်စားလှယ် များ ကွင်းဆင်းပြသစိစစ်ခဲ့ပါသည်။

၂။ ထို့နောက် မြန်မာ့လျှပ်စစ်ဓာတ်အားလုပ်ငန်းမှ တည်ဆောက်လိုသည့် ၂၃၀ ကေစီ Compact Mono Pole တိုင်များအား လမ်းမကြီးနှင့် ပိုမိုဝေးကွာစေရန် ရေမြောင်းဘေးသို့ ကပ်၍

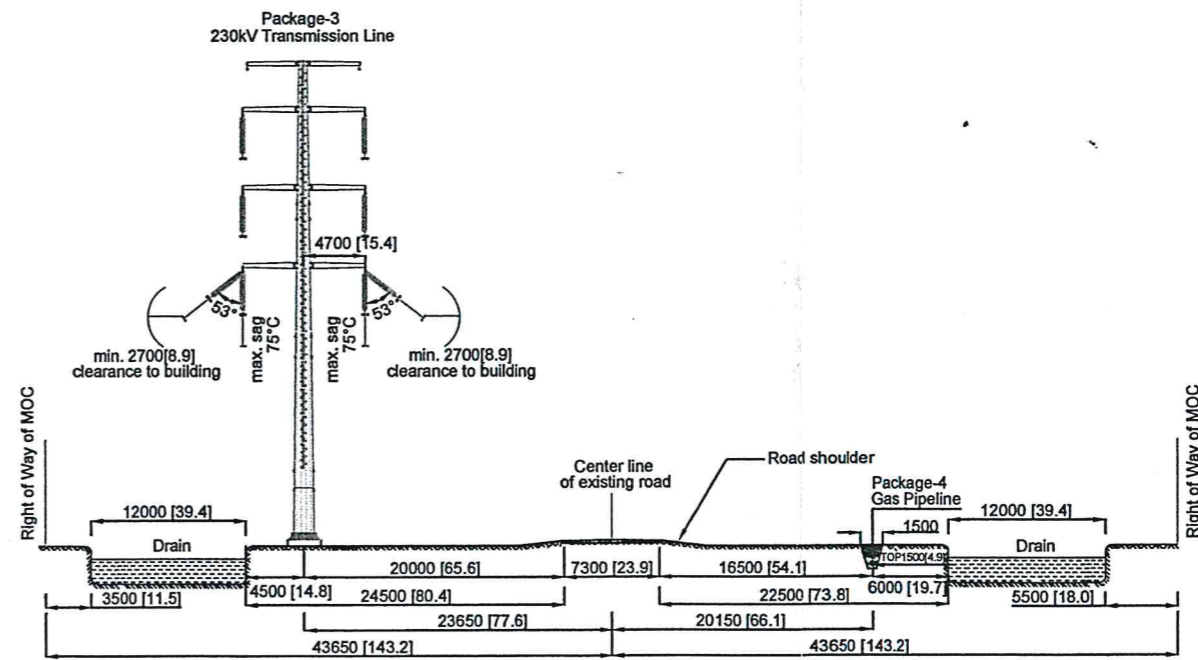
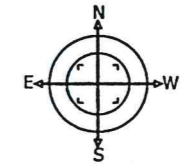
တည်ဆောက်မည်ဆိုပါက လမ်းပန်းမှ ၂၀ မီတာ လွတ်ကင်းပြီး လမ်းမကြီးအား တိုင်အနီးထိ တိုးချဲ့ သည့်တိုင်အောင် Electrical Clearance အရ လက်ခံနိုင်ပါသည်။

၃။ သို့ဖြစ်ပါ၍ စက်မှုဇုန်လမ်းမကြီး၏ လမ်းလယ်ကျွန်းအပေါ်မှ တာဝါတိုင်စိုက်မည့် အစီအစဉ် နှင့်အချို့အပိုင်းတွင် ရေမြောင်းဘေးမှ တာဝါတိုင်စိုက်မည့် အစီအစဉ်ပေါ် ခွင့်ပြုပေးနိုင်ပါရန် ပြုပြင်ထားသော တိုင်နေရာချထားမှုနှင့်တကွ ထပ်မံမေတ္တာရပ်ခံ ညှိနှိုင်းအပ်ပါသည်-

ပူးတွဲလျက် - ဝန်ကြီးဌာနနှစ်ခု ကိုယ်စားလှယ်များ ပူးပေါင်း - (၁၀) ရွက်
ကွင်းဆင်းမှုအရ ပြုပြင်ထားသော တိုင်စိုက်မည့်
အခြေပြပုံ

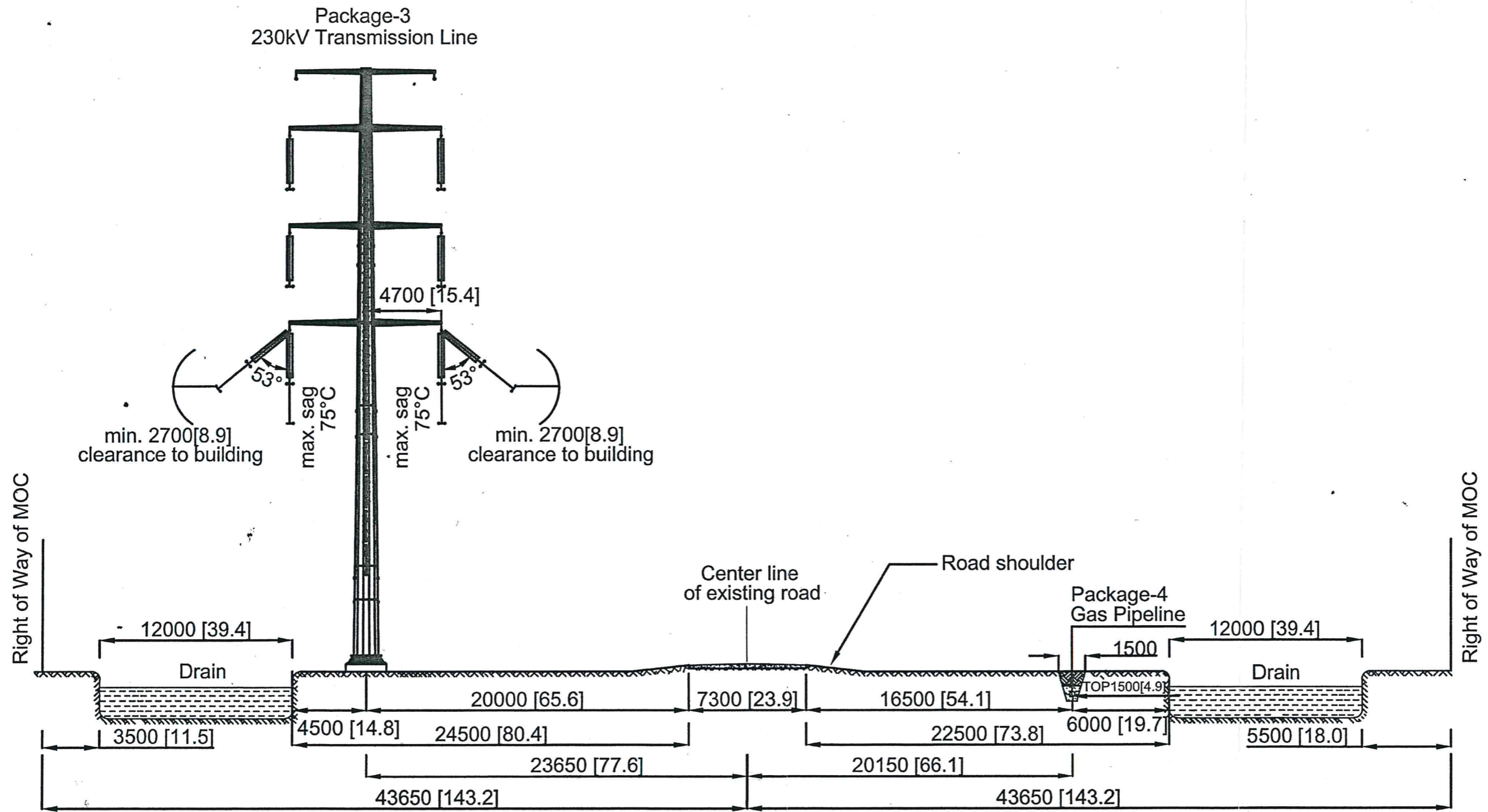

ပြည်ထောင်စုဝန်ကြီး (MOC)
(အောင်သန်းဦး၊ ဒုတိယဝန်ကြီး)

မိတ္တူကို
- ရုံးလက်ခံ



SECTION 1-1 (5 MILE FROM DAGON BRIDGE)

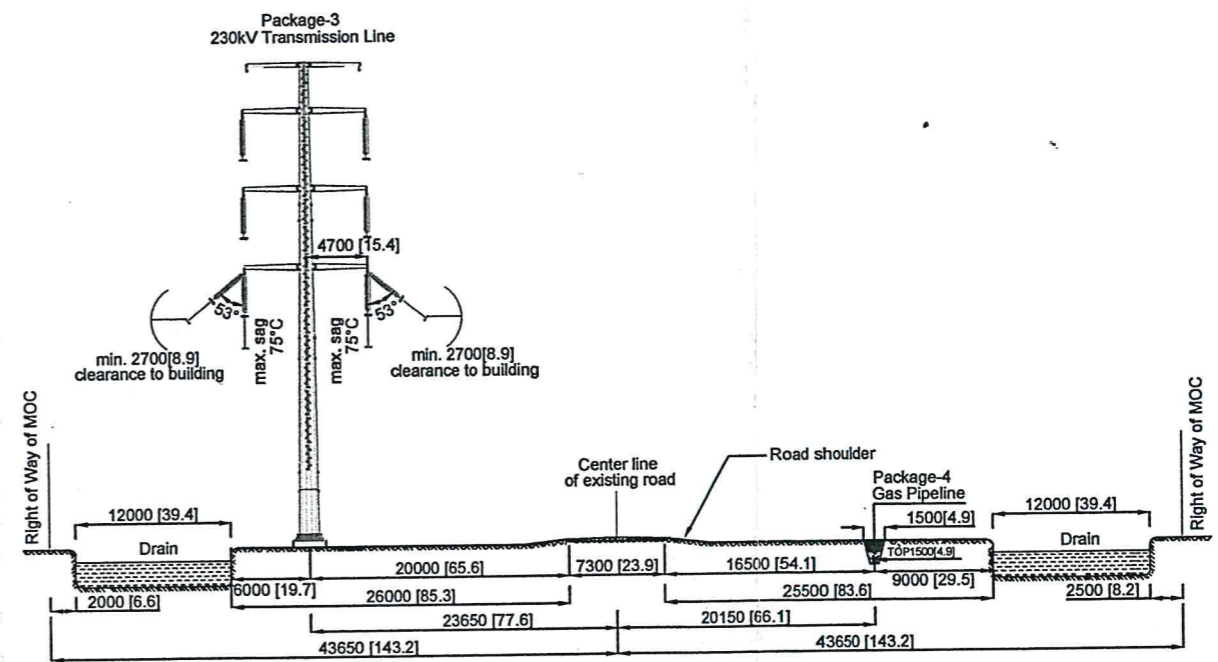
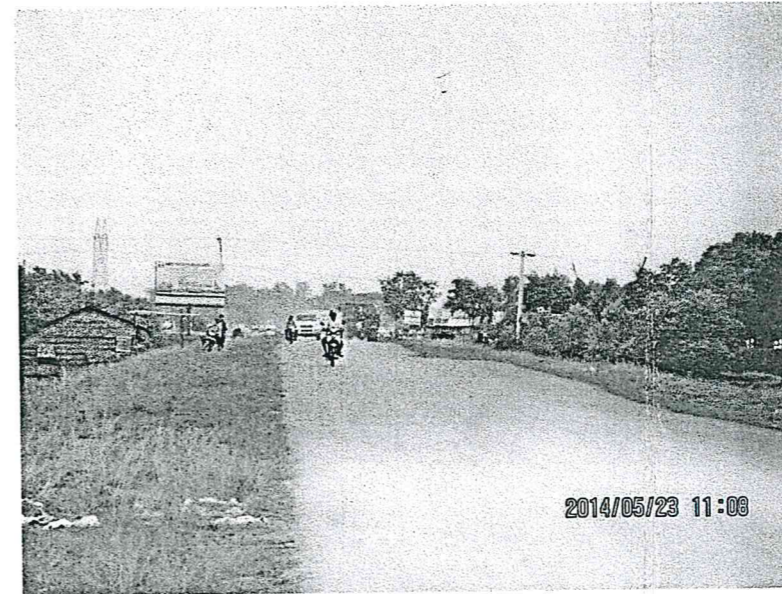
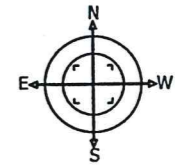
Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I)	Drawing No.	
 Myanma Electric Power Enterprise (MEPE) Nippon Koei Co., Ltd.	Title 230 kV TRANSMISSION LINE KEY MAP & LINE ROUTES(SECTION 1-1) THANLYIN S/S - THILAWA S/S	



SECTION 1-1 (5 MILE FROM DAGON BRIDGE)



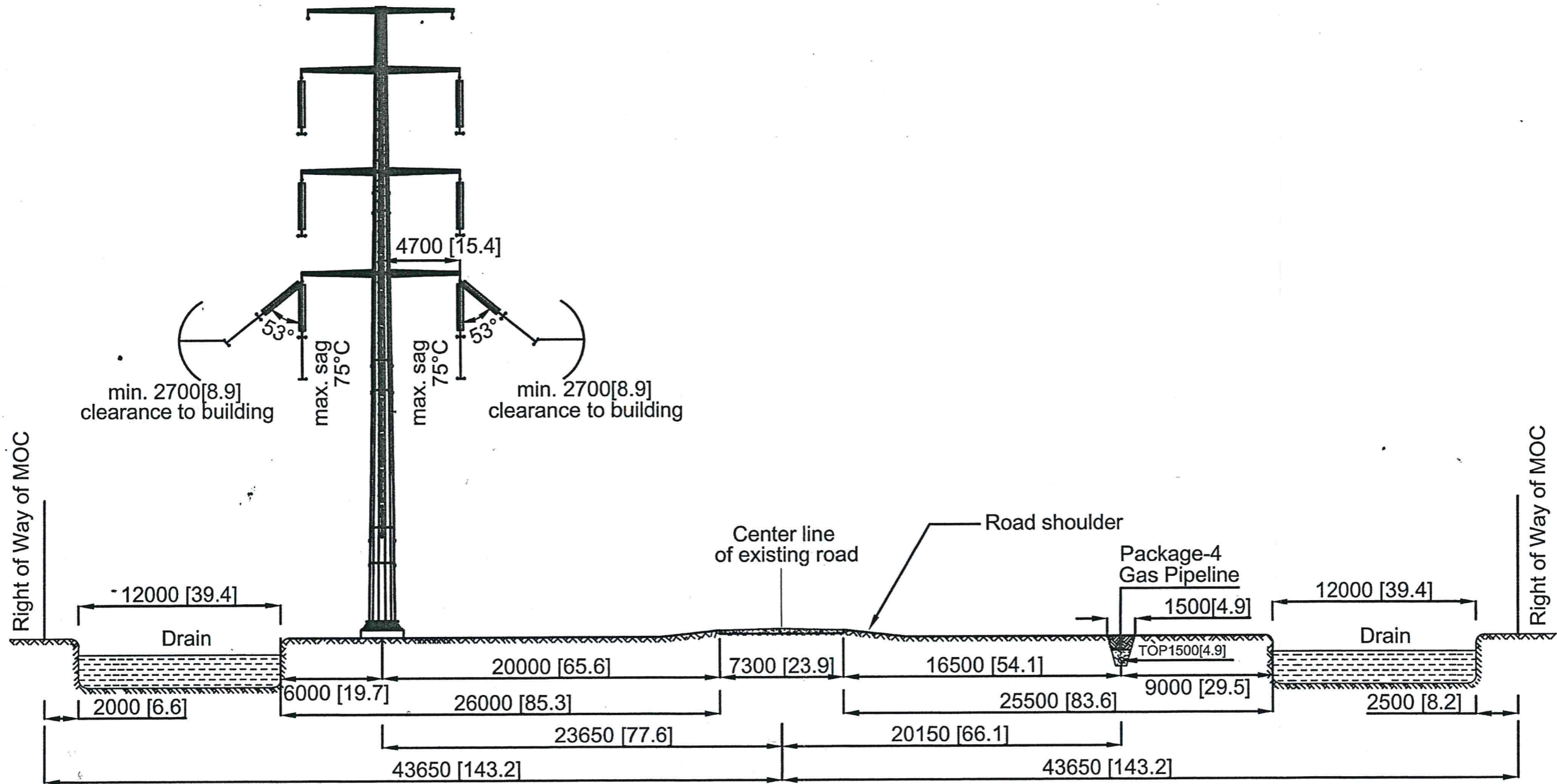
THILAWA S/S



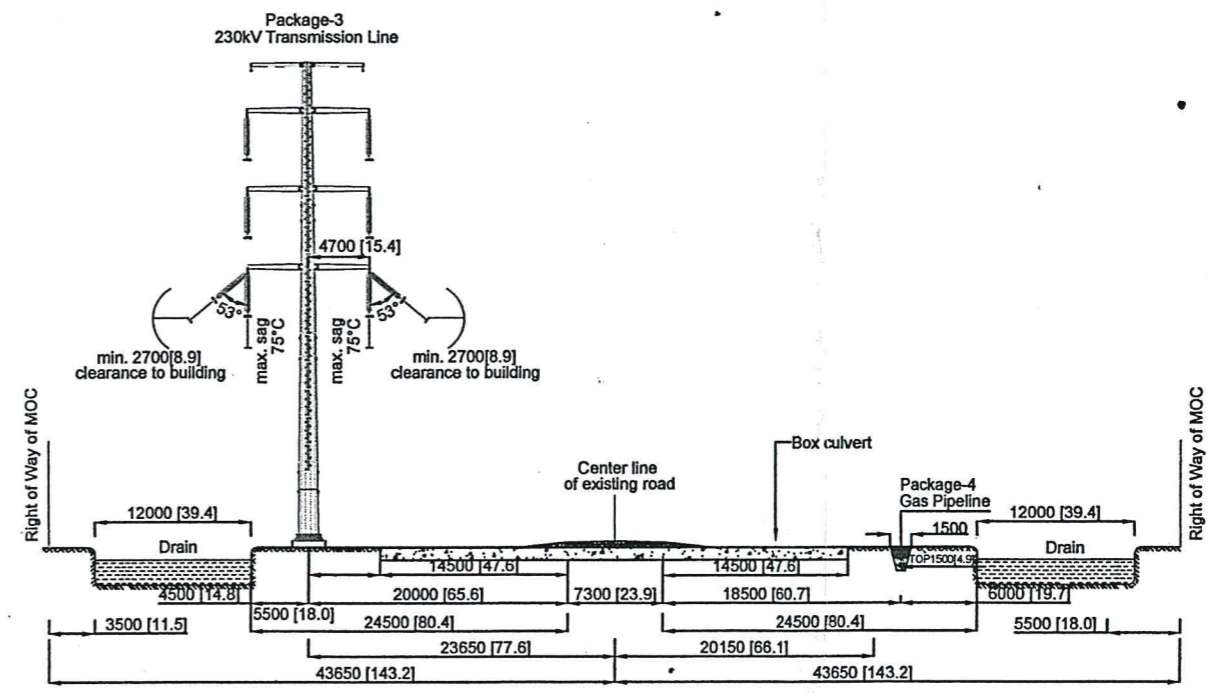
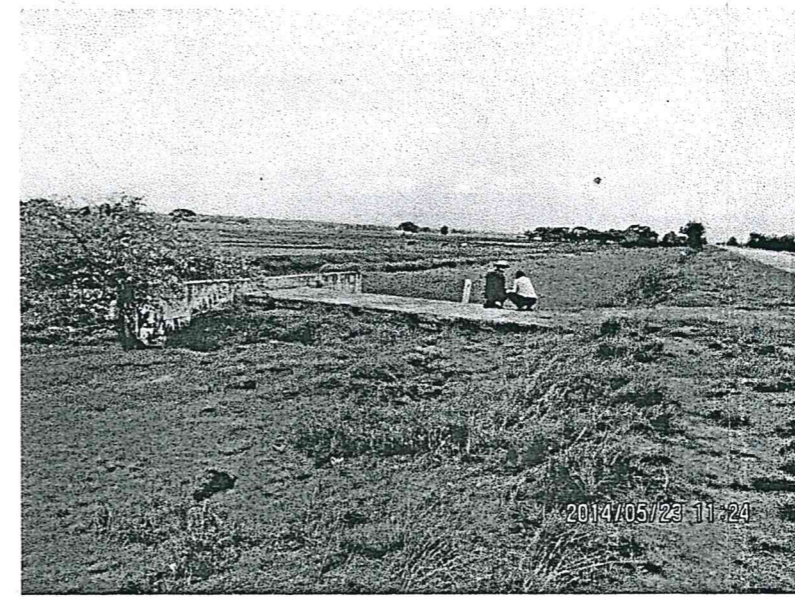
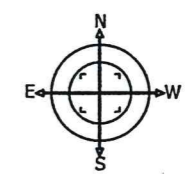
SECTION 2-2 (6 MILE FROM DAGON BRIDGE)

Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I)		Drawing No.
Myanma Electric Power Enterprise (MEPE) Nippon Koei Co.,Ltd.	Title	
	230 kV TRANSMISSION LINE KEY MAP & LINE ROUTES(SECTION 2-2) THANLYIN S/S - THILAWA S/S	

Package-3
230kV Transmission Line



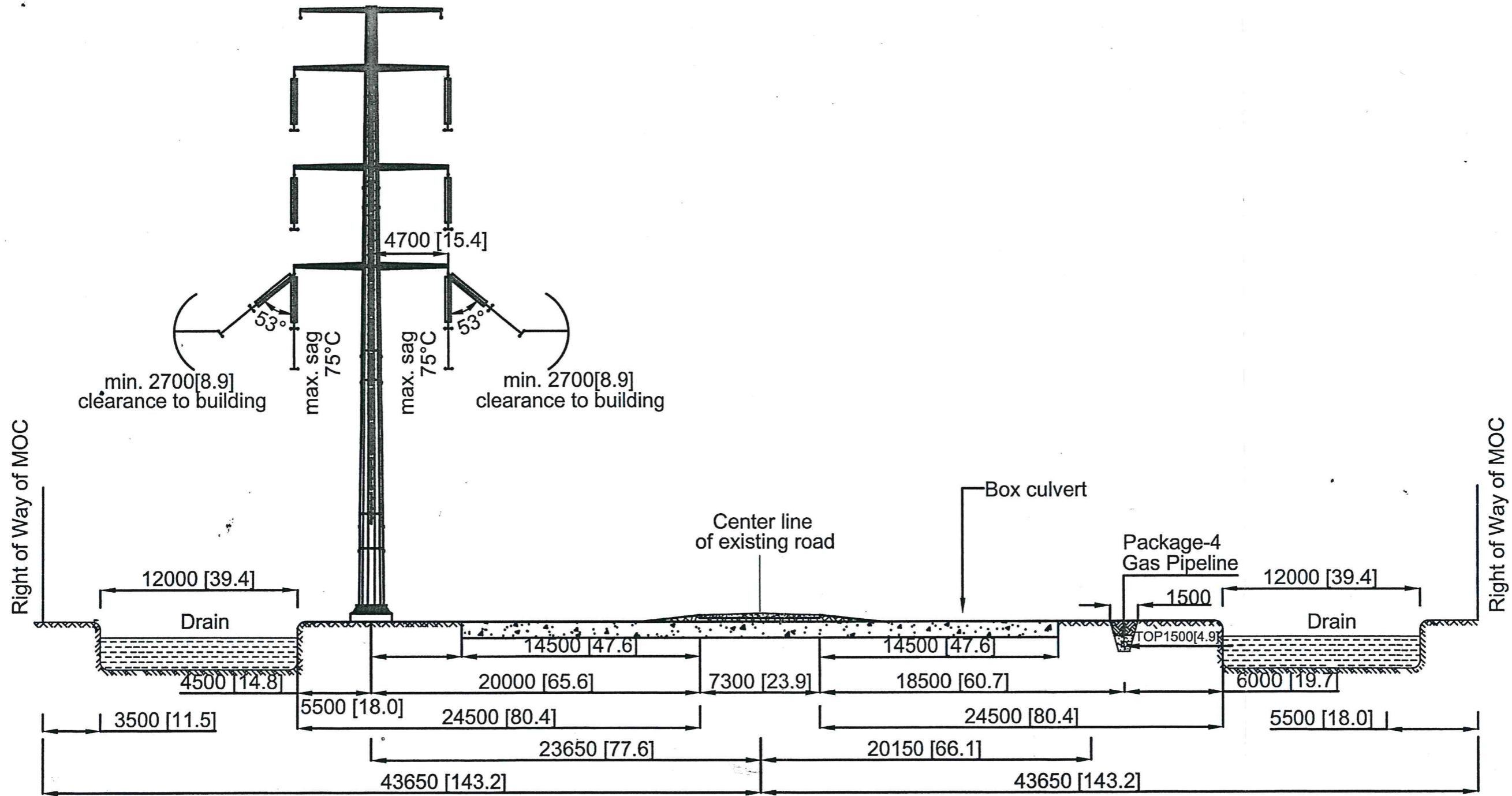
SECTION 2-2 (6 MILE FROM DAGON BRIDGE)



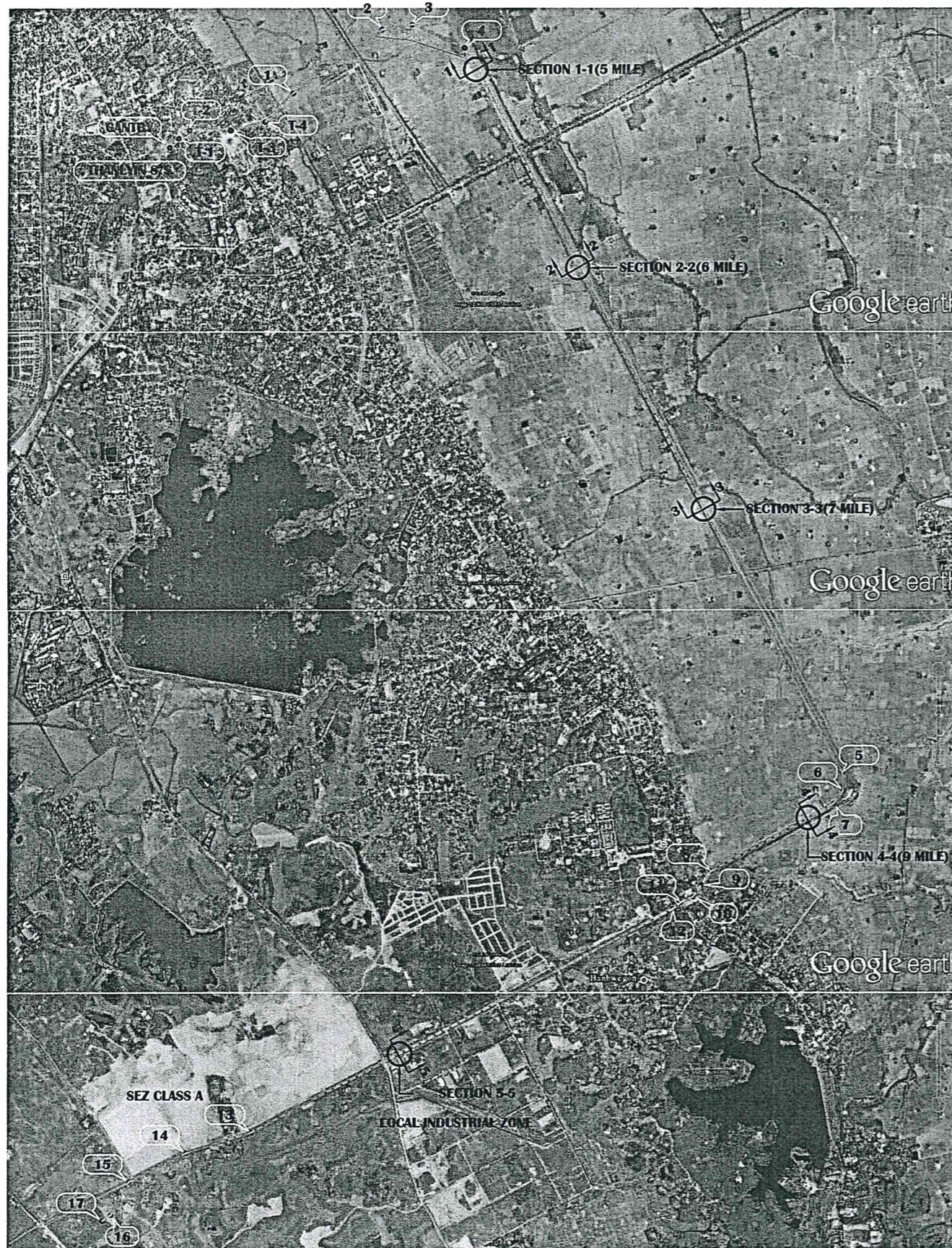
SECTION 3-3 (7 MILE FROM DAGON BRIDGE)

Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I)		Drawing No.
Myanma Electric Power Enterprise (MEPE) Nippon Koei Co.,Ltd.	Title	230 kV TRANSMISSION LINE KEY MAP & LINE ROUTES(SECTION 3-3) THANLYIN S/S - THILAWA S/S

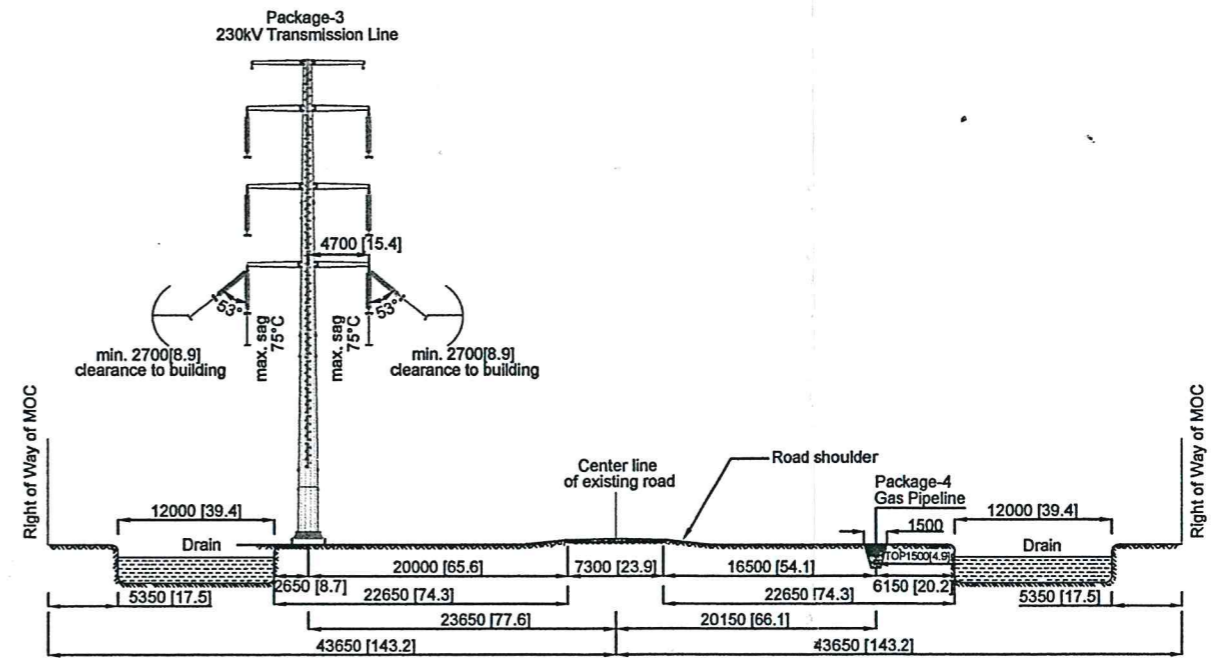
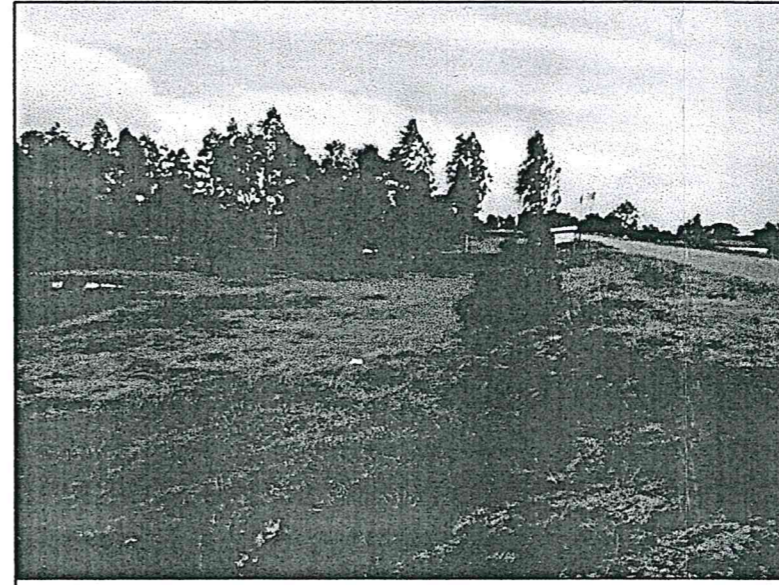
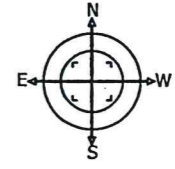
Package-3
230kV Transmission Line



SECTION 3-3 (7 MILE FROM DAGON BRIDGE)

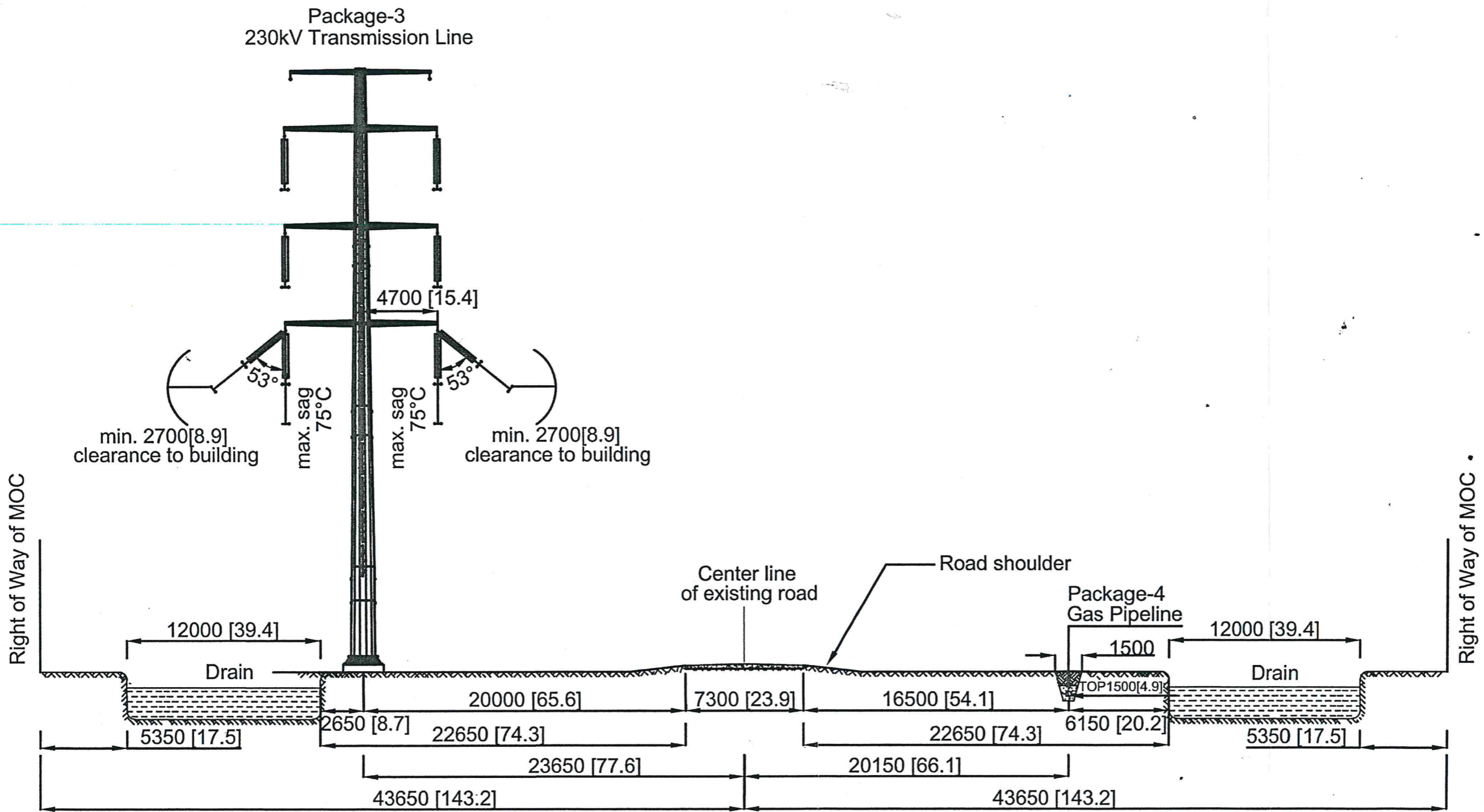


THILAWA S/S

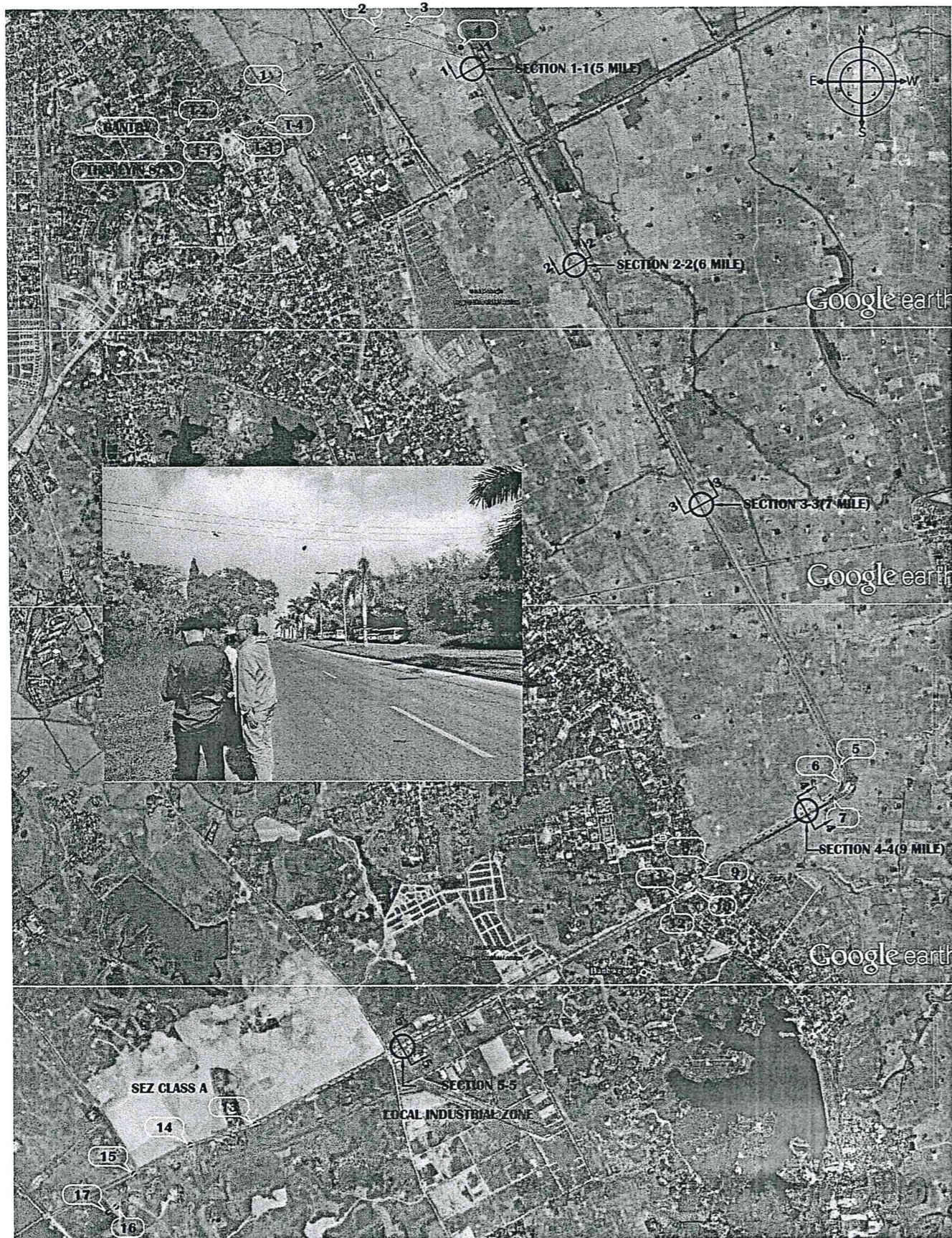


SECTION 4-4 (9 MILE FROM DAGON BRIDGE)

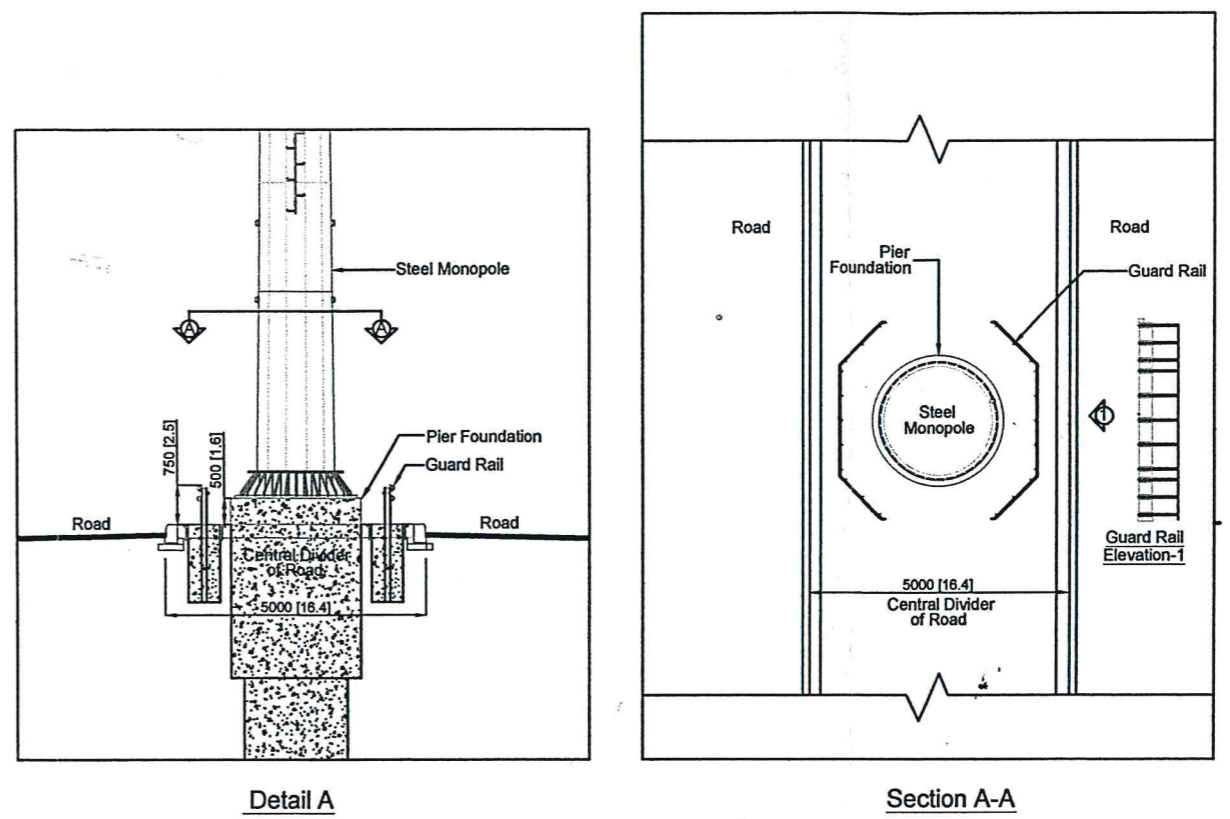
Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I)		Drawing No.
Myanmar Electric Power Enterprise (MEPE) Nippon Koei Co.,Ltd.	Title	
	230 kV TRANSMISSION LINE KEY MAP & LINE ROUTES(SECTION 4-4) THANLYIN S/S - THILAWA S/S	



SECTION 4-4 (9 MILE FROM DAGON BRIDGE)

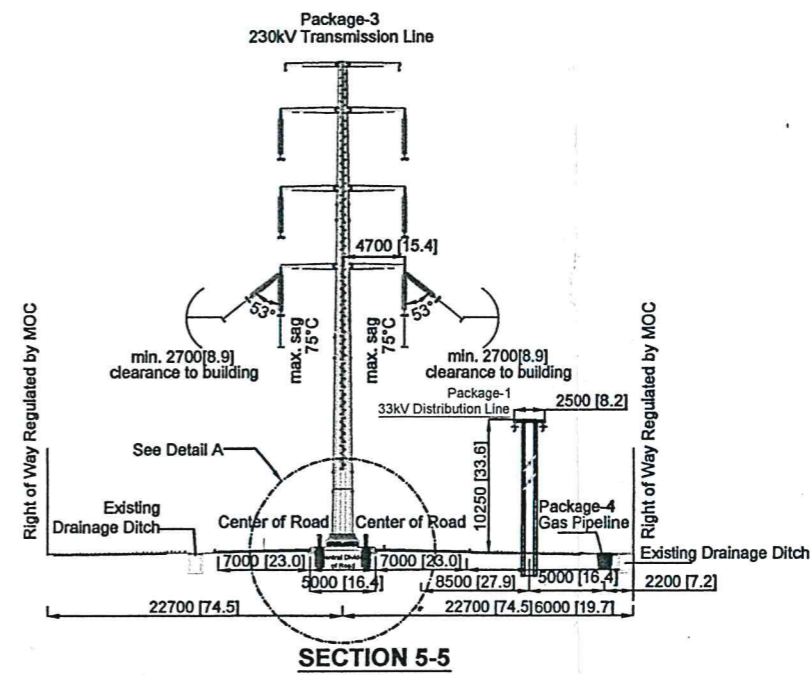


THILAWA S/S



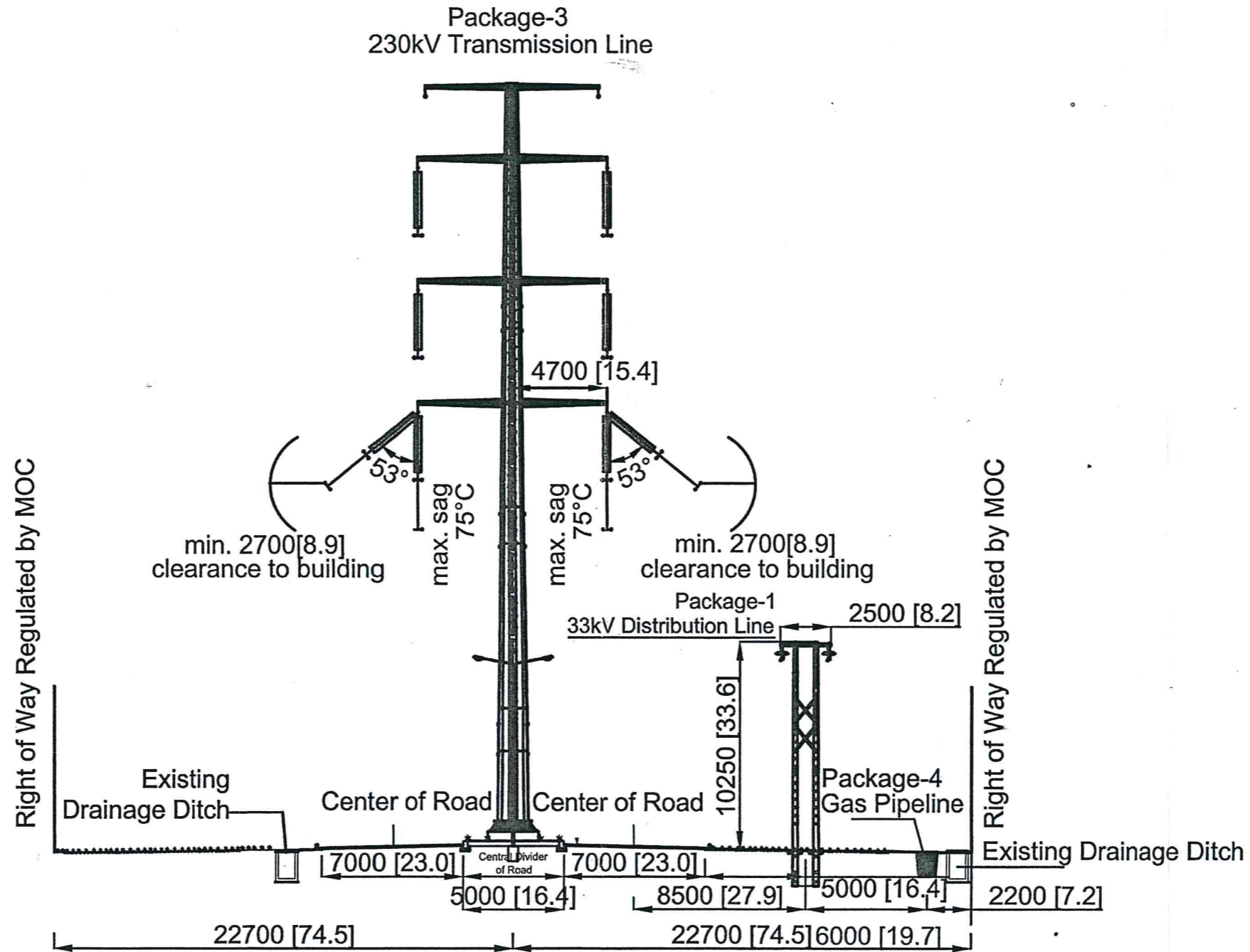
Detail A

Section A-A



SECTION 5-5

Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I)		Drawing No.
Myanmar Electric Power Enterprise (MEPE) Nippon Koei Co., Ltd.	Title	
	230 kV TRANSMISSION LINE KEY MAP & LINE ROUTES(SECTION 5-5) THANLYIN S/S - THILAWA S/S	



SECTION 5-5

*Appendix-8 Quotation for Environmental
Monitoring*

Quotation for Environmental Survey



Resource and Environment Myanmar Co., Ltd.

B702 Delta Plaza, Shwegondaing Rd., Bahan Tsp., Yangon, The Union of Republic of Myanmar
(951) 71014338, (959) 5144005, (959) 5376382

service@enviromyanmar.net / enviromyanmar@gmail.com

www.enviromyanmar.net

To: Nippon Koei Co., Ltd.

Quotation for Environmental Survey

Date. 25-03-2018

	Description	Unit	Quantity	Unit Cost (USD)	Total Cost (USD)
1	REMUNERATION				
1.1	Supporting Staff and Technician				
	Air quality monitoring	PersonxDay	1 x 1 = 1	120	120
	Noise and vibration level monitoring	PersonxDay	1 x 1 = 1	120	120
	Water technician	PersonxDay	2 x 1 = 2	120	240
	Sub-total I				480
2	DIRECT COST				
2.1	Survey, Laboratory Analysis and Data Collection				
	Air quality (NO2 - 1 hour; SO2 - 24 hours; PM10 - 24 hours; PM2.5 - 24 hours)	PointxTime	2 x 1 = 2	450	900
	Noise level (24 hours monitoring)	PointxTime	2 x 1 = 2	250	500
	Vibration level (24 hours monitoring)	PointxTime	2 x 1 = 2	250	500
	Water quality (6 parameters)	PointxTime	2 x 1 = 2	450	900
	Sub-total II-1				2,800
2.2	Logistic & Reporting				
	Transportation and logistic	SetxTime	1 x 1 = 1	200	200
	Reporting (English)	SetxTime	1 x 1 = 1	200	200
	Sub-total II-2				400
TOTAL REMUNERATION AND DIRECT COST					3,680
ADMINISTRATIVE COST					368
TOTAL COST					4,048

Sincerely,

*Appendix-9 Abbreviated Land Acquisition
Plan*

**230 kV TRANSMISSION LINE AND SUBSTATION
DEVELOPMENT PROJECT
FOR
SUB-PROJECT FOR ELECTRIC POWER
DEVELOPMENT IN THILAWA AREA**

Abbreviated Land Acquisition Plan

September, 2017

**Department of Power Transmission and Control System
(DPTSC)**

Ministry of Electricity and Energy (MOEE)



Source: TOENEC Corporation

Project Location Map for Transmission Line & Substation Development Project

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CHAPTER 1: BACKGROUND OF THE ABBREVIATED LAND ACQUISITION PLAN (ALAP)

1.1 Project Owner and Proponent

Project Owner/Proponent: Department of Power Transmission and System Control (DPTSC) in the Ministry of Electricity and Energy (MOEE)

Address: Building No. 27, Naypyitaw, Myanmar

1.2 Project Outline

1.2.1 Introduction

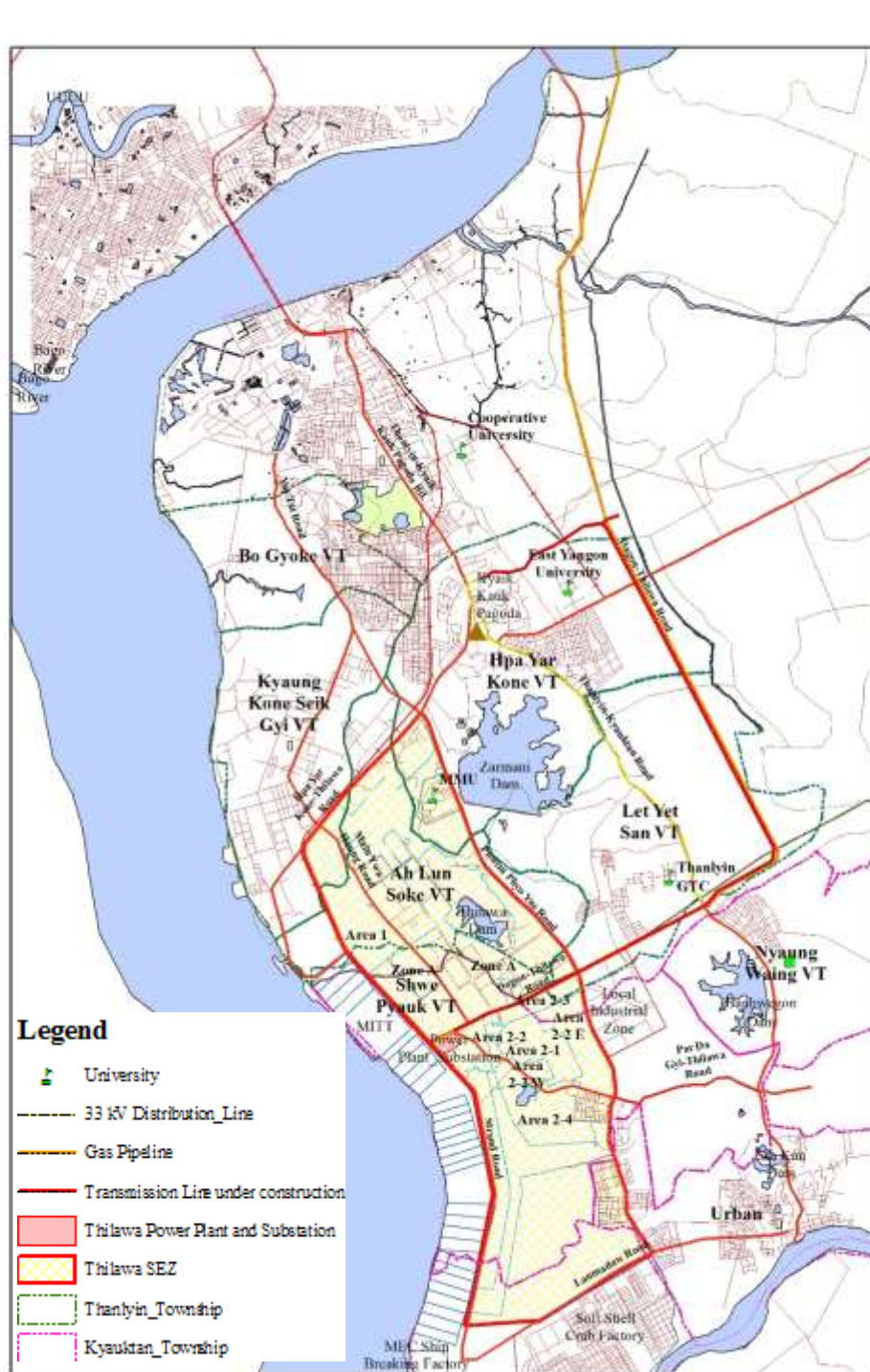
The Government of Myanmar has received a loan from the Japan International Cooperation Agency (JICA) to finance the Sub-project for Electric Power Development in Thilawa Area under Infrastructure Development Project in Thilawa Area (Phase I). The Sub-Project for Electric Power Development which are composed by four packages are required to secure the power for Thilawa area, such as Thilawa SEZ, Thilawa Port, Industries, Residence, etc. The four packages are: i) 33kV Distribution line development, ii) Dual fuel Gas Turbine, iii) 230kV Transmission line & substation development, and iv) Gas Pipeline & Gas regulation station.

230 kV Transmission line and a substation development project (the Project) is one of the Packages of the Sub-project which is to secure the power supply not only to the Thilawa SEZ but also to the surrounding area including the ports, to improve the investment climate of this Thilawa area. 230 kV Transmission Line is connected between Thanlyin substation and a new substation in Thilawa along Dagon-Thilawa road. The total length of 230 kV Transmission line is 10 miles (16 km).

Approximately 10 miles (16 km) of 230 kV transmission line is to be installed from the Thanlyin substation to the new Thilawa substation. 230 kV transmission line passes Bayet Village Tract, Hpa Yar Kone Village Tract, Let Yet San Village Tract in Thanlyin Township and Shwe Pyi Thar Yar ward in Kyauktan Township in Yangon South District. 230 kV double circuit transmission line is planned to construct with 37 m high Mono Pole (Panzer Mast) steel tower from Thanlyin substation to a new Thilawa substation in order to supply electricity fully to Thilawa SEZ. Mono pole (Panzer Mast) tower type, which is compact and takes a small space, is planned to design along the line route within the Right of Way (ROW) of Dagon-Thilawa Road. High panzer masts are planned to use to have a clearance distance of 25 m between Sag Point and the ground so that big containers can go safely.

In addition, a new 230 kV substation is to be constructed in Thilawa. Thilawa substation is constructed in the same premises with dual fuel gas turbines near the premises of Class A area in Thilawa SEZ in Shwe Pyi Thar Yar ward in Kyauktan Township in Yangon South District. The total premise of dual fuel gas turbines and a substation is 10 ha wide and the new substation requires 2 ha of land. Thilawa substation will be equipped with three numbers of 230/33 kV (100) MVA main transformers and one transformer of 33/11 kV (20) MVA and a 230 kV transmission line switch yard for receiving power from Thanlyin substation.

The location of Thilawa substation and line route of 230 kV Transmission Line are shown in Figure 1.2-1 and on the map following the cover page of this RAP report.

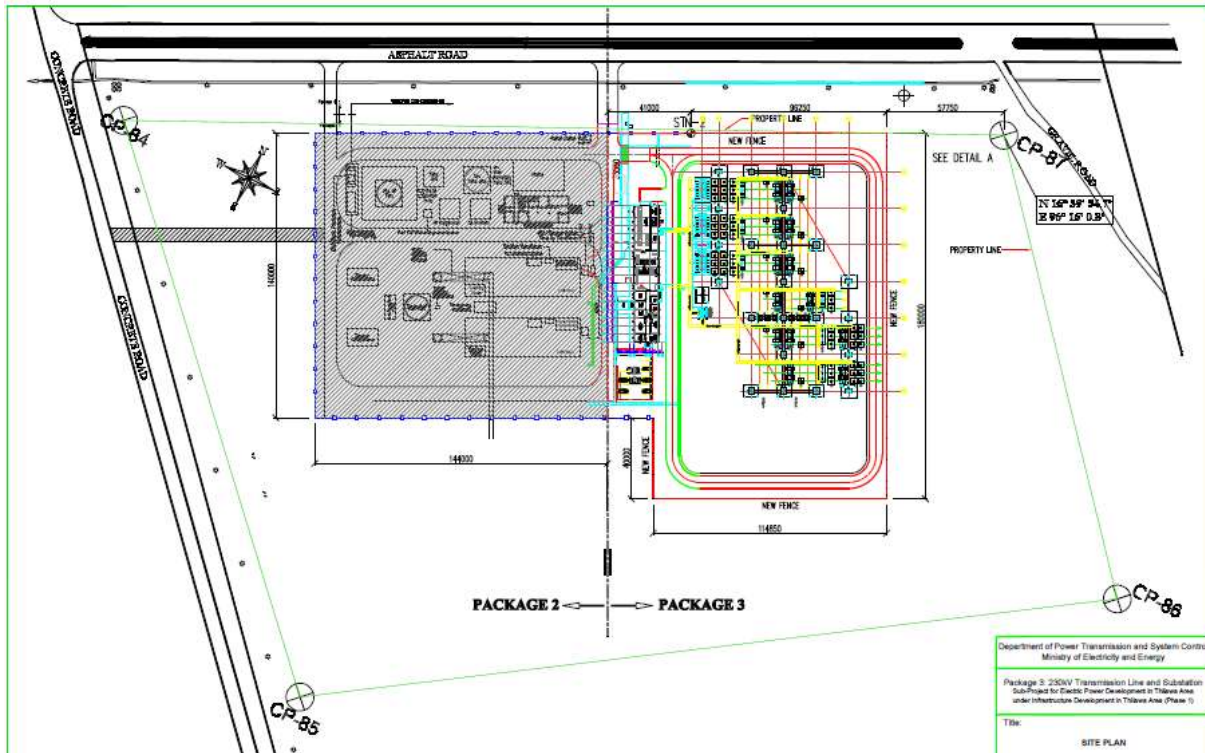


Source: Nippon Koei Engineering Team

Figure 1.2-1 Location of Power Plant and Substation in Thilawa

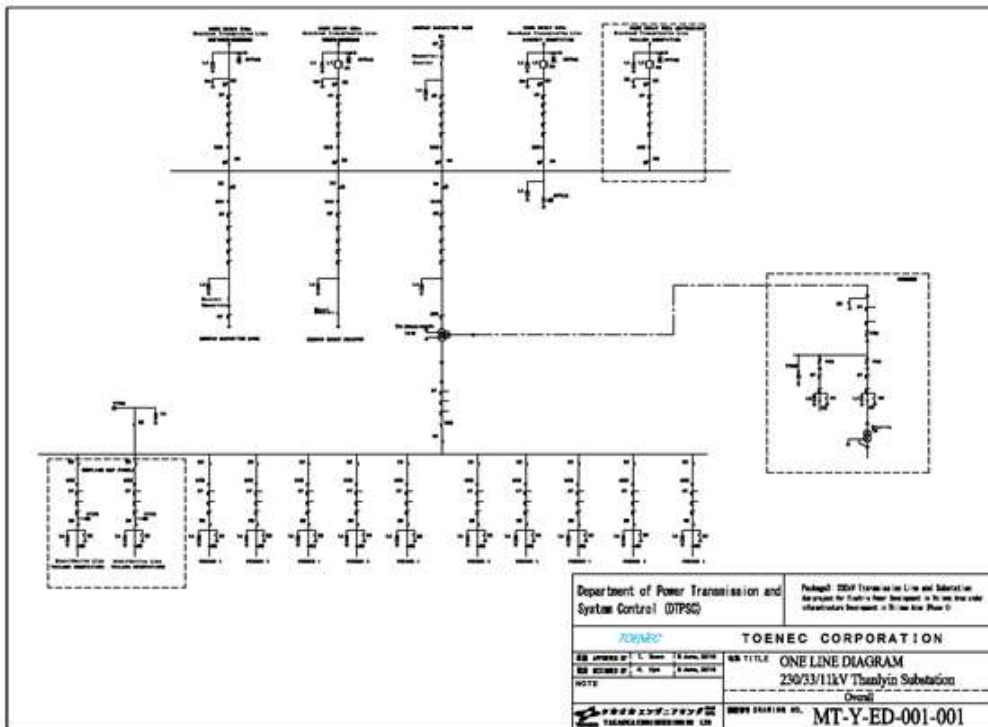
33 kV Gas Insulated Switchgear (GIS) system, which will be set up in the control room in Thilawa substation, receives 33 kV from seven numbers of sources such as three numbers of main transformers and two numbers of feeder from Thanlyin in Thilawa substation and two numbers of Gas turbines in Thilawa powerplant and then it distributes electricity to 33/11 kV (20) MVA transformer. Layout drawing of the substation is shown in Figure 1.2-2 and the area of power plant and substation is marked by CP-84 ($16^{\circ} 39' 48.7''$ N, $96^{\circ} 15' 48.1''$ E), CP-85 ($16^{\circ} 39' 42''$ N, $96^{\circ} 15' 55''$ E), CP-86 ($16^{\circ} 39' 49.1''$ N, $96^{\circ} 16' 5.8''$

E) and CP-87 ($16^{\circ} 39' 54.7''$ N, $96^{\circ} 16' 0.8''$ E). The overall single line diagram and that of 230 kV Thilawa line are shown in Figures 1.2-3 and Figure 1.2-4 for reference. Cross sectional drawing of Thanlyin and Thilawa Substation are shown in Figure 1.2-5 and 1.2-6 respectively.



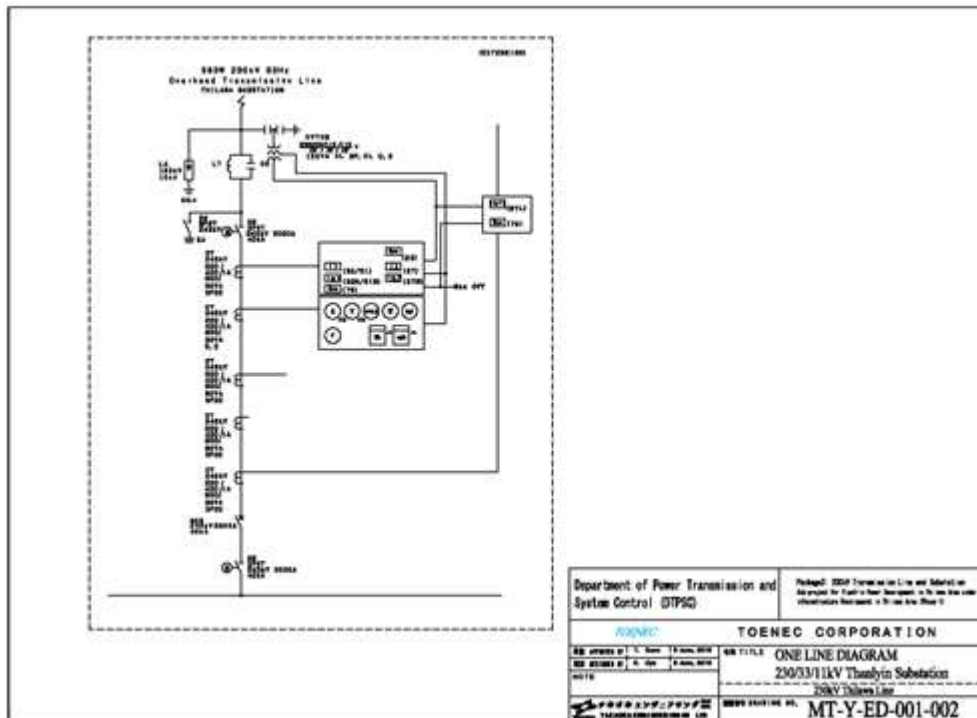
Note: Scale is not applicable
Source: DPTSC

Figure 1.2-2 Layout of Thilawa Substation



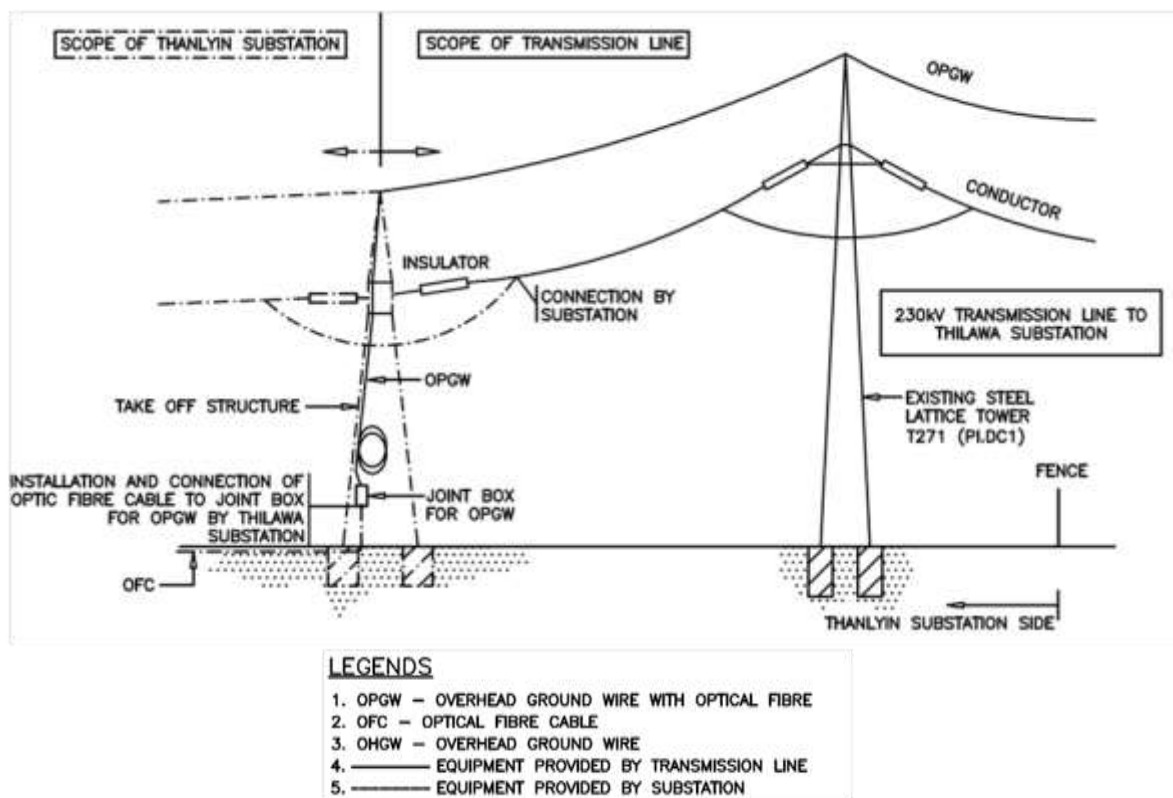
Source: DPTSC

Figure 1.2-3 Overall Single Line Diagram



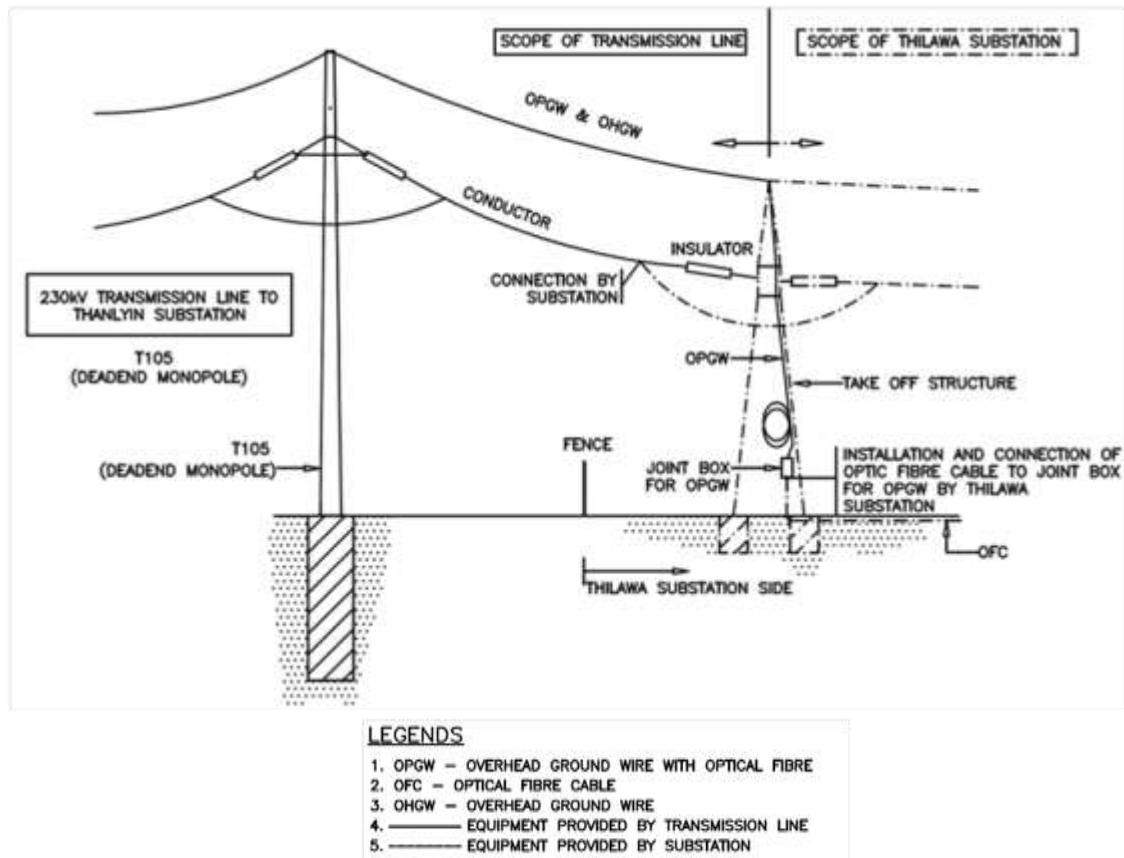
Source: DPTSC

Figure 1.2-4 Single Line Diagram of Thilawa Substation



Source: DPTSC

Figure 1.2-5 Cross Sectional Drawing at Thanlyin Substation



Source: DPTSC

Figure 1.2-6 Cross Section Drawing at Thilawa Substation

1.3 Purpose of the ALAP

In the international practices, namely the World Bank Operational Policies 4.12, if the impacts on the entire displaced population are minor, or less than 200 people are displaced, an abbreviated resettlement plan is applied. In this project, resettlement and relocation are not occurred. In addition, land acquisition is necessary out at three private areas. For these reasons ALAP was prepared for the Project. The ALAP has three purposes:

- Firstly that of providing data about the level and kinds of social impact of the proposed project of transmission line and substation construction, especially impact on the land by the Project, and impact on their livelihoods and communities and their quality of life;
- Secondly that of setting out the policy and regulatory guidelines on land acquisition of the Myanmar Government and JICA; and
- Finally that of stating specific policy objectives of land acquisition as an active and positive process to ensure the contribution, which the construction of transmission line and substation are capable of making to the quality of life of the people and communities through whose land, and physical and social assets it passes.

1.4 Scope and Limitation of the ALAP

The ALAP is based on the proposed construction project of the transmission line and a substation with currently available design criteria and primary data collection result.

Land acquisition is not necessary for construction of a substation in Thilawa as it is constructed inside the premise of 10 ha which was provided by Thilawa SEZ Management Committee (TSMC) to the MOEE to use for construction of a power plant and a substation. The location of the power plant and a substation was shown in Figure 1.2-1.

Land acquisition is necessary for construction of towers for Transmission Line and potential land loss and impacts on structures for Transmission Line have been identified by field survey and discussion with related departments such as General Administration Department (GAD) in Yangon South District and Thanlyin Township, Thanlyin Township Farmland Management and Statistic Department, Thanlyin Township Agricultural Department, Yangon Electricity Supply Corporation in Thanlyin Township, related Village Tract (VT) Administrators and Project Affected Persons (PAPs).

During the field survey in initial stage, affected farmland and assets in the Project area were identified with the assistance of Thanlyin Township GAD, Thanlyin Township Farmland Management and Statistic Department, Thanlyin Township Agriculture Department and related VT administrators. After identifying the owner of farmlands, the consultation with the owners of the farmland was carried out for giving compensation in cooperation with the above departments.

Further, consultations about mitigation measures and compensation for PAPs is carried out when the final alignment as well as ROW of transmission line is precisely measured in April, 2017.

1.5 Policy Framework on Land Acquisition and Resettlement

This section is attached as Appendix-A.

CHAPTER 2: DETAILED MEASUREMENT SURVEY (DMS)

2.1 Background

The first and second DMS survey for construction of 230 kV Transmission Line was carried out in June, 2014 and in August, 2014 respectively based on the line route as shown in Figure 2.1-1. Questionnaire for DMS survey is attached as Appendix-2. At that time, the number of PAPs is four.



Source: DPTSC

Figure 2.1-1 Proposed line route near Thanlyin Substation in June, 2014

The line route of 230 kV Transmission line near Thanlyin substation was changed in June, 2016 as the previous proposed Transmission line near Thanlyin substation was located within the plot which was entitled to use as an alternative way (Form-15) by the Central Farmland Management Committee in March, 2016 and it became difficult to negotiate with the land owner of this plot to construct lattice transmission towers on it. This land plot was located within the Right of Way (ROW) of the Transmission line as shown in Figure 2.1-2.



Figure 2.1-2 Land Plot which was located within the ROW of 75 ft from the Previous Proposed Line in 2014

The Project Proponent changed the line route near Thanlyin substation as shown in Figure 2.1-3 to solve the above land acquisition issue in June, 2016. The third DMS was carried out based on this new proposed line. The number of affected farmland who belongs to PAPs is reduced from four to three due to the change of line route in the third DMS for construction of 230 kV Transmission Line. The location of three numbers of affected land are shown in Figure 2.1-4.



Source: DPTSC

Figure 2.1-3 New proposed Transmission Line route near Thanlyin substation in June, 2016



Source: IEE Study Team

Figure 2.1-4 Location of three numbers of affected farmland for construction of 230 kV Transmission Line

Depending on negotiation with land owners, the project proponent adjusted the line route near Tower No. T-50 near the mark called "C" as shown in Figure 2.1-4 in May, 2017 by changing the type of

monopole from suspension type to tension type although the cost is not effective. The number of PAPs is reduced from three to two in May, 2017.

2.2 DMS for Land acquisition at the Project Area

The third DMS was undertaken along the ROW of the new proposed transmission line route starting from Thanlyin substation along Dagon-Thilawa road to Thanlyin substation together with related departments such as Thanlyin Township General Administration Department, Farmland Management and Statistic Department, Village Tract Administrators, etc... once the new alignment for the transmission line is confirmed in May, 2016. . The objective of the DMS is to identify land which will be affected and to collect detailed data of all PAPs concerning the land acquisition cost and crop compensation cost, in collaboration with PAPs as well as local authorities. DMS measured affected land area for crop compensation accurately in order to calculate exact crop compensation amount PAPs and Project Affected Lands (PALs) in ROW of transmission line are determined by using the farmland record in Farmland Management and Statistic Department by the corresponding surveyor in each Village Tract in Farmland Management and Statistic Department and corresponding Village Tract Administrator. During the survey for land acquisition, following data is collected.

- Geography in and around the ROW
- Land/asset holder name
- Type of Land (e.g. agricultural land, residential land, plantation, community forest, and other fixed asset)
- Number of asset in ROW of transmission line route

2.3 Type and Scale of Potential Impact

2.3.1 Potential Affected Assets

(1) Survey Result

During the field survey, 15 numbers of assets including vendor shops, huts and livestock farm along the ROW of Dagon-Thilawa Road and 85 numbers of street lamps on the central divider of Dagon-Thilawa Road near Thilawa SEZ were identified.

Concerning 15 numbers of assets, they are located within the ROW of construction of proposed transmission line route and they are necessary to remove. They are located within the ROW of the road of Ministry of Construction (MOC). According to the modification of Road Law in July, 2014, these 15 numbers of assets have been sued by MOC and MOC will remove them. A list of these 15 numbers of assets in the ROW of Dagon-Thilawa Road is attached in Appendix-3.

Regarding 85 numbers of street lamps on the central divider of Dagon-Thilawa Road, they belong to the Department of Urban and Housing Development (DUHD) in MOC. These lamps are not working and A list of some lamps necessary to demolish is shown in Appendix-D.

2.3.2 Potential Affected Trees

It was found that 34 numbers of *Aurisia* (Malaysia Padauk) along Dagon-Thilawa Road are necessary to remove for the construction of transmission line. A list of trees necessary to remove and an approval letter for removal of these trees from Forest Department in Thanlyin Township is shown in Appendix-E.

2.3.3 Potential Affected Lands

(1) Survey Result

According to field survey in May, 2016, three private farmland owners who own farm land are identified within proposed construction area of transmission tower. The affected land would be acquired before construction stage. Potential affected lands within proposed construction area of transmission tower are shown in Table 2.3-1.

Table 2.3-1 Potential Affected Land as of May, 2016

No	Township	Village Tract	Village	Land Owner	Potential Affected Land (acre) during construction	No. of Towers to be constructed on this land	Related Tower No. in 230 kV T/L	Type of Land	Land certificate*
1	Thanlyin	Ba Yet	Ba Yet	Mr. E	0.23	1	T-9	Agriculture	Yes
2			Ba Yet	Mr. F	0.23	1	T-9 (A)		Yes
3		Let Yet San	Ah Lel	Mr. G	0.23	1	T-50		Yes

Source: IEE Study Team

Note: "Land certificate" means whether farmland owner has a farming permit certificate

All potential affected lands were located in Thanlyin Township, and all land are used for agriculture. All PAP have the land certification to do agriculture.

In May, 2017, only two farmland owners are identified as Project Affected Persons (PAP) as shown in Table 2.3-2 depending on negotiation with three farmland owners.

Table 2.3-2 Potential Affected Land as of May, 2017

No	Township	Village Tract	Village	Land Owner	Potential Affected Land (acre) during construction	No. of Towers to be constructed on this land	Related Tower No. in 230 kV T/L	Type of Land	Land certificate*
1	Thanlyin	Ba Yet	Ba Yet	Mr. E	0.23	1	T-9	Agriculture	Yes
2			Ba Yet	Mr. F	0.23	1	T-9 (A)		Yes

Source: IEE Study Team

Note: "Land certificate" means whether farmland owner has a farming permit certificate

2.4 Consultation with Project Affected Person (PAPs)

A list of consultation with PAPs is shown in the following Table 2.4-1. Please see Appendix-5 for the meeting minutes, participants list and photos of Stakeholder Meeting and Public Consultation Meeting and evidence letters to show the response of opinion of PAPs for the meeting minutes of consultation with PAPs.

Table 2.4-1 Outline of SHM, PCM and Consultation Meetings with PAPs

No.	Stage	Period	Venue	No. of Participants	Agenda and results
1.	Scoping Stage (SHM)	10:30-11:30, 26 March, 2014	Convention Hall of Housing Department in Thanlyin Township	35	<ul style="list-style-type: none"> ➤ Description of the Project ➤ Dissemination of the EIA outcome ➤ Collection of comments and opinions on the project
2.	Draft EIA Stage (PCM)	9:30 – 10:30, 1 September, 2014	Convention Hall of Housing Department (Land Record Department Branch Office-2)	46	<ul style="list-style-type: none"> ➤ Description of the Project ➤ Explanation of EIA results and EMP ➤ Questions and Answers
3.	First time site survey with related departments and local authorities	8 May, 2016	The project site in Thanlyin Township	15	<ul style="list-style-type: none"> ➤ To specify the location of affected land, affected area and Project Affected Persons (PAPs)
4.	Second time site survey with related departments and local authorities	28 May, 2016	The project site in Thanlyin Township	15	<ul style="list-style-type: none"> ➤ To specify the location of affected land, affected area and Project Affected Persons (PAPs)
5.	Consultation with PAPs	3 June, 2016	Thanlyin Township GAD office	14	<ul style="list-style-type: none"> ➤ To explain about the Project, the affected land, affected area during construction and after construction, the period of construction, etc... ➤ To respond the inquiry from PAPs
6.	Site survey and Consultation with PAPs	6 June, 2016	The project site in Thanlyin Township and Thanlyin Township GAD office	14	<ul style="list-style-type: none"> ➤ Site survey together with PAPs ➤ To show the proposed location of Towers at the site to PAPs ➤ To respond the opinion of PAPs to minimize the area of land loss
7.	SHM	13 June, 2016	Office No. (27), the Ministry of Electricity and Energy in Naypyitaw	11	<ul style="list-style-type: none"> ➤ To inform the result of consultation with PAPs to Stakeholders ➤ To find solution how to solve the issues to meet with the request of PAPs. <p><u>Result</u></p> <ul style="list-style-type: none"> ➤ The line route was modified to meet the request of PAPs. See meeting minutes in Appendix-5. ➤ The number of PAP was reduced from four to two.
8.	Consultation with all PAPs	5 July, 2016	Thanlyin Township GAD office	9	<ul style="list-style-type: none"> ➤ To explain about the modified proposed Project, the affected land and to hear the opinion of land owners <p><u>Result</u></p> <ul style="list-style-type: none"> ➤ Got agreement from one number of PAP.
9.	Consultation with PAPs who owns Tower No. T-9 (a)	14 July, 2016	Thanlyin Township GAD office	5	<ul style="list-style-type: none"> ➤ To hear the reply from the land owner of Tower No. T-9 (a)
10.	Consultation with PAPs who owns Tower No. T-50	8 Aug, 2016	Thanlyin Township GAD office and the project site in Thanlyin Township	11	<ul style="list-style-type: none"> ➤ To explain about the area of affected land. ➤ To explain about the procedure and amount of crop compensation ➤ To show the affected land at site.
11.	Consultation with PAPs who owns Tower No. T-9 (a) and T-50	22 Aug, 2016	Thanlyin Township GAD office and the project site in Thanlyin Township	14	<ul style="list-style-type: none"> ➤ To explain about the area of affected land.
12.	SHM	31 Jan, 2017	Office of Thilawa SEZ Management Committee (TSEZMC) in Thilawa	15	<ul style="list-style-type: none"> ➤ To inform all Stakeholders the schedule of construction of 230 kV Transmission Line ➤ To request cooperation from related departments. ➤ To introduce each counterpart from each related department.
13.	Crop Compensation Giving Ceremony	26 April, 2017	Thanlyin Township GAD office	14	<ul style="list-style-type: none"> ➤ To pay crop compensation to three numbers of PAPs ➤ To respond the request of PAPs about the location of towers <p><u>Result</u></p> <ul style="list-style-type: none"> ➤ One PAP received the crop compensation for the rainy season.

*Abbreviated Land Acquisition Plan of 230kV Transmission and Substation Development Project
for Sub-Project for Electric Power Development in Thilawa Area*

No.	Stage	Period	Venue	No. of Participants	Agenda and results
					<ul style="list-style-type: none"> ➢ Representatives of one PAP attended the ceremony but he did not receive the compensation. ➢ After the ceremony, proposed location of Tower No. T-50 was shown to the representatives of PAPs at the site.
14.	Consultation with one PAP who does not agree	18 May, 2017	The project site of Tower T-50 in Thanlyin Township	8	<ul style="list-style-type: none"> ➢ Site visit together with representatives of PAPs for Tower No. T-50 <p>Result</p> <ul style="list-style-type: none"> ➢ Based on the result of negotiation with representatives of the owner of Tower No. T-50, the line route was changed to reduce to area of land affected although it costs more. See meeting minutes in Appendix-5. ➢ The number of PAPs was changed from three to two.
15.	Consultation with one PAP who does not agree	21 July, 2017	The project site of Tower T-9 (A) in Thanlyin Township	7	<ul style="list-style-type: none"> ➢ Site visit together with a staff of Ba Yet village tract from GAD for Tower No. T-9 (A) in response to the complaint letter submitted by the land owner of T-9 (A) to oppose the construction of T-9 (A) at the proposed location which belongs to the land owner. The land owner and his representative did not come.
16.	Consultation with one PAP who does not agree	6 Aug, 2017	Thanlyin Township GAD office	7	<ul style="list-style-type: none"> ➢ To point out that the absence of the land owner's cooperation for the Project ➢ To explain the proposed location of T-9 (A) is located under the existing Thanlyin-Kamarnat 230 kV Transmission Line and it does not affect additional land as no building shall exist within the horizontal distance of 50 ft left and right from the center of the 230 kV Transmission Line according to clearance standard set for Electrical Inspection by the Ministry of Industry. ➢ In addition, the construction design and material was confirmed and the construction is to be carried out according to the schedule. <p>Result</p> <ul style="list-style-type: none"> ➢ Thanlyin GAD reported the actual condition to Yangon South District GAD.
17	Consultation with one PAP who does not agree	27 Aug, 2017	Yangon South District GAD office	13	<ul style="list-style-type: none"> ➢ Negotiation with the land owner. ➢ The land owner does not agree as the proposed location of the tower is in the middle of his farm land along Dagon-Thilawa road.
18	Consultation with one PAP who does not agree	29 Aug, 2017	Thanlyin Township GAD office	12	<ul style="list-style-type: none"> ➢ The land owner requested to change the line route. ➢ The project proponent explained to the land owner that the line route is unable to change due to technical reason. <p>Result</p> <ul style="list-style-type: none"> ➢ The project proponent will report to the Head office of MOEE in Naypyitaw regarding this line route change request and explanation about impossibility of line route change from technical point of view. ➢ The project proponent will negotiate with the land owner to resolve this issue.
19	Consultation with one PAP who does not agree	11 Sep, 2017	Meeting room of Thilawa Gas Turbine	7	<ul style="list-style-type: none"> ➢ DPTSC, the project owner requested land acquisition from the land owner by showing the request letter from DPTSC Head Office.

No.	Stage	Period	Venue	No. of Participants	Agenda and results
20	Consultation with one PAP who does not agree	22 Sep, 2017			➤ DPTSC got agreement with the land owner to construct one lattice tower on his land by adjusting the location of this tower.

Source: IEE Study Team

According to the result of continuous consultation with PAPs from May, 2016 to Aug, 2017, the number of PAPs is two as shown in Table 2.3-2 depending on the result of negotiation with the land owner of Tower No. T-50 in May, 2017. In other words, the location of mono pole of T-50 was adjusted to the place which is within the ROW of MOC and it is located outside of 95 ft from the center of the road, which is the condition MOC approved in Appendix-7: Negotiation Letter with MOC for an evidence of negotiation letters between the Ministry of Electricity and Energy (MOEE) and MOC in the main IEE report.

Regarding the location of towers of Tower No. T-9, the land owner agreed and received the crop compensation and the location of the tower was changed to the place where the farmland owner requested to minimize the area of affected land as much as possible. Concerning Tower No. T-9 (A), DPTSC got agreement with the land owner by adjusting the location of the tower in September, 2017.

CHAPTER 3: COMPENSATION AND ASSISTANCE

3.1 Compensation Estimation

3.1.1 Compensation for Assets

There is no asset which is necessary to pay compensation.

3.1.2 Permanent Land Acquisition

Table 3.1-1 shows the amount of land acquisition cost for the affected land of 100 ft × 100 ft which is necessary for construction. It was calculated as below,

$$\text{Amount of Land Acquisition Cost}^1 = \text{Area of Potential Affected Land} \times \text{Unit Price}$$

where, *Amount:* Amount of Land Acquisition Cost (MMK)

Unit price: Unit price of Affected Land (MMK/ha)

**It is based on the result of hearing from PAPs.*

Table 3.1-1 Compensation for Land Acquisition

No	Township	Village Tract	Village	Land Owner	Potential Affected Land (acre) during construction	No. of Towers	Unit Price (MMK/acre)	Land Acquisition Cost (MMK)
1	Thanlyin	Ba Yet	Ba Yet	Mr. E	0.23	1	-	-
2			Ba Yet	Mr. F	0.23	1	-	-

Source: IEE Study Team

Recommendation: The Project proponent is not used to paying land compensation and it usually pays crop compensation for permanent land acquisition. IEE Study Team recommended DPTSC in MOEE to pay land compensation for permanent land acquisition such as construction of towers in the future to meet with Farm Land Rules in Myanmar and the international standard of land acquisition. In this project only crop compensation is paid by MOEE.

¹ In the practical process for setting the land acquisition cost for private agricultural lands, General Administration Department in concerned township will set up a crop compensation committee. Then, the affected agricultural land area and identification of affected facilities will be measured by this committee. Especially, Land Record Department in concerned township is in charge of this measurement. Finally, Agricultural Department in concerned township set the unit price of compensation cost. the unit price of affected land for permanent use was not set in this report.

3.1.3 Crop Compensation

Table 3.1-2 and 3.1-3 shows the amount of crop compensation for the affected land of 100 ft × 100 ft which is necessary for construction in the rainy season and in the summer or in the winter respectively calculated by the crop compensation committee. According to Farmlaw Rule enacted in 2012, it is necessary to pay crop compensation as three times of the market price of the crop.

$$\text{Compensation Amount} = \text{Affected Area (Acre)} \times \text{Market Unit Price (Tin/MMK)} \times 3 \text{ (Times)}$$

Table 3.1-2 Compensation for Crop Acquisition in the rainy season

No.	Project Affected Person (PAP) Name	Tower No.	Type of crop	Area affected (Acre)	Yield rate (Tin/Acre)	Total Affected Yied (Tin)	Market Unit Price (Tin/MMK)	Compensation for one year (MMK)	Total Compensation (Three times) (MMK)
1.	Mr. E	T-9 (A)	Paddy in rainy season	0.23	55	12.65	5,500	69,575	208,725
2.	Mr. F	T-9	Paddy in rainy season	0.23	55	12.65	5,500	69,575	208,725

Table 3.1-3 Compensation for Crop Acquisition in the summer or in the winter

No.	Project Affected Person (PAP) Name	Tower No.	Type of crop	Area affected (Acre)	Yield (Tin/Acre)	Total Affected Yield (Tin)	Market Unit Price (Tin/MMK)	Compensation for one year (MMK)	Total Compensation (Three times) (MMK)
1.	Mr. E	T-9 (A)	Paddy in the summer	0.23	90	20.7	5,500	113,850	341,550
2.	Mr. F	T-9	Paddy in the summer	0.23	90	20.7	5,500	113,850	341,550

Appendix-F shows the crop compensation calculated by the crop compensation committee.

3.1.4 Compensation for Temporary Land Use

According to the project plan, access road for installation of transmission tower or pole is not expected to construct. In addition, the materials for transmission tower and pole are expected to transport by manual labor. Therefore, the serious impact by temporary land use is not expected. However, if the temporary land use will be occurred during the agricultural season, the compensation will be paid for loss of crop. On the other hands, in case that there is no temporary land use, or the construction works are conducted during the agricultural off-season, the compensation for crops will not occur.

3.2 Entitlement Matrix

The entitlement matrix of this project is shown in Table 3.2-1. The entitlement matrix is prepared based on the result of hearing survey. The matrix proposes eligibility and its entitlement benefit for each category of loss. It sets standards for compensation.

In the project, entitlement matrix included three type of loss; i) private land to be acquired, ii) loss of crops and iii) temporary land use. Farmers who are owners of affected farmlands will be given land acquisition cost from DPTSC.

Table 3.2-1 Entitlement Matrix for the Project

No	Type of Loss	Application	Entitled Persons	Compensation policy	Implementation Issues/Guidelines
1	Private land to be acquired	Private land located in proposed transmission line route	Legal owner of the private land	The land acquisition cost will be paid to private land owner	a) Land acquisition cost will be decided by compensation committee based on the market price ²
2	Loss of crops	Farm land located in proposed transmission line route	Farmers who cultivate the land	The compensation for crops will be paid to farm land owner	a) Compensation for crops will be decided by compensation committee based on the market price b) DPTSC will pay the compensation for affected crops during construction before the construction starts.
3	Temporary Land Use	Crops located in the construction area during farming season	Farmers who cultivate the land	Compensation in kind for crops based on productivity of the land in the past.	a) The construction work schedule has to take into account the agricultural seasons to avoid harvest season if possible. If the works conduct during the agricultural off-season, the compensation will not be paid to PAPs. b) Prices of agricultural products in local markets have to be checked for comparison. c) Compensation rate will be decided by compensation committee. d) PAPs will be given notice several months in advance regarding evacuation. Crops grown after the issue of the notice will not be compensated.

Source: IEE Study Team

² The project owner is not used to paying land compensation for construction of transmission towers. It is recommended to give land compensation to land owners for construction of transmission towers in accordance with the Farm Land Law and Farm Land Regulations. But in this project, the land compensation is not planned to give to PAPs.

CHAPTER 4: INSTITUTIONAL ARRANGEMENT

4.1 Institutional Arrangement of the ALAP

General ALAP implementation and monitoring is conducted by environmental and social staff within the PMU in cooperation with construction contractor management team. Designated staff shall also take responsibility in coordinating with local authorities and affected persons for effective and efficient implementation of ALAP. Table 4.1-1 describes the institutional arrangement responsible for successful execution of ALAP.

Table 4.1-1 Institutional Arrangement of the ALAP

Institutional Arrangement	Roles and responsibilities
Pre-construction	
Compensation Committee at Township concerned	Set compensation standards and assistance
Administration Department in DPTSC	Finalize compensation price with affected people and disburse compensation
Environmental and Social Staff in Project Management Unit of DPTSC	Monitor compensation procedure based on ALAP
Construction	
Environmental and Social Staff in Project Management Unit of DPTSC	Open windows for project affected peoples

Source: Nippon Koei Engineer Service Team

CHAPTER 5: IMPLEMENTATION SCHEDULE

5.1 Implementation Schedule of ALAP

Implementation schedule of the ALAP varies depends on the status of land acquisition process in each site. The implementation schedule of each site is shown in Table 5.1-1.

Table 5.1-1 Expected Implementation Schedule of ALAP

Item	2015							2016				
	6	7	8	9	10	11	12	1	2	3	4	
Route survey for detailed design												
Organizing compensation committee												
Finalization of compsnation and assistance standard by township compensation commitee												
Negotiation and agreement between DPTSC and PAPS												
Disburse compensationto PAPS												
Start of Construction at Project Affected Land												
Internal and External Monitoring												

Item	2016								2017				
	5	6	7	8	9	10	11	12	1	2	3	4	5
Route survey for detailed design													
Organizing compensation committee	▲												
Finalization of compsnation/ assistance standard by township compensation commitee													
Negotiation and agreement between DPTSC and PAPS													
Disburse compensation to PAPS													
Start of Construction at Project Affected Land													
Internal and External Monitoring													

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Item	2016							2017					
	6	7	8	9	10	11	12	1	2	3	4	5	6
Route survey for detailed design													
Organizing compensation committee													
Finalization of compensation and assistance standard by township compensation committee													
Negotiation and agreement between DPTSC and PAPS		_____											
Disburse compensation to PAPS											▲		
Start of Construction at Project Affected Land													
Internal and External Monitoring													

Item	2017						2018							
	7	8	9	10	11	12	1	2	3	4	5	6	7	
Route survey for detailed design														
Organizing compensation committee														
Finalization of compensation/ assistance standard by township compensation committee														
Negotiation and agreement between DPTSC and PAPS	_____													
Disburse compensation to PAPS														
Start of Construction at Project Affected Land		_____												
Internal and External Monitoring		-	-	-	-	-	-							

Source: IEE Study Team

CHAPTER 6: MONITORING PLAN

6.1 Monitoring Items

DPTSC shall be responsible to fully implement the ALAP monitoring plan throughout the entire project life circle.

The monitoring plan shall include evaluation of performance to determine whether ALAP is effectively implemented in accordance with the requirement stipulated or not and how unanticipated impacts during the construction period shall be addressed appropriately. Items to be monitored should be covered following social components as a minimum.

- Budget and timeframe
- Delivery of compensation
- Livelihood
- Level of affected person satisfaction
- Effectiveness of ALAP implementation

Internal monitoring shall be conducted as occasionally basis by DPTSC. The task includes;

- Monitoring implementation status of ALAP
- Assessing the effectiveness of grievance redress system and status of being followed as described in ALAP
- Ensuring requirement set out in the entitlement section are done appropriately
- Overseeing that compensation/assistance and entitlements are to meet the objectives of ALAP
- Identifying land acquisition cost and compensation for crop are met in accordance with contents of entitlement.
- Ensuring that frequent site visits are made to observe the countermeasures processes, and interview and respond to concerns expressed by the PAPs.

PMU will ensure that this ALAP is thoroughly communicated to relevant personnel during all construction and operation of the Project, and that this procedure is strictly observed and complied with by DPTSC and its contractors, to ensure compliance with ALAP and environment and social consideration guidelines of JICA.

6.2 Internal Monitoring

Internal monitoring will be carried out by DPTSC periodically during implementation of the ALAP. Internal monitoring will take place on a monthly basis. DPTSC will send their staff to the Project site once a month to consult with the environmental staff in construction contractor, participate in field work and conduct interview with the Project affected villagers/affected village representatives. In every three month, the progress of ALAP work will be confirmed and will be attached with progress report of the project. The ALAP will be evaluated in every six month and modify as appropriate.

6.3 External Monitoring

(1) Outline of External Monitoring

External monitoring is one of requirement of World Bank OP4.12 for ensuring ALAP is implemented in accordance with guideline. External third parties shall be communicated to conduct independent monitoring, evaluation and verification of process for execution of ALAP. In this project General Administration Department of Thanlyin Township will be responsible for the external monitoring.

The purpose of external monitoring is to evaluate overall performance of ALAP and its achievement including land acquisition and compensation activities independently and recommend additional requirement and future planning for successful execution of ALAP lifecycle management.

(2) Monitoring Methodology

External monitoring shall be conducted during and after the land acquisition procedure. General Administration Department (GAD) in Thanlyin Township the Engineering Service Team of the Project will conduct the monitoring and evaluation of implementing process of ALAP based on desk review and field visits, meeting with relevant authorities and PAPs. The methods to be applied for external monitoring are outlined as follows:

- a) During the land acquisition phase: i) interview with relevant authorities involved into implementation of land acquisition to confirm actual situation at the field level, ii) interview with PAPs if necessary.
- b) After land acquisition phase: i) interview with PAPs to confirm the payment of land acquisition has been finished, ii) interview with relevant entities involved into implementation of land acquisition to confirm actual situation at the field level and with PAPs to confirm level of livelihood restoration (special attention will be paid to the inclusion of vulnerable groups).

6.4 Grievance Redress System

The grievance redress system is an effective instrument to tackle the various complaints receiving from the PAPs and community in such a way that elevate the process of finding solution to reach the satisfaction and mutual agreement in a timely fashion and transparent manner.

The main actor to implement land acquisition which including grievance redress system is GAD in Thanlyin Township. The following procedure shall be applied during the land acquisition.

Complaints from PAPs are lodged verbally or in written form to the GAD in Thanlyin Township during the land acquisition phase via the village tract or directly. GAD in Thanlyin Township is the contact organization for direct lodging of complaints from PAPs. The officer from GAD will interview with the concerned PAP who raises issues. The lodged complaint and interview result is discussed within DPTSC, and approach to settle the complaint is decided. Based on the decided approach, the assigned officer negotiates with the concerned PAP. In case the agreement between the concerned PAP and DPTSC is not achieved within 15 days from the day of complaint lodged, the case is forwarded to Yangon Regional Government (YRG). The relevant department in YRG reviews previous documents and discuss with PAPs until agreement is reached. In case agreement is not reached within 15 days from the case is forwarded to YRG, the case is forwarded to the court.

*Appendix-A: Policy Framework on Land
Acquisition and
Resettlement*

POLICY FRAMEWORK ON LAND ACQUISITION AND RESETTLEMENT

1.1 Policy Framework on Land Acquisition and Resettlement in Myanmar

It was confirmed that the land to be acquired for the Project is categorized as agricultural land. In order to acquire agricultural land to use for public purpose, two main steps are required. First, the project owner has to get approval from land record department at relevant township for conversion of land from agricultural land to other purposes. Secondly, the project owner has to set compensation price in consulting with compensation committee organized by general administrated department at relevant township. The following is the summary of these procedures.

1.1-1 Conversion of Agricultural Land

According to the Article 29 – 30 in Chapter X of the Farmland law, 2012, application for use of farmlands by other means are permitted for the sake of long-term national interests and planning projects as proposed by Naypyitaw Council or region /state governments or by concerned Union Ministries. The application must be submitted to Union Government with comments given by Central Farmland Management Committee. Only when the approval is received from the Union Government, the project shall be implemented accordingly. The detailed requirements and regulations are shown in Articles 78 – 94 of Chapter IX in Farmland Rules, 2012.

As stated in the Article 80, in case of that if farmlands are required to be used for construction projects which are necessarily related to rural and urban development, such as schools, hospital, dispensary, library, street, bridge, rural market, religious building, cemetery and other necessary buildings, the following requirements should be met with application of the use of lands by other means.

- a. If it is for school, the approval of Union education ministry and availability of fund.
- b. If it is for healthcare unit such as hospital or dispensary, the approval of union health ministry and availability of fund.
- c. If it is for religious building, the approval of union ministry of religious affairs, and availability of fund.
- d. If it is for other matters, the approval of concerned union ministry and availability fund.

The procedures and steps of the application as shown in the Articles 82 – 90 of the Farmland Rules (2012) are here presented in Table 1 for more clarification.

Table 1 Steps of Application

Step No.	Procedures	Concerning Department	Process	Further Action	Time Taken
1	<i>Application with Form -14</i>	Township Land Records Department (TLRD)	Open the dossier for using farmlands by other means on the application	Scrutinizing the requirements as listed in the Article 84 of the Rules	Within 30 days starting from the acceptance date of application
2	<i>Submitting the application to Township Farmland Management Committee with the comments given by TLRD</i>	Township Farmland Management Committee (TFMC)	Scrutinizing the requirements as listed in the Article 86 of the Rules	the application shall be submitted to Region / State Farmland Management Committee through the District Farmland Management Committee with the comments	Within 15 days starting from the acceptance date of the application in TLRD
3	If the application of farmlands by other means is for Paddy land (Le)	Region / State Farmland Management Committee (R/S - FMC)	Scrutinizing the application	Continued Submission of the application to Central Farmland Management Committee with the comments given by the Region / State Farmland Management Committee	Within 30 days
4	If the application of farmlands by other	Region / State Farmland	Scrutinizing the application which	Continued submission of the application to Region /	Within 30 days

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Step No.	Procedures	Concerning Department	Process	Further Action	Time Taken
	means is except Paddy land	Management Committee	has been passed by step by step	State Government with the comment given by Region / State Farmland Management Committee	
5	Issuing Form – 15b Approved Permit shall be issued for the Paddy lands (Le) which are to be used by other means	Central Farmland Management Committee (CFMC)	If the application is met with the requirements, the approval shall be issued regarding to the Article 87 (a)		
6	Issuing Form – 15 A Approved Permit shall be issued for the except Paddy lands which are to be used by other means	Region / State Farmland Management Committee	If the application is met with the requirements, the approval shall be issued regarding to the Article 87 (b)		
Total time taken for the whole application process until the approval for the use of farmlands by other means					
7	Form – 16 Inspection Report on condition of implementations in the granted farmlands for other means, The report is to be submitted in every 6-months basis to Central Farmland Management Committee	Region / State Farmland Management Committee	Field inspections shall be done by DFMC and TFMC into the granted farmlands by using other means. The inspection reports with the photo documents shall be presented to R/S-FMC	If the DFMC and TFMC find that the granted lands is not yet started utilizing by other means or the proposed project is not yet implemented within 6 months from the date of approval, the case shall be opened as a separate dossier, then the report shall be submitted with photo evidences to Region / State Farmland Management Committee	Within 6 months
8	Presenting the case to Central Farmland Management Committee for necessary actions to be taken	CFMC	Upon receiving the case, CFMC shall analyze and scrutinize the case	After scrutinizing the case, the necessary actions shall be taken as shown in the Article 93.	-
9	Confiscate the land	Central Farmland Management Committee (CFMC)	CFMC shall confiscate the land as it is revoked under rule (93) (a) or the land revoked by Region / State Government as it is informed under sub rule (b).	-	-

Source: Farmland Rules (2012)

1.1-2 Setting-Up Compensation Price

After obtaining the approval of conversion for the proposed project land from the land record department at relevant township the project owner draft compensation price for the land in consulting with relevant village heads and affected peoples. Then the project owner makes a request general administrated department at relevant township for organizing a compensation committee in order to scrutinize the drafted compensation price. In general, compensation committee is comprised of project owner, and record department, police officer, agriculture and irrigation department, conservation environment and forestry department and general administrated department at the relevant township. After the compensation price was finalized at compensation committee, the project owner shall pay the compensation to affected peoples. In case affected people is not satisfied the compensation price, he/she can appeal to the compensation committee to reconsider the price.

1.2 JICA Policy on Involuntary Resettlement

The key principle of JICA policies on involuntary resettlement are summarized as below.

- I. Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives
- II. When, population displacement is unavoidable, effective measures to minimize the impact and to compensate for losses should be taken
- III. People who must be resettled involuntarily and people whose means of life will be hindered or lost must be sufficiently compensated supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels
- IV. Compensation must be based on the full relocation cost as much as possible.
- V. Compensation and other kinds of assistance must be provided prior to displacement
- VI. For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy OP4.12, Annex A
- VII. In preparing a “resettlement action plan, consultation must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people
- VIII. Appropriate participation of affected people must be promoted in planning, implementation and monitoring of resettlement action plans
- IX. Appropriate and accessible grievance mechanisms must be established for the affected people and their communities
- X. Above principles are complemented by World Bank OP4.12 since it is stated in JICA Guideline that “JICA confirms that projects do not deviate significantly from the World Bank’s Safeguard Policies”. Additionally, key principle based on World Bank OP4.12 is as follows.
- XI. Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey(including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits
- XII. Eligibility of benefits include, the PAPs who have formal legal rights to land(including customary and traditional land rights recognized under law), the PAPs who don’t have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land there are occupying
- XIII. Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land –based
- XIV. Provide support for the transition period (between displacement and livelihood restoration
- XV. Particulars attentions must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc.
- XVI. For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared

XVII. In addition to the above principles on the JICA policy, it also laid emphasis on a detailed resettlement policy inclusive of all the above points, project specific resettlement plan; institutional framework for implementation; monitoring and evaluation mechanism; time schedule for implementation; detailed Financial Plan etc.

1.3 Policy Gap between the Government of Myanmar and JICA

Table2.3-1 shows the policy gap between the Government of Myanmar and JICA.

Table 0-1 Policy Gap between the Government of Myanmar and JICA

No	JICA guidelines	Legislations of Myanmar	Gap between JICA guidelines and laws of Myanmar	Gap filling measures for the Project
1	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)	Any specific legislation yet to be enacted.	-	Alternatives are to be considered in order to avoid involuntary resettlement during project design phase.
2	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	Legislations regarding land acquisition are stipulated in the following legislations; 1.5A (3), Part II in Land Acquisition Act(1894), 2.Article 26 in Farm Land Law and, 3.Article 66 in Farm Land Rules	1. It recognizes the entitlement for claiming an interest in compensation for the acquired land under the Land Acquisition Act. 2. It address the person who has the ownership to use the farmland is to be given compensation in case the land is confiscated for interests of the State or the public interests. 3. It is stipulated that the responsibility of giving indemnity and compensation by the central government in case the farmland is to be confiscated for the interests of nation.	There is not significant gap.
3	People who will be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	Legislations regarding compensation due to land acquisition are stipulated in the following legislations; 1. Article 23 in Land Acquisition Act(1894), 2. Article 26 in Farm Land Law and, 3. Article 67 in Farm Land Rules	Stipulations on compensation are addressed in the following legislations, however, the needs of support for restoring the standard of living, income opportunities or production levels to pre-project levels are not mentioned. 1. It is stipulated that compensation shall be calculated based on the market value of the land at the date of the publication f the notification. It defines the land, crops, tress and moveable/immoveable property as objects of compensation. It requests that reasonable expenses shall be paid for relocation or change of business location. 2. It address the person who has the ownership to use the farmland is to be given compensation in case the land is confiscated for interests of the State or the public interests. 3. It addresses indemnity (crop and structure) and compensation (land) calculation form for the agricultural land.	Compensation and support will be prepared taking account of restoring affected people's standard of living, to pre-project levels.
4	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	1. Article 23 in Land Acquisition Act 1894) 2. Article 67 in Farm Land Rules	There is no stipulation referring full replacement cost in present legislations. In the following legislations, it is stipulated that compensation shall be calculated based on market value. 1. It is stipulated that compensation	There is not significant gap.

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No	JICA guidelines	Legislations of Myanmar	Gap between JICA guidelines and laws of Myanmar	Gap filling measures for the Project
			shall be calculated based on the market value of the land at the date of the publication of the notification. 2. It is stipulated that indemnity of crop, structure and compensation of land shall be calculated based on the current market price.	
5	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)		There is no stipulation referring needs of providing compensation or other kinds of assistance before displacement, however, Land Acquisition Act imposes 6% of annual interest on the amount of compensation in case the compensation is not paid before acquiring land.	Compensation and other kinds of assistance will be provided prior to displacement.
6	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	Any specific legislation yet to be enacted.	-	Resettlement plan will be prepared and disclosed to the public.
7	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	Any specific legislation yet to be enacted.	-	Information on the project will be disclosed to affected people during preparation of resettlement action plan.
8	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	Any specific legislation yet to be enacted.	-	Consultation will be implemented in a comprehensive manner to the affected people.
9	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)	Any specific legislation yet to be enacted.	-	Involvement of affected people will be practiced by consultations in timely manner.
10	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	1. Article 5A and Article 18 in Land Acquisition Act (1894) 2. Article 68 in Farm Land Rules	The grievance mechanisms are prepared based on the following legislations. 1. It is stipulated that the objection to acquisition of land is to be heard by the collector within thirty day of the notification. Objection on the amount of the compensation, the persons to whom it is payable or the apportionment of the compensation among the persons interested are submitted to the Court within six weeks of the notice from the Collector or within six months from the date of the Collector's award whichever period shall first expire. 2. It is stipulated that concerned region/state farmland management body shall manage the complaints and central farmland management body shall monitor and negotiate as appropriate.	Based on legislations, Grievance mechanism will be prepared.
11	Affected people are to be indentified and recorded as early as possible in order to establish their eligibility through an initial baseline	Any specific legislation yet to be enacted.	-	Population census and asset inventory survey will be implemented to identify affected people.

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No	JICA guidelines	Legislations of Myanmar	Gap between JICA guidelines and laws of Myanmar	Gap filling measures for the Project
	survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP.4.12 Para.6)			
12	Eligibility of benefits includes, the PAPs who have formal legal rights to the land (including customary and traditional land rights recognized under law), the PAPs who do not have formal legal rights to the land at the time of census but have claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP4.12 Para 15)	Any specific legislation yet to be enacted.	-	Eligibility of the project will be prepared for all households whose income sources or assets are confirmed as affected due to project.
13	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)	Any specific legislation yet to be enacted.	-	Measures will be prepared to PAPs in carrying out consultation.
14	Provide support for the transition period (between displacement and livelihood restoration). (WB OP4.12 Para.6)	Any specific legislation yet to be enacted.	-	Sufficient support for the transition period will be provided as appropriate.
15	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women, children, ethnic minorities, etc. (WB OP4.12 Para.8)	Any specific legislation yet to be enacted.	-	Additional support for the Vulnerable groups will be prepared as appropriate.
16	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	Any specific legislation yet to be enacted.	-	Abbreviated resettlement plan will be provided since the entail land acquisition or involuntary resettlement of fewer than 200 people.

Source: Nippon Koei Engineer Service Team prepared based on JICA Guidelines, Land Acquisition Act (1894), Farmland Law (2012) and Farmland Rules (2012)

1.3-1 Resettlement Policy of the Project

The followings are the resettlement policy of the Project.

- I. The Government of Myanmar will use the Project Resettlement Policy (the Project Policy) for the gas pipeline and GRS stations construction project specially because existing national laws and regulations have not been designed to address involuntary resettlement according to international practices, including JICA's policy. The Project Policy is aimed at filling-in any gaps in what local laws and regulations cannot provide in order to help ensure that PAPs are able to rehabilitate themselves to at least their pre-project condition. This section discusses the principles of the Project Policy and the entitlements of the PAPs based on the type and degree of their losses.

Where there are gaps between the Myanmar legal framework for resettlement and JICA's Policy on Involuntary Resettlement, practicable mutually agreeable approaches will be designed consistent with Government practices and JICA's Policy.

- II. Land acquisition and involuntary resettlement will be avoided where feasible, or minimized, by identifying possible alternative project designs that have the least adverse impact on the communities in the project area.
- III. Where displacement of households is unavoidable, all PAPs (including communities) losing assets, livelihoods or resources will be fully compensated and assisted so that they can improve, or at least restore, their former economic and social conditions.
- IV. The Resettlement Plan will be translated into local languages and disclosed for the reference of PAPs as well as other interested groups.
- V. Payment for land and/or non-land assets will be based on the principle of relocation cost.
- VI. The resettlement plan must consider the needs of those most vulnerable to the adverse impacts of resettlement they are considered the poor, those without legal title to land, ethnic minorities, women, children, elderly and disabled) and ensure them improve their socio-economic status.
- VII. Organization and administrative arrangements for the effective preparation and implementation of the resettlement plan will be identified and in place prior to the commencement of the process; this will include the provision of adequate human resources for supervision, consultation, and monitoring of land acquisition and rehabilitation activities.
- VIII. Appropriate reporting (including auditing and redress functions), monitoring and evaluation mechanisms, will be identified and set in place as part to the resettlement management system.

1.3-2 Cut-off-date of Eligibility

Cut-off date is date of completion of the census and assets inventory of persons affected by the project. Persons occupying the project area after the cutoff date are not eligible for compensation and/or resettlement assistance. Similarly, fixed assets (such as built structures, crops, fruit trees, and woodlots) established after the date of completion of the assets inventory, or an alternative mutually agreed on date, will not be compensated. Generically, cut-off date is set at first day of census and inventory survey. In the Project, cut-off-date for titleholders is recommended at 8th April 2014 as first day of the field survey. However, the date was not informed Project Affected Person yet.

1.3-3 Principle of Relocation Cost

All compensation for land and non-land assets owned by households/shop owners who meet the cut-off-date will be based on the principle of relocation cost. Relocation cost is the amount calculated before displacement which is needed to replace an affected asset without depreciation and without deduction for taxes and/or costs of transaction as follows;

- a. Productive land (agricultural, garden and forest) based on actual current market prices that reflect recent sales in the area, and in the absence of such recent sales, based on recent sales in comparable locations with comparable attributes, fees and taxes or in the absence of such sales, based on productive value
- b. Residential land based on actual current market prices that reflect recent land sales, and in the absence of such recent land sales, based on prices of recent sales in comparable locations with comparable attributes; fees and taxes.

*Appendix-B: Questionnaire for Hearing
Survey*

Socio-Economic Survey

Household Identification (For Agricultural Land Owner)

District:

Village:

Location GPS Lat (WGS84)

Location GPS Long (WGS84)

Mark Location on cadastral map and Google Map

Date of Data Collection:

List the Names and Positions of Persons Collecting Data

Name:

Position:

Name:

Position:

Name:

Position:

Household's Representation

No. Position First Name Surname Phone Number

1.

2.

3.

1. Demography/Ethnicity/Communication

How many members in your household?

.....

What is your ethnic group?

.....

What is your mother tongue?

.....

Can you fully understand the Burmese Language as spoken by outsiders such as government officials?

Yes

No

Can you read documents in the Burmese Language without difficulty?

Yes

No

Note: "without difficulty" means to be able to easily understand written information about such things as laws or land registration procedures

2. Affected Land/Assets

2.1. What is your total land?

Agricultural Landha

Plantation Landha

Others (specify)ha

2.2 What is the area to be affected by transmission tower base construction?

.....ha of agricultural land

.....ha of plantation land ha of other land (specify)

2.3 Is your affected land has land use certificate?

Yes

No

If yes, please specify the type of certificate

.....

2.4 What is your asset to be affected by transmission ROW clearance?

(ex. Rubber trees 10, Coconut trees 10, hut made of straw for paddy 1, hut made of bamboo for livestock, 2-storyhouse made of timber 1 etc)

.....

.....

.....

.....

Note: assets include fixed assets (house, hut, well etc), trees but exclude rice plants vegetable and fruit trees which the mature size not exceed 3 m height

2.5. How many % of affected land / assets will be in total household's productive assets including agricultural land?

..... %

2.6 How much the replacement cost of the affected land?

.....MMK

2.7 How much the replacement cost of the affected assets?

.....MMK

.....MMK

3.8 What kind of compensation you prefer (circle)?

By cash

By land

4. Opinion on the Project

What is the opinion (comment, recommendation, request etc) on the Project

.....

.....

.....

.....

.....

.....

*Appendix-C: Photo of assets to be removed
in the ROW of Dagon-Thilawa
Road*

**List of Temporary Huts which may Affect
construction of
230 kV Thanlyin - Thilawa Transmission Line.**



Affected Facilities (HUTS) along the new Thanlyin - Thilawa 230 kV Transmission Line.

Sr. No.	Facilities No.	Quantity of affected facilities	Coordinate		Description and location of Facilities	Materials of Facilities	Tower No.
			N	E			
1	1	1	16°44'25.01"	96°17'47.42"	Shop along the Dagon - Thilawa Road near Thone Gwa Junction	Bamboo	15
2	2	1	16°44'25.01"	96°17'47.42"	Shop along the Dagon - Thilawa Road near Thone Gwa Junction	Bamboo	15
3	3	1	16°44'25.01"	96°17'47.42"	Shop along the Dagon - Thilawa Road near Thone Gwa Junction	Bamboo	15
4	4	1	16°44'15.50"	96°17'52.61"	Shop along the Dagon - Thilawa Road near Thone Gwa Junction	Bamboo	17
5	5	1	16°44'15.50"	96°17'52.61"	Shop along the Dagon - Thilawa Road near Thone Gwa Junction	Bamboo	17
6	6	1	16°42'33.09"	96°18'48.42"	Shop along the Dagon - Thilawa Road.	Bamboo	38
7	7	1	16°42'33.09"	96°18'48.42"	Animal Shed along the Dagon - Thilawa Road.	Bamboo	38
8	8	1	16°42'33.09"	96°18'48.42"	Shop along the Dagon - Thilawa Road.	Bamboo	38
9	9	1	16°41'42.80"	96°19'15.83"	Small Hut	Bamboo	49
10	10	1	16°41'11.70"	96°18'36.33"	Shop and Hut along the Dagon - Thilawa Road near Thilawa Kyauktan Junction.	Bamboo	60
11	11	1	16°44'52.50"	96°17'31.14"	Small Hut	Bamboo	9
12	12	1	16°44'52.50"	96°17'31.14"	Small Hut	Bamboo	9
13	13	1	16°44'52.50"	96°17'31.14"	Duck farm along the Dagon - Thilawa Road.	Bamboo	9
14	14	1	16°44'52.50"	96°17'31.14"	Chicken farm along the Dagon - Thilawa Road.	Bamboo	9
15	15	1	16°44'52.50"	96°17'31.14"	Cattle farm along the Dagon - Thilawa Road.	Bamboo	9

* Total affected facilities is 15.

* Affected facilities are encountered on the right position of transmission line route and very close to route within range of ROW.

Figure 1: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**1) : Vendor Store near Thone Gwa Junction
(6 m × 11 m)
Movable, Needs Setback before February,2017
for 6 Months.**



**2) : Vendor Store near Thone Gwa Junction
(7 m × 12 m)
Movable, Needs Setback before February,2017
for 6 Months.**



**3) : Bamboo hut near Thone Gwa Junction
(4 m × 5 m)
Movable, Needs Setback before February,2017
for 6 Months.**



**4) : Bamboo hut near Thone Gwa Junction
(9 m × 5 m)
Movable, Needs Setback before February,2017
for 6 Months.**



Figure 1: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**5) Vendor Store near Thone Gwa Junction
(3 m × 8 m)**

**Movable, Needs Setback before February,2017
for 6 Months.**



**6) Vendor Shop along Dagon - Thilawa Road
(4 m × 7 m)**

**Movable, Needs Setback before February,2017
for 6 Months.**



**7) Animal Shed along Dagon - Thilawa Road
(12 m × 7 m)**

**Movable, Needs Setback before February,2017
for 6 Months.**



**8) Vendor Shop along Dagon - Thilawa Road
(5 m × 4 m)**

**Movable, Needs Setback before February,2017
for 6 Months.**



Figure 1: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**9) Bamboo Hut along Dagon - Thilawa Road
(3 m × 4 m)
Movable, Needs Setback before February,2017
for 6 Months.**



**10) Bamboo Hut near
Thilawa Kyauktan Junction
(3 m × 4 m)
Movable, Needs Setback before February,2017
for 6 Months.**



**11) Bamboo Hut along Dagon - Thilawa Road
(3 m × 4 m)
Movable, Needs Setback before February,2017
for 6 Months.**



**12) Bamboo Hut along Dagon - Thilawa Road
(3 m × 4 m)
Movable, Needs Setback before February,2017
for 6 Months.**



Figure 1: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**13) Duck Farm along Dagon - Thilawa Road
(3 m × 4 m)**

**Movable, Needs Setback before February,2017
for 6 Months.**



**14) Chicken Farm along Dagon - Thilawa Road
(3 m × 4 m)**

**Movable, Needs Setback before February,2017
for 6 Months.**



**15) Cattle Farm along Dagon - Thilawa Road
(3 m × 4 m)**

**Movable, Needs Setback before February,2017
for 6 Months.**



*Appendix-D: A list of trees to be removed
along Dagon-Thilawa Road
and approval letter
to remove them from Forest
Department*

List of Trees which may Affect construction of 230 kV Thanlyin - Thilawa Transmission Line.



Affected Facilities (TREES) along the new Thanlyin - Thilawa 230 kV Transmission Line.

Sr. No.	Facilities No.	Quantity of affected facilities	Coordinate		Description and location of Facilities	Tower No.
			N	E		
1	1	1	16°41'08.81"	96°18'32.62"	Tree along the Dagon - Thilawa Road in Thilawa SEZ Area nearby Thilawa Kyauktan Junction.	61
2	2	1	16°41'06.39"	96°18'27.83"	Tree along the Dagon - Thilawa Road in Thilawa SEZ Area.	62
3	3	1	16°40'57.27"	96°18'09.81"	Tree along the Dagon - Thilawa Road in Thilawa SEZ Area.	66
4	4	1	16°44'15.54"	96°17'52.39"	Tree along the Dagon - Thilawa Road near Thone Gwa Junction	17
5	5	1	16°44'15.66"	96°17'52.67"	Tree along the Dagon - Thilawa Road near Thone Gwa Junction	17
6	6	1	16°44'15.61"	96°17'52.88"	Tree along the Dagon - Thilawa Road near Thone Gwa Junction	17
7	7	1	16°44'15.29"	96°17'53.02"	Tree along the Dagon - Thilawa Road near Thone Gwa Junction	17
8	8	1	16°44'10.67"	96°17'55.55"	Tree along the Dagon - Thilawa Road.	18
9	9	1	16°44'10.92"	96°17'55.42"	Tree along the Dagon - Thilawa Road.	18
10	10	1	16°44'11.28"	96°17'55.23"	Tree along the Dagon - Thilawa Road.	18
11	11	1	16°43'36.22"	96°18'14.04"	Tree along the Dagon - Thilawa Road.	25
12	12	1	16°43'36.45"	96°18'13.86"	Tree along the Dagon - Thilawa Road.	25
13	13	1	16°43'36.61"	96°18'13.79"	Tree along the Dagon - Thilawa Road.	25
14	14	1	16°43'31.89"	96°18'16.35"	Tree along the Dagon - Thilawa Road.	26
15	15	1	16°43'21.91"	96°18'21.90"	Tree along the Dagon - Thilawa Road.	28
16	16	1	16°43'21.45"	96°18'22.21"	Tree along the Dagon - Thilawa Road.	28
17	17	1	16°43'21.01"	96°18'22.47"	Tree along the Dagon - Thilawa Road.	28
18	18	1	16°43'16.58"	96°18'24.84"	Tree along the Dagon - Thilawa Road.	29
19	19	1	16°43'17.20"	96°18'24.51"	Tree along the Dagon - Thilawa Road.	29
20	20	1	16°43'16.91"	96°18'24.69"	Tree along the Dagon - Thilawa Road.	29
21	21	1	16°43'11.93"	96°18'27.27"	Tree along the Dagon - Thilawa Road.	30
22	22	1	16°43'11.76"	96°18'27.55"	Tree along the Dagon - Thilawa Road.	30
23	23	1	16°43'11.75"	96°18'27.30"	Tree along the Dagon - Thilawa Road.	30
24	24	1	16°43'6.88"	96°18'30.14"	Tree along the Dagon - Thilawa Road.	31
25	25	1	16°43'07.16"	96°18'30.00"	Tree along the Dagon - Thilawa Road.	31
26	26	1	16°43'07.21"	96°18'29.91"	Tree along the Dagon - Thilawa Road.	31
27	27	1	16°43'07.01"	96°18'29.10"	Tree along the Dagon - Thilawa Road.	31
28	28	1	16°43'06.84"	96°18'30.16"	Tree along the Dagon - Thilawa Road.	31
29	29	1	16°43'02.48"	96°18'32.43"	Tree along the Dagon - Thilawa Road.	32
30	30	1	16°41'56.37"	96°19'08.77"	Tree along the Dagon - Thilawa Road.	46
31	31	1	16°41'56.52"	96°19'08.66"	Tree along the Dagon - Thilawa Road.	46
32	32	1	16°41'56.65"	96°19'08.56"	Tree along the Dagon - Thilawa Road.	46
33	33	1	16°41'51.57"	96°19'11.34"	Tree along the Dagon - Thilawa Road.	47
34	34	1	16°41'51.23"	96°19'11.50"	Tree along the Dagon - Thilawa Road.	47

Affected Facilities (TREES) along the new Thanlyin - Thilawa 230 kV Transmission Line.

Sr. No.	Facilities No.	Quantity of affected facilities	Coordinate		Description and location of Facilities	Tower No.
			N	E		
35	35	1	16°41'46.83"	96°19'13.90"	Tree along the Dagon - Thilawa Road.	48
36	36	1	16°41'47.15"	96°19'13.70"	Tree along the Dagon - Thilawa Road.	48
37	37	1	16°41'27.86"	96°19'00.48"	Tree along the Dagon - Thilawa Road.	54
38	38	1	16°41'27.80"	96°19'00.05"	Tree along the Dagon - Thilawa Road.	54
39	39	1	16°41'19.85"	96°18'45.05"	Tree along the Dagon - Thilawa Road.	57
40	40	1	16°41'21.19"	96°18'48.49"	Tree along the Dagon - Thilawa Road.	57
41	41	1	16°41'11.64"	96°18'36.47"	Tree along the Dagon - Thilawa Road nearby Thilawa Kyauktan Junction.	60
42	42	1	16°41'11.52"	96°18'36.41"	Tree along the Dagon - Thilawa Road nearby Thilawa Kyauktan Junction.	60
43	43	1	16°41'11.79"	96°18'36.26"	Tree along the Dagon - Thilawa Road nearby Thilawa Kyauktan Junction.	60
44	44	1	16°41'11.55"	96°18'36.18"	Tree along the Dagon - Thilawa Road nearby Thilawa Kyauktan Junction.	60

* Total affected facilities is 44.

* Affected facilities are encountered on the right position of transmission line route and very close to route within range of ROW.

Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**1) Tree near
Thilawa Kyauktan Junction
Needs to Takeout / Cut before February,2017**



**2) Tree near
Thilawa Kyauktan Junction
Needs to Takeout / Cut before February,2017**



**3) Tree near
Thilawa Kyauktan Junction
Needs to Takeout / Cut before February,2017**



**4) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**5) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**6) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**7) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**8) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**9) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**10) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**11) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**12) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**13) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**14) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**15) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**16) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**17) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**18) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**19) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**20) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**21) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**22) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**23) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**24) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**25) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**26) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**27) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**28) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**29) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**30) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**31) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**32) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**33) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**34) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**35) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**36) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**37) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**38) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**39) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**40) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



Figure 3: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**41) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**42) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**43) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



**44) Tree along Dagon - Thilawa road
Needs to Takeout / Cut before February,2017**



ဦး သစ် သန် စာအမှတ်-လင/စခ/ဝဝ၂(၅၅၂ ရက်စွဲ ။ ၂၀၁၇-ခုနှစ်၊ မေလ ၂၃ ရက်


သို့

တာဝန်ခံ
စီမံကိန်းမန်နေဂျာရုံး(၁)
အမှတ်(၃၅)ရုံးအကွက်(၁၀)၊ ဒဂုံ(မြောက်ပိုင်း) မြို့နယ်
ရန်ကုန်မြို့

အကြောင်းအရာ။ ၂၃၀-ကေဗွီ သန်လျင်- သီလဝါဓါတ်အားလိုင်း တည်ဆောက်ရေးအတွက် မလွတ်ကင်းသော သစ်ပင်များဖယ်ရှားခွင့်ရရှိရေးကိစ္စ။
ရည်ညွှန်းချက် ။ (၁) ညွှန်ကြားရေးမှူး၊ သစ်တောဦးစီးဌာန၊ ရန်ကုန်တိုင်း ဒေသကြီးရုံး၏ (၅၅.၅.၂၀၁၇)ရက်စွဲပါစာအမှတ်-လင/စခ/ဝဝ၂ (၄၇၃၉-၄၀/၂၀၁၇)
(၂) လက်ထောက်ညွှန်ကြားရေးမှူး၊ သစ်တောဦးစီးဌာန၊ ရန်ကုန်အနောက်ပိုင်း ခရိုင်ရုံး၏ (၁၇.၅.၂၀၁၇)ရက်စွဲပါစာအမှတ်-လင/စခ/ဝဝ၂(၂၅၈၈/ ၁၇)

၁။ အထက်အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ သန်လျင်မြို့နယ်၊ ဒဂုံ-သီလဝါလမ်းတစ်လျှောက် ဓါတ်အားလိုင်း သွယ်တန်းဆောက်လုပ်ရေးလုပ်ငန်း နယ်နိမိတ်အတွင်းကျရောက်သော အော်ရီရှား သစ်ပင်(၃၄)ပင်မှာ တာဝါတိုင် Foundation အတွက် Pile ရိုက်သောလုပ်ငန်းခွင်များနှင့် လွတ်ကင်းမှုမရှိသည်မှာ မှန်ကန်မှုရှိပါသဖြင့် ဖယ်ရှားခွင့်ရရှိရန်အတွက် နီးစပ်ရာဒေသခံပြည်သူ(၂၀)ဦးမှ သဘောတူကြောင်းဆန္ဒရယူပြီးဖြစ်သဖြင့် ခုတ်ယူလိုသည့် ဌာနမှရန်ကုန်တိုင်းအစိုးရအဖွဲ့သို့ တင်ပြရန် ရည်ညွှန်းပါစာများဖြင့် အကြောင်းကြားလာပါသည်။

၂။ သို့ဖြစ်ပါ၍ ဒဂုံ-သီလဝါလမ်းတစ်လျှောက် ဓါတ်အားလိုင်းသွယ်တန်းဆောက်လုပ်ရေးလုပ်ငန်း နယ်နိမိတ်အတွင်းကျရောက်သော အော်ရီရှားသစ်ပင်(၃၄)ပင်မှာ တာဝါတိုင် Foundation အတွက် Pile ရိုက်သောလုပ်ငန်းခွင်များနှင့်လွတ်ကင်းမှုမရှိသည်မှာမှန်ကန်မှုရှိပါသဖြင့် ခုတ်ယူဖယ်ရှား ခွင့်ပြုနိုင်ပါရန်အတွက် ရန်ကုန်တိုင်းအစိုးရအဖွဲ့၏ သဘောထားမှတ်ချက်အား တင်ပြတောင်းခံပေးပါရန် ညှိနှိုင်းအကြောင်းကြားအပ်ပါသည်။

 2315/17017
(ဖြူဖြူနိုင်)
ဦးစီးအရာရှိ
သစ်တောဦးစီးဌာန၊ သန်လျင်မြို့နယ်

မိတ္တူကိုင်-
၁။ ရုံးလက်ခံ
၂။ မျှောစာတွဲ



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်
တိုင်းဒေသကြီးအစိုးရအဖွဲ့
ရန်ကုန်တိုင်းဒေသကြီး

စာအမှတ်၊ ၄ / ၇ - ၂ (၂၃) / လျှပ် ဆက်
ရက်စွဲ၊ ၂၀၁၇ ခုနှစ်၊ မေလ ၃၀ ရက်

✓ သီလဝါအထူးစီးပွားရေးဇုန် စီမံခန့်ခွဲမှုကော်မတီ

အကြောင်းအရာ။ သဘောထားမှတ်ချက်တောင်းခံခြင်းကိစ္စ

ရည်ညွှန်းချက်။ သီလဝါအထူးစီးပွားရေးဇုန် စီမံခန့်ခွဲမှုကော်မတီ၏ (၂၂.၅.၂၀၁၇) ရက်စွဲပါ စာအမှတ်၊ သလဝ-၂/ TSEZ / ၂၀၁၇ (၅၇၈)

၁။ သီလဝါအထူးစီးပွားရေးဇုန်နှင့် သီလဝါဒေသအနီးတဝိုက်အား ဓာတ်အားဖြန့်ဖြူးပေးနိုင်ရန် အတွက် သီလဝါဓာတ်အားဖွံ့ဖြိုးတိုးတက်ရေးစီမံကိန်းကို အကောင်အထည်ဖော် ဆောင်ရွက်လျက် ရှိရာ အဆိုပါစီမံကိန်း၏ လုပ်ငန်းတစ်ခုဖြစ်သော (၁၀)မိုင်ရှည်လျားသည့် ၂၃၀ ကေစီ သန်လျင်- သီလဝါ မဟာဓာတ်အားလိုင်းကို သန်လျင်ဓာတ်အားခွဲရုံမှ သီလဝါဓာတ်အားခွဲရုံအထိ ဒဂုံ-သီလဝါ လမ်းတစ်လျှောက်တွင် Center Line of Existing Road မှ လမ်းဝဲယာ (၉၅)ပေအကွာနှင့် သီလဝါ အထူးစီးပွားရေးဇုန်အရှေ့တွင် ဒဂုံ-သီလဝါလမ်းပေါ်ရှိ လမ်းလယ်ကျွန်းတလျှောက် သွယ်တန်း ဆောက်လုပ်မည်ဖြစ်ပါသဖြင့် ဒဂုံ-သီလဝါလမ်းဘေးတလျှောက်ရှိ ဆောက်လုပ်ရေးလုပ်ငန်း လုပ်ကိုင်မည့် နယ်နိမိတ်အတွင်းတွင် ကျရောက်ကာ မလွတ်ကင်းသော အော်ရေးရှား သစ်ပင်(၃၄)ပင်ကို ဖယ်ရှားရန် လိုအပ်လျက်ရှိပါသောကြောင့် သဘောထားမှတ်ချက်ပြန်ကြားပေးပါရန် သီလဝါအထူးစီးပွားရေးဇုန် စီမံခန့်ခွဲမှုကော်မတီမှ ရည်ညွှန်းပါစာဖြင့် တင်ပြလာပါသည်။

၂။ အဆိုပါကိစ္စနှင့်စပ်လျဉ်း၍ ၂၅.၅.၂၀၁၇ ရက်နေ့တွင် ကျင်းပပြုလုပ်သော ရန်ကုန်တိုင်းဒေသကြီး အစိုးရအဖွဲ့ အစည်းအဝေးအမှတ်စဉ်(၁၉/၂၀၁၇)၊ ဆုံးဖြတ်ချက်အပိုဒ်(၄၅)အရ ဖယ်ရှားခြင်းခံရသော သစ်ပင်များကို စနစ်တကျပြန်လည်အစားထိုးစိုက်ပေးရန် အကြောင်းကြားပါသည်။

(Handwritten signature)
၂၀/၅/၁၇

ဝန်ကြီးချုပ်(ကိုယ်စား)
(နီလာကျော်၊ လျှပ်စစ်၊ စက်မှု၊ လက်မှုနှင့်သစ်ပန်းဆက်သွယ်ရေးဝန်ကြီး)

မိတ္တူ

ရန်ကုန်တိုင်းဒေသကြီးလျှပ်စစ်၊စက်မှုလက်မှုနှင့်လမ်းပန်းဆက်သွယ်ရေးဝန်ကြီး
ရန်ကုန်တိုင်းဒေသကြီးသစ်တောဦးစီးဌာန
လက်ခံစာတွဲ / မျှောစာတွဲ

ဦး စီး အ ရာ ရှိ ရုံး
သစ် တော ဦး စီး ဌာ န
သန် လျင် မြို့ နယ်
စာအမှတ် - လငါ စခါ ဝဝ၂ (၁၂၁၂ ၊ ၂၀၁၇)
ရက်စွဲ ၂၀၁၇-ခုနှစ်၊ ဇူလိုင်လ (၃)ရက်

သို့

ဘာဝန်ခံ

စီမံကိန်းမန်နေဂျာ(၁)

အမှတ်(၃၅) အကွက်အမှတ်(၁၀) ဒဂုံ (မြောက်ပိုင်း)မြို့နယ်

ရန်ကုန်မြို့

အကြောင်းအရာ။


ရင်စို့လုံးပတ်(၁)ပေနှင့်အထက်အော်ရီးရှား(၃၄)ပင်ခုတ်၍ငွေပေးသွင်း
ရန်ကိစ္စ။

ရည်ညွှန်းချက် ။

လက်ထောက်ညွှန်ကြားရေးမှူး၊သစ်တောဦးစီးဌာန၊ရန်ကုန်အနောက်
ပိုင်းခရိုင်ရုံး၏(၁၄. ၆ . ၂၀၁၇)ရက်စွဲပါ စာအမှတ် -လငါစခါဝဝ၂
(၃၂၀၆၊ ၂၀၁၇)

အထက်အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ သီလဝါအထူးစီးပွားရေးဇုန်နှင့်သီလဝါ ဒေသ
အနီးတစ်ဝိုက်အား ဓါတ်အားဖြန့်ဖြူးပေးနိုင်ပါရန်အတွက် သီလဝါဓါတ်အားဖွံ့ဖြိုး တိုးတက်ရေး
စီမံကိန်းအကောင်အထည်ဖော် ဆောင်ရွက်လျက်ရှိရာ အဆိုပါစီမံကိန်း၏ လုပ်ငန်း တစ်ခုဖြစ်သော
(၁၀)မိုင် ရှည်လျားသော (၂၃၀)ဧကခွဲ သန်လျင်-သီလဝါလမ်း တစ်လျှောက် တွင် လမ်းဘေးဝဲ/ယာ
(၉၅)ပေအကွာနှင့် သီလဝါအထူးစီးပွားရေး ဇုန် အရှေ့ တွင် ဒဂုံ-သီလဝါ လမ်းဘေးတစ်လျှောက်ရှိ
ဆောက်လုပ်ရေးလုပ်ငန်းလုပ်ကိုင်မည့် နယ်နိမိတ် အတွင်းတွင် ကျရောက်ကာ မလွတ်ကင်းသော
အော်ရီးရှား(၃၄)ပင်ကို ဖယ်ရှားရန် လိုအပ် သောကြောင့် ရန်ကုန်တိုင်းဒေသကြီးအစိုးရအဖွဲ့၏
သဘောထားမှတ်ချက်ပေါ် သိရှိ ကြပ်မတ် ဆောင်ရွက်နိုင်ပါရန်နှင့် အပင်ပျက်စီးမှုအတွက်
ရင်စို့လုံးပတ်(၁)ပေနှင့်အထက်အော်ရီးရှား သစ်ပင်များအတွက်(၁)ပင်လျှင် ၇၅၀၀ နှုန်းလျော် ကြေး
ပေးဆောင်ပြီးမှ ခုတ်လှဲ စေရန်၊ ခုတ်လှဲပြီးအော်ရီးရှားသစ်ပင်များကို ထင်းအဖြစ်အသုံးပြုလိုပါ
က(၁၀၀၀)နှုန်းဖြင့် အခွန်တော်ကောက်သွားရန်နှင့်မယူလိုပါက စုပုံပြီး ဒေသခံပြည်သူများသို့ အခမဲ့
ဖြန့်ဝေ၍ ဓါတ်ပုံမှတ်တမ်းနှင့်အတူပြန်လည် တင်ပြရန် အကြောင်းကြားလာပါသည်။

၂။ သို့ဖြစ်ပါ၍ ၂၃၀ ကေဠီ သန်လျင်-သီလဝါလမ်းတစ်လျှောက်ရှိ ဆောက်လုပ်ရေး လုပ်ငန်း လုပ်ကိုင်မည့် နယ်နိမိတ်အတွင်း ကျရောက်၍ မလွတ်ကင်းသော အော်ရီရှား (၃၄)ပင် အနက် လုံးပတ်(၁)ပေအထက် အော်ရီရှား(၃၀)ပင်အား တစ်ပင်လျှင် (၇၅၀၀)ကျပ် ခုနှစ်ထောင့် ငါးရာ ကျပ်တိတိနှုန်းဖြင့် (၂၂၅၀၀၀)ကျပ် နှစ်သိန်းနှစ်သောင်း ငါးထောင် တိတိ အား အမြန်ပေးသွင်း ပါရန် အကြောင်းကြားပါသည်။

 3.12.2018
(ဖြူဖြူခိုင်)
ဦးစီးအရာရှိ
သစ်တောဦးစီးဌာန၊ သန်လျင်မြို့နယ်

မိတ္တူကို-

- ၁။ လက်ထောက်ညွှန်ကြားရေးမှူး၊ သစ်တောဦးစီးဌာန၊ ရန်ကုန်အနောက်ပိုင်းခရိုင်
- ၂။ ရုံးလက်ခံ
- ၃။ မျောစာတွဲ

ဦး စီး အ ရာ ရှိ ရုံး
 သစ် တော ဦး စီး ဌာ န
 သန် လျင် မြို့ နယ်
 စာအမှတ်-လင/စခ/ဝဝ၂(၁၀၂၁/၁၇)
 ရက်စွဲ။ ၂၀၁၇-ခုနှစ်၊ ဇွန်လ ၁၆ ရက်

သို့

တာဝန်ခံ
 စီမံကိန်းမန်နေဂျာရုံ(၁)
 အမှတ်(၃၅)ရုံးအကွက်(၁၀)၊ ဒဂုံ(မြောက်ပိုင်း)မြို့နယ်
 ရန်ကုန်မြို့

အကြောင်းအရာ။ ၂၃၀-ကေဗွီ သန်လျင် - သီလဝါဓါတ်အားလှိုင်း တည်ဆောက်ရေးအတွက် မလွတ်
 ကင်းသော သစ်ပင်များဖယ်ရှားခွင့် ရရှိရေးကိစ္စ။
 ရည် ညွှန်း ချက် ။ (၁) ညွှန်ကြားရေးမှူး၊ သစ်တောဦးစီးဌာန၊ ရန်ကုန်တိုင်းဒေသကြီးရုံး၏ (၁၂.၆.
 ၂၀၁၇)ရက်စွဲပါစာအမှတ်- (၅၄၅၀-၅၁/၂၀၁၇)
 (၂) လက်ထောက်ညွှန်ကြားရေးမှူး၊ သစ်တောဦးစီးဌာန၊ ရန်ကုန်အနောက်ပိုင်း
 ခရိုင်ရုံး၏(၁၄.၆.၂၀၁၇)ရက်စွဲပါစာအမှတ်-လင/စခ/ဝဝ၂(၃၂၀၆/၁၇)

အထက်အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ သန်လျင်မြို့နယ်၊ သီလဝါအထူးစီးပွားရေးဇုန်
 နှင့်သီလဝါဒေသအနီးတစ်ဝိုက်အား ဓါတ်အားဖြန့်ဖြူး ပေးနိုင်ပါရန်အတွက် သီလဝါဓါတ်အား ဖွံ့ဖြိုး
 တိုးတက်ရေးစီမံကိန်းကို အကောင်အထည်ဖော်ဆောင်ရွက်လျက်ရှိရာ အဆိုပါစီမံကိန်း၏ လုပ်ငန်းတစ်
 ခုဖြစ်သော (၁၀)မိုင် ရှည်လျားသော (၂၃၀)ကေဗွီ သန်လျင်-သီလဝါလမ်းတစ်လျှောက်တွင်လမ်းဝဲယာ
 (၉၅)ပေအကွာနှင့်သီလဝါအထူးစီးပွားရေးဇုန်အရှေ့တွင် ဒဂုံ-သီလဝါလမ်းဘေးတစ်လျှောက်ရှိ ဆောက်
 လုပ်ရေးလုပ်ငန်းလုပ်ကိုင်မည့် နယ်နိမိတ်အတွင်းတွင် ကျရောက်သော မလွတ်ကင်းသည့် အော်ရီရှား
 (၃၄)ပင်ကို ဖယ်ရှားရန် လိုအပ်လျက်ရှိပါသောကြောင့် သဘောထားမှတ်ချက်ပြန်ကြားပေးပါရန်နှင့်
 သီလဝါအထူးစီးပွားရေးဇုန်၊ စီမံခန့်ခွဲမှုကော်မတီမှ တင်ပြလာမှုနှင့်စပ်လျဉ်း၍ (၂၅.၅.၂၀၁၇)ရက်နေ့
 တွင် ကျင်းပပြုလုပ်သော ရန်ကုန်တိုင်းဒေသကြီး၊ အစိုးရအဖွဲ့ အစည်းအဝေးအမှတ်စဉ်(၁၉/၂၀၁၇)ဆုံး
 ဖြတ်ချက်အပိုဒ်(၄၅)အရ ဖယ်ရှားခြင်းခံရသော သစ်ပင်များကို စနစ်တကျ ပြန်လည်အစားထိုးစိုက်ပေး
 ရန် ရန်ကုန်တိုင်းဒေသကြီးအစိုးရအဖွဲ့ရုံးမှ ညွှန်ကြားရေးမှူးရုံးသို့ စာမိတ္တူပေးပို့ အကြောင်းကြားလာ
 ပါသည်။

၂။ သို့ဖြစ်ပါ၍ ရန်ကုန်တိုင်းဒေသကြီးအစိုးရအဖွဲ့၏ သဘောထားမှတ်ချက်အပေါ်သိရှိ လိုက်နာ
 ဆောင်ရွက်နိုင်ပါရန်နှင့် အပင်ပျက်စီးမှုအတွက် ရင်စို့လုံးပတ် ၁'နှင့်အထက် သစ်မာပင်များအတွက် (၁)
 ပင်လျှင် ၇၅၀၀/-နှုန်းလျော်ကြေး ပေးဆောင်ပြီးမှ ခုတ်လှဲစေရန်၊ ခုတ်လှဲပြီး အောင်ရီရှားသစ်ပင်
 များကို ထင်း အဖြစ် အသုံးပြုလိုပါက ၁၀၀၀/၃နှုန်းဖြင့် အခွန်တော်သွင်းရန်နှင့်အယူလိုပါက စုပုံပြီး

ဒေသခံပြည်သူများသို့ အခမဲ့ဖြန့်ဝေ၍ ဓါတ်ပုံမှတ်တမ်းနှင့်ပြန်လည်တင်ပြရန် ရည်ညွှန်းပါစာများဖြင့် အကြောင်းကြား လာခြင်းအား သိရှိလိုက်နာဆောင်ရွက်နိုင်ပါရန် ထပ်ဆင့်အကြောင်းကြားလာပါသည်။

Phy ၂၀၂၁/၂၀၂၂
(ဖြူဖြူနိုင်)

ဦးစီးအရာရှိ
သစ်တောဦးစီးဌာန၊ သန်လျင်မြို့နယ်

မိတ္တူကို-
၁။ ရုံးလက်ခံ / မျှောစာတွဲ ။

*Appendix-E: Photo of lamps to be removed
on the central divider of
Dagon-Thilawa Road*

**List of Street Lamps which may Affect construction
of
230 kV Thanlyin - Thilawa Transmission Line.**



Affected Facilities (STREET LAMPS) along the new Thanlyin - Thilawa 230 kV Transmission Line.

Sr. No.	Facilities No.	Quantity of affected facilities	Coordinate		Description and location of Facilities	Materials of Facilities	Tower No.
			N	E			
1	1	1	16°41'8.81"	96°18'32.62"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	61
2	2	1	16°41'6.39"	96°18'27.83"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	62
3	3	1	16°41'3.98"	96°18'23.10"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	63
4	4	1	16°41'1.76"	96°18'18.71"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	64
5	5	1	16°40'59.53"	96°18'14.30"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	65
6	6	1	16°40'57.27"	96°18'9.81"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	66
7	7	1	16°40'53.01"	96°18'1.34"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	68
8	8	1	16°40'50.79"	96°17'56.94"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	69
9	9	1	16°40'48.55"	96°17'52.49"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	70
10	10	1	16°40'46.34"	96°17'48.07"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	71
11	11	1	16°40'44.14"	96°17'43.71"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	72
12	12	1	16°40'42.00"	96°17'39.44"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	73
13	13	1	16°40'35.43"	96°17'26.36"	Old Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.	Concrete	76

* Total affected facilities is 13.

* Affected facilities are encountered on the right position of transmission line route and very close to route within range of ROW.

Figure 2: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**1) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



**2) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



Figure 2: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

3) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.

Not in Use, Needs to be remove before February,2017



4) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.

Not in Use, Needs to be remove before February,2017



Figure 2: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**5) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



**6) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



Figure 2: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**7) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



**8) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



Figure 2: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**9) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



**10) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



Figure 2: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**11) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



**12) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



Figure 2: List of Project Affected Facilities for the construction of 230 kV Thanlyin - Thilawa Transmission Line.

**13) : Street Lamps along the Dagon - Thilawa Road in Thilawa SEZ Area.
Not in Use, Needs to be remove before February,2017**



ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

ဆောက်လုပ်ရေးဝန်ကြီးဌာန

မြို့ပြနှင့်အိမ်ရာဖွံ့ဖြိုးရေးဦးစီးဌာန

စာအမှတ် ဆလရ/မြို့ရာ/သီလဝါ/ ၂၀၁၇(၂၀၀)

ရက်စွဲ ၂၀၁၇ခုနှစ်၊ဖေဖော်ဝါရီလ(၃)ရက်

သို့

ဒုတိယညွှန်ကြားရေးမှူး(စက်/လျှပ်)

စီမံကိန်းမန်နေဂျာရုံး(၁)၊ ရန်ကုန်


လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန

အကြောင်းအရာ။ ၂၃၀ကေဗွီ၊ သန်လျင်-သီလဝါ ဓာတ်အားလိုင်းတည်ဆောက်ရေးနှင့်မလွတ်ကင်းသည့် လမ်းမီးတိုင်နှင့် ကွန်ကရစ်ဆိုင်းဘုတ်များကိစ္စ

ရည်ညွှန်းချက် ဒုတိယညွှန်ကြားရေးမှူး(စက်/လျှပ်)၊ စီမံကိန်းမန်နေဂျာရုံး(၁)၊ ရန်ကုန်၊ လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန၏ (၂၀-၁-၂၀၁၇)ရက်စွဲပါစာအမှတ် ၁၁၄/စီဂျာ(၁)လှိုင်း

သီလဝါ အထူးစီးပွားရေးဇုန်နှင့် သီလဝါဒေသ အနီးပတ်ဝန်းကျင်အား ဓာတ်အားဖြန့်ဖြူး ပေးနိုင်ရန်အတွက် လျှပ်စစ်နှင့် စွမ်းအားဝန်ကြီးဌာနမှ ဆောက်လုပ်မည့် ၂၃၀ကေဗွီ၊ သန်လျင်- သီလဝါ ဓာတ်အားလိုင်းအား မြို့ပြနှင့်အိမ်ရာဖွံ့ဖြိုးရေးဦးစီးဌာနမှ ဆောင်ရွက်ခဲ့သည့် သီလဝါလမ်း(ဖွံ့ဖြိုးရေးလမ်း)ပေါ်ရှိ လမ်းလယ်ကျွန်း တလျှောက်တွင် ဆောင်ရွက်နိုင်စေရန် အောက်ဖော်ပြပါ လုပ်ငန်းများ ဆောင်ရွက်ပေးမည် ဆိုပါက ကန့်ကွက်ရန်မရှိကြောင်း ပြန်ကြားအပ်ပါသည်-

- (က) လမ်းလယ်ကျွန်းပေါ်တွင် သွယ်တန်းတည်ဆောက်ထားသော လမ်းမီးတိုင် (၈၅)တိုင်အား စနစ်တကျ ဖြုတ်သိမ်းပေးရန်
- (ခ) ကွန်ကရစ်ဆိုင်းဘုတ်အား တတ်နိုင်သမျှ မပျက်စီးအောင်ဆောင်ရွက်ရန်နှင့် ပျက်စီးပါက အသစ်ပြန်ဆောင်ရွက်ပေးရန်


 (မင်းထိန်)
 ညွှန်ကြားရေးမှူးချုပ်

မိတ္တူ

- တွဲဘက်အတွင်းရေးမှူး(၁)၊ သီလဝါ အထူးဖွံ့ဖြိုးရေးဇုန်

*Appendix-F: Crop compensation calculated
by the crop compensation
committee*

ရုံးတံဆိပ်

မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

နစ်နာကြေး နှင့် လျော်ကြေး ပေးဆောင်ရန် တွက်ချက်မှု

မြို့နယ်... တိုင်းဒေသကြီး/ပြည်နယ်၊ ... ခရိုင်၊ ... မြို့နယ်၊ ... ရပ်ကွက်/ကျေးရွာအုပ်စု၊
 ကွင်း/အကွက်အမှတ်နှင့်အမည် ... လုပ်ပိုင်ခွင့်ရသူအမည် ...

စဉ်	လုပ်ပိုင်ခွင့်ရလယ်ယာမြေ			နစ်နာကြေး/သင့်ငွေ								လျော်ကြေး/သင့်ငွေ			သင့်ငွေ စုစုပေါင်း			
	ဦးပိုင် အမှတ်	ဧရိယာ (ဧက)	မြေမျိုး (ဧက)	သိမ်းယူ သည့် ဧရိယာ (ဧက)	စိုက် စေ/ အပင် ရေ	အ ထွက် နှုန်း	စိုက် ထွက် အ ထွက် နှုန်း	တစ်တင်း တန်ဖိုး/ နှုန်း/ တစ်ပင် တန်ဖိုး	သင့်ငွေပေါင်း	မြေ တစ် ဧက တန်ဖိုး	မြေ တန်ဖိုး သင့်ငွေ	အဆောက် အအုံ အမျိုး အစား အရေ အတွက်	အဆောက် အအုံ အညီ အမျိုး အစား အရေ အတွက်	အဆောက် အအုံ အညီ အမျိုး အစား အရေ အတွက်		အဆောက် အအုံ အညီ အမျိုး အစား အရေ အတွက်	အဆောက် အအုံ အညီ အမျိုး အစား အရေ အတွက်	အဆောက် အအုံ အညီ အမျိုး အစား အရေ အတွက်
၁	၂(က)	၂(ခ)	၂(ဂ)	၃	၄(ခ)	၄(ဂ)	၄(ဃ)	၄(င)	၄(စ)	၅(က)	၅(ခ)	၅(ဂ)	၅(ဃ)	၅(င)	၅(စ)	၅(ဆ)	၅(ဇ)	၆
၁	၆၈	၂.၆၅	၂၄	၀.၂၃	၂၀၀၀	၂၅၅	၃၂၀၀	၂၂၀၀၀										

နစ်နာကြေးနှင့် လျော်ကြေးပေးဆောင်ရန် သင့်ငွေစုစုပေါင်း ကျပ် (/-)

စာဖြင့်.....

ရှင်းလင်းချက်။ စာတိုင် ၅(ဆ) = စာတိုင် ၅(ခ) + စာတိုင် ၅(ဃ) + စာတိုင် ၅(စ)

စာတိုင် ၆ = စာတိုင် ၄(စ) + ၅(ဆ)

တွက်ချက်သူ

စိစစ်သူ

ထပ်မံစိစစ်သူ

အတည်ပြုသူ

ဥက္ကဋ္ဌ/အတွင်းရေးမှူး

ဥက္ကဋ္ဌ/အတွင်းရေးမှူး

ဥက္ကဋ္ဌ/အတွင်းရေးမှူး

ဥက္ကဋ္ဌ/အတွင်းရေးမှူး

မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

ခရိုင်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

တိုင်းဒေသကြီး/ပြည်နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

ဗဟိုလယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

မြို့

ခရိုင်

တိုင်းဒေသကြီး/ပြည်နယ်

နေပြည်တော်

ရုံးတံဆိပ်

မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

နစ်နာကြေး နှင့် လျော်ကြေး ပေးဆောင်ရန် တွက်ချက်မှု

မြို့နယ်...-တိုင်းဒေသကြီး/ပြည်နယ်၊ ...-ခရိုင်၊ ...မြို့နယ်၊ ...ရပ်ကွက်/ကျေးရွာအုပ်စု၊
 ကွင်း/အတွက်အမှတ်နှင့်အမည်...-လုပ်ပိုင်ခွင့်ရသူအမည်...-မြို့နယ်...မြေ...မြေ...

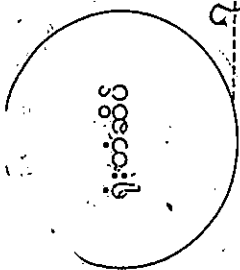
စဉ်	လုပ်ပိုင်ခွင့်ရလယ်ယာမြေ		နစ်နာကြေးသင့်ငွေ						လျော်ကြေးသင့်ငွေ				သင့်ငွေ စုစုပေါင်း					
	ဦးပိုင် အမှတ်	ဧရိယာ (ဧက)	မြေမျိုး	သိမ်းယူ သည့် ဧရိယာ (ဧက)	သီးနှံ အမည်	ရေ	အထွက်နှုန်း	စိုက်ပျိုးရေး အထွက်နှုန်း	တစ်တင်း တန်ဖိုး/ တစ်ပင် တန်ဖိုး	သင့်ငွေပေါင်း	မြေ တစ် ဧက တန်ဖိုး သင့်ငွေ	အဆောက် အအုံ အမျိုးအစား အရေအတွက်		အဆောက် အအုံ အညီ အမျိုးအစား အရေအတွက်	အဆောက် အအုံ အညီ အမျိုးအစား အရေအတွက်	အဆောက် အအုံ အညီ အမျိုးအစား အရေအတွက်	အဆောက် အအုံ အညီ အမျိုးအစား အရေအတွက်	
၁	၂(က)	၂(ခ)	၂(ဂ)	၂	၄(က)	၄(ခ)	၄(ဂ)	၄(ဃ)	၄(င)	၄(စ)	၅(က)	၅(ခ)	၅(ဂ)	၅(ဃ)	၅(င)	၅(စ)	၅(ဆ)	၆
၁	၆၈	၇.၅၅	ပယ်	၀.၁၇	ပယ်	၅၅၀၀	၂၁၀	၂၅	၅၀၀၂၅/-									

နစ်နာကြေးနှင့် လျော်ကြေးပေးဆောင်ရန် သင့်ငွေစုစုပေါင်း ကျပ် (/-)
 စာဖြင့်.....

ရှင်းလင်းချက်။ စာတိုင် ၅(ဆ) = စာတိုင် ၅(ခ) + စာတိုင် ၅(ဃ) + စာတိုင် ၅(စ)
 စာတိုင် ၆ = စာတိုင် ၄(စ) + ၅(ဆ)

တွက်ချက်သူ

စိစစ်သူ
 ထပ်မံစိစစ်သူ
 အတည်ပြုသူ
 ဥက္ကဋ္ဌ/အတွင်းရေးမှူး
 ဥက္ကဋ္ဌ/အတွင်းရေးမှူး
 မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့
 ခရိုင်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့
 တိုင်းဒေသကြီး/ပြည်နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့
 ဗဟိုလယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့
 ခရိုင်...-တိုင်းဒေသကြီး/ပြည်နယ်
 ...-တိုင်းဒေသကြီး/ပြည်နယ်
 ...-တိုင်းဒေသကြီး/ပြည်နယ်
 ...-တိုင်းဒေသကြီး/ပြည်နယ်



မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

နစ်နာကြေး နှင့် လျော်ကြေး ပေးဆောင်ရန် တွက်ချက်မှု

မြို့နယ်... တိုင်းဒေသကြီး/ပြည်နယ်... အစားအပျိုး... ခရိုင်... မြို့နယ်... ရပ်ကွက်/လေးရွာအုပ်စု... (ဒီဇင်ဘာ ၂၀၁၄ ခုနှစ်) မှစ၍ လုပ်ပိုင်ခွင့်ရသူအမည်... မြို့နယ်... လုပ်ပိုင်ခွင့်ရသူအမည်... မြို့နယ်... လုပ်ပိုင်ခွင့်ရသူအမည်... မြို့နယ်... လုပ်ပိုင်ခွင့်ရသူအမည်... မြို့နယ်... လုပ်ပိုင်ခွင့်ရသူအမည်...

စဉ်	ဦးပိုင်အမှတ်	ဧရိယာ (ဧက)	မြေမျိုး	သိမ်းယူသည့် ဧရိယာ (ဧက)	နစ်နာကြေးသင့်ငွေ				လျော်ကြေးသင့်ငွေ					သင့်ငွေ စုစုပေါင်း	
					သီးနှံ အမည်	စိုက် ဧက/အပင် ရေ	အထွက်နှုန်း	စိုက်ရေး အထွက်နှုန်း	စိုက်ရေး အထွက်နှုန်း	စိုက်ရေး အထွက်နှုန်း	အထွက်နှုန်း	အထွက်နှုန်း	အထွက်နှုန်း		အထွက်နှုန်း
၁	၂(က)	၂(ခ)	၂(ဂ)	၃	၄(ခ)	၄(ဃ)	၄(င)	၄(စ)	၅(က)	၅(ခ)	၅(ဃ)	၅(င)	၅(စ)	၅(ဆ)	၆
၂	၁၅/က	၅.၃၅	ဗယ	၀.၂၃	၅၅၀၇၇.၄	၄၅	၅၅၀၇၇.၄	၂၀၈၇၂၅							

နစ်နာကြေးနှင့် လျော်ကြေးပေးဆောင်ရန် သင့်ငွေစုစုပေါင်း ကျပ် (/-)

စာဖြင့်.....

ရှင်းလင်းချက်။ စာတိုင် ၅(ဆ) = စာတိုင် ၅(ခ) + စာတိုင် ၅(ဃ) + စာတိုင် ၅(စ)

စာတိုင် ၆ = စာတိုင် ၄(စ) + ၅(ဆ)

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တွက်ချက်သူ

စိစစ်သူ

ထပ်မံစိစစ်သူ

အတည်ပြုသူ

ဥက္ကဋ္ဌ/အတွင်းရေးမှူး

ဥက္ကဋ္ဌ/အတွင်းရေးမှူး

ဥက္ကဋ္ဌ/အတွင်းရေးမှူး

မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့ ခရိုင်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့ တိုင်းဒေသကြီး/ပြည်နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

ရုံးလုပ်ကြံမြို့

ခရိုင်

တိုင်းဒေသကြီး/ပြည်နယ်

နေပြည်တော်

မြို့နယ်လယ်ယာမြေစိမ့်ခန့်ခွဲမှုအဖွဲ့

နစ်နာကြေး နှင့် လျော်ကြေး ပေးဆောင်ရန် တွက်ချက်မှု

မြို့နယ်/တိုင်းဒေသကြီး/ပြည်နယ်/ပြည်ထောင်စု/မြို့နယ်/ရွာ/အုပ်ချုပ်ရေးအဖွဲ့
 လုပ်ပိုင်ခွင့်ရလယ်ယာမြေ လျော်ကြေး/အထောက်အပံ့အကူပေးရန်အတွက်/ကျေးရွာအုပ်စု
 ကွင်း/အတွက်အမှတ်နှင့်အမည်
 မြို့နယ်အမည်

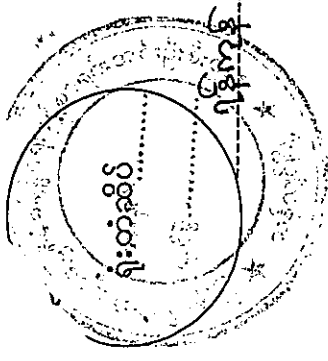
စဉ်	လုပ်ပိုင်ခွင့်ရလယ်ယာမြေ		နစ်နာကြေး/သင့်ငွေ										လျော်ကြေး/သင့်ငွေ		သင့်ငွေ စုစုပေါင်း			
	ဦးပိုင် အမှတ်	ဧရိယာ (ဧက)	မြေမျိုး	သိမ်းယူ သည့် ဧရိယာ (ဧက)	စိုက် စား/ အပင် ရေ	အ ထွက် နှုန်း	စိုက် ထွက်	တစ်တင်း တန်ဖိုး/ နှုန်း/ တစ်ပင် တန်ဖိုး	သင့်ငွေပေါင်း	မြေ တစ် ဧက တန်ဖိုး	မြေ ဝန် ဝန် ဝန်	အထောက် အပံ့ အကူ အရ အတွက်	အထောက် အပံ့ အကူ အရ အတွက်	အထောက် အပံ့ အကူ အရ အတွက်		အထောက် အပံ့ အကူ အရ အတွက်	အထောက် အပံ့ အကူ အရ အတွက်	အထောက် အပံ့ အကူ အရ အတွက်
၁	၂(က)	၂(ခ)	၂(ဂ)	၂	၄(က)	၄(ခ)	၄(ဂ)	၄(ဃ)	၄(င)	၄(စ)	၅(က)	၅(ခ)	၅(ဂ)	၅(ဃ)	၅(င)	၅(စ)	၅(ဆ)	၆
၂	၂(ခ)	၅.၅၂	မယ်	၀.၂၅	၀.၂၅	၅၇၀	၅၇၀	၅၇၀	၅၇၀	၅၇၀	၅၇၀	၅၇၀	၅၇၀	၅၇၀	၅၇၀	၅၇၀	၅၇၀	၅၇၀

နစ်နာကြေးနှင့် လျော်ကြေးပေးဆောင်ရန် သင့်ငွေစုစုပေါင်း ကျပ် (/-)

ရှင်းလင်းချက်။ စာတိုင် ၅(ဆ) = စာတိုင် ၅(ခ) + စာတိုင် ၅(ဃ) + စာတိုင် ၅(စ)
 စာတိုင် ၆ = စာတိုင် ၄(စ) + ၅(ဆ)

တွက်ချက်သူ

စိစစ်သူ
 ထပ်မံစိစစ်သူ
 အတည်ပြုသူ
 ဥက္ကဋ္ဌ/အတွင်းရေးမှူး
 ဥက္ကဋ္ဌ/အတွင်းရေးမှူး
 မြို့နယ်လယ်ယာမြေစိမ့်ခန့်ခွဲမှုအဖွဲ့
 မြို့နယ်လယ်ယာမြေစိမ့်ခန့်ခွဲမှုအဖွဲ့
 မြို့နယ်လယ်ယာမြေစိမ့်ခန့်ခွဲမှုအဖွဲ့
 မြို့နယ်လယ်ယာမြေစိမ့်ခန့်ခွဲမှုအဖွဲ့



မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

နစ်နာကြေး နှင့် လျော်ကြေး ပေးဆောင်ရန် တွက်ချက်မှု

တိုင်းဒေသကြီး/ပြည်နယ်၊ ခရိုင်၊ အနယ်၊ မြို့နယ်၊ အထက် ရပ်ကွက်/ကျေးရွာအုပ်စု၊
 ကွင်း/အကွက်အမှတ်နှင့်အမည် လုပ်ပိုင်ခွင့်ရသူအမည် (ရင်းနှီးမြှုပ်နှံမှု)

စဉ်	ဦးပိုင် အမှတ်	ဧရိယာ (ဧက)	မြေမျိုး	သိမ်းယူ သည့် ဧရိယာ (ဧက)	နစ်နာကြေးသင့်ငွေ					လျော်ကြေးသင့်ငွေ					သင့်ငွေ စုစုပေါင်း		
					သီးနှံ အ မည်	စိုက် ဧက/ အပင် ဧရ	အ ထွက် နှုန်း	စုစု အ ထွက်	တစ်တင်း တန်ဖိုး/ နှုန်း/ တစ်ပင် တန်ဖိုး	သင့်ငွေပေါင်း	မြေ တစ် ဧက တန်ဖိုး	မြေ တန် ဖိုး သင့်ငွေ	အဆောက် အမျိုး အစား အရေ အတွက်	အဆောက် အညီ အတန်း အရေ အတွက်		အဆောက် အညီ အတန်း အရေ အတွက်	အဆောက် အညီ အတန်း အရေ အတွက်
၁	၂(က)	၂(ခ)	၂(ဂ)	၂	၄(စ)	၄(င)	၄(ဆ)	၄(ဇ)	၄(ဇ)	၄(ဇ)	၄(ဇ)	၄(ဇ)	၄(ဇ)	၄(ဇ)	၄(ဇ)	၄(ဆ)	၆
၂	၀၄/က	၈.၅၉	၈၈	၀.၂၇	၀.၂၇	၅၅.၀၀	၄၇၂.၅၅၀၀/-	၂၀၈၇၂/-	၂၀၈၇၂/-	၂၀၈၇၂/-	၂၀၈၇၂/-	၂၀၈၇၂/-	၂၀၈၇၂/-	၂၀၈၇၂/-	၂၀၈၇၂/-	၂၀၈၇၂/-	၂၀၈၇၂/-

နစ်နာကြေးနှင့် လျော်ကြေးပေးဆောင်ရန် သင့်ငွေစုစုပေါင်း ကျပ် (/-) စာဖြင့်.....

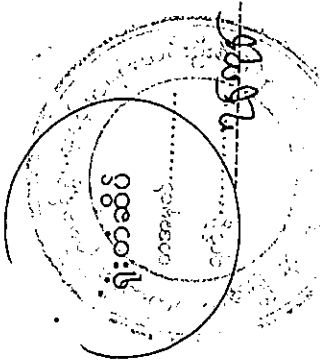
ရှင်းလင်းချက်။ စာတိုင် ၅(ဆ) = စာတိုင် ၅(ခ) + စာတိုင် ၅(ဃ) + စာတိုင် ၅(စ)

စာတိုင် ၆ = စာတိုင် ၄(ခ) + ၅(ဆ)

တွက်ချက်သူ စိတ်သက်သာ

ပြည်ထောင်စုအဖွဲ့ဝင်များ၊
 ဥက္ကဋ္ဌ/အတွင်းရေးမှူး၊
 မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့၊
 ခရိုင်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့၊
 တိုင်းဒေသကြီး/ပြည်နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့၊
 တိုင်းဒေသကြီး/ပြည်နယ်

အတည်ပြုသူ
 ဥက္ကဋ္ဌ/အတွင်းရေးမှူး၊
 မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့၊
 ခရိုင်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့၊
 တိုင်းဒေသကြီး/ပြည်နယ်



မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့

နစ်နာကြေး နှင့် လျော်ကြေး ပေးဆောင်ရန် တွက်ချက်မှု

တိုင်းဒေသကြီး/ပြည်နယ်၊
 ကွင်း/အတွက်အမှတ်နှင့်အမည်
 ရက်စွဲ/ကျေးရွာအုပ်စု၊
 နံပါတ်/အမှတ်
 လုပ်ပိုင်ခွင့်ရသူအမည်
 နံပါတ်/အမှတ်
 လုပ်ပိုင်ခွင့်ရသူအမည်
 နံပါတ်/အမှတ်

စဉ်	လုပ်ပိုင်ခွင့်ရလယ်ယာမြေ				နစ်နာကြေး/သင့်ငွေ										လျော်ကြေး/သင့်ငွေ		သင့်ငွေ စုစုပေါင်း				
	ဦးပိုင် အမှတ်	ဧရိယာ (ဧက)	မြေမျိုး	သိမ်းယူ သည့် ဧရိယာ (ဧက)	သီးနှံ အမည်	စိုက် စေက်/ အပင် ရေ	အ ထွက် နှုန်း	အ စုစုပေါင်း ထွက်	တစ်တင်း တန်ဖိုး/ နှုန်း/ တစ်ပင် တန်ဖိုး	သင့်ငွေပေါင်း	မြေ တစ် ဧက တန်ဖိုး သင့်ငွေ	မြေ တန် ဖိုး သင့်ငွေ	အဆောက် အအုံ အမျိုး အစား အရေ အတွက်	အဆောက် အအုံ အညီ အမျိုး အစား အရေ အတွက်	အဆောက် အအုံ အညီ တန်ဖိုး သင့်ငွေ	အဆောက် အအုံ အညီ တန်ဖိုး သင့်ငွေ		အဆောက် အအုံ အညီ တန်ဖိုး သင့်ငွေ	အဆောက် အအုံ အညီ တန်ဖိုး သင့်ငွေ		
၁	၂(က)	၂(ခ)	၂(ဂ)	၂	၄(က)	၄(ခ)	၄(ဂ)	၄(ဃ)	၄(င)	၄(စ)	၄(ဆ)	၄(ဇ)	၄(ဇာ)	၄(ဇာ)	၄(ဇာ)	၄(ဇာ)	၄(ဇာ)	၄(ဇာ)	၄(ဆ)	၄(ဆ)	၆
၁	၃၄/က	၈၅၉	ကယ	၈၂၃	၈၂၃ (၆၅)	၈၂၃	၈၂၃	၈၂၃	၅၅၀၇၂	၃၄၀၇၂	၃၄၀၇၂	၃၄၀၇၂	၃၄၀၇၂	၃၄၀၇၂	၃၄၀၇၂	၃၄၀၇၂	၃၄၀၇၂	၃၄၀၇၂	၃၄၀၇၂	၃၄၀၇၂	၃၄၀၇၂

နစ်နာကြေးနှင့် လျော်ကြေးပေးဆောင်ရန် သင့်ငွေစုစုပေါင်း ကျပ် (/-)

စာဖြင့်.....

ရှင်းလင်းချက်။ စာတိုင် ၅(ဆ) = စာတိုင် ၅(ခ) + စာတိုင် ၅(ဃ) + စာတိုင် ၅(စ)

စာတိုင် ၆ = စာတိုင် ၄(စ) + ၅(ဆ)

တွက်ချက်သူ

စိစစ်သူ

ထပ်မံစိစစ်သူ

အတည်ပြုသူ
 အတွင်းရေးမှူး
 ဥက္ကဋ္ဌ/အတွင်းရေးမှူး
 မြို့နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့
 နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့
 တိုင်းဒေသကြီး/ပြည်နယ်လယ်ယာမြေစီမံခန့်ခွဲမှုအဖွဲ့
 တိုင်းဒေသကြီး/ပြည်နယ်
 ရှင်းလင်းချက်